

Hosting Environment (Daemon)

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Contents

1	Namespace Index	1
1.1	Namespace List	1
2	Data Structure Index	3
2.1	Class Hierarchy	3
3	Data Structure Index	11
3.1	Data Structures	11
4	File Index	19
4.1	File List	19
5	Namespace Documentation	23
5.1	Arc Namespace Reference	23
5.1.1	Detailed Description	36
5.1.2	Typedef Documentation	36
5.1.2.1	AttrConstIter	36
5.1.2.2	AttrIter	37
5.1.2.3	AttrMap	37
5.1.2.4	get_plugin_instance	37
5.1.3	Enumeration Type Documentation	37
5.1.3.1	LogFormat	37
5.1.3.2	LogLevel	37
5.1.3.3	StatusKind	38
5.1.3.4	WSAFault	38
5.1.4	Function Documentation	38
5.1.4.1	addVOMSAC	38
5.1.4.2	ContentFromPayload	39
5.1.4.3	CreateThreadFunction	39
5.1.4.4	createVOMSAC	39
5.1.4.5	FileOpen	39
5.1.4.6	final_xmlsec	39
5.1.4.7	get_cert_str	39
5.1.4.8	get_key_from_certfile	40
5.1.4.9	get_key_from_certstr	40
5.1.4.10	get_key_from_keyfile	40
5.1.4.11	get_key_from_keystri	40
5.1.4.12	get_node	40
5.1.4.13	get_property	40

5.1.4.14	GUID	40
5.1.4.15	init_xmlsec	40
5.1.4.16	istring_to_level	40
5.1.4.17	load_key_from_certfile	41
5.1.4.18	load_key_from_certstr	41
5.1.4.19	load_key_from_keyfile	41
5.1.4.20	load_trusted_cert_file	41
5.1.4.21	load_trusted_cert_str	41
5.1.4.22	load_trusted_certs	41
5.1.4.23	MatchXMLName	41
5.1.4.24	MatchXMLName	42
5.1.4.25	MatchXMLName	42
5.1.4.26	MatchXMLNamespace	42
5.1.4.27	MatchXMLNamespace	42
5.1.4.28	MatchXMLNamespace	42
5.1.4.29	OpenSSLInit	42
5.1.4.30	operator<<	42
5.1.4.31	operator<<	42
5.1.4.32	operator<<	42
5.1.4.33	parseVOMSAC	43
5.1.4.34	parseVOMSAC	44
5.1.4.35	passphrase_callback	44
5.1.4.36	string	44
5.1.4.37	TimeStamp	44
5.1.4.38	TimeStamp	44
5.1.4.39	TmpDirCreate	44
5.1.4.40	VOMSDecode	44
5.1.4.41	WSAFaultAssign	45
5.1.4.42	WSAFaultExtract	45
5.1.5	Variable Documentation	45
5.1.5.1	CredentialLogger	45
5.1.5.2	plugins_table_name	45
5.1.5.3	thread_stacksize	45
5.2	ArcCredential Namespace Reference	45
5.2.1	Detailed Description	46
5.2.2	Enumeration Type Documentation	46
5.2.2.1	certType	46
6	Data Structure Documentation	49
6.1	ArcCredential::ACACI Struct Reference	49
6.2	ArcCredential::ACATTHOLDER Struct Reference	49
6.3	ArcCredential::ACATTR Struct Reference	49
6.4	ArcCredential::ACATTRIBUTE Struct Reference	49
6.5	ArcCredential::ACC Struct Reference	49
6.6	ArcCredential::ACCERTS Struct Reference	50
6.7	ArcCredential::ACDIGEST Struct Reference	50
6.8	ArcCredential::ACFORM Struct Reference	50
6.9	ArcCredential::ACFULLATTRIBUTES Struct Reference	50
6.10	ArcCredential::ACHOLDER Struct Reference	50
6.11	ArcCredential::ACIETFATTR Struct Reference	50

6.12	ArcCredential::ACINFO Struct Reference	51
6.13	ArcCredential::ACIS Struct Reference	51
6.14	ArcCredential::ACSEQ Struct Reference	51
6.15	ArcCredential::ACTARGET Struct Reference	51
6.16	ArcCredential::ACTARGETS Struct Reference	51
6.17	ArcCredential::ACVAL Struct Reference	51
6.18	Arc::Adler32Sum Class Reference	51
6.18.1	Detailed Description	52
6.19	ArcSec::AlgFactory Class Reference	52
6.19.1	Detailed Description	52
6.19.2	Member Function Documentation	53
6.19.2.1	createAlg	53
6.20	ArcSec::AnyURIAttribute Class Reference	53
6.20.1	Member Function Documentation	53
6.20.1.1	encode	53
6.20.1.2	equal	54
6.20.1.3	getId	54
6.20.1.4	getType	54
6.21	Arc::ApplicationEnvironment Class Reference	54
6.21.1	Detailed Description	54
6.22	Arc::ApplicationType Class Reference	55
6.23	Arc::ArcLocation Class Reference	55
6.23.1	Detailed Description	55
6.23.2	Member Function Documentation	55
6.23.2.1	GetPlugins	55
6.23.2.2	Init	55
6.24	ArcSec::ArcPeriod Struct Reference	56
6.25	Arc::ARCPolicyHandlerConfig Class Reference	56
6.26	ArcSec::Attr Struct Reference	56
6.26.1	Detailed Description	56
6.27	ArcSec::AttributeFactory Class Reference	56
6.27.1	Detailed Description	57
6.28	Arc::AttributeIterator Class Reference	57
6.28.1	Detailed Description	58
6.28.2	Constructor & Destructor Documentation	58
6.28.2.1	AttributeIterator	58
6.28.2.2	AttributeIterator	58
6.28.3	Member Function Documentation	58
6.28.3.1	hasMore	58
6.28.3.2	key	59
6.28.3.3	operator*	59
6.28.3.4	operator++	59
6.28.3.5	operator++	59
6.28.3.6	operator->	59
6.28.4	Friends And Related Function Documentation	59
6.28.4.1	MessageAttributes	59
6.28.5	Field Documentation	60
6.28.5.1	current_	60
6.28.5.2	end_	60
6.29	ArcSec::AttributeProxy Class Reference	60

6.29.1	Detailed Description	60
6.29.2	Member Function Documentation	61
6.29.2.1	getAttribute	61
6.30	ArcSec::AttributeValue Class Reference	61
6.30.1	Detailed Description	62
6.30.2	Member Function Documentation	62
6.30.2.1	encode	62
6.30.2.2	equal	62
6.30.2.3	getId	62
6.30.2.4	getType	63
6.31	ArcSec::Attrs Class Reference	63
6.31.1	Detailed Description	63
6.32	ArcSec::AuthzRequest Struct Reference	63
6.33	ArcSec::AuthzRequestSection Struct Reference	63
6.33.1	Detailed Description	63
6.34	Arc::AutoPointer< T > Class Template Reference	64
6.34.1	Detailed Description	64
6.35	Arc::Base64 Class Reference	64
6.36	Arc::BaseConfig Class Reference	65
6.36.1	Detailed Description	65
6.36.2	Member Function Documentation	65
6.36.2.1	AddCAdir	65
6.36.2.2	AddCAFile	65
6.36.2.3	AddCertificate	65
6.36.2.4	AddOverlay	66
6.36.2.5	AddPluginsPath	66
6.36.2.6	AddPrivateKey	66
6.36.2.7	AddProxy	66
6.36.2.8	GetOverlay	66
6.36.2.9	MakeConfig	66
6.37	ArcSec::BooleanAttribute Class Reference	66
6.37.1	Member Function Documentation	67
6.37.1.1	encode	67
6.37.1.2	equal	67
6.37.1.3	getId	67
6.37.1.4	getType	67
6.38	Arc::Broker Class Reference	67
6.38.1	Member Function Documentation	68
6.38.1.1	GetBestTarget	68
6.38.1.2	PreFilterTargets	68
6.38.1.3	SortTargets	69
6.38.2	Field Documentation	69
6.38.2.1	PossibleTargets	69
6.39	Arc::BrokerLoader Class Reference	69
6.39.1	Detailed Description	70
6.39.2	Constructor & Destructor Documentation	70
6.39.2.1	BrokerLoader	70
6.39.2.2	~BrokerLoader	70
6.39.3	Member Function Documentation	70
6.39.3.1	GetBrokers	70

6.39.3.2	load	70
6.40	Arc::BrokerPluginArgument Class Reference	71
6.41	Arc::ByteArray Class Reference	71
6.42	Arc::CacheParameters Struct Reference	71
6.42.1	Detailed Description	71
6.43	ArcCredential::cert_verify_context Struct Reference	71
6.44	Arc::CertEnvLocker Class Reference	71
6.45	Arc::ChainContext Class Reference	72
6.45.1	Detailed Description	72
6.45.2	Member Function Documentation	72
6.45.2.1	operator PluginsFactory *	72
6.46	Arc::Checksum Class Reference	72
6.46.1	Detailed Description	73
6.47	Arc::ChecksumAny Class Reference	73
6.47.1	Detailed Description	73
6.48	Arc::CIStrngValue Class Reference	73
6.48.1	Detailed Description	74
6.48.2	Constructor & Destructor Documentation	74
6.48.2.1	CIStrngValue	74
6.48.2.2	CIStrngValue	74
6.48.2.3	CIStrngValue	74
6.48.3	Member Function Documentation	74
6.48.3.1	equal	74
6.48.3.2	operator bool	74
6.49	Arc::ClassLoader Class Reference	75
6.50	Arc::ClassLoaderPluginArgument Class Reference	75
6.51	Arc::ClientHTTP Class Reference	75
6.51.1	Detailed Description	76
6.52	Arc::ClientHTTPwithSAML2SSO Class Reference	76
6.52.1	Constructor & Destructor Documentation	76
6.52.1.1	ClientHTTPwithSAML2SSO	76
6.52.2	Member Function Documentation	76
6.52.2.1	process	76
6.53	Arc::ClientInterface Class Reference	77
6.53.1	Detailed Description	77
6.54	Arc::ClientSOAP Class Reference	77
6.54.1	Detailed Description	78
6.54.2	Constructor & Destructor Documentation	78
6.54.2.1	ClientSOAP	78
6.54.3	Member Function Documentation	78
6.54.3.1	AddSecHandler	78
6.54.3.2	GetEntry	78
6.54.3.3	Load	79
6.54.3.4	process	79
6.54.3.5	process	79
6.55	Arc::ClientSOAPwithSAML2SSO Class Reference	79
6.55.1	Constructor & Destructor Documentation	79
6.55.1.1	ClientSOAPwithSAML2SSO	79
6.55.2	Member Function Documentation	80
6.55.2.1	process	80

6.55.2.2	process	80
6.56	Arc::ClientTCP Class Reference	80
6.56.1	Detailed Description	80
6.57	Arc::ClientX509Delegation Class Reference	81
6.57.1	Constructor & Destructor Documentation	81
6.57.1.1	ClientX509Delegation	81
6.57.2	Member Function Documentation	81
6.57.2.1	acquireDelegation	81
6.57.2.2	createDelegation	82
6.58	ArcSec::CombiningAlg Class Reference	82
6.58.1	Detailed Description	82
6.58.2	Member Function Documentation	83
6.58.2.1	combine	83
6.58.2.2	getalgId	83
6.59	Arc::Config Class Reference	83
6.59.1	Detailed Description	84
6.59.2	Constructor & Destructor Documentation	84
6.59.2.1	Config	84
6.59.2.2	Config	84
6.59.2.3	Config	84
6.59.2.4	Config	84
6.59.2.5	Config	85
6.59.2.6	Config	85
6.59.3	Member Function Documentation	85
6.59.3.1	getFileName	85
6.59.3.2	parse	85
6.59.3.3	print	85
6.59.3.4	save	85
6.59.3.5	setFileName	85
6.60	Arc::ConfusaCertHandler Class Reference	85
6.60.1	Detailed Description	86
6.60.2	Constructor & Destructor Documentation	86
6.60.2.1	ConfusaCertHandler	86
6.60.3	Member Function Documentation	86
6.60.3.1	createCertRequest	86
6.60.3.2	getCertRequestB64	86
6.61	Arc::ConfusaParserUtils Class Reference	86
6.61.1	Detailed Description	87
6.61.2	Member Function Documentation	87
6.61.2.1	destroy_doc	87
6.61.2.2	evaluate_path	87
6.61.2.3	extract_body_information	87
6.61.2.4	get_doc	87
6.61.2.5	handle_redirect_step	87
6.61.2.6	urlencode	87
6.61.2.7	urlencode_params	88
6.62	Arc::CountedPointer< T > Class Template Reference	88
6.62.1	Detailed Description	88
6.63	Arc::Counter Class Reference	89
6.63.1	Detailed Description	90

6.63.2	Member Typedef Documentation	91
6.63.2.1	IDType	91
6.63.3	Constructor & Destructor Documentation	91
6.63.3.1	Counter	91
6.63.3.2	~Counter	91
6.63.4	Member Function Documentation	91
6.63.4.1	cancel	91
6.63.4.2	changeExcess	92
6.63.4.3	changeLimit	92
6.63.4.4	extend	92
6.63.4.5	getCounterTicket	93
6.63.4.6	getCurrentTime	93
6.63.4.7	getExcess	93
6.63.4.8	getExpirationReminder	94
6.63.4.9	getExpiryTime	94
6.63.4.10	getLimit	94
6.63.4.11	getValue	95
6.63.4.12	reserve	95
6.63.4.13	setExcess	95
6.63.4.14	setLimit	96
6.64	Arc::CounterTicket Class Reference	96
6.64.1	Detailed Description	97
6.64.2	Constructor & Destructor Documentation	97
6.64.2.1	CounterTicket	97
6.64.3	Member Function Documentation	97
6.64.3.1	cancel	97
6.64.3.2	extend	97
6.64.3.3	isValid	98
6.65	Arc::CRC32Sum Class Reference	98
6.65.1	Detailed Description	98
6.66	Arc::Credential Class Reference	98
6.66.1	Constructor & Destructor Documentation	100
6.66.1.1	Credential	100
6.66.1.2	Credential	100
6.66.1.3	Credential	100
6.66.1.4	Credential	100
6.66.1.5	Credential	101
6.66.1.6	Credential	101
6.66.2	Member Function Documentation	102
6.66.2.1	AddCertExtObj	102
6.66.2.2	AddExtension	102
6.66.2.3	AddExtension	102
6.66.2.4	GenerateEECRequest	102
6.66.2.5	GenerateEECRequest	102
6.66.2.6	GenerateEECRequest	103
6.66.2.7	GenerateRequest	103
6.66.2.8	GenerateRequest	103
6.66.2.9	GenerateRequest	103
6.66.2.10	GetCert	103
6.66.2.11	GetCertNumofChain	103

6.66.2.12	GetCertReq	103
6.66.2.13	GetDN	103
6.66.2.14	GetEndTime	103
6.66.2.15	getFormat	104
6.66.2.16	GetIdentityName	104
6.66.2.17	GetLifeTime	104
6.66.2.18	GetPrivKey	104
6.66.2.19	GetProxyPolicy	104
6.66.2.20	GetPubKey	104
6.66.2.21	GetStartTime	104
6.66.2.22	GetType	104
6.66.2.23	GetVerification	104
6.66.2.24	InitProxyCertInfo	104
6.66.2.25	InquireRequest	105
6.66.2.26	InquireRequest	105
6.66.2.27	InquireRequest	105
6.66.2.28	IsCredentialsValid	105
6.66.2.29	IsValid	105
6.66.2.30	LogError	105
6.66.2.31	OutputCertificate	105
6.66.2.32	OutputCertificateChain	106
6.66.2.33	OutputPrivateKey	106
6.66.2.34	OutputPublicKey	106
6.66.2.35	SetLifeTime	106
6.66.2.36	SetProxyPolicy	106
6.66.2.37	SetStartTime	106
6.66.2.38	SignEECRequest	106
6.66.2.39	SignEECRequest	107
6.66.2.40	SignEECRequest	107
6.66.2.41	SignRequest	107
6.66.2.42	SignRequest	107
6.66.2.43	SignRequest	107
6.66.2.44	STACK_OF	107
6.67	Arc::CredentialError Class Reference	108
6.67.1	Detailed Description	108
6.67.2	Constructor & Destructor Documentation	108
6.67.2.1	CredentialError	108
6.68	Arc::CredentialStore Class Reference	108
6.68.1	Detailed Description	108
6.69	Arc::Database Class Reference	109
6.69.1	Detailed Description	109
6.69.2	Constructor & Destructor Documentation	109
6.69.2.1	Database	109
6.69.2.2	Database	109
6.69.2.3	Database	109
6.69.2.4	~Database	110
6.69.3	Member Function Documentation	110
6.69.3.1	close	110
6.69.3.2	connect	110
6.69.3.3	enable_ssl	110

6.69.3.4	isconnected	110
6.69.3.5	shutdown	111
6.70	Arc::DataBuffer Class Reference	111
6.70.1	Detailed Description	112
6.70.2	Constructor & Destructor Documentation	112
6.70.2.1	DataBuffer	112
6.70.2.2	DataBuffer	112
6.70.3	Member Function Documentation	113
6.70.3.1	add	113
6.70.3.2	buffer_size	113
6.70.3.3	checksum_object	113
6.70.3.4	checksum_valid	113
6.70.3.5	eof_read	113
6.70.3.6	eof_read	114
6.70.3.7	eof_write	114
6.70.3.8	eof_write	114
6.70.3.9	error	114
6.70.3.10	error_read	114
6.70.3.11	error_write	114
6.70.3.12	for_read	114
6.70.3.13	for_read	115
6.70.3.14	for_write	115
6.70.3.15	for_write	115
6.70.3.16	is_notwritten	115
6.70.3.17	is_notwritten	115
6.70.3.18	is_read	115
6.70.3.19	is_read	116
6.70.3.20	is_written	116
6.70.3.21	is_written	116
6.70.3.22	set	116
6.70.3.23	wait_any	117
6.71	Arc::DataCallback Class Reference	117
6.71.1	Detailed Description	117
6.72	Arc::DataHandle Class Reference	117
6.72.1	Detailed Description	117
6.73	Arc::DataMover Class Reference	117
6.73.1	Detailed Description	118
6.73.2	Member Function Documentation	118
6.73.2.1	checks	118
6.73.2.2	checks	118
6.73.2.3	force_to_meta	119
6.73.2.4	secure	119
6.73.2.5	set_default_max_inactivity_time	119
6.73.2.6	set_default_min_average_speed	119
6.73.2.7	set_default_min_speed	119
6.73.2.8	Transfer	119
6.73.2.9	Transfer	120
6.73.2.10	verbose	120
6.74	Arc::DataPoint Class Reference	120
6.74.1	Detailed Description	123

6.74.2	Member Enumeration Documentation	123
6.74.2.1	DataPointAccessLatency	123
6.74.2.2	DataPointInfoType	123
6.74.3	Constructor & Destructor Documentation	124
6.74.3.1	DataPoint	124
6.74.4	Member Function Documentation	124
6.74.4.1	AddChecksumObject	124
6.74.4.2	AddLocation	124
6.74.4.3	Check	124
6.74.4.4	CompareLocationMetadata	125
6.74.4.5	CompareMeta	125
6.74.4.6	CurrentLocationMetadata	125
6.74.4.7	FinishReading	125
6.74.4.8	FinishWriting	125
6.74.4.9	GetFailureReason	126
6.74.4.10	List	126
6.74.4.11	NextLocation	126
6.74.4.12	Passive	126
6.74.4.13	PostRegister	127
6.74.4.14	PrepareReading	127
6.74.4.15	PrepareWriting	127
6.74.4.16	PreRegister	128
6.74.4.17	PreUnregister	128
6.74.4.18	ProvidesMeta	129
6.74.4.19	Range	129
6.74.4.20	ReadOutOfOrder	129
6.74.4.21	Registered	129
6.74.4.22	Resolve	129
6.74.4.23	SetAdditionalChecks	129
6.74.4.24	SetMeta	130
6.74.4.25	SetSecure	130
6.74.4.26	SetURL	130
6.74.4.27	SortLocations	130
6.74.4.28	StartReading	131
6.74.4.29	StartWriting	131
6.74.4.30	Stat	131
6.74.4.31	StopReading	132
6.74.4.32	StopWriting	132
6.74.4.33	TransferLocations	132
6.74.4.34	Unregister	132
6.74.4.35	WriteOutOfOrder	132
6.74.5	Field Documentation	133
6.74.5.1	valid_url_options	133
6.75	Arc::DataPointDirect Class Reference	133
6.75.1	Detailed Description	134
6.75.2	Member Function Documentation	134
6.75.2.1	AddChecksumObject	134
6.75.2.2	AddLocation	135
6.75.2.3	CompareLocationMetadata	135
6.75.2.4	CurrentLocationMetadata	135

6.75.2.5	NextLocation	135
6.75.2.6	Passive	135
6.75.2.7	PostRegister	136
6.75.2.8	PreRegister	136
6.75.2.9	PreUnregister	136
6.75.2.10	ProvidesMeta	136
6.75.2.11	Range	137
6.75.2.12	ReadOutOfOrder	137
6.75.2.13	Registered	137
6.75.2.14	Resolve	137
6.75.2.15	SetAdditionalChecks	137
6.75.2.16	SetSecure	138
6.75.2.17	SortLocations	138
6.75.2.18	Unregister	138
6.75.2.19	WriteOutOfOrder	138
6.76	Arc::DataPointIndex Class Reference	138
6.76.1	Detailed Description	140
6.76.2	Member Function Documentation	140
6.76.2.1	AddChecksumObject	140
6.76.2.2	AddLocation	140
6.76.2.3	Check	141
6.76.2.4	CompareLocationMetadata	141
6.76.2.5	CurrentLocationMetadata	141
6.76.2.6	FinishReading	141
6.76.2.7	FinishWriting	142
6.76.2.8	NextLocation	142
6.76.2.9	Passive	142
6.76.2.10	PrepareReading	142
6.76.2.11	PrepareWriting	143
6.76.2.12	ProvidesMeta	143
6.76.2.13	Range	143
6.76.2.14	ReadOutOfOrder	144
6.76.2.15	Registered	144
6.76.2.16	SetAdditionalChecks	144
6.76.2.17	SetMeta	144
6.76.2.18	SetSecure	144
6.76.2.19	SortLocations	145
6.76.2.20	StartReading	145
6.76.2.21	StartWriting	145
6.76.2.22	StopReading	146
6.76.2.23	StopWriting	146
6.76.2.24	TransferLocations	146
6.76.2.25	WriteOutOfOrder	146
6.77	Arc::DataPointLoader Class Reference	146
6.78	Arc::DataPointPluginArgument Class Reference	147
6.79	Arc::DataSpeed Class Reference	147
6.79.1	Detailed Description	148
6.79.2	Constructor & Destructor Documentation	148
6.79.2.1	DataSpeed	148
6.79.2.2	DataSpeed	148

6.79.3	Member Function Documentation	149
6.79.3.1	hold	149
6.79.3.2	set_base	149
6.79.3.3	set_max_data	149
6.79.3.4	set_max_inactivity_time	149
6.79.3.5	set_min_average_speed	149
6.79.3.6	set_min_speed	150
6.79.3.7	set_progress_indicator	150
6.79.3.8	transfer	150
6.79.3.9	verbose	150
6.79.3.10	verbose	150
6.80	Arc::DataStatus Class Reference	151
6.80.1	Detailed Description	151
6.80.2	Member Enumeration Documentation	151
6.80.2.1	DataStatusType	151
6.81	ArcSec::DateAttribute Class Reference	153
6.81.1	Member Function Documentation	153
6.81.1.1	encode	153
6.81.1.2	equal	153
6.81.1.3	getId	153
6.81.1.4	getType	153
6.82	ArcSec::DateTimeAttribute Class Reference	154
6.82.1	Detailed Description	154
6.82.2	Member Function Documentation	154
6.82.2.1	encode	154
6.82.2.2	equal	154
6.82.2.3	getId	154
6.82.2.4	getType	155
6.83	Arc::DBranch Class Reference	155
6.84	Arc::DelegationConsumer Class Reference	155
6.84.1	Detailed Description	156
6.84.2	Constructor & Destructor Documentation	156
6.84.2.1	DelegationConsumer	156
6.84.2.2	DelegationConsumer	156
6.84.3	Member Function Documentation	156
6.84.3.1	Acquire	156
6.84.3.2	Acquire	156
6.84.3.3	Backup	156
6.84.3.4	Generate	156
6.84.3.5	ID	156
6.84.3.6	LogError	156
6.84.3.7	Request	157
6.84.3.8	Restore	157
6.85	Arc::DelegationConsumerSOAP Class Reference	157
6.85.1	Detailed Description	157
6.85.2	Constructor & Destructor Documentation	158
6.85.2.1	DelegationConsumerSOAP	158
6.85.2.2	DelegationConsumerSOAP	158
6.85.3	Member Function Documentation	158
6.85.3.1	DelegateCredentialsInit	158

6.85.3.2	DelegatedToken	158
6.85.3.3	UpdateCredentials	158
6.85.3.4	UpdateCredentials	158
6.86	Arc::DelegationContainerSOAP Class Reference	158
6.86.1	Detailed Description	159
6.86.2	Member Function Documentation	159
6.86.2.1	DelegateCredentialsInit	159
6.86.2.2	DelegatedToken	159
6.86.2.3	UpdateCredentials	159
6.86.3	Field Documentation	160
6.86.3.1	context_lock_	160
6.86.3.2	max_duration_	160
6.86.3.3	max_size_	160
6.86.3.4	max_usage_	160
6.87	Arc::DelegationProvider Class Reference	160
6.87.1	Detailed Description	161
6.87.2	Constructor & Destructor Documentation	161
6.87.2.1	DelegationProvider	161
6.87.2.2	DelegationProvider	161
6.87.3	Member Function Documentation	161
6.87.3.1	Delegate	161
6.88	Arc::DelegationProviderSOAP Class Reference	161
6.88.1	Detailed Description	162
6.88.2	Constructor & Destructor Documentation	162
6.88.2.1	DelegationProviderSOAP	162
6.88.2.2	DelegationProviderSOAP	162
6.88.3	Member Function Documentation	162
6.88.3.1	DelegateCredentialsInit	162
6.88.3.2	DelegateCredentialsInit	163
6.88.3.3	DelegatedToken	163
6.88.3.4	ID	163
6.88.3.5	UpdateCredentials	163
6.88.3.6	UpdateCredentials	163
6.89	ArcSec::DenyOverridesCombiningAlg Class Reference	163
6.89.1	Detailed Description	164
6.89.2	Member Function Documentation	164
6.89.2.1	combine	164
6.89.2.2	getalgId	164
6.90	Arc::DiskSpaceRequirementType Class Reference	165
6.91	Arc::DItem Class Reference	165
6.92	Arc::DItemString Class Reference	165
6.93	Arc::DNListHandlerConfig Class Reference	165
6.94	ArcSec::DurationAttribute Class Reference	166
6.94.1	Detailed Description	166
6.94.2	Member Function Documentation	166
6.94.2.1	encode	166
6.94.2.2	equal	167
6.94.2.3	getId	167
6.94.2.4	getType	167
6.95	ArcSec::EqualFunction Class Reference	167

6.95.1	Detailed Description	168
6.95.2	Member Function Documentation	168
6.95.2.1	evaluate	168
6.95.2.2	evaluate	168
6.95.2.3	getFunctionName	168
6.96	ArcSec::EvalResult Struct Reference	168
6.96.1	Detailed Description	168
6.97	ArcSec::EvaluationCtx Class Reference	169
6.97.1	Detailed Description	169
6.97.2	Constructor & Destructor Documentation	169
6.97.2.1	EvaluationCtx	169
6.98	ArcSec::Evaluator Class Reference	169
6.98.1	Detailed Description	170
6.98.2	Member Function Documentation	170
6.98.2.1	addPolicy	170
6.98.2.2	addPolicy	170
6.98.2.3	evaluate	170
6.98.2.4	evaluate	171
6.98.2.5	evaluate	171
6.98.2.6	evaluate	171
6.98.2.7	evaluate	171
6.98.2.8	evaluate	171
6.98.2.9	evaluate	171
6.98.2.10	getAlgFactory	171
6.98.2.11	getAttrFactory	171
6.98.2.12	getFnFactory	172
6.98.2.13	getName	172
6.98.2.14	setCombiningAlg	172
6.98.2.15	setCombiningAlg	172
6.99	ArcSec::EvaluatorContext Class Reference	172
6.99.1	Detailed Description	172
6.99.2	Member Function Documentation	173
6.99.2.1	operator AlgFactory *	173
6.99.2.2	operator AttributeFactory *	173
6.99.2.3	operator FnFactory *	173
6.100	ArcSec::EvaluatorLoader Class Reference	173
6.100.1	Detailed Description	173
6.100.2	Member Function Documentation	174
6.100.2.1	getEvaluator	174
6.100.2.2	getEvaluator	174
6.100.2.3	getEvaluator	174
6.100.2.4	getPolicy	174
6.100.2.5	getPolicy	174
6.100.2.6	getRequest	174
6.100.2.7	getRequest	174
6.101	Arc::ExecutableType Class Reference	174
6.102	Arc::ExecutionTarget Class Reference	175
6.102.1	Detailed Description	175
6.102.2	Constructor & Destructor Documentation	175
6.102.2.1	ExecutionTarget	175

6.102.2.2 ExecutionTarget	175
6.102.2.3 ExecutionTarget	176
6.102.3 Member Function Documentation	176
6.102.3.1 GetSubmitter	176
6.102.3.2 operator=	176
6.102.3.3 Print	176
6.102.3.4 SaveToStream	177
6.102.3.5 Update	177
6.102.4 Field Documentation	177
6.102.4.1 ApplicationEnvironments	177
6.102.4.2 ComputingShareName	177
6.102.4.3 FreeSlotsWithDuration	178
6.102.4.4 MaxDiskSpace	178
6.102.4.5 MaxMainMemory	178
6.102.4.6 MaxVirtualMemory	178
6.102.4.7 OperatingSystem	178
6.103Arc::ExpirationReminder Class Reference	179
6.103.1 Detailed Description	179
6.103.2 Member Function Documentation	179
6.103.2.1 getExpiryTime	179
6.103.2.2 getReservationID	179
6.103.2.3 operator<	180
6.104Arc::FileCache Class Reference	180
6.104.1 Detailed Description	181
6.104.2 Constructor & Destructor Documentation	181
6.104.2.1 FileCache	181
6.104.2.2 FileCache	182
6.104.2.3 FileCache	182
6.104.2.4 FileCache	182
6.104.3 Member Function Documentation	182
6.104.3.1 AddDN	182
6.104.3.2 CheckCreated	183
6.104.3.3 CheckDN	183
6.104.3.4 CheckValid	183
6.104.3.5 Copy	183
6.104.3.6 File	184
6.104.3.7 GetCreated	184
6.104.3.8 GetValid	184
6.104.3.9 Link	184
6.104.3.10operator bool	185
6.104.3.11operator==	185
6.104.3.12Release	185
6.104.3.13SetValid	185
6.104.3.14Start	185
6.104.3.15Stop	185
6.104.3.16StopAndDelete	186
6.105FileCacheHash Class Reference	186
6.105.1 Detailed Description	186
6.105.2 Member Function Documentation	186
6.105.2.1 getHash	186

6.105.2.2 maxLength	186
6.106Arc::FileInfo Class Reference	187
6.106.1 Detailed Description	187
6.107Arc::FileLock Class Reference	187
6.107.1 Detailed Description	188
6.107.2 Constructor & Destructor Documentation	188
6.107.2.1 FileLock	188
6.107.3 Member Function Documentation	188
6.107.3.1 acquire	188
6.107.3.2 acquire	189
6.107.3.3 release	189
6.108Arc::FileType Class Reference	189
6.109Arc::FinderLoader Class Reference	189
6.110ArcSec::FnFactory Class Reference	189
6.110.1 Detailed Description	190
6.110.2 Member Function Documentation	190
6.110.2.1 createFn	190
6.111ArcSec::Function Class Reference	190
6.111.1 Detailed Description	191
6.111.2 Member Function Documentation	191
6.111.2.1 evaluate	191
6.111.2.2 evaluate	191
6.112ArcSec::GenericAttribute Class Reference	191
6.112.1 Member Function Documentation	192
6.112.1.1 encode	192
6.112.1.2 equal	192
6.112.1.3 getld	192
6.112.1.4 getType	192
6.113Arc::GlobusResult Class Reference	192
6.114Arc::GSSCredential Class Reference	192
6.115Arc::HakaClient Class Reference	193
6.115.1 Member Function Documentation	193
6.115.1.1 processConsent	193
6.115.1.2 processIdP2Confusa	193
6.115.1.3 processIdPLogin	193
6.116Arc::HTTPClientInfo Struct Reference	194
6.117Arc::InfoCache Class Reference	194
6.117.1 Detailed Description	194
6.117.2 Constructor & Destructor Documentation	194
6.117.2.1 InfoCache	194
6.118Arc::InfoCacheInterface Class Reference	194
6.118.1 Member Function Documentation	195
6.118.1.1 Get	195
6.119Arc::InfoFilter Class Reference	195
6.119.1 Detailed Description	195
6.119.2 Constructor & Destructor Documentation	196
6.119.2.1 InfoFilter	196
6.119.3 Member Function Documentation	196
6.119.3.1 Filter	196
6.119.3.2 Filter	196

6.120Arc::InfoRegister Class Reference	196
6.120.1 Detailed Description	196
6.121Arc::InfoRegisterContainer Class Reference	197
6.121.1 Detailed Description	197
6.121.2 Member Function Documentation	197
6.121.2.1 addRegistrar	197
6.121.2.2 addService	197
6.121.2.3 removeService	197
6.122Arc::InfoRegisters Class Reference	198
6.122.1 Detailed Description	198
6.122.2 Constructor & Destructor Documentation	198
6.122.2.1 InfoRegisters	198
6.123Arc::InfoRegistrar Class Reference	198
6.123.1 Detailed Description	198
6.123.2 Member Function Documentation	199
6.123.2.1 addService	199
6.123.2.2 registration	199
6.124Arc::InformationContainer Class Reference	199
6.124.1 Detailed Description	200
6.124.2 Constructor & Destructor Documentation	200
6.124.2.1 InformationContainer	200
6.124.3 Member Function Documentation	200
6.124.3.1 Acquire	200
6.124.3.2 Assign	200
6.124.3.3 Get	200
6.124.4 Field Documentation	200
6.124.4.1 doc_	200
6.125Arc::InformationInterface Class Reference	201
6.125.1 Detailed Description	201
6.125.2 Constructor & Destructor Documentation	201
6.125.2.1 InformationInterface	201
6.125.3 Member Function Documentation	202
6.125.3.1 Get	202
6.125.4 Field Documentation	202
6.125.4.1 lock_	202
6.126Arc::InformationRequest Class Reference	202
6.126.1 Detailed Description	202
6.126.2 Constructor & Destructor Documentation	202
6.126.2.1 InformationRequest	202
6.126.2.2 InformationRequest	203
6.126.2.3 InformationRequest	203
6.126.2.4 InformationRequest	203
6.126.3 Member Function Documentation	203
6.126.3.1 SOAP	203
6.127Arc::InformationResponse Class Reference	203
6.127.1 Detailed Description	203
6.127.2 Constructor & Destructor Documentation	204
6.127.2.1 InformationResponse	204
6.127.3 Member Function Documentation	204
6.127.3.1 Result	204

6.128Arc::IniConfig Class Reference	204
6.129Arc::initializeCredentialsType Class Reference	204
6.130ArcSec::InRangeFunction Class Reference	204
6.130.1 Member Function Documentation	205
6.130.1.1 evaluate	205
6.130.1.2 evaluate	205
6.131Arc::IntraProcessCounter Class Reference	205
6.131.1 Detailed Description	206
6.131.2 Constructor & Destructor Documentation	206
6.131.2.1 IntraProcessCounter	206
6.131.2.2 ~IntraProcessCounter	206
6.131.3 Member Function Documentation	207
6.131.3.1 cancel	207
6.131.3.2 changeExcess	207
6.131.3.3 changeLimit	207
6.131.3.4 extend	208
6.131.3.5 getExcess	208
6.131.3.6 getLimit	208
6.131.3.7 getValue	208
6.131.3.8 reserve	209
6.131.3.9 setExcess	209
6.131.3.10setLimit	210
6.132Arc::ISIS_description Struct Reference	210
6.133Arc::ISString Class Reference	210
6.134Arc::JobDescriptionParserLoader::iterator Class Reference	210
6.135Arc::Job Class Reference	210
6.135.1 Detailed Description	211
6.135.2 Constructor & Destructor Documentation	211
6.135.2.1 Job	211
6.135.3 Member Function Documentation	211
6.135.3.1 operator=	211
6.135.3.2 Print	212
6.135.3.3 ReadAllJobsFromFile	212
6.135.3.4 RemoveJobsFromFile	213
6.135.3.5 SaveToStream	214
6.135.3.6 ToXML	214
6.135.3.7 WriteJobsToFile	214
6.135.3.8 WriteJobsToFile	215
6.135.3.9 WriteJobsToTruncatedFile	215
6.136Arc::JobController Class Reference	216
6.136.1 Detailed Description	217
6.136.2 Member Function Documentation	217
6.136.2.1 Cat	217
6.136.2.2 Cat	218
6.136.2.3 FillJobStore	218
6.136.2.4 Migrate	218
6.136.2.5 PrintJobStatus	219
6.136.2.6 SaveJobStatusToStream	219
6.137Arc::JobControllerLoader Class Reference	220
6.137.1 Detailed Description	220

6.137.2 Constructor & Destructor Documentation	220
6.137.2.1 JobControllerLoader	220
6.137.2.2 ~JobControllerLoader	221
6.137.3 Member Function Documentation	221
6.137.3.1 GetJobControllers	221
6.137.3.2 load	221
6.138Arc::JobControllerPluginArgument Class Reference	221
6.139Arc::JobDescription Class Reference	222
6.139.1 Member Function Documentation	222
6.139.1.1 GetSourceLanguage	222
6.139.1.2 operator bool	222
6.139.1.3 Parse	223
6.139.1.4 Parse	223
6.139.1.5 Parse	223
6.139.1.6 Print	223
6.139.1.7 SaveToStream	224
6.139.1.8 UnParse	224
6.139.1.9 UnParse	224
6.139.2 Field Documentation	225
6.139.2.1 OtherAttributes	225
6.140Arc::JobDescriptionParser Class Reference	225
6.141Arc::JobDescriptionParserLoader Class Reference	225
6.141.1 Detailed Description	226
6.141.2 Constructor & Destructor Documentation	226
6.141.2.1 JobDescriptionParserLoader	226
6.141.2.2 ~JobDescriptionParserLoader	226
6.141.3 Member Function Documentation	226
6.141.3.1 GetJobDescriptionParsers	226
6.141.3.2 load	226
6.142Arc::JobIdentificationType Class Reference	227
6.143Arc::JobState Class Reference	227
6.143.1 Detailed Description	227
6.144Arc::JobSupervisor Class Reference	227
6.144.1 Detailed Description	228
6.144.2 Constructor & Destructor Documentation	228
6.144.2.1 JobSupervisor	228
6.144.3 Member Function Documentation	228
6.144.3.1 GetJobControllers	228
6.145Arc::LoadableModuleDescription Class Reference	228
6.146Arc::Loader Class Reference	228
6.146.1 Detailed Description	229
6.146.2 Constructor & Destructor Documentation	229
6.146.2.1 Loader	229
6.146.2.2 ~Loader	229
6.146.3 Field Documentation	229
6.146.3.1 factory_	229
6.147Arc::LogDestination Class Reference	230
6.147.1 Detailed Description	230
6.147.2 Constructor & Destructor Documentation	230
6.147.2.1 LogDestination	230

6.147.2.2 LogDestination	230
6.148Arc::LogFile Class Reference	231
6.148.1 Detailed Description	231
6.148.2 Constructor & Destructor Documentation	231
6.148.2.1 LogFile	231
6.148.2.2 LogFile	232
6.148.3 Member Function Documentation	232
6.148.3.1 log	232
6.148.3.2 setBackups	232
6.148.3.3 setMaxSize	232
6.148.3.4 setReopen	232
6.149Arc::Logger Class Reference	233
6.149.1 Detailed Description	233
6.149.2 Constructor & Destructor Documentation	234
6.149.2.1 Logger	234
6.149.2.2 Logger	234
6.149.2.3 ~Logger	234
6.149.3 Member Function Documentation	234
6.149.3.1 addDestination	234
6.149.3.2 addDestinations	235
6.149.3.3 getDestinations	235
6.149.3.4 getRootLogger	235
6.149.3.5 getThreshold	235
6.149.3.6 msg	235
6.149.3.7 msg	236
6.149.3.8 setThreadContext	236
6.149.3.9 setThreshold	236
6.149.3.10setThresholdForDomain	236
6.149.3.11setThresholdForDomain	237
6.150Arc::LoggerContext Class Reference	237
6.150.1 Detailed Description	237
6.151Arc::LoggerFormat Struct Reference	237
6.152Arc::LogMessage Class Reference	237
6.152.1 Detailed Description	238
6.152.2 Constructor & Destructor Documentation	238
6.152.2.1 LogMessage	238
6.152.2.2 LogMessage	238
6.152.3 Member Function Documentation	239
6.152.3.1 getLevel	239
6.152.3.2 setIdentifier	239
6.152.4 Friends And Related Function Documentation	239
6.152.4.1 Logger	239
6.152.4.2 operator<<	239
6.153Arc::LogStream Class Reference	240
6.153.1 Detailed Description	240
6.153.2 Constructor & Destructor Documentation	240
6.153.2.1 LogStream	240
6.153.2.2 LogStream	240
6.153.3 Member Function Documentation	241
6.153.3.1 log	241

6.154ArcSec::MatchFunction Class Reference	241
6.154.1 Detailed Description	242
6.154.2 Member Function Documentation	242
6.154.2.1 evaluate	242
6.154.2.2 evaluate	242
6.154.2.3 getFunctionName	242
6.155Arc::MCC Class Reference	242
6.155.1 Detailed Description	243
6.155.2 Constructor & Destructor Documentation	243
6.155.2.1 MCC	243
6.155.3 Member Function Documentation	244
6.155.3.1 AddSecHandler	244
6.155.3.2 Next	244
6.155.3.3 process	244
6.155.3.4 ProcessSecHandlers	244
6.155.3.5 Unlink	244
6.155.4 Field Documentation	245
6.155.4.1 logger	245
6.155.4.2 next_	245
6.155.4.3 sechandlers_	245
6.156Arc::MCC_Status Class Reference	245
6.156.1 Detailed Description	246
6.156.2 Constructor & Destructor Documentation	246
6.156.2.1 MCC_Status	246
6.156.3 Member Function Documentation	246
6.156.3.1 getExplanation	246
6.156.3.2 getKind	246
6.156.3.3 getOrigin	246
6.156.3.4 isOk	247
6.156.3.5 operator bool	247
6.156.3.6 operator std::string	247
6.156.3.7 operator!	247
6.157Arc::MCCConfig Class Reference	248
6.157.1 Member Function Documentation	248
6.157.1.1 MakeConfig	248
6.158Arc::MCCInterface Class Reference	248
6.158.1 Detailed Description	249
6.158.2 Member Function Documentation	249
6.158.2.1 process	249
6.159Arc::MCCLoader Class Reference	249
6.159.1 Detailed Description	250
6.159.2 Constructor & Destructor Documentation	250
6.159.2.1 MCCLoader	250
6.159.2.2 ~MCCLoader	250
6.159.3 Member Function Documentation	251
6.159.3.1 operator[]	251
6.160Arc::MCCPluginArgument Class Reference	251
6.161Arc::MD5Sum Class Reference	251
6.161.1 Detailed Description	251
6.162Arc::MemoryAllocationException Class Reference	252

6.163Arc::Message Class Reference	252
6.163.1 Detailed Description	252
6.163.2 Constructor & Destructor Documentation	253
6.163.2.1 Message	253
6.163.2.2 Message	253
6.163.2.3 Message	253
6.163.2.4 ~Message	253
6.163.3 Member Function Documentation	253
6.163.3.1 Attributes	253
6.163.3.2 Auth	253
6.163.3.3 AuthContext	253
6.163.3.4 AuthContext	254
6.163.3.5 Context	254
6.163.3.6 Context	254
6.163.3.7 operator=	254
6.163.3.8 Payload	254
6.163.3.9 Payload	254
6.164Arc::MessageAttributes Class Reference	254
6.164.1 Detailed Description	255
6.164.2 Constructor & Destructor Documentation	255
6.164.2.1 MessageAttributes	255
6.164.3 Member Function Documentation	255
6.164.3.1 add	255
6.164.3.2 count	256
6.164.3.3 get	256
6.164.3.4 getAll	256
6.164.3.5 remove	257
6.164.3.6 removeAll	257
6.164.3.7 set	257
6.164.4 Field Documentation	257
6.164.4.1 attributes_	257
6.165Arc::MessageAuth Class Reference	258
6.165.1 Detailed Description	258
6.165.2 Member Function Documentation	258
6.165.2.1 Export	258
6.165.2.2 Filter	258
6.166Arc::MessageAuthContext Class Reference	259
6.166.1 Detailed Description	259
6.167Arc::MessageContext Class Reference	259
6.167.1 Detailed Description	259
6.167.2 Member Function Documentation	260
6.167.2.1 Add	260
6.168Arc::MessageContextElement Class Reference	260
6.168.1 Detailed Description	260
6.169Arc::MessagePayload Class Reference	260
6.169.1 Detailed Description	261
6.170Arc::ModuleDesc Class Reference	261
6.170.1 Detailed Description	261
6.171Arc::ModuleManager Class Reference	261
6.171.1 Detailed Description	262

6.171.2 Constructor & Destructor Documentation	262
6.171.2.1 ModuleManager	262
6.171.3 Member Function Documentation	262
6.171.3.1 find	262
6.171.3.2 findLocation	262
6.171.3.3 load	262
6.171.3.4 makePersistent	262
6.171.3.5 makePersistent	263
6.171.3.6 reload	263
6.171.3.7 setCfg	263
6.171.3.8 unload	263
6.171.3.9 unload	263
6.172Arc::MultiSecAttr Class Reference	263
6.172.1 Detailed Description	264
6.172.2 Member Function Documentation	264
6.172.2.1 Export	264
6.172.2.2 operator bool	264
6.173Arc::MySQLDatabase Class Reference	264
6.173.1 Detailed Description	265
6.173.2 Member Function Documentation	265
6.173.2.1 close	265
6.173.2.2 connect	265
6.173.2.3 enable_ssl	265
6.173.2.4 isconnected	266
6.173.2.5 shutdown	266
6.174Arc::MySQLQuery Class Reference	266
6.174.1 Member Function Documentation	266
6.174.1.1 execute	266
6.174.1.2 get_array	267
6.174.1.3 get_num_columns	267
6.174.1.4 get_num_rows	267
6.174.1.5 get_row	267
6.174.1.6 get_row	267
6.174.1.7 get_row_field	268
6.175Arc::NotificationType Class Reference	268
6.176Arc::NS Class Reference	268
6.177Arc::OAuthConsumer Class Reference	268
6.177.1 Detailed Description	269
6.177.2 Constructor & Destructor Documentation	269
6.177.2.1 OAuthConsumer	269
6.177.3 Member Function Documentation	269
6.177.3.1 approveCSR	269
6.177.3.2 parseDN	270
6.177.3.3 processLogin	270
6.177.3.4 pushCSR	270
6.177.3.5 storeCert	270
6.178Arc::OpenIdpClient Class Reference	270
6.178.1 Member Function Documentation	271
6.178.1.1 processConsent	271
6.178.1.2 processIdP2Confusa	271

6.178.1.3 processIdPLogin	271
6.179Arc::OptionParser Class Reference	271
6.180ArcSec::OrderedCombiningAlg Class Reference	272
6.181passwd Struct Reference	272
6.182Arc::PathIterator Class Reference	272
6.182.1 Detailed Description	272
6.182.2 Constructor & Destructor Documentation	273
6.182.2.1 PathIterator	273
6.182.3 Member Function Documentation	273
6.182.3.1 operator bool	273
6.182.3.2 operator*	273
6.182.3.3 operator++	273
6.182.3.4 operator--	273
6.182.3.5 Rest	273
6.183Arc::PayloadRaw Class Reference	273
6.183.1 Detailed Description	274
6.183.2 Constructor & Destructor Documentation	274
6.183.2.1 PayloadRaw	274
6.183.2.2 ~PayloadRaw	274
6.183.3 Member Function Documentation	274
6.183.3.1 Buffer	274
6.183.3.2 BufferPos	275
6.183.3.3 BufferSize	275
6.183.3.4 Content	275
6.183.3.5 Insert	275
6.183.3.6 Insert	275
6.183.3.7 operator[]	275
6.183.3.8 Size	275
6.183.3.9 Truncate	276
6.184Arc::PayloadRawBuf Struct Reference	276
6.184.1 Field Documentation	276
6.184.1.1 allocated	276
6.184.1.2 length	276
6.184.1.3 size	276
6.185Arc::PayloadRawInterface Class Reference	276
6.185.1 Detailed Description	277
6.185.2 Member Function Documentation	277
6.185.2.1 Buffer	277
6.185.2.2 BufferPos	277
6.185.2.3 BufferSize	278
6.185.2.4 Content	278
6.185.2.5 Insert	278
6.185.2.6 Insert	278
6.185.2.7 operator[]	278
6.185.2.8 Size	278
6.185.2.9 Truncate	279
6.186Arc::PayloadSOAP Class Reference	279
6.186.1 Detailed Description	279
6.186.2 Constructor & Destructor Documentation	279
6.186.2.1 PayloadSOAP	279

6.186.2.2 PayloadSOAP	280
6.186.2.3 PayloadSOAP	280
6.187Arc::PayloadStream Class Reference	280
6.187.1 Detailed Description	281
6.187.2 Constructor & Destructor Documentation	281
6.187.2.1 PayloadStream	281
6.187.2.2 ~PayloadStream	281
6.187.3 Member Function Documentation	281
6.187.3.1 Get	281
6.187.3.2 Get	281
6.187.3.3 Get	281
6.187.3.4 Limit	282
6.187.3.5 operator bool	282
6.187.3.6 operator!	282
6.187.3.7 Pos	282
6.187.3.8 Put	282
6.187.3.9 Put	282
6.187.3.10Put	282
6.187.3.11Size	283
6.187.3.12Timeout	283
6.187.3.13Timeout	283
6.187.4 Field Documentation	283
6.187.4.1 handle_	283
6.187.4.2 seekable_	283
6.188Arc::PayloadStreamInterface Class Reference	283
6.188.1 Detailed Description	284
6.188.2 Member Function Documentation	284
6.188.2.1 Get	284
6.188.2.2 Get	284
6.188.2.3 Get	285
6.188.2.4 Limit	285
6.188.2.5 operator bool	285
6.188.2.6 operator!	285
6.188.2.7 Pos	285
6.188.2.8 Put	285
6.188.2.9 Put	285
6.188.2.10Put	286
6.188.2.11Size	286
6.188.2.12Timeout	286
6.188.2.13Timeout	286
6.189Arc::PayloadWSRF Class Reference	286
6.189.1 Detailed Description	287
6.189.2 Constructor & Destructor Documentation	287
6.189.2.1 PayloadWSRF	287
6.189.2.2 PayloadWSRF	287
6.189.2.3 PayloadWSRF	287
6.190ArcSec::PDP Class Reference	287
6.190.1 Detailed Description	288
6.191ArcSec::PDPCfgContext Class Reference	288
6.192ArcSec::PDPPluginArgument Class Reference	288

6.193Arc::Period Class Reference	288
6.193.1 Constructor & Destructor Documentation	289
6.193.1.1 Period	289
6.193.1.2 Period	289
6.193.1.3 Period	289
6.193.1.4 Period	289
6.193.2 Member Function Documentation	289
6.193.2.1 GetPeriod	289
6.193.2.2 istr	289
6.193.2.3 operator std::string	290
6.193.2.4 operator!=	290
6.193.2.5 operator<	290
6.193.2.6 operator<=	290
6.193.2.7 operator=	290
6.193.2.8 operator=	290
6.193.2.9 operator==	290
6.193.2.10operator>	290
6.193.2.11operator>=	290
6.193.2.12SetPeriod	290
6.194ArcSec::PeriodAttribute Class Reference	291
6.194.1 Detailed Description	291
6.194.2 Member Function Documentation	291
6.194.2.1 encode	291
6.194.2.2 equal	291
6.194.2.3 getId	291
6.194.2.4 getType	292
6.195ArcSec::PermitOverridesCombiningAlg Class Reference	292
6.195.1 Detailed Description	292
6.195.2 Member Function Documentation	292
6.195.2.1 combine	292
6.195.2.2 getalgId	293
6.196Arc::Plexer Class Reference	293
6.196.1 Detailed Description	294
6.196.2 Constructor & Destructor Documentation	294
6.196.2.1 Plexer	294
6.196.2.2 ~Plexer	294
6.196.3 Member Function Documentation	294
6.196.3.1 Next	294
6.196.3.2 process	294
6.196.4 Field Documentation	295
6.196.4.1 logger	295
6.197Arc::PlexerEntry Class Reference	295
6.197.1 Detailed Description	295
6.198Arc::Plugin Class Reference	295
6.198.1 Detailed Description	296
6.199Arc::PluginArgument Class Reference	296
6.199.1 Detailed Description	297
6.199.2 Member Function Documentation	297
6.199.2.1 get_factory	297
6.199.2.2 get_module	298

6.200Arc::PluginDesc Class Reference	298
6.200.1 Detailed Description	298
6.201Arc::PluginDescriptor Struct Reference	298
6.201.1 Detailed Description	298
6.202Arc::PluginsFactory Class Reference	298
6.202.1 Detailed Description	299
6.202.2 Constructor & Destructor Documentation	299
6.202.2.1 PluginsFactory	299
6.202.3 Member Function Documentation	299
6.202.3.1 FilterByKind	299
6.202.3.2 load	300
6.202.3.3 report	300
6.202.3.4 scan	300
6.202.3.5 TryLoad	300
6.203ArcSec::Policy Class Reference	300
6.203.1 Detailed Description	301
6.203.2 Constructor & Destructor Documentation	301
6.203.2.1 Policy	301
6.203.2.2 Policy	301
6.203.3 Member Function Documentation	302
6.203.3.1 addPolicy	302
6.203.3.2 eval	302
6.203.3.3 getEffect	302
6.203.3.4 getEvalName	302
6.203.3.5 getEvalResult	302
6.203.3.6 getName	302
6.203.3.7 make_policy	302
6.203.3.8 setEvalResult	302
6.203.3.9 setEvaluatorContext	303
6.204ArcSec::PolicyStore::PolicyElement Class Reference	303
6.205ArcSec::PolicyParser Class Reference	303
6.205.1 Detailed Description	303
6.205.2 Member Function Documentation	303
6.205.2.1 parsePolicy	303
6.206ArcSec::PolicyStore Class Reference	304
6.206.1 Detailed Description	304
6.206.2 Constructor & Destructor Documentation	304
6.206.2.1 PolicyStore	304
6.207Arc::PrintF< T0, T1, T2, T3, T4, T5, T6, T7 > Class Template Reference	304
6.208Arc::PrintFBase Class Reference	305
6.209Arc::Profile Class Reference	305
6.210ArcCredential::PROXYCERTINFO_st Struct Reference	306
6.211ArcCredential::PROXYPOLICY_st Struct Reference	306
6.212Arc::Query Class Reference	306
6.212.1 Constructor & Destructor Documentation	306
6.212.1.1 Query	306
6.212.1.2 Query	307
6.212.1.3 ~Query	307
6.212.2 Member Function Documentation	307
6.212.2.1 execute	307

6.212.2.2	get_array	307
6.212.2.3	get_num_columns	307
6.212.2.4	get_num_rows	308
6.212.2.5	get_row	308
6.212.2.6	get_row	308
6.212.2.7	get_row_field	308
6.213	Arc::Range< T > Class Template Reference	309
6.214	Arc::Register_Info_Type Struct Reference	309
6.215	Arc::RegisteredService Class Reference	309
6.215.1	Detailed Description	309
6.215.2	Constructor & Destructor Documentation	310
6.215.2.1	RegisteredService	310
6.216	Arc::RegularExpression Class Reference	310
6.216.1	Detailed Description	310
6.216.2	Member Function Documentation	310
6.216.2.1	match	310
6.217	ArcSec::Request Class Reference	311
6.217.1	Detailed Description	311
6.217.2	Constructor & Destructor Documentation	311
6.217.2.1	Request	311
6.217.2.2	Request	312
6.217.3	Member Function Documentation	312
6.217.3.1	addRequestItem	312
6.217.3.2	getEvalName	312
6.217.3.3	getName	312
6.217.3.4	getRequestItems	312
6.217.3.5	make_request	312
6.217.3.6	setAttributeFactory	312
6.217.3.7	setRequestItems	312
6.218	ArcSec::RequestAttribute Class Reference	313
6.218.1	Detailed Description	313
6.218.2	Constructor & Destructor Documentation	313
6.218.2.1	RequestAttribute	313
6.218.3	Member Function Documentation	313
6.218.3.1	duplicate	313
6.219	ArcSec::RequestItem Class Reference	313
6.219.1	Detailed Description	314
6.219.2	Constructor & Destructor Documentation	314
6.219.2.1	RequestItem	314
6.220	ArcSec::RequestTuple Class Reference	314
6.221	Arc::ResourceSlotType Class Reference	314
6.222	Arc::ResourcesType Class Reference	314
6.223	ArcSec::Response Class Reference	314
6.223.1	Detailed Description	315
6.224	ArcSec::ResponseItem Class Reference	315
6.224.1	Detailed Description	315
6.225	ArcSec::ResponseList Class Reference	315
6.226	Arc::Run Class Reference	315
6.226.1	Detailed Description	316
6.226.2	Constructor & Destructor Documentation	316

6.226.2.1	Run	316
6.226.2.2	Run	316
6.226.2.3	~Run	316
6.226.3	Member Function Documentation	317
6.226.3.1	Abandon	317
6.226.3.2	AfterFork	317
6.226.3.3	AssignStderr	317
6.226.3.4	AssignStdin	317
6.226.3.5	AssignStdout	317
6.226.3.6	AssignWorkingDirectory	317
6.226.3.7	CloseStderr	317
6.226.3.8	CloseStdin	317
6.226.3.9	CloseStdout	317
6.226.3.10	KeepStderr	318
6.226.3.11	KeepStdin	318
6.226.3.12	KeepStdout	318
6.226.3.13	Kill	318
6.226.3.14	operator bool	318
6.226.3.15	operator!	318
6.226.3.16	ReadStderr	318
6.226.3.17	ReadStdout	318
6.226.3.18	Result	318
6.226.3.19	Running	319
6.226.3.20	Start	319
6.226.3.21	Wait	319
6.226.3.22	Wait	319
6.226.3.23	WriteStdin	319
6.227	Arc::SAML2LoginClient Class Reference	319
6.227.1	Constructor & Destructor Documentation	320
6.227.1.1	SAML2LoginClient	320
6.227.2	Member Function Documentation	320
6.227.2.1	findSimpleSAMLInstallation	320
6.227.2.2	processLogin	320
6.228	Arc::SAML2SSOHTTPClient Class Reference	320
6.228.1	Member Function Documentation	321
6.228.1.1	approveCSR	321
6.228.1.2	parseDN	321
6.228.1.3	processConsent	321
6.228.1.4	processIdP2Confusa	321
6.228.1.5	processIdPLogin	322
6.228.1.6	processLogin	322
6.228.1.7	pushCSR	322
6.228.1.8	storeCert	322
6.229	Arc::SAMLToken Class Reference	322
6.229.1	Detailed Description	323
6.229.2	Member Enumeration Documentation	324
6.229.2.1	SAMLVersion	324
6.229.3	Constructor & Destructor Documentation	324
6.229.3.1	SAMLToken	324
6.229.3.2	SAMLToken	324

6.229.3.3 ~SAMLToken	325
6.229.4 Member Function Documentation	325
6.229.4.1 Authenticate	325
6.229.4.2 Authenticate	325
6.229.4.3 operator bool	325
6.230Arc::ScalableTime< T > Class Template Reference	325
6.231Arc::ScalableTime< int > Class Template Reference	326
6.232Arc::SecAttr Class Reference	326
6.232.1 Detailed Description	326
6.232.2 Member Function Documentation	327
6.232.2.1 Export	327
6.232.2.2 Export	327
6.232.2.3 Import	327
6.232.2.4 operator bool	327
6.232.2.5 operator!=	327
6.232.2.6 operator==	327
6.233Arc::SecAttrFormat Class Reference	328
6.233.1 Detailed Description	328
6.234Arc::SecAttrValue Class Reference	328
6.234.1 Detailed Description	328
6.234.2 Member Function Documentation	329
6.234.2.1 operator bool	329
6.234.2.2 operator!=	329
6.234.2.3 operator==	329
6.235ArcSec::SecHandler Class Reference	329
6.235.1 Detailed Description	330
6.236Arc::SecHandlerConfig Class Reference	330
6.237ArcSec::SecHandlerConfig Class Reference	330
6.237.1 Detailed Description	330
6.238ArcSec::SecHandlerPluginArgument Class Reference	331
6.239ArcSec::Security Class Reference	331
6.239.1 Detailed Description	331
6.240Arc::Service Class Reference	331
6.240.1 Detailed Description	332
6.240.2 Constructor & Destructor Documentation	333
6.240.2.1 Service	333
6.240.3 Member Function Documentation	333
6.240.3.1 AddSecHandler	333
6.240.3.2 getID	333
6.240.3.3 ProcessSecHandlers	333
6.240.3.4 RegistrationCollector	333
6.240.4 Field Documentation	333
6.240.4.1 logger	333
6.240.4.2 sechandlers_	334
6.241Arc::ServicePluginArgument Class Reference	334
6.242Arc::SimpleCondition Class Reference	334
6.242.1 Detailed Description	335
6.242.2 Member Function Documentation	335
6.242.2.1 broadcast	335
6.242.2.2 lock	335

6.242.2.3	reset	335
6.242.2.4	signal	335
6.242.2.5	signal_nonblock	335
6.242.2.6	unlock	335
6.242.2.7	wait	335
6.242.2.8	wait	335
6.242.2.9	wait_nonblock	335
6.243	Arc::SimpleCounter Class Reference	336
6.243.1	Member Function Documentation	336
6.243.1.1	wait	336
6.244	Arc::SOAPMessage Class Reference	336
6.244.1	Detailed Description	336
6.244.2	Constructor & Destructor Documentation	337
6.244.2.1	SOAPMessage	337
6.244.2.2	SOAPMessage	337
6.244.2.3	SOAPMessage	337
6.244.2.4	~SOAPMessage	337
6.244.3	Member Function Documentation	337
6.244.3.1	Attributes	337
6.244.3.2	Payload	337
6.244.3.3	Payload	337
6.245	Arc::Software Class Reference	337
6.245.1	Detailed Description	339
6.245.2	Member Typedef Documentation	339
6.245.2.1	ComparisonOperator	339
6.245.3	Member Enumeration Documentation	339
6.245.3.1	ComparisonOperatorEnum	339
6.245.4	Constructor & Destructor Documentation	340
6.245.4.1	Software	340
6.245.4.2	Software	340
6.245.4.3	Software	340
6.245.4.4	Software	340
6.245.5	Member Function Documentation	341
6.245.5.1	convert	341
6.245.5.2	empty	341
6.245.5.3	getFamily	341
6.245.5.4	getName	341
6.245.5.5	getVersion	342
6.245.5.6	operator std::string	342
6.245.5.7	operator!=	342
6.245.5.8	operator()	342
6.245.5.9	operator<	343
6.245.5.10	operator<=	343
6.245.5.11	operator==	343
6.245.5.12	operator>	344
6.245.5.13	operator>=	344
6.245.5.14	toString	345
6.245.6	Friends And Related Function Documentation	345
6.245.6.1	operator<<	345
6.245.7	Field Documentation	346

6.245.7.1	VERSIONTOKENS	346
6.246	Arc::SoftwareRequirement Class Reference	346
6.246.1	Detailed Description	347
6.246.2	Constructor & Destructor Documentation	347
6.246.2.1	SoftwareRequirement	347
6.246.2.2	SoftwareRequirement	347
6.246.2.3	SoftwareRequirement	348
6.246.2.4	SoftwareRequirement	348
6.246.3	Member Function Documentation	348
6.246.3.1	add	348
6.246.3.2	add	349
6.246.3.3	clear	349
6.246.3.4	empty	349
6.246.3.5	getComparisonOperatorList	349
6.246.3.6	getSoftwareList	349
6.246.3.7	isRequiringAll	350
6.246.3.8	isResolved	350
6.246.3.9	isSatisfied	350
6.246.3.10	isSatisfied	351
6.246.3.11	isSatisfied	351
6.246.3.12	operator=	352
6.246.3.13	selectSoftware	352
6.246.3.14	selectSoftware	353
6.246.3.15	selectSoftware	353
6.246.3.16	setRequirement	354
6.247	ArcSec::Source Class Reference	354
6.247.1	Detailed Description	355
6.247.2	Constructor & Destructor Documentation	355
6.247.2.1	Source	355
6.247.2.2	Source	355
6.248	ArcSec::SourceFile Class Reference	355
6.248.1	Detailed Description	356
6.249	ArcSec::SourceURL Class Reference	356
6.249.1	Detailed Description	356
6.250	ArcSec::StringAttribute Class Reference	356
6.250.1	Member Function Documentation	357
6.250.1.1	encode	357
6.250.1.2	equal	357
6.250.1.3	getId	357
6.250.1.4	getType	357
6.251	Arc::Submitter Class Reference	357
6.251.1	Detailed Description	358
6.251.2	Member Function Documentation	358
6.251.2.1	Migrate	358
6.251.2.2	Submit	358
6.252	Arc::SubmitterLoader Class Reference	359
6.252.1	Detailed Description	359
6.252.2	Constructor & Destructor Documentation	359
6.252.2.1	SubmitterLoader	359
6.252.2.2	~SubmitterLoader	359

6.252.3 Member Function Documentation	359
6.252.3.1 GetSubmitters	359
6.252.3.2 load	360
6.253 Arc::SubmitterPluginArgument Class Reference	360
6.254 Arc::TargetGenerator Class Reference	360
6.254.1 Detailed Description	361
6.254.2 Constructor & Destructor Documentation	361
6.254.2.1 TargetGenerator	361
6.254.3 Member Function Documentation	362
6.254.3.1 AddIndexServer	362
6.254.3.2 AddJob	362
6.254.3.3 AddJob	362
6.254.3.4 AddService	362
6.254.3.5 AddTarget	363
6.254.3.6 FoundJobs	363
6.254.3.7 FoundTargets	363
6.254.3.8 GetExecutionTargets	363
6.254.3.9 GetJobs	364
6.254.3.10 GetTargets	364
6.254.3.11 ModifyFoundTargets	364
6.254.3.12 PrintTargetInfo	364
6.254.3.13 RetrieveExecutionTargets	365
6.254.3.14 RetrieveJobs	365
6.254.3.15 SaveTargetInfoToStream	365
6.254.3.16 ServiceCounter	366
6.255 Arc::TargetRetriever Class Reference	366
6.255.1 Detailed Description	367
6.255.2 Constructor & Destructor Documentation	367
6.255.2.1 TargetRetriever	367
6.255.3 Member Function Documentation	367
6.255.3.1 GetExecutionTargets	367
6.255.3.2 GetJobs	367
6.255.3.3 GetTargets	368
6.256 Arc::TargetRetrieverLoader Class Reference	368
6.256.1 Detailed Description	369
6.256.2 Constructor & Destructor Documentation	369
6.256.2.1 TargetRetrieverLoader	369
6.256.2.2 ~TargetRetrieverLoader	369
6.256.3 Member Function Documentation	369
6.256.3.1 GetTargetRetrievers	369
6.256.3.2 load	369
6.257 Arc::TargetRetrieverPluginArgument Class Reference	370
6.258 Test::TestMCC Class Reference	370
6.259 Test::TestService Class Reference	370
6.259.1 Member Function Documentation	371
6.259.1.1 process	371
6.260 Arc::ThreadDataItem Class Reference	371
6.260.1 Detailed Description	372
6.260.2 Constructor & Destructor Documentation	372
6.260.2.1 ThreadDataItem	372

6.260.2.2 ThreadDataItem	372
6.260.2.3 ThreadDataItem	372
6.260.3 Member Function Documentation	372
6.260.3.1 Attach	372
6.260.3.2 Attach	373
6.260.3.3 Dup	373
6.260.3.4 Get	373
6.261Arc::ThreadInitializer Class Reference	373
6.262Arc::ThreadRegistry Class Reference	373
6.262.1 Detailed Description	373
6.262.2 Member Function Documentation	374
6.262.2.1 WaitForExit	374
6.262.2.2 WaitOrCancel	374
6.263Arc::Time Class Reference	374
6.263.1 Detailed Description	375
6.263.2 Constructor & Destructor Documentation	375
6.263.2.1 Time	375
6.263.2.2 Time	375
6.263.2.3 Time	375
6.263.2.4 Time	375
6.263.3 Member Function Documentation	375
6.263.3.1 GetFormat	375
6.263.3.2 GetTime	375
6.263.3.3 operator std::string	375
6.263.3.4 operator!=	376
6.263.3.5 operator+	376
6.263.3.6 operator-	376
6.263.3.7 operator-	376
6.263.3.8 operator<	376
6.263.3.9 operator<=	376
6.263.3.10operator=	376
6.263.3.11operator=	376
6.263.3.12operator=	376
6.263.3.13operator=	376
6.263.3.14operator==	376
6.263.3.15operator>	377
6.263.3.16operator>=	377
6.263.3.17SetFormat	377
6.263.3.18SetTime	377
6.263.3.19SetTime	377
6.263.3.20str	377
6.264ArcSec::TimeAttribute Class Reference	377
6.264.1 Detailed Description	378
6.264.2 Member Function Documentation	378
6.264.2.1 encode	378
6.264.2.2 equal	378
6.264.2.3 getId	378
6.264.2.4 getType	378
6.265Arc::TimedMutex Class Reference	378
6.266Arc::URL Class Reference	379

6.266.1 Member Enumeration Documentation	381
6.266.1.1 Scope	381
6.266.2 Constructor & Destructor Documentation	381
6.266.2.1 URL	381
6.266.2.2 URL	381
6.266.2.3 ~URL	381
6.266.3 Member Function Documentation	381
6.266.3.1 AddLDAPAttribute	381
6.266.3.2 AddMetaDataOption	381
6.266.3.3 AddOption	381
6.266.3.4 BaseDN2Path	381
6.266.3.5 ChangeHost	382
6.266.3.6 ChangeLDAPFilter	382
6.266.3.7 ChangeLDAPScope	382
6.266.3.8 ChangePath	382
6.266.3.9 ChangePort	382
6.266.3.10ChangeProtocol	382
6.266.3.11CommonLocOption	382
6.266.3.12CommonLocOptions	382
6.266.3.13ConnectionURL	382
6.266.3.14FullPath	383
6.266.3.15fullstr	383
6.266.3.16Host	383
6.266.3.17HTTPOption	383
6.266.3.18HTTPOptions	383
6.266.3.19IsSecureProtocol	383
6.266.3.20LDAPAttributes	383
6.266.3.21LDAPFilter	383
6.266.3.22LDAPScope	383
6.266.3.23Locations	384
6.266.3.24MetaDataOption	384
6.266.3.25MetaDataOptions	384
6.266.3.26operator bool	384
6.266.3.27operator<	384
6.266.3.28operator==	384
6.266.3.29Option	384
6.266.3.30Options	384
6.266.3.31OptionString	385
6.266.3.32ParseOptions	385
6.266.3.33Passwd	385
6.266.3.34Path	385
6.266.3.35Path2BaseDN	385
6.266.3.36plainstr	385
6.266.3.37Port	385
6.266.3.38Protocol	385
6.266.3.39str	385
6.266.3.40Username	385
6.266.4 Friends And Related Function Documentation	386
6.266.4.1 operator<<	386
6.266.5 Field Documentation	386

6.266.5.1 commonlocoptions	386
6.266.5.2 host	386
6.266.5.3 httpoptions	386
6.266.5.4 ip6addr	386
6.266.5.5 ldapattributes	386
6.266.5.6 ldapfilter	386
6.266.5.7 ldapscope	386
6.266.5.8 locations	386
6.266.5.9 metadataoptions	387
6.266.5.10passwd	387
6.266.5.11path	387
6.266.5.12port	387
6.266.5.13protocol	387
6.266.5.14urloptions	387
6.266.5.15username	387
6.266.5.16valid	387
6.267Arc::URLLocation Class Reference	387
6.267.1 Detailed Description	388
6.267.2 Constructor & Destructor Documentation	388
6.267.2.1 URLLocation	388
6.267.2.2 URLLocation	388
6.267.2.3 URLLocation	388
6.267.2.4 URLLocation	389
6.267.2.5 URLLocation	389
6.267.2.6 ~URLLocation	389
6.267.3 Member Function Documentation	389
6.267.3.1 fullstr	389
6.267.3.2 Name	389
6.267.3.3 str	389
6.267.4 Field Documentation	389
6.267.4.1 name	389
6.268Arc::URLMap Class Reference	390
6.269Arc::User Class Reference	390
6.270Arc::UserConfig Class Reference	390
6.270.1 Detailed Description	392
6.270.2 Constructor & Destructor Documentation	393
6.270.2.1 UserConfig	393
6.270.2.2 UserConfig	394
6.270.2.3 UserConfig	394
6.270.2.4 UserConfig	395
6.270.3 Member Function Documentation	395
6.270.3.1 AddBartender	395
6.270.3.2 AddServices	395
6.270.3.3 AddServices	396
6.270.3.4 ApplyToConfig	397
6.270.3.5 Bartender	397
6.270.3.6 Bartender	398
6.270.3.7 Broker	398
6.270.3.8 Broker	399
6.270.3.9 Broker	399

6.270.3.10CACertificatePath	399
6.270.3.11CACertificatePath	400
6.270.3.12CACertificatesDirectory	400
6.270.3.13CACertificatesDirectory	401
6.270.3.14CertificateLifeTime	401
6.270.3.15CertificateLifeTime	401
6.270.3.16CertificatePath	402
6.270.3.17CertificatePath	402
6.270.3.18ClearRejectedServices	403
6.270.3.19ClearRejectedServices	403
6.270.3.20ClearSelectedServices	403
6.270.3.21ClearSelectedServices	404
6.270.3.22CredentialsFound	404
6.270.3.23GetRejectedServices	404
6.270.3.24GetSelectedServices	405
6.270.3.25IdPName	405
6.270.3.26IdPName	405
6.270.3.27InitializeCredentials	406
6.270.3.28JobListFile	407
6.270.3.29JobListFile	408
6.270.3.30KeyPassword	408
6.270.3.31KeyPassword	408
6.270.3.32KeyPath	409
6.270.3.33KeyPath	409
6.270.3.34KeySize	410
6.270.3.35KeySize	410
6.270.3.36LoadConfigurationFile	410
6.270.3.37operator bool	412
6.270.3.38operator!	412
6.270.3.39OverlayFile	413
6.270.3.40OverlayFile	413
6.270.3.41Password	413
6.270.3.42Password	414
6.270.3.43ProxyPath	414
6.270.3.44ProxyPath	414
6.270.3.45SaveToFile	415
6.270.3.46SLCS	415
6.270.3.47SLCS	415
6.270.3.48StoreDirectory	416
6.270.3.49StoreDirectory	416
6.270.3.50Timeout	416
6.270.3.51Timeout	417
6.270.3.52UserName	417
6.270.3.53UserName	418
6.270.3.54UtilsDirPath	418
6.270.3.55UtilsDirPath	418
6.270.3.56Verbosity	419
6.270.3.57Verbosity	419
6.270.3.58VOMSServerPath	419
6.270.3.59VOMSServerPath	420

6.270.4 Field Documentation	420
6.270.4.1 ARCUSERDIRECTORY	420
6.270.4.2 DEFAULT_BROKER	420
6.270.4.3 DEFAULT_TIMEOUT	420
6.270.4.4 DEFAULTCONFIG	421
6.270.4.5 EXAMPLECONFIG	421
6.270.4.6 SYSCONFIG	421
6.270.4.7 SYSCONFIGARCLOC	421
6.271 Arc::UsernameToken Class Reference	421
6.271.1 Detailed Description	422
6.271.2 Member Enumeration Documentation	422
6.271.2.1 PasswordType	422
6.271.3 Constructor & Destructor Documentation	422
6.271.3.1 UsernameToken	422
6.271.3.2 UsernameToken	422
6.271.3.3 UsernameToken	423
6.271.4 Member Function Documentation	423
6.271.4.1 Authenticate	423
6.271.4.2 Authenticate	423
6.271.4.3 operator bool	423
6.271.4.4 Username	423
6.272 Arc::UserSwitch Class Reference	424
6.272.1 Detailed Description	424
6.273 Arc::VOMSACInfo Class Reference	424
6.274 Arc::VOMSTrustList Class Reference	424
6.274.1 Detailed Description	424
6.274.2 Constructor & Destructor Documentation	425
6.274.2.1 VOMSTrustList	425
6.274.2.2 VOMSTrustList	425
6.274.3 Member Function Documentation	425
6.274.3.1 AddChain	425
6.274.3.2 AddChain	426
6.274.3.3 AddRegex	426
6.275 Arc::WSAEndpointReference Class Reference	426
6.275.1 Detailed Description	426
6.275.2 Constructor & Destructor Documentation	426
6.275.2.1 WSAEndpointReference	426
6.275.2.2 WSAEndpointReference	427
6.275.2.3 WSAEndpointReference	427
6.275.2.4 WSAEndpointReference	427
6.275.2.5 ~WSAEndpointReference	427
6.275.3 Member Function Documentation	427
6.275.3.1 Address	427
6.275.3.2 Address	427
6.275.3.3 MetaData	427
6.275.3.4 operator XMLNode	427
6.275.3.5 operator=	427
6.275.3.6 ReferenceParameters	428
6.276 Arc::WSAHeader Class Reference	428
6.276.1 Detailed Description	429

6.276.2	Constructor & Destructor Documentation	429
6.276.2.1	WSAHeader	429
6.276.2.2	WSAHeader	429
6.276.3	Member Function Documentation	429
6.276.3.1	Action	429
6.276.3.2	Action	429
6.276.3.3	Check	429
6.276.3.4	FaultTo	429
6.276.3.5	From	429
6.276.3.6	MessageID	429
6.276.3.7	MessageID	430
6.276.3.8	NewReferenceParameter	430
6.276.3.9	operator XMLNode	430
6.276.3.10	ReferenceParameter	430
6.276.3.11	ReferenceParameter	430
6.276.3.12	RelatesTo	430
6.276.3.13	RelatesTo	430
6.276.3.14	RelationshipType	430
6.276.3.15	RelationshipType	430
6.276.3.16	ReplyTo	430
6.276.3.17	To	431
6.276.3.18	To	431
6.276.4	Field Documentation	431
6.276.4.1	header_allocated_	431
6.277	Arc::WSRF Class Reference	431
6.277.1	Detailed Description	432
6.277.2	Constructor & Destructor Documentation	432
6.277.2.1	WSRF	432
6.277.2.2	WSRF	432
6.277.3	Member Function Documentation	432
6.277.3.1	operator bool	432
6.277.3.2	set_namespaces	432
6.277.3.3	SOAP	433
6.277.4	Field Documentation	433
6.277.4.1	allocated_	433
6.277.4.2	valid_	433
6.278	Arc::WSRFBBaseFault Class Reference	433
6.278.1	Detailed Description	433
6.278.2	Constructor & Destructor Documentation	434
6.278.2.1	WSRFBBaseFault	434
6.278.2.2	WSRFBBaseFault	434
6.278.3	Member Function Documentation	434
6.278.3.1	set_namespaces	434
6.279	Arc::WSRFResourceUnavailableFault Class Reference	434
6.280	Arc::WSRFResourceUnknownFault Class Reference	434
6.281	Arc::WSRP Class Reference	435
6.281.1	Detailed Description	436
6.281.2	Constructor & Destructor Documentation	437
6.281.2.1	WSRP	437
6.281.2.2	WSRP	437

6.281.3 Member Function Documentation	437
6.281.3.1 set_namespaces	437
6.282 Arc::WSRPDeleteResourceProperties Class Reference	437
6.283 Arc::WSRPDeleteResourcePropertiesRequest Class Reference	437
6.284 Arc::WSRPDeleteResourcePropertiesRequestFailedFault Class Reference	438
6.285 Arc::WSRPDeleteResourcePropertiesResponse Class Reference	438
6.286 Arc::WSRPFault Class Reference	439
6.286.1 Detailed Description	439
6.286.2 Constructor & Destructor Documentation	439
6.286.2.1 WSRPFault	439
6.286.2.2 WSRPFault	439
6.287 Arc::WSRPGetMultipleResourcePropertiesRequest Class Reference	440
6.288 Arc::WSRPGetMultipleResourcePropertiesResponse Class Reference	440
6.289 Arc::WSRPGetResourcePropertyDocumentRequest Class Reference	440
6.290 Arc::WSRPGetResourcePropertyDocumentResponse Class Reference	441
6.291 Arc::WSRPGetResourcePropertyRequest Class Reference	441
6.292 Arc::WSRPGetResourcePropertyResponse Class Reference	442
6.293 Arc::WSRPInsertResourceProperties Class Reference	442
6.294 Arc::WSRPInsertResourcePropertiesRequest Class Reference	442
6.295 Arc::WSRPInsertResourcePropertiesRequestFailedFault Class Reference	443
6.296 Arc::WSRPInsertResourcePropertiesResponse Class Reference	443
6.297 Arc::WSRPInvalidModificationFault Class Reference	444
6.298 Arc::WSRPInvalidResourcePropertyQNameFault Class Reference	444
6.299 Arc::WSRPModifyResourceProperties Class Reference	445
6.300 Arc::WSRPPutResourcePropertyDocumentRequest Class Reference	445
6.301 Arc::WSRPPutResourcePropertyDocumentResponse Class Reference	446
6.302 Arc::WSRPQueryResourcePropertiesRequest Class Reference	446
6.303 Arc::WSRPQueryResourcePropertiesResponse Class Reference	446
6.304 Arc::WSRPResourcePropertyChangeFailure Class Reference	447
6.304.1 Detailed Description	447
6.304.2 Constructor & Destructor Documentation	447
6.304.2.1 WSRPResourcePropertyChangeFailure	447
6.304.2.2 WSRPResourcePropertyChangeFailure	447
6.305 Arc::WSRPSetResourcePropertiesRequest Class Reference	448
6.306 Arc::WSRPSetResourcePropertiesResponse Class Reference	448
6.307 Arc::WSRPSetResourcePropertyRequestFailedFault Class Reference	448
6.308 Arc::WSRPUnableToModifyResourcePropertyFault Class Reference	449
6.309 Arc::WSRPUnableToPutResourcePropertyDocumentFault Class Reference	449
6.310 Arc::WSRPUpdateResourceProperties Class Reference	450
6.311 Arc::WSRPUpdateResourcePropertiesRequest Class Reference	450
6.312 Arc::WSRPUpdateResourcePropertiesRequestFailedFault Class Reference	451
6.313 Arc::WSRPUpdateResourcePropertiesResponse Class Reference	451
6.314 ArcSec::X500NameAttribute Class Reference	452
6.314.1 Member Function Documentation	452
6.314.1.1 encode	452
6.314.1.2 equal	452

6.314.1.3	getId	452
6.314.1.4	getType	452
6.315Arc::X509Token	Class Reference	453
6.315.1	Detailed Description	453
6.315.2	Member Enumeration Documentation	453
6.315.2.1	X509TokenType	453
6.315.3	Constructor & Destructor Documentation	453
6.315.3.1	X509Token	453
6.315.3.2	X509Token	454
6.315.3.3	~X509Token	454
6.315.4	Member Function Documentation	454
6.315.4.1	Authenticate	454
6.315.4.2	Authenticate	455
6.315.4.3	operator bool	455
6.316Arc::XmlContainer	Class Reference	455
6.317Arc::XmlDatabase	Class Reference	455
6.318Arc::XMLNode	Class Reference	455
6.318.1	Detailed Description	458
6.318.2	Constructor & Destructor Documentation	458
6.318.2.1	XMLNode	458
6.318.2.2	XMLNode	458
6.318.2.3	XMLNode	458
6.318.2.4	XMLNode	458
6.318.2.5	XMLNode	458
6.318.2.6	XMLNode	458
6.318.2.7	XMLNode	459
6.318.2.8	~XMLNode	459
6.318.3	Member Function Documentation	459
6.318.3.1	Attribute	459
6.318.3.2	Attribute	459
6.318.3.3	Attribute	459
6.318.3.4	AttributesSize	459
6.318.3.5	Child	459
6.318.3.6	Destroy	459
6.318.3.7	Exchange	460
6.318.3.8	FullName	460
6.318.3.9	Get	460
6.318.3.10	GetDoc	460
6.318.3.11	GetRoot	460
6.318.3.12	GetXML	460
6.318.3.13	GetXML	460
6.318.3.14	Move	461
6.318.3.15	Name	461
6.318.3.16	Name	461
6.318.3.17	Name	461
6.318.3.18	Namespace	461
6.318.3.19	NamespacePrefix	461
6.318.3.20	Namespaces	461
6.318.3.21	Namespaces	461
6.318.3.22	New	462

6.318.3.23NewAttribute	462
6.318.3.24NewAttribute	462
6.318.3.25NewChild	462
6.318.3.26NewChild	462
6.318.3.27NewChild	462
6.318.3.28NewChild	463
6.318.3.29NewChild	463
6.318.3.30operator bool	463
6.318.3.31operator std::string	463
6.318.3.32operator!	463
6.318.3.33operator!=	463
6.318.3.34operator!=	463
6.318.3.35operator!=	463
6.318.3.36operator!=	463
6.318.3.37operator++	464
6.318.3.38operator--	464
6.318.3.39operator=	464
6.318.3.40operator=	464
6.318.3.41operator=	464
6.318.3.42operator==	464
6.318.3.43operator==	464
6.318.3.44operator==	464
6.318.3.45operator==	464
6.318.3.46operator[]	465
6.318.3.47operator[]	465
6.318.3.48operator[]	465
6.318.3.49Parent	465
6.318.3.50Path	465
6.318.3.51Prefix	465
6.318.3.52ReadFromFile	466
6.318.3.53ReadFromStream	466
6.318.3.54Replace	466
6.318.3.55Same	466
6.318.3.56SaveToFile	466
6.318.3.57SaveToStream	466
6.318.3.58Set	466
6.318.3.59Size	466
6.318.3.60Swap	466
6.318.3.61Validate	467
6.318.3.62XPathLookup	467
6.318.4 Friends And Related Function Documentation	467
6.318.4.1 MatchXMLName	467
6.318.4.2 MatchXMLName	467
6.318.4.3 MatchXMLName	467
6.318.4.4 MatchXMLNamespace	467
6.318.4.5 MatchXMLNamespace	467
6.318.4.6 MatchXMLNamespace	468
6.318.5 Field Documentation	468
6.318.5.1 is_owner_	468
6.318.5.2 is_temporary_	468

6.319Arc::XMLNodeContainer Class Reference	468
6.319.1 Detailed Description	468
6.319.2 Constructor & Destructor Documentation	469
6.319.2.1 XMLNodeContainer	469
6.319.2.2 XMLNodeContainer	469
6.319.3 Member Function Documentation	469
6.319.3.1 Add	469
6.319.3.2 Add	469
6.319.3.3 AddNew	469
6.319.3.4 AddNew	469
6.319.3.5 Nodes	469
6.319.3.6 operator=	469
6.319.3.7 operator[]	470
6.319.3.8 Size	470
6.320Arc::XMLSecNode Class Reference	470
6.320.1 Detailed Description	470
6.320.2 Constructor & Destructor Documentation	471
6.320.2.1 XMLSecNode	471
6.320.3 Member Function Documentation	471
6.320.3.1 AddSignatureTemplate	471
6.320.3.2 DecryptNode	471
6.320.3.3 EncryptNode	471
6.320.3.4 SignNode	472
6.320.3.5 VerifyNode	472
7 File Documentation	473
7.1 URL.h File Reference	473
7.1.1 Detailed Description	474
7.1.2 Define Documentation	474
7.1.2.1 RC_DEFAULT_PORT	474

Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Arc (Some utility methods for using xml security library (http://www.aleksey.com/xmlsec/))	23
ArcCredential	45

Chapter 2

Data Structure Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

ArcCredential::ACACI	49
ArcCredential::ACATTHOLDER	49
ArcCredential::ACATTR	49
ArcCredential::ACATTRIBUTE	49
ArcCredential::ACC	49
ArcCredential::ACCERTS	50
ArcCredential::ACDIGEST	50
ArcCredential::ACFORM	50
ArcCredential::ACFULLATTRIBUTES	50
ArcCredential::ACHOLDER	50
ArcCredential::ACIETFATTR	50
ArcCredential::ACINFO	51
ArcCredential::ACIS	51
ArcCredential::ACSEQ	51
ArcCredential::ACTARGET	51
ArcCredential::ACTARGETS	51
ArcCredential::ACVAL	51
Arc::ApplicationType	55
Arc::ArcLocation	55
ArcSec::ArcPeriod	56
ArcSec::Attr	56
Arc::AttributeIterator	57
ArcSec::AttributeProxy	60
ArcSec::AttributeValue	61
ArcSec::AnyURIAttribute	53
ArcSec::BooleanAttribute	66
ArcSec::DateAttribute	153
ArcSec::DateTimeAttribute	154
ArcSec::DurationAttribute	166

ArcSec::GenericAttribute	191
ArcSec::PeriodAttribute	291
ArcSec::StringAttribute	356
ArcSec::TimeAttribute	377
ArcSec::X500NameAttribute	452
ArcSec::Attrs	63
ArcSec::AuthzRequest	63
ArcSec::AuthzRequestSection	63
Arc::AutoPointer< T >	64
Arc::Base64	64
Arc::BaseConfig	65
Arc::MCCCConfig	248
Arc::ByteArray	71
Arc::CacheParameters	71
ArcCredential::cert_verify_context	71
Arc::CertEnvLocker	71
Arc::ChainContext	72
Arc::Checksum	72
Arc::Adler32Sum	51
Arc::ChecksumAny	73
Arc::CRC32Sum	98
Arc::MD5Sum	251
Arc::ClientHTTPwithSAML2SSO	76
Arc::ClientInterface	77
Arc::ClientTCP	80
Arc::ClientHTTP	75
Arc::ClientSOAP	77
Arc::ClientSOAPwithSAML2SSO	79
Arc::ClientX509Delegation	81
ArcSec::CombiningAlg	82
ArcSec::DenyOverridesCombiningAlg	163
ArcSec::OrderedCombiningAlg	272
ArcSec::PermitOverridesCombiningAlg	292
Arc::ConfusaCertHandler	85
Arc::ConfusaParserUtils	86
Arc::CountedPointer< T >	88
Arc::Counter	89
Arc::IntraProcessCounter	205
Arc::CounterTicket	96
Arc::Credential	98
Arc::CredentialError	108
Arc::CredentialStore	108
Arc::Database	109
Arc::MySQLDatabase	264
Arc::DataBuffer	111
Arc::DataCallback	117
Arc::DataHandle	117
Arc::DataMover	117

Arc::DataSpeed	147
Arc::DataStatus	151
Arc::DBranch	155
Arc::DelegationConsumer	155
Arc::DelegationConsumerSOAP	157
Arc::DelegationContainerSOAP	158
Arc::DelegationProvider	160
Arc::DelegationProviderSOAP	161
Arc::DiskSpaceRequirementType	165
Arc::DItem	165
Arc::DItemString	165
ArcSec::EvalResult	168
ArcSec::EvaluationCtx	169
ArcSec::EvaluatorContext	172
ArcSec::EvaluatorLoader	173
Arc::ExecutableType	174
Arc::ExecutionTarget	175
Arc::ExpirationReminder	179
Arc::FileCache	180
FileCacheHash	186
Arc::FileInfo	187
Arc::FileLock	187
Arc::FileType	189
Arc::FinderLoader	189
ArcSec::Function	190
ArcSec::EqualFunction	167
ArcSec::InRangeFunction	204
ArcSec::MatchFunction	241
Arc::GlobusResult	192
Arc::GSSCredential	192
Arc::HTTPClientInfo	194
Arc::InfoCache	194
Arc::InfoFilter	195
Arc::InfoRegister	196
Arc::InfoRegisterContainer	197
Arc::InfoRegisters	198
Arc::InfoRegistrar	198
Arc::InformationInterface	201
Arc::InfoCacheInterface	194
Arc::InformationContainer	199
Arc::InformationRequest	202
Arc::InformationResponse	203
Arc::initializeCredentialsType	204
Arc::ISIS_description	210
Arc::IString	210
Arc::JobDescriptionParserLoader::iterator	210
Arc::Job	210
Arc::JobDescription	222

Arc::JobIdentificationType	227
Arc::JobState	227
Arc::JobSupervisor	227
Arc::LoadableModuleDescription	228
Arc::Loader	228
Arc::BrokerLoader	69
Arc::DataPointLoader	146
Arc::JobControllerLoader	220
Arc::JobDescriptionParserLoader	225
Arc::MCCLoader	249
Arc::SubmitterLoader	359
Arc::TargetRetrieverLoader	368
Arc::LogDestination	230
Arc::LogFile	231
Arc::LogStream	240
Arc::Logger	233
Arc::LoggerContext	237
Arc::LoggerFormat	237
Arc::LogMessage	237
Arc::MCC_Status	245
Arc::MemoryAllocationException	252
Arc::Message	252
Arc::MessageAttributes	254
Arc::MessageAuth	258
Arc::MessageAuthContext	259
Arc::MessageContext	259
Arc::MessageContextElement	260
ArcSec::PDPCConfigContext	288
Arc::MessagePayload	260
Arc::PayloadRawInterface	276
Arc::PayloadRaw	273
Arc::PayloadSOAP	279
Arc::PayloadStreamInterface	283
Arc::PayloadStream	280
Arc::PayloadWSRF	286
Arc::ModuleDesc	261
Arc::ModuleManager	261
Arc::PluginsFactory	298
Arc::ClassLoader	75
Arc::NotificationType	268
Arc::NS	268
Arc::OptionParser	271
passwd	272
Arc::PathIterator	272
Arc::PayloadRawBuf	276
Arc::Period	288
Arc::PlexerEntry	295
Arc::Plugin	295

Arc::Broker	67
Arc::DataPoint	120
Arc::DataPointDirect	133
Arc::DataPointIndex	138
Arc::JobController	216
Arc::JobDescriptionParser	225
Arc::MCCInterface	248
Arc::MCC	242
Arc::Plexer	293
Test::TestMCC	370
Test::TestMCC	370
Arc::Service	331
Arc::RegisteredService	309
Test::TestService	370
Arc::Submitter	357
Arc::TargetRetriever	366
ArcSec::AlgFactory	52
ArcSec::AttributeFactory	56
ArcSec::Evaluator	169
ArcSec::FnFactory	189
ArcSec::PDP	287
ArcSec::Policy	300
ArcSec::Request	311
ArcSec::SecHandler	329
Arc::PluginArgument	296
Arc::BrokerPluginArgument	71
Arc::ClassLoaderPluginArgument	75
Arc::DataPointPluginArgument	147
Arc::JobControllerPluginArgument	221
Arc::MCCPluginArgument	251
Arc::ServicePluginArgument	334
Arc::SubmitterPluginArgument	360
Arc::TargetRetrieverPluginArgument	370
ArcSec::PDPPluginArgument	288
ArcSec::SecHandlerPluginArgument	331
Arc::PluginDesc	298
Arc::PluginDescriptor	298
ArcSec::PolicyStore::PolicyElement	303
ArcSec::PolicyParser	303
ArcSec::PolicyStore	304
Arc::PrintFBase	305
Arc::PrintF< T0, T1, T2, T3, T4, T5, T6, T7 >	304
ArcCredential::PROXYCERTINFO_st	306
ArcCredential::PROXYPOLICY_st	306
Arc::Query	306
Arc::MySQLQuery	266
Arc::Range< T >	309
Arc::Register_Info_Type	309

Arc::RegularExpression	310
ArcSec::RequestAttribute	313
ArcSec::RequestItem	313
ArcSec::RequestTuple	314
Arc::ResourceSlotType	314
Arc::ResourcesType	314
ArcSec::Response	314
ArcSec::ResponseItem	315
ArcSec::ResponseList	315
Arc::Run	315
Arc::SAML2LoginClient	319
Arc::OAuthConsumer	268
Arc::SAML2SSOHTTPClient	320
Arc::HakaClient	193
Arc::OpenIdpClient	270
Arc::SAMLToken	322
Arc::ScalableTime< T >	325
Arc::ScalableTime< int >	326
Arc::SecAttr	326
Arc::MultiSecAttr	263
Arc::SecAttrFormat	328
Arc::SecAttrValue	328
Arc::CStringValue	73
ArcSec::Security	331
Arc::SimpleCondition	334
Arc::SimpleCounter	336
Arc::SOAPMessage	336
Arc::Software	337
Arc::ApplicationEnvironment	54
Arc::SoftwareRequirement	346
ArcSec::Source	354
ArcSec::SourceFile	355
ArcSec::SourceURL	356
Arc::TargetGenerator	360
Arc::ThreadDataItem	371
Arc::ThreadInitializer	373
Arc::ThreadRegistry	373
Arc::Time	374
Arc::TimedMutex	378
Arc::URL	379
Arc::URLLocation	387
Arc::URLMap	390
Arc::User	390
Arc::UserConfig	390
Arc::UsernameToken	421
Arc::UserSwitch	424
Arc::VOMSACInfo	424
Arc::VOMSTrustList	424

Arc::WSAEndpointReference	426
Arc::WSAHeader	428
Arc::WSRF	431
Arc::WSRFBBaseFault	433
Arc::WSRFResourceUnavailableFault	434
Arc::WSRFResourceUnknownFault	434
Arc::WSRPFault	439
Arc::WSRPInvalidResourcePropertyQNameFault	444
Arc::WSRPResourcePropertyChangeFailure	447
Arc::WSRPDeleteResourcePropertiesRequestFailedFault	438
Arc::WSRPInsertResourcePropertiesRequestFailedFault	443
Arc::WSRPInvalidModificationFault	444
Arc::WSRPSetResourcePropertyRequestFailedFault	448
Arc::WSRPUnableToModifyResourcePropertyFault	449
Arc::WSRPUnableToPutResourcePropertyDocumentFault	449
Arc::WSRPUpdateResourcePropertiesRequestFailedFault	451
Arc::WSRP	435
Arc::WSRPDeleteResourcePropertiesRequest	437
Arc::WSRPDeleteResourcePropertiesResponse	438
Arc::WSRPGetMultipleResourcePropertiesRequest	440
Arc::WSRPGetMultipleResourcePropertiesResponse	440
Arc::WSRPGetResourcePropertyDocumentRequest	440
Arc::WSRPGetResourcePropertyDocumentResponse	441
Arc::WSRPGetResourcePropertyRequest	441
Arc::WSRPGetResourcePropertyResponse	442
Arc::WSRPInsertResourcePropertiesRequest	442
Arc::WSRPInsertResourcePropertiesResponse	443
Arc::WSRPPutResourcePropertyDocumentRequest	445
Arc::WSRPPutResourcePropertyDocumentResponse	446
Arc::WSRPQueryResourcePropertiesRequest	446
Arc::WSRPQueryResourcePropertiesResponse	446
Arc::WSRPSetResourcePropertiesRequest	448
Arc::WSRPSetResourcePropertiesResponse	448
Arc::WSRPUpdateResourcePropertiesRequest	450
Arc::WSRPUpdateResourcePropertiesResponse	451
Arc::WSRPModifyResourceProperties	445
Arc::WSRPDeleteResourceProperties	437
Arc::WSRPInsertResourceProperties	442
Arc::WSRPUpdateResourceProperties	450
Arc::X509Token	453
Arc::XmlContainer	455
Arc::XmlDatabase	455
Arc::XMLNode	455
Arc::Config	83
Arc::IniConfig	204
Arc::Profile	305
Arc::SecHandlerConfig	330
Arc::ARCPolicyHandlerConfig	56
Arc::DNListHandlerConfig	165

Arc::XMLSecNode	470
ArcSec::SecHandlerConfig	330
Arc::XMLNodeContainer	468

Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

ArcCredential::ACACI	49
ArcCredential::ACATTHOLDER	49
ArcCredential::ACATTR	49
ArcCredential::ACATTRIBUTE	49
ArcCredential::ACC	49
ArcCredential::ACCERTS	50
ArcCredential::ACDIGEST	50
ArcCredential::ACFORM	50
ArcCredential::ACFULLATTRIBUTES	50
ArcCredential::ACHOLDER	50
ArcCredential::ACIETFATTR	50
ArcCredential::ACINFO	51
ArcCredential::ACIS	51
ArcCredential::ACSEQ	51
ArcCredential::ACTARGET	51
ArcCredential::ACTARGETS	51
ArcCredential::ACVAL	51
Arc::Adler32Sum (Implementation of Adler32 checksum)	51
ArcSec::AlgFactory (Interface for algorithm factory class)	52
ArcSec::AnyURIAttribute	53
Arc::ApplicationEnvironment (ApplicationEnvironment (p. 54))	54
Arc::ApplicationType	55
Arc::ArcLocation (Determines ARC installation location)	55
ArcSec::ArcPeriod	56
Arc::ARCPolicyHandlerConfig	56
ArcSec::Attr (Attr (p. 56) contains a tuple of attribute type and value)	56
ArcSec::AttributeFactory	56
Arc::AttributeIterator (A const iterator class for accessing multiple values of an attribute)	57

ArcSec::AttributeProxy (Interface for creating the AttributeValue (p. 61) object, it will be used by AttributeFactory (p. 56))	60
ArcSec::AttributeValue (Interface for containing different type of <Attribute> node for both policy and request)	61
ArcSec::Attrs (Attrs (p. 63) is a container for one or more Attr (p. 56)) . . .	63
ArcSec::AuthzRequest	63
ArcSec::AuthzRequestSection	63
Arc::AutoPointer< T > (Wrapper for pointer with automatic destruction) .	64
Arc::Base64	64
Arc::BaseConfig	65
ArcSec::BooleanAttribute	66
Arc::Broker	67
Arc::BrokerLoader	69
Arc::BrokerPluginArgument	71
Arc::ByteArray	71
Arc::CacheParameters	71
ArcCredential::cert_verify_context	71
Arc::CertEnvLocker	71
Arc::ChainContext (Interface to chain specific functionality)	72
Arc::Checksum (Defines interface for variuos checksum manipulations) . .	72
Arc::ChecksumAny (Wrapper for Checksum (p. 72) class)	73
Arc::CIStrngValue (This class implements case insensitive strings as security attributes)	73
Arc::ClassLoader	75
Arc::ClassLoaderPluginArgument	75
Arc::ClientHTTP (Class for setting up a MCC (p. 242) chain for HTTP communication)	75
Arc::ClientHTTPwithSAML2SSO	76
Arc::ClientInterface (Utility base class for MCC (p. 242))	77
Arc::ClientSOAP	77
Arc::ClientSOAPwithSAML2SSO	79
Arc::ClientTCP (Class for setting up a MCC (p. 242) chain for TCP communication)	80
Arc::ClientX509Delegation	81
ArcSec::CombiningAlg (Interface for combining algorithm)	82
Arc::Config (Configuration element - represents (sub)tree of ARC configuration)	83
Arc::ConfusaCertHandler	85
Arc::ConfusaParserUtils	86
Arc::CountedPointer< T > (Wrapper for pointer with automatic destruction and mutiple references)	88
Arc::Counter (A class defining a common interface for counters)	89
Arc::CounterTicket (A class for "tickets" that correspond to counter reservations)	96
Arc::CRC32Sum (Implementation of CRC32 checksum)	98
Arc::Credential	98
Arc::CredentialError	108
Arc::CredentialStore	108
Arc::Database (Interface for calling database client library)	109
Arc::DataBuffer (Represents set of buffers)	111

Arc::DataCallback	117
Arc::DataHandle (This class is a wrapper around the DataPoint (p. 120) class)	117
Arc::DataMover	117
Arc::DataPoint (This base class is an abstraction of URL (p. 379))	120
Arc::DataPointDirect (This is a kind of generalized file handle)	133
Arc::DataPointIndex (Complements DataPoint (p. 120) with attributes common for Indexing Service (p. 331) URLs)	138
Arc::DataPointLoader	146
Arc::DataPointPluginArgument	147
Arc::DataSpeed (Keeps track of average and instantaneous transfer speed)	147
Arc::DataStatus	151
ArcSec::DateAttribute	153
ArcSec::DateTimeAttribute	154
Arc::DBranch	155
Arc::DelegationConsumer	155
Arc::DelegationConsumerSOAP	157
Arc::DelegationContainerSOAP	158
Arc::DelegationProvider	160
Arc::DelegationProviderSOAP	161
ArcSec::DenyOverridesCombiningAlg (Implement the "Deny-Overrides" algorithm)	163
Arc::DiskSpaceRequirementType	165
Arc::DItem	165
Arc::DItemString	165
Arc::DNListHandlerConfig	165
ArcSec::DurationAttribute	166
ArcSec::EqualFunction (Evaluate whether the two values are equal)	167
ArcSec::EvalResult (Struct to record the xml node and effect, which will be used by Evaluator (p. 169) to get the information about which rule/policy(in xmlnode) is satisfied)	168
ArcSec::EvaluationCtx (EvaluationCtx (p. 169), in charge of storing some context information for)	169
ArcSec::Evaluator (Interface for policy evaluation. Execute the policy evaluation, based on the request and policy)	169
ArcSec::EvaluatorContext (Context for evaluator. It includes the factories which will be used to create related objects)	172
ArcSec::EvaluatorLoader (EvaluatorLoader (p. 173) is implemented as a helper class for loading different Evaluator (p. 169) objects, like ArcEvaluator)	173
Arc::ExecutableType	174
Arc::ExecutionTarget (ExecutionTarget (p. 175))	175
Arc::ExpirationReminder (A class intended for internal use within counters)	179
Arc::FileCache	180
FileCacheHash	186
Arc::FileInfo (FileInfo (p. 187) stores information about files (metadata))	187
Arc::FileLock (A general file locking class)	187
Arc::FileType	189
Arc::FinderLoader	189

ArcSec::FnFactory (Interface for function factory class)	189
ArcSec::Function (Interface for function, which is in charge of evaluating two AttributeValue (p. 61))	190
ArcSec::GenericAttribute	191
Arc::GlobusResult	192
Arc::GSSCredential	192
Arc::HakaClient	193
Arc::HTTPClientInfo	194
Arc::InfoCache (Stores XML document in filesystem split into parts)	194
Arc::InfoCacheInterface	194
Arc::InfoFilter (Filters information document according to identity of requestor)	195
Arc::InfoRegister (Registration to ISIS interface)	196
Arc::InfoRegisterContainer	197
Arc::InfoRegisters (Handling multiple registrations to ISISes)	198
Arc::InfoRegistrar (Registration process associated with particular ISIS) . .	198
Arc::InformationContainer (Information System document container and processor)	199
Arc::InformationInterface (Information System message processor)	201
Arc::InformationRequest (Request for information in InfoSystem)	202
Arc::InformationResponse (Informational response from InfoSystem) . . .	203
Arc::IniConfig	204
Arc::initializeCredentialsType	204
ArcSec::InRangeFunction	204
Arc::IntraProcessCounter (A class for counters used by threads within a single process)	205
Arc::ISIS_description	210
Arc::IString	210
Arc::JobDescriptionParserLoader::iterator	210
Arc::Job (Job (p. 210))	210
Arc::JobController (Base class for the JobControllers)	216
Arc::JobControllerLoader	220
Arc::JobControllerPluginArgument	221
Arc::JobDescription	222
Arc::JobDescriptionParser	225
Arc::JobDescriptionParserLoader	225
Arc::JobIdentificationType	227
Arc::JobState	227
Arc::JobSupervisor (% JobSupervisor (p. 227) class)	227
Arc::LoadableModuleDescription	228
Arc::Loader (Plugins loader)	228
Arc::LogDestination (A base class for log destinations)	230
Arc::LogFile (A class for logging to files)	231
Arc::Logger (A logger class)	233
Arc::LoggerContext (Container for logger configuration)	237
Arc::LoggerFormat	237
Arc::LogMessage (A class for log messages)	237
Arc::LogStream (A class for logging to ostreams)	240
ArcSec::MatchFunction (Evaluate whether arg1 (value in regular expression) matched arg0 (lable in regular expression))	241

Arc::MCC (Message (p. 252) Chain Component - base class for every MCC (p. 242) plugin)	242
Arc::MCC_Status (A class for communication of MCC (p. 242) processing results)	245
Arc::MCCConfig	248
Arc::MCCInterface (Interface for communication between MCC (p. 242), Service (p. 331) and Plexer (p. 293) objects)	248
Arc::MCCLoader (Creator of Message (p. 252) Component Chains (MCC (p. 242)))	249
Arc::MCCPluginArgument	251
Arc::MD5Sum (Implementation of MD5 checksum)	251
Arc::MemoryAllocationException	252
Arc::Message (Object being passed through chain of MCCs)	252
Arc::MessageAttributes (A class for storage of attribute values)	254
Arc::MessageAuth (Contains authenticity information, authorization tokens and decisions)	258
Arc::MessageAuthContext (Handler for content of message auth* context)	259
Arc::MessageContext (Handler for content of message context)	259
Arc::MessageContextElement (Top class for elements contained in message context)	260
Arc::MessagePayload (Base class for content of message passed through chain)	260
Arc::ModuleDesc (Description of loadable module)	261
Arc::ModuleManager (Manager of shared libraries)	261
Arc::MultiSecAttr (Container of multiple SecAttr (p. 326) attributes)	263
Arc::MySQLDatabase	264
Arc::MySQLQuery	266
Arc::NotificationType	268
Arc::NS	268
Arc::OAuthConsumer	268
Arc::OpenIdpClient	270
Arc::OptionParser	271
ArcSec::OrderedCombiningAlg	272
passwd	272
Arc::PathIterator (Class to iterate through elements of path)	272
Arc::PayloadRaw (Raw byte multi-buffer)	273
Arc::PayloadRawBuf	276
Arc::PayloadRawInterface (Random Access Payload for Message (p. 252) objects)	276
Arc::PayloadSOAP (Payload of Message (p. 252) with SOAP content)	279
Arc::PayloadStream (POSIX handle as Payload)	280
Arc::PayloadStreamInterface (Stream-like Payload for Message (p. 252) object)	283
Arc::PayloadWSRF (This class combines MessagePayload (p. 260) with WSRF (p. 431))	286
ArcSec::PDP (Base class for Policy (p. 300) Decision Point plugins)	287
ArcSec::PDPCfgContext	288
ArcSec::PDPPluginArgument	288
Arc::Period	288
ArcSec::PeriodAttribute	291

ArcSec::PermitOverridesCombiningAlg (Implement the "Permit-Overrides" algorithm)	292
Arc::Plexer (The Plexer (p. 293) class, used for routing messages to services)	293
Arc::PlexerEntry (A pair of label (regex) and pointer to MCC (p. 242))	295
Arc::Plugin (Base class for loadable ARC components)	295
Arc::PluginArgument (Base class for passing arguments to loadable ARC components)	296
Arc::PluginDesc (Description of plugin)	298
Arc::PluginDescriptor (Description of ARC loadable component)	298
Arc::PluginsFactory (Generic ARC plugins loader)	298
ArcSec::Policy (Interface for containing and processing different types of policy)	300
ArcSec::PolicyStore::PolicyElement	303
ArcSec::PolicyParser (A interface which will isolate the policy object from actual policy storage (files, urls, database))	303
ArcSec::PolicyStore (Storage place for policy objects)	304
Arc::Printf < T0 , T1 , T2 , T3 , T4 , T5 , T6 , T7 >	304
Arc::PrintfBase	305
Arc::Profile	305
ArcCredential::PROXYCERTINFO_st	306
ArcCredential::PROXYPOLICY_st	306
Arc::Query	306
Arc::Range < T >	309
Arc::Register_Info_Type	309
Arc::RegisteredService (RegisteredService (p. 309) - extension of Service (p. 331) performing self-registration)	309
Arc::RegularExpression (A regular expression class)	310
ArcSec::Request (Base class/Interface for request, includes a container for RequestItems and some operations)	311
ArcSec::RequestAttribute (Wrapper which includes AttributeValue (p. 61) object which is generated according to date type of one specic node in Request.xml)	313
ArcSec::RequestItem (Interface for request item container, <subjects, actions, objects, ctxs> tuple)	313
ArcSec::RequestTuple	314
Arc::ResourceSlotType	314
Arc::ResourcesType	314
ArcSec::Response (Container for the evaluation results)	314
ArcSec::ResponseItem (Evaluation result concerning one RequestTuple (p. 314))	315
ArcSec::ResponseList	315
Arc::Run	315
Arc::SAML2LoginClient	319
Arc::SAML2SSOHTTPClient	320
Arc::SAMLToken (Class for manipulating SAML Token Profile (p. 305))	322
Arc::ScalableTime < T >	325
Arc::ScalableTime < int >	326
Arc::SecAttr (This is an abstract interface to a security attribute)	326
Arc::SecAttrFormat (Export/import format)	328
Arc::SecAttrValue (This is an abstract interface to a security attribute)	328

ArcSec::SecHandler (Base class for simple security handling plugins) . . .	329
Arc::SecHandlerConfig	330
ArcSec::SecHandlerConfig	330
ArcSec::SecHandlerPluginArgument	331
ArcSec::Security (Common stuff used by security related classes)	331
Arc::Service (Service (p. 331) - last component in a Message (p. 252) Chain)	331
Arc::ServicePluginArgument	334
Arc::SimpleCondition (Simple triggered condition)	334
Arc::SimpleCounter	336
Arc::SOAPMessage (Message (p. 252) restricted to SOAP payload)	336
Arc::Software (Used to represent software (names and version) and comparison)	337
Arc::SoftwareRequirement (Class used to express and resolve version requirements on software)	346
ArcSec::Source (Acquires and parses XML document from specified source)	354
ArcSec::SourceFile (Convenience class for obtaining XML document from file)	355
ArcSec::SourceURL (Convenience class for obtaining XML document from remote URL)	356
ArcSec::StringAttribute	356
Arc::Submitter (Base class for the Submitters)	357
Arc::SubmitterLoader	359
Arc::SubmitterPluginArgument	360
Arc::TargetGenerator (Target generation class)	360
Arc::TargetRetriever (TargetRetriever base class)	366
Arc::TargetRetrieverLoader	368
Arc::TargetRetrieverPluginArgument	370
Test::TestMCC	370
Test::TestService	370
Arc::ThreadDataItem (Base class for per-thread object)	371
Arc::ThreadInitializer	373
Arc::ThreadRegistry	373
Arc::Time (A class for storing and manipulating times)	374
ArcSec::TimeAttribute	377
Arc::TimedMutex	378
Arc::URL	379
Arc::URLLocation (Class to hold a resolved URL (p. 379) location)	387
Arc::URLMap	390
Arc::User	390
Arc::UserConfig (User configuration class)	390
Arc::UsernameToken (Interface for manipulation of WS-Security according to Username Token Profile (p. 305))	421
Arc::UserSwitch	424
Arc::VOMSACInfo	424
Arc::VOMSTrustList	424
Arc::WSAEndpointReference (Interface for manipulation of WS-Addressing Endpoint Reference)	426
Arc::WSAHeader (Interface for manipulation WS-Addressing information in SOAP header)	428
Arc::WSRF (Base class for every WSRF (p. 431) message)	431

Arc::WSRFBaseFault (Base class for WSRF (p. 431) fault messages) . . .	433
Arc::WSRFResourceUnavailableFault	434
Arc::WSRFResourceUnknownFault	434
Arc::WSRP (Base class for WS-ResourceProperties structures)	435
Arc::WSRPDeleteResourceProperties	437
Arc::WSRPDeleteResourcePropertiesRequest	437
Arc::WSRPDeleteResourcePropertiesRequestFailedFault	438
Arc::WSRPDeleteResourcePropertiesResponse	438
Arc::WSRPFault (Base class for WS-ResourceProperties faults)	439
Arc::WSRPGetMultipleResourcePropertiesRequest	440
Arc::WSRPGetMultipleResourcePropertiesResponse	440
Arc::WSRPGetResourcePropertyDocumentRequest	440
Arc::WSRPGetResourcePropertyDocumentResponse	441
Arc::WSRPGetResourcePropertyRequest	441
Arc::WSRPGetResourcePropertyResponse	442
Arc::WSRPInsertResourceProperties	442
Arc::WSRPInsertResourcePropertiesRequest	442
Arc::WSRPInsertResourcePropertiesRequestFailedFault	443
Arc::WSRPInsertResourcePropertiesResponse	443
Arc::WSRPInvalidModificationFault	444
Arc::WSRPInvalidResourcePropertyQNameFault	444
Arc::WSRPModifyResourceProperties	445
Arc::WSRPPutResourcePropertyDocumentRequest	445
Arc::WSRPPutResourcePropertyDocumentResponse	446
Arc::WSRPQueryResourcePropertiesRequest	446
Arc::WSRPQueryResourcePropertiesResponse	446
Arc::WSRPResourcePropertyChangeFailure	447
Arc::WSRPSetResourcePropertiesRequest	448
Arc::WSRPSetResourcePropertiesResponse	448
Arc::WSRPSetResourcePropertyRequestFailedFault	448
Arc::WSRPUnableToModifyResourcePropertyFault	449
Arc::WSRPUnableToPutResourcePropertyDocumentFault	449
Arc::WSRPUpdateResourceProperties	450
Arc::WSRPUpdateResourcePropertiesRequest	450
Arc::WSRPUpdateResourcePropertiesRequestFailedFault	451
Arc::WSRPUpdateResourcePropertiesResponse	451
ArcSec::X500NameAttribute	452
Arc::X509Token (Class for manipulating X.509 Token Profile (p. 305)) . . .	453
Arc::XmlContainer	455
Arc::XmlDatabase	455
Arc::XMLNode (Wrapper for LibXML library Tree interface)	455
Arc::XMLNodeContainer	468
Arc::XMLSecNode (Extends XMLNode (p. 455) class to support XML security operation)	470

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

AlgFactory.h	??
AnyURIAttribute.h	??
ArcConfig.h	??
ArcLocation.h	??
ArcRegex.h	??
AttributeFactory.h	??
AttributeProxy.h	??
AttributeValue.h	??
Base64.h	??
BooleanAttribute.h	??
Broker.h	??
ByteArray.h	??
CertUtil.h	??
Checksum.h	??
CISStringValue.h	??
ClassLoader.h	??
ClientInterface.h	??
ClientSAML2SSO.h	??
ClientX509Delegation.h	??
CombiningAlg.h	??
ConfusaCertHandler.h	??
ConfusaParserUtils.h	??
Counter.h	??
Credential.h	??
CredentialStore.h	??
DataBuffer.h	??
DataCallback.h	??
DataHandle.h	??
DataMover.h	??

DataPoint.h	??
DataPointDirect.h	??
DataPointIndex.h	??
DataSpeed.h	??
DataStatus.h	??
DateTime.h	??
DateTimeAttribute.h	??
DBInterface.h	??
DBBranch.h	??
DelegationInterface.h	??
DenyOverridesAlg.h	??
EqualFunction.h	??
EvaluationCtx.h	??
Evaluator.h	??
EvaluatorLoader.h	??
ExecutionTarget.h	??
FileCache.h	??
FileCacheHash.h	??
FileInfo.h	??
FileLock.h	??
FileUtils.h	??
FinderLoader.h	??
FnFactory.h	??
Function.h	??
GenericAttribute.h	??
GlobusErrorUtils.h	??
GlobusWorkarounds.h	??
GSSCredential.h	??
GUID.h	??
HakaClient.h	??
InfoCache.h	??
InfoFilter.h	??
InfoRegister.h	??
InformationInterface.h	??
IniConfig.h	??
InRangeFunction.h	??
IntraProcessCounter.h	??
IString.h	??
Job.h	??
JobController.h	??
JobDescription.h	??
JobDescriptionParser.h	??
JobState.h	??
JobSupervisor.h	??
listfunc.h	??
Loader.h	??
Logger.h	??
MatchFunction.h	??
MCC.h	??
MCC_Status.h	??

MCCLoader.h	??
Message.h	??
MessageAttributes.h	??
MessageAuth.h	??
ModuleManager.h	??
MysqlWrapper.h	??
OAuthConsumer.h	??
OpenIdpClient.h	??
OpenSSL.h	??
OptionParser.h	??
OrderedAlg.h	??
PayloadRaw.h	??
PayloadSOAP.h	??
PayloadStream.h	??
PayloadWSRF.h	??
PDP.h	??
PermitOverridesAlg.h	??
Plexer.h	??
Plugin.h	??
Policy.h	??
PolicyParser.h	??
PolicyStore.h	??
Profile.h	??
Proxycertinfo.h	??
RegisteredService.h	??
Request.h	??
RequestAttribute.h	??
RequestItem.h	??
Response.h	??
Result.h	??
Run.h	??
SAML2LoginClient.h	??
saml_util.h	??
SAMLToken.h	??
SecAttr.h	??
SecAttrValue.h	??
SecHandler.h	??
Security.h	??
Service.h	??
SOAPEnvelope.h	??
SOAPMessage.h	??
Software.h	??
Source.h	??
StringAttribute.h	??
StringConv.h	??
Submitter.h	??
TargetGenerator.h	??
TargetRetriever.h	??
loader/TestMCC.h	??
message/TestMCC.h	??

TestService.h	??
Thread.h	??
URL.h (Class to hold general URL's)	473
URLMap.h	??
User.h	??
UserConfig.h	??
UsernameToken.h	??
Utils.h	??
VOMSAttribute.h	??
VOMSUtil.h	??
win32.h	??
WSA.h	??
WSResourceProperties.h	??
WSRF.h	??
WSRFBaseFault.h	??
X500NameAttribute.h	??
X509Token.h	??
XmlContainer.h	??
XmlDatabase.h	??
XMLNode.h	??
XMLSecNode.h	??
XmlSecUtils.h	??

Chapter 5

Namespace Documentation

5.1 Arc Namespace Reference

Some utility methods for using xml security library (<http://www.aleksey.com/xmlsec/>)

Data Structures

- class **Broker**
- class **BrokerLoader**
- class **BrokerPluginArgument**
- class **ClientInterface**
Utility base class for MCC (p. 242).
- class **ClientTCP**
Class for setting up a MCC (p. 242) chain for TCP communication.
- struct **HTTPClientInfo**
- class **ClientHTTP**
Class for setting up a MCC (p. 242) chain for HTTP communication.
- class **ClientSOAP**
- class **SecHandlerConfig**
- class **DNListHandlerConfig**
- class **ARCPolicyHandlerConfig**
- class **ClientHTTPwithSAML2SSO**
- class **ClientSOAPwithSAML2SSO**
- class **ClientX509Delegation**
- class **ConfusaCertHandler**
- class **ConfusaParserUtils**
- class **HakaClient**
- class **OpenIdpClient**

- class **OAuthConsumer**
- class **SAML2LoginClient**
- class **SAML2SSOHTTPClient**
- class **ApplicationEnvironment**
ApplicationEnvironment (p. 54).
- class **ExecutionTarget**
ExecutionTarget (p. 175).
- class **Job**
Job (p. 210).
- class **JobController**
Base class for the JobControllers.
- class **JobControllerLoader**
- class **JobControllerPluginArgument**
- class **Range**
- class **ScalableTime**
- class **ScalableTime< int >**
- class **JobIdentificationType**
- class **ExecutableType**
- class **NotificationType**
- class **ApplicationType**
- class **ResourceSlotType**
- class **DiskSpaceRequirementType**
- class **ResourcesType**
- class **FileType**
- class **JobDescription**
- class **JobDescriptionParser**
- class **JobDescriptionParserLoader**
- class **JobState**
- class **JobSupervisor**
% JobSupervisor (p. 227) class
- class **Software**
Used to represent software (names and version) and comparison.
- class **SoftwareRequirement**
Class used to express and resolve version requirements on software.
- class **Submitter**
Base class for the Submitters.
- class **SubmitterLoader**
- class **SubmitterPluginArgument**

- class **TargetGenerator**
Target generation class
- class **TargetRetriever**
TargetRetriever base class
- class **TargetRetrieverLoader**
- class **TargetRetrieverPluginArgument**
- class **Config**
Configuration element - represents (sub)tree of ARC configuration.
- class **BaseConfig**
- class **ArcLocation**
Determines ARC installation location.
- class **RegularExpression**
A regular expression class.
- class **Base64**
- class **MemoryAllocationException**
- class **ByteArray**
- class **Counter**
A class defining a common interface for counters.
- class **CounterTicket**
A class for "tickets" that correspond to counter reservations.
- class **ExpirationReminder**
A class intended for internal use within counters.
- class **Period**
- class **Time**
A class for storing and manipulating times.
- class **Database**
Interface for calling database client library.
- class **Query**
- class **DItem**
- class **DBranch**
- class **DItemString**
- class **FileLock**
A general file locking class.
- class **IniConfig**
- class **IntraProcessCounter**

A class for counters used by threads within a single process.

- class **PrintfBase**
- class **Printf**
- class **IString**
- struct **LoggerFormat**
- class **LogMessage**

A class for log messages.

- class **LogDestination**

A base class for log destinations.

- class **LogStream**

A class for logging to ostreams.

- class **LogFile**

A class for logging to files.

- class **LoggerContext**

Container for logger configuration.

- class **Logger**

A logger class.

- class **MySQLDatabase**
- class **MySQLQuery**
- class **OptionParser**
- class **Profile**
- class **Run**
- class **ThreadDataItem**

Base class for per-thread object.

- class **SimpleCondition**

Simple triggered condition.

- class **SimpleCounter**
- class **TimedMutex**
- class **ThreadRegistry**
- class **ThreadInitializer**
- class **URL**
- class **URLLocation**

Class to hold a resolved URL (p. 379) location.

- class **PathIterator**

Class to iterate through elements of path.

- class **User**
- class **UserSwitch**
- class **initializeCredentialsType**
- class **UserConfig**
User configuration class
- class **CertEnvLocker**
- class **AutoPointer**
Wrapper for pointer with automatic destruction.
- class **CountedPointer**
Wrapper for pointer with automatic destruction and mutiple references.
- class **NS**
- class **XMLNode**
Wrapper for LibXML library Tree interface.
- class **XMLNodeContainer**
- class **CredentialError**
- class **Credential**
- class **VOMSACInfo**
- class **VOMSTrustList**
- class **CredentialStore**
- class **Checksum**
Defines interface for variuos checksum manipulations.
- class **CRC32Sum**
Implementation of CRC32 checksum.
- class **MD5Sum**
Implementation of MD5 checksum.
- class **Adler32Sum**
Implementation of Adler32 checksum.
- class **ChecksumAny**
*Wrapper for **Checksum** (p. 72) class.*
- class **DataBuffer**
Represents set of buffers.
- class **DataCallback**
- class **DataHandle**
*This class is a wrapper around the **DataPoint** (p. 120) class.*
- class **DataMover**

- class **DataPoint**

*This base class is an abstraction of **URL** (p. 379).*

- class **DataPointLoader**
- class **DataPointPluginArgument**
- class **DataPointDirect**

This is a kind of generalized file handle.

- class **DataPointIndex**

*Complements **DataPoint** (p. 120) with attributes common for **Indexing Service** (p. 331) URLs.*

- class **DataSpeed**

Keeps track of average and instantaneous transfer speed.

- class **DataStatus**
- struct **CacheParameters**
- class **FileCache**
- class **FileInfo**

***FileInfo** (p. 187) stores information about files (metadata).*

- class **URLMap**
- class **XmlContainer**
- class **XmlDatabase**
- class **DelegationConsumer**
- class **DelegationProvider**
- class **DelegationConsumerSOAP**
- class **DelegationProviderSOAP**
- class **DelegationContainerSOAP**
- class **GlobusResult**
- class **GSSCredential**
- class **InfoCache**

Stores XML document in filesystem split into parts.

- class **InfoCacheInterface**
- class **InfoFilter**

Filters information document according to identity of requestor.

- class **InfoRegister**

Registration to ISIS interface.

- class **InfoRegisters**

Handling multiple registrations to ISISes.

- struct **Register_Info_Type**
- struct **ISIS_description**

- class **InfoRegistrar**
Registration process associated with particular ISIS.
- class **InfoRegisterContainer**
- class **InformationInterface**
Information System message processor.
- class **InformationContainer**
Information System document container and processor.
- class **InformationRequest**
Request for information in InfoSystem.
- class **InformationResponse**
Informational response from InfoSystem.
- class **RegisteredService**
***RegisteredService** (p. 309) - extension of **Service** (p. 331) performing self-registration.*
- class **FinderLoader**
- class **Loader**
Plugins loader.
- class **LoadableModuleDescription**
- class **ModuleManager**
Manager of shared libraries.
- class **Plugin**
Base class for loadable ARC components.
- class **PluginArgument**
Base class for passing arguments to loadable ARC components.
- struct **PluginDescriptor**
Description of ARC loadable component.
- class **PluginDesc**
Description of plugin.
- class **ModuleDesc**
Description of loadable module.
- class **PluginsFactory**
Generic ARC plugins loader.
- class **MCCInterface**

*Interface for communication between **MCC** (p. 242), **Service** (p. 331) and **Plexer** (p. 293) objects.*

- class **MCC**

***Message** (p. 252) Chain Component - base class for every **MCC** (p. 242) plugin.*

- class **MCCConfig**
- class **MCCPluginArgument**
- class **MCC_Status**

*A class for communication of **MCC** (p. 242) processing results.*

- class **MCCLoader**

*Creator of **Message** (p. 252) Component Chains (**MCC** (p. 242)).*

- class **ChainContext**

Interface to chain specific functionality.

- class **MessagePayload**

Base class for content of message passed through chain.

- class **MessageContextElement**

Top class for elements contained in message context.

- class **MessageContext**

Handler for content of message context.

- class **MessageAuthContext**

Handler for content of message auth context.*

- class **Message**

Object being passed through chain of MCCs.

- class **AttributeIterator**

A const iterator class for accessing multiple values of an attribute.

- class **MessageAttributes**

A class for storage of attribute values.

- class **MessageAuth**

Contains authenticity information, authorization tokens and decisions.

- class **PayloadRawInterface**

*Random Access Payload for **Message** (p. 252) objects.*

- struct **PayloadRawBuf**

- class **PayloadRaw**

Raw byte multi-buffer.

- class **PayloadSOAP**
*Payload of **Message** (p. 252) with SOAP content.*
- class **PayloadStreamInterface**
*Stream-like Payload for **Message** (p. 252) object.*
- class **PayloadStream**
POSIX handle as Payload.
- class **PlexerEntry**
*A pair of label (regex) and pointer to **MCC** (p. 242).*
- class **Plexer**
*The **Plexer** (p. 293) class, used for routing messages to services.*
- class **CIStrStringValue**
This class implements case insensitive strings as security attributes.
- class **SecAttrValue**
This is an abstract interface to a security attribute.
- class **SecAttrFormat**
Export/import format.
- class **SecAttr**
This is an abstract interface to a security attribute.
- class **MultiSecAttr**
*Container of multiple **SecAttr** (p. 326) attributes.*
- class **Service**
***Service** (p. 331) - last component in a **Message** (p. 252) Chain.*
- class **ServicePluginArgument**
- class **SOAPMessage**
***Message** (p. 252) restricted to SOAP payload.*
- class **ClassLoader**
- class **ClassLoaderPluginArgument**
- class **WSAEndpointReference**
Interface for manipulation of WS-Addressing Endpoint Reference.
- class **WSAHeader**
Interface for manipulation WS-Addressing information in SOAP header.

- class **SAMLTOKEN**
*Class for manipulating SAML Token **Profile** (p. 305).*
- class **UsernameToken**
*Interface for manipulation of WS-Security according to Username Token **Profile** (p. 305).*
- class **X509Token**
*Class for manipulating X.509 Token **Profile** (p. 305).*
- class **PayloadWSRF**
*This class combines **MessagePayload** (p. 260) with **WSRF** (p. 431).*
- class **WSRP**
Base class for WS-ResourceProperties structures.
- class **WSRPFault**
Base class for WS-ResourceProperties faults.
- class **WSRPInvalidResourcePropertyQNameFault**
- class **WSRPResourcePropertyChangeFailure**
- class **WSRPUnableToPutResourcePropertyDocumentFault**
- class **WSRPInvalidModificationFault**
- class **WSRPUnableToModifyResourcePropertyFault**
- class **WSRPSetResourcePropertyRequestFailedFault**
- class **WSRPInsertResourcePropertiesRequestFailedFault**
- class **WSRPUpdateResourcePropertiesRequestFailedFault**
- class **WSRPDeleteResourcePropertiesRequestFailedFault**
- class **WSRPGetResourcePropertyDocumentRequest**
- class **WSRPGetResourcePropertyDocumentResponse**
- class **WSRPGetResourcePropertyRequest**
- class **WSRPGetResourcePropertyResponse**
- class **WSRPGetMultipleResourcePropertiesRequest**
- class **WSRPGetMultipleResourcePropertiesResponse**
- class **WSRPPutResourcePropertyDocumentRequest**
- class **WSRPPutResourcePropertyDocumentResponse**
- class **WSRPModifyResourceProperties**
- class **WSRPInsertResourceProperties**
- class **WSRPUpdateResourceProperties**
- class **WSRPDeleteResourceProperties**
- class **WSRPSetResourcePropertiesRequest**
- class **WSRPSetResourcePropertiesResponse**
- class **WSRPInsertResourcePropertiesRequest**
- class **WSRPInsertResourcePropertiesResponse**
- class **WSRPUpdateResourcePropertiesRequest**
- class **WSRPUpdateResourcePropertiesResponse**

- class **WSRPDeleteResourcePropertiesRequest**
- class **WSRPDeleteResourcePropertiesResponse**
- class **WSRPQueryResourcePropertiesRequest**
- class **WSRPQueryResourcePropertiesResponse**
- class **WSRF**

Base class for every WSRF (p. 431) message.

- class **WSRFBaseFault**

Base class for WSRF (p. 431) fault messages.

- class **WSRFResourceUnknownFault**
- class **WSRFResourceUnavailableFault**
- class **XMLSecNode**

Extends XMLNode (p. 455) class to support XML security operation.

Typedefs

- typedef **Plugin** `*(get_plugin_instance)(PluginArgument *arg)`
- typedef `std::multimap< std::string, std::string >` **AttrMap**
- typedef `AttrMap::const_iterator` **AttrConstIter**
- typedef `AttrMap::iterator` **AttrIter**

Enumerations

- enum **TimeFormat**
- enum **LogLevel**
- enum **LogFormat**
- enum **StatusKind** { ,
STATUS_OK = 1, **GENERIC_ERROR** = 2, **PARSING_ERROR** = 4, **PROTOCOL_-**
RECOGNIZED_ERROR = 8,
UNKNOWN_SERVICE_ERROR = 16, **BUSY_ERROR** = 32, **SESSION_-**
CLOSE = 64 }
- enum **WSAFault** { , **WSAFaultUnknown**, **WSAFaultInvalidAddressingHeader**
}

Functions

- `std::ostream & operator<< (std::ostream &, const Period &)`
- `std::ostream & operator<< (std::ostream &, const Time &)`
- `std::string TimeStamp (const TimeFormat &=Time::GetFormat())`
- `std::string TimeStamp (Time, const TimeFormat &=Time::GetFormat())`
- `int FileOpen (const std::string &path, int flags, mode_t mode=0600)`
- `int FileOpen (const std::string &path, int flags, uid_t uid, gid_t gid, mode_t mode=0600)`

- bool **FileCopy** (const std::string &source_path, const std::string &destination_path)
- bool **FileCopy** (const std::string &source_path, int destination_handle)
- bool **FileCopy** (int source_handle, const std::string &destination_path)
- bool **FileCopy** (int source_handle, int destination_handle)
- Glib::Dir * **DirOpen** (const std::string &path)
- Glib::Dir * **DirOpen** (const std::string &path, uid_t uid, gid_t gid)
- bool **FileStat** (const std::string &path, struct stat *st, bool follow_symlinks)
- bool **FileStat** (const std::string &path, struct stat *st, uid_t uid, gid_t gid, bool follow_symlinks)
- bool **DirCreate** (const std::string &path, mode_t mode, bool with_parents=false)
- bool **DirCreate** (const std::string &path, uid_t uid, gid_t gid, mode_t mode, bool with_parents=false)
- bool **DirDelete** (const std::string &path)
- bool **DirDelete** (const std::string &path, uid_t uid, gid_t gid)
- bool **TmpDirCreate** (std::string &path)
- void **GUID** (std::string &guid)
- std::string **UUID** (void)
- std::ostream & **operator**<< (std::ostream &os, **LogLevel** level)
- **LogLevel** **string_to_level** (const std::string &str)
- bool **istring_to_level** (const std::string &llStr, **LogLevel** &ll)
- bool **string_to_level** (const std::string &str, **LogLevel** &ll)
- std::string **level_to_string** (const **LogLevel** &level)
- **LogLevel** **old_level_to_level** (unsigned int old_level)
- template<typename T >
T **stringto** (const std::string &s)
- template<typename T >
bool **stringto** (const std::string &s, T &t)
- template<typename T >
std::string **tostring** (T t, const int width=0, const int precision=0)
- std::string **lower** (const std::string &s)
- std::string **upper** (const std::string &s)
- void **tokenize** (const std::string &str, std::vector< std::string > &tokens, const std::string &delimiters=" ", const std::string &start_quotes="", const std::string &end_quotes="")
- std::string **trim** (const std::string &str, const char *sep=NULL)
- std::string **strip** (const std::string &str)
- std::string **uri_unescape** (const std::string &str)
- std::string **convert_to_rdn** (const std::string &dn)
- bool **CreateThreadFunction** (void(*func)(void *), void *arg, **SimpleCounter** *count=NULL)
- std::list< **URL** > **ReadURLList** (const **URL** &urllist)
- std::string **GetEnv** (const std::string &var)
- std::string **GetEnv** (const std::string &var, bool &found)
- bool **SetEnv** (const std::string &var, const std::string &value, bool overwrite=true)
- void **UnsetEnv** (const std::string &var)
- std::string **StrError** (int errnum=errno)

- bool **MatchXMLName** (const **XMLNode** &node1, const **XMLNode** &node2)
- bool **MatchXMLName** (const **XMLNode** &node, const char *name)
- bool **MatchXMLName** (const **XMLNode** &node, const std::string &name)
- bool **MatchXMLNamespace** (const **XMLNode** &node1, const **XMLNode** &node2)
- bool **MatchXMLNamespace** (const **XMLNode** &node, const char *uri)
- bool **MatchXMLNamespace** (const **XMLNode** &node, const std::string &uri)
- bool **createVOMSAC** (std::string &codedac, **Credential** &issuer_cred, **Credential** &holder_cred, std::vector< std::string > &fqan, std::vector< std::string > &targets, std::vector< std::string > &attributes, std::string &voname, std::string &uri, int lifetime)
- bool **addVOMSAC** (**ArcCredential::AC** **&aclist, std::string &acorder, std::string &decodedac)
- bool **parseVOMSAC** (X509 *holder, const std::string &ca_cert_dir, const std::string &ca_cert_file, const **VOMSTrustList** &vomscert_trust_dn, std::vector< **VOMSACInfo** > &output, bool verify=true)
- bool **parseVOMSAC** (const **Credential** &holder_cred, const std::string &ca_cert_dir, const std::string &ca_cert_file, const **VOMSTrustList** &vomscert_trust_dn, std::vector< **VOMSACInfo** > &output, bool verify=true)
- char * **VOMSDecode** (const char *data, int size, int *j)
- const std::string **get_property** (const **Arc::Credential** &u, const std::string property)
- bool **OpenSSLInit** (void)
- void **HandleOpenSSLError** (void)
- void **HandleOpenSSLError** (int code)
- std::string **string** (**StatusKind** kind)
- const char * **ContentFromPayload** (const **MessagePayload** &payload)
- void **WSAFaultAssign** (**SOAPEnvelope** &message, **WSAFault** fid)
- **WSAFault** **WSAFaultExtract** (**SOAPEnvelope** &message)
- int **passphrase_callback** (char *buf, int size, int rflag, void *)
- bool **init_xmlsec** (void)
- bool **final_xmlsec** (void)
- std::string **get_cert_str** (const char *certfile)
- xmlSecKey * **get_key_from_keystr** (const std::string &value)
- xmlSecKey * **get_key_from_keyfile** (const char *keyfile)
- std::string **get_key_from_certfile** (const char *certfile)
- xmlSecKey * **get_key_from_certstr** (const std::string &value)
- xmlSecKeysMngrPtr **load_key_from_keyfile** (xmlSecKeysMngrPtr *keys_manager, const char *keyfile)
- xmlSecKeysMngrPtr **load_key_from_certfile** (xmlSecKeysMngrPtr *keys_manager, const char *certfile)
- xmlSecKeysMngrPtr **load_key_from_certstr** (xmlSecKeysMngrPtr *keys_manager, const std::string &certstr)
- xmlSecKeysMngrPtr **load_trusted_cert_file** (xmlSecKeysMngrPtr *keys_manager, const char *cert_file)
- xmlSecKeysMngrPtr **load_trusted_cert_str** (xmlSecKeysMngrPtr *keys_manager, const std::string &cert_str)
- xmlSecKeysMngrPtr **load_trusted_certs** (xmlSecKeysMngrPtr *keys_manager, const char *cafile, const char *capath)
- **XMLNode** **get_node** (**XMLNode** &parent, const char *name)

Variables

- const Glib::TimeVal **ETERNAL**
- const Glib::TimeVal **HISTORIC**
- const size_t **thread_stacksize** = (16 * 1024 * 1024)
- **Logger CredentialLogger**
- const char * **plugins_table_name**

5.1.1 Detailed Description

Some utility methods for using xml security library (<http://www.aleksey.com/xmlsec/>)

JobDescription (p. 222) The **JobDescription** (p. 222) class is the internal representation of a job description in the ARC-lib. It is structured into a number of other classes/objects which should strictly follow the description given in the job description document <http://svn.nordugrid.org/trac/nordugrid/browser/arc1/trunk/doc/tech_doc/client/job_description.odt>.

The class consist of a parsing method **JobDescription::Parse** (p. 223) which tries to parse the passed source using a number of different parsers. The parser method is complemented by the **JobDescription::UnParse** (p. 224) method, a method to generate a job description document in one of the supported formats. Additionally the internal representation is contained in public members which makes it directly accessible and modifiable from outside the scope of the class.

JobDescriptionParser (p. 225) The **JobDescriptionParser** (p. 225) class is abstract which provide a interface for job description parsers. A job description parser should inherit this class and overwrite the **JobDescriptionParser::Parse** and **JobDescriptionParser::UnParse** methods.

Credential (p. 98) class covers the functionality about general processing about certificate/key files, including: 1. certificate/key parsing, information extracting (such as subject name, issuer name, lifetime, etc.), chain verifying, extension processing about proxy certinfo, extension processing about other general certificate extension (such as voms attributes, it should be the extension-specific code itself to create, parse and verify the extension, not the **Credential** (p. 98) class. For voms, it is some code about writing and parsing voms-implementing Attribute Certificate/ RFC3281, the voms-attribute is then be looked as a binary part and embeded into extension of X509 certificate/proxy certificate); 2. certificate request, extension emeding and certificate signing, for both proxy certificate and EEC (end entity certificate) certificate The Credential class support PEM, DER PKCS12 credential.

Some implicit idea in the ClassLoader/ModuleManager stuff: `share_lib_name` (e.g. `mccsoap`) should be global identical `plugin_name` (e.g. `__arc_attrfactory_modules__`) should be global identical `desc->name` (e.g. `attr.factory`) should also be global identical

5.1.2 Typedef Documentation

5.1.2.1 typedef AttrMap::const_iterator Arc::AttrConstIter

A typedef of a `const_iterator` for `AttrMap`.

This typedef is used as a shorthand for a `const_iterator` for `AttrMap`. It is used extensively within the **MessageAttributes** (p. 254) class as well as the `AttributesIterator` class, but is not visible externally.

5.1.2.2 typedef `AttrMap::iterator` `Arc::AttrIter`

A typedef of an (non-const) iterator for `AttrMap`.

This typedef is used as a shorthand for a (non-const) iterator for `AttrMap`. It is used in one method within the **MessageAttributes** (p. 254) class, but is not visible externally.

5.1.2.3 typedef `std::multimap<std::string,std::string>` `Arc::AttrMap`

A typedef of a multimap for storage of message attributes.

This typedef is used as a shorthand for a multimap that uses strings for keys as well as values. It is used within the `MessageAttributes` class for internal storage of message attributes, but is not visible externally.

5.1.2.4 typedef `Plugin*(* Arc::get_plugin_instance)(PluginArgument *arg)`

Constructor function of ARC loadable component.

This function is called with plugin-specific argument and should produce and return valid instance of plugin. If plugin can't be produced by any reason (for example because passed argument is not applicable) then `NULL` is returned. No exceptions should be raised.

5.1.3 Enumeration Type Documentation

5.1.3.1 enum `Arc::LogFormat`

Output formats.

Defines prefix for every message. `LongFormat` - all information about message is printed `ShortFormat` - only message level is printed `DebugFormat` - message time (microsecond precision) and time difference from previous message are printed. This format is mostly meant for profiling. `EmptyFormat` - only message is printed

5.1.3.2 enum `Arc::LogLevel`

Logging levels.

Logging levels for tagging and filtering log messages. `FATAL` level designates very severe error events that will presumably lead the application to abort. `ERROR` level designates error events that might still allow the application to continue running. `WARNING` level designates potentially harmful situations. `INFO` level designates informational messages that highlight the progress of the application at coarse-grained level.

VERBOSE level designates fine-grained informational events that will give additional information about the application. DEBUG level designates finer-grained informational events which should only be used for debugging purposes.

5.1.3.3 enum Arc::StatusKind

Status kinds (types)

This enum defines a set of possible status kinds.

Enumerator:

- STATUS_OK** Default status - undefined error.
- GENERIC_ERROR** No error.
- PARSING_ERROR** Error does not fit any class.
- PROTOCOL_RECOGNIZED_ERROR** Error detected while parsing request/response.
- UNKNOWN_SERVICE_ERROR** **Message** (p. 252) does not fit into expected protocol.
- BUSY_ERROR** There is no destination configured for this message.
- SESSION_CLOSE** **Message** (p. 252) can't be processed now.

5.1.3.4 enum Arc::WSAFault

WS-Addressing possible faults.

Enumerator:

- WSAFaultUnknown** This is not a fault
- WSAFaultInvalidAddressingHeader** This is not a WS-Addressing fault

5.1.4 Function Documentation

5.1.4.1 bool Arc::addVOMSAC (ArcCredential::AC **& *aclist*, std::string & *acorder*, std::string & *decodedac*)

Add decoded AC string into a list of AC objects

Parameters

<i>aclist</i>	The list of AC objects (output)
<i>acorder</i>	The order of AC objects (output)
<i>decodedac</i>	The AC string that is decoded from the string returned from voms server (input)

5.1.4.2 `const char* Arc::ContentFromPayload (const MessagePayload & payload)`

Returns pointer to main memory chunk of **Message** (p. 252) payload.

If no buffer is present or if payload is not of **PayloadRawInterface** (p. 276) type NULL is returned.

5.1.4.3 `bool Arc::CreateThreadFunction (void(*)(void *) func, void * arg, SimpleCounter * count = NULL)`

This macro behaves like function which makes thread of class' method.

It accepts class instance and full name of method - like class::method. 'method' should not be static member of the class. Result is true if creation of thread succeeded. Specified instance must be valid during whole lifetime of thread. So probably it is safer to destroy 'instance' in 'method' just before exiting. Helper function to create simple thread. It takes care of all peculiarities of Glib::Thread API. As result it runs function 'func' with argument 'arg' in a separate thread. If count parameter not NULL then corresponding object will be incremented before function returns and then decremented then thread finished. Returns true on success.

5.1.4.4 `bool Arc::createVOMSAC (std::string & codedac, Credential & issuer_cred, Credential & holder_cred, std::vector< std::string > & fqan, std::vector< std::string > & targets, std::vector< std::string > & attributes, std::string & voname, std::string & uri, int lifetime)`

Create AC(Attribute Certificate) with voms specific format.

Parameters

<i>codedac</i>	The coded AC as output of this method
<i>issuer_cred</i>	The issuer credential which is used to sign the AC
<i>holder_cred</i>	The holder credential, the holder certificate is the one which carries AC The rest arguments are the same as the above method

5.1.4.5 `int Arc::FileOpen (const std::string & path, int flags, mode_t mode = 0600)`

Utility functions for handling files and directories.

Open a file and return a file handle

5.1.4.6 `bool Arc::final_xmlsec (void)`

Finalize the xml security library

5.1.4.7 `std::string Arc::get_cert_str (const char * certfile)`

Get certificate in string format from certificate file

5.1.4.8 `std::string Arc::get_key_from_certfile (const char * certfile)`

Get public key in string format from certificate file

5.1.4.9 `xmlSecKey* Arc::get_key_from_certstr (const std::string & value)`

Get public key in xmlSecKey structure from certificate string (the string under "-----BEGIN CERTIFICATE-----" and "-----END CERTIFICATE-----")

5.1.4.10 `xmlSecKey* Arc::get_key_from_keyfile (const char * keyfile)`

Get key in xmlSecKey structure from key file

5.1.4.11 `xmlSecKey* Arc::get_key_from_keyst (const std::string & value)`

Get key in xmlSecKey structure from key in string format

5.1.4.12 `XMLNode Arc::get_node (XMLNode & parent, const char * name)`

Generate a new child **XMLNode** (p. 455) with specified name

5.1.4.13 `const std::string Arc::get_property (const Arc::Credential & u, const std::string property)`

Extract the needed field from the certificate

5.1.4.14 `void Arc::GUID (std::string & guid)`

Utilities for generating unique identifiers in the form 12345678-90ab-cdef-1234-567890abcdef.
Generates a unique identifier using information such as IP address, current time etc.

5.1.4.15 `bool Arc::init_xmlsec (void)`

Initialize the xml security library, it should be called before the xml security functionality is used.

5.1.4.16 `bool Arc::istring_to_level (const std::string & lStr, LogLevel & l)`

Case-insensitive parsing of a string to a LogLevel with error response.

The method will try to parse (case-insensitive) the argument string to a corresponding LogLevel. If the method succeeds, true will be returned and the argument *l* will be set to the parsed LogLevel. If the parsing fails *false* will be returned. The parsing succeeds if *lStr* match (case-insensitively) one of the names of the LogLevel members.

Parameters

<i>llStr</i>	a string which should be parsed to a Arc::LogLevel (p. 37).
<i>ll</i>	a Arc::LogLevel (p. 37) reference which will be set to the matching Arc::LogLevel (p. 37) upon successful parsing.

Returns

`true` in case of successful parsing, otherwise `false`.

See also

LogLevel (p. 37)

5.1.4.17 `xmlSecKeysMngrPtr Arc::load_key_from_certfile (xmlSecKeysMngrPtr * keys_manager, const char * certfile)`

Load public key from a certificate file into key manager

5.1.4.18 `xmlSecKeysMngrPtr Arc::load_key_from_certstr (xmlSecKeysMngrPtr * keys_manager, const std::string & certstr)`

Load public key from a certificate string into key manager

5.1.4.19 `xmlSecKeysMngrPtr Arc::load_key_from_keyfile (xmlSecKeysMngrPtr * keys_manager, const char * keyfile)`

Load private or public key from a key file into key manager

5.1.4.20 `xmlSecKeysMngrPtr Arc::load_trusted_cert_file (xmlSecKeysMngrPtr * keys_manager, const char * cert_file)`

Load trusted certificate from certificate file into key manager

5.1.4.21 `xmlSecKeysMngrPtr Arc::load_trusted_cert_str (xmlSecKeysMngrPtr * keys_manager, const std::string & cert_str)`

Load trusted certificate from certificate string into key manager

5.1.4.22 `xmlSecKeysMngrPtr Arc::load_trusted_certs (xmlSecKeysMngrPtr * keys_manager, const char * cafile, const char * capath)`

Load trusted certificates from a file or directory into key manager

5.1.4.23 `bool Arc::MatchXMLName (const XMLNode & node1, const XMLNode & node2)`

Returns true if underlying XML elements have same names

5.1.4.24 `bool Arc::MatchXMLName (const XMLNode & node, const char * name)`

Returns true if 'name' matches name of 'node'. If name contains prefix it's checked too

5.1.4.25 `bool Arc::MatchXMLName (const XMLNode & node, const std::string & name)`

Returns true if 'name' matches name of 'node'. If name contains prefix it's checked too

5.1.4.26 `bool Arc::MatchXMLNamespace (const XMLNode & node, const std::string & uri)`

Returns true if 'namespace' matches 'node's namespace.

5.1.4.27 `bool Arc::MatchXMLNamespace (const XMLNode & node, const char * uri)`

Returns true if 'namespace' matches 'node's namespace.

5.1.4.28 `bool Arc::MatchXMLNamespace (const XMLNode & node1, const XMLNode & node2)`

Returns true if underlying XML elements belong to same namespaces

5.1.4.29 `bool Arc::OpenSSLInit (void)`

This module contains various convenience utilities for using OpenSSL.

Application may be linked to this module instead of OpenSSL libraries directly. This function initializes OpenSSL library. It may be called multiple times and makes sure everything is done properly and OpenSSL may be used in multi-threaded environment. Because this function makes use of **ArcLocation** (p. 55) it is advisable to call it after **ArcLocation::Init()** (p. 55).

5.1.4.30 `std::ostream& Arc::operator<< (std::ostream & , const Period &)`

Prints a Period-object to the given ostream -- typically cout.

5.1.4.31 `std::ostream& Arc::operator<< (std::ostream & , const Time &)`

Prints a Time-object to the given ostream -- typically cout.

5.1.4.32 `std::ostream& Arc::operator<< (std::ostream & os, LogLevel level)`

Printing of LogLevel values to ostreams.

Output operator so that LogLevel values can be printed in a nicer way.

5.1.4.33 `bool Arc::parseVOMSAC (X509 * holder, const std::string & ca_cert_dir, const std::string & ca_cert_file, const VOMSTrustList & vomscert_trust_dn, std::vector< VOMSACInfo > & output, bool verify = true)`

Parse the certificate, and output the attributes.

Parameters

<i>holder</i>	The proxy certificate which includes the voms specific formatted AC.
<i>ca_cert_dir</i>	The trusted certificates which are used to verify the certificate which is used to sign the AC
<i>ca_cert_file</i>	The same as ca_cert_dir except it is a file instead of a directory. Only one of them need to be set
<i>vomsdir</i>	The directory which include *.lsc file for each vo. For instance, a vo called "knowarc.eu" should have file \$prefix/vomsdir/knowarc/voms.knowarc.eu.lsc which contains on the first line the DN of the VOMS server, and on the second line the corresponding CA DN: /O=Grid/O=NorduGrid/OU=KnowARC/CN=voms.knowarc.eu /O=Grid/O=NorduGrid/CN=NorduGrid Certification Authority See more in: https://twiki.cern.ch/twiki/bin/view/LCG/VomsFAQforServiceManagers
<i>output</i>	The parsed attributes (Role and Generic Attribute) . Each attribute is stored in element of a vector as a string. It is up to the consumer to understand the meaning of the attribute. There are two types of attributes stored in VOMS AC: AC_IETFATTR, AC_FULL_ATTRIBUTES. The AC_IETFATTR will be like /Role=Employee/Group=Tester/Capability=NULL The AC_FULL_ATTRIBUTES will be like knowarc:Degree=PhD (qualifier::name=value) In order to make the output attribute values be identical, the voms server information is added as prefix of the original attributes in AC. for AC_FULL_ATTRIBUTES, the voname + hostname is added: /voname=knowarc.eu/hostname=arthur.hep.lu.se:15001//knowarc.eu/coredev:attribute1=1 for AC_IETFATTR, the 'VO' (voname) is added: /VO=knowarc.eu/Group=coredev/Role=NULL/Capability=NULL /VO=knowarc.eu/Group=testers/Role=NULL/Capability=NULL

some other redundant attributes is provided: voname=knowarc.eu/hostname=arthur.hep.lu.se:15001

Parameters

<i>verify</i>	true: Verify the voms certificate is trusted based on the ca_cert_dir/ca_cert_file which specifies the CA certificates, and the vomscert_trust_dn which specifies the trusted DN chain from voms server certificate to CA certificate.
---------------	--

false: Not verify, which means the issuer of AC (voms server certificate is supposed to be trusted by default). In this case the parameters 'ca_cert_dir', 'ca_cert_file' and 'vomscert_trust_dn' will not effect, and should be set as empty. This case is specifically used by 'arcproxy --info' to list all of the attributes in AC, and not to need to verify if the AC's issuer is trusted.

5.1.4.34 `bool Arc::parseVOMSAC (const Credential & holder_cred, const std::string & ca_cert_dir, const std::string & ca_cert_file, const VOMSTrustList & vomscert_trust_dn, std::vector< VOMSACInfo > & output, bool verify = true)`

Parse the certificate. Similar to above one, but collects information From all certificates in a chain.

5.1.4.35 `int Arc::passphrase_callback (char * buf, int size, int rwflag, void *)`

callback method for inputing passphrase of key file

5.1.4.36 `std::string Arc::string (StatusKind kind)`

Conversion to string.

Conversion from StatusKind to string.

Parameters

<i>kind</i>	The StatusKind to convert.
-------------	----------------------------

5.1.4.37 `std::string Arc::TimeStamp (const TimeFormat & = Time::GetFormat ())`

Returns a time-stamp of the current time in some format.

5.1.4.38 `std::string Arc::TimeStamp (Time , const TimeFormat & = Time::GetFormat ())`

Returns a time-stamp of some specified time in some format.

5.1.4.39 `bool Arc::TmpDirCreate (std::string & path)`

Create a temporary directory under the system defined temp location, and return its path.

Uses mkdtemp if available, and a combination of random parameters if not. This latter method is not as safe as mkdtemp.

5.1.4.40 `char* Arc::VOMSDecode (const char * data, int size, int * j)`

Decode the data which is encoded by voms server. Since voms code uses some specific coding method (not base64 encoding), we simply copy the method from voms code to here

5.1.4.41 void Arc::WSAFaultAssign (SOAPEnvelope & *message*, WSAFault *fid*)

Makes WS-Addressing fault.

It fills SOAP Fault message with WS-Addressing fault related information.

5.1.4.42 WSAFault Arc::WSAFaultExtract (SOAPEnvelope & *message*)

Gets WS-addressing fault.

Analyzes SOAP Fault message and returns WS-Addressing fault it represents.

5.1.5 Variable Documentation**5.1.5.1 Logger Arc::CredentialLogger**

Logger (p. 233) to be used by all modules of credentials library

5.1.5.2 const char* Arc::plugins_table_name

Name of symbol referring to table of plugins.

This C null terminated string specifies name of symbol which shared library should export to give an access to an array of **PluginDescriptor** (p. 298) elements. The array is terminated by element with all components set to NULL.

5.1.5.3 const size_t Arc::thread_stacksize = (16 * 1024 * 1024)

This module provides convenient helpers for Glibmm interface for thread management.

So far it takes care of automatic initialization of threading environment and creation of simple detached threads. Always use it instead of glibmm/thread.h and keep among first includes. It safe to use it multiple times and to include it both from source files and other include files. Defines size of stack assigned to every new thread.

5.2 ArcCredential Namespace Reference**Data Structures**

- struct **cert_verify_context**
- struct **PROXYPOLICY_st**
- struct **PROXYCERTINFO_st**
- struct **ACDIGEST**
- struct **ACIS**
- struct **ACFORM**
- struct **ACACI**

- struct **ACHOLDER**
- struct **ACVAL**
- struct **ACIETFATTR**
- struct **ACTARGET**
- struct **ACTARGETS**
- struct **ACATTR**
- struct **ACINFO**
- struct **ACC**
- struct **ACSEQ**
- struct **ACCERTS**
- struct **ACATTRIBUTE**
- struct **ACATTHOLDER**
- struct **ACFULLATTRIBUTES**

Enumerations

- enum **certType** {
CERT_TYPE_EEC, **CERT_TYPE_CA**, **CERT_TYPE_GSI_3_IMPERSONATION_PROXY**, **CERT_TYPE_GSI_3_INDEPENDENT_PROXY**,
CERT_TYPE_GSI_3_LIMITED_PROXY, **CERT_TYPE_GSI_3_RESTRICTED_PROXY**, **CERT_TYPE_GSI_2_PROXY**, **CERT_TYPE_GSI_2_LIMITED_PROXY**,
CERT_TYPE_RFC_IMPERSONATION_PROXY, **CERT_TYPE_RFC_INDEPENDENT_PROXY**, **CERT_TYPE_RFC_LIMITED_PROXY**, **CERT_TYPE_RFC_RESTRICTED_PROXY**,
CERT_TYPE_RFC_ANYLANGUAGE_PROXY }

5.2.1 Detailed Description

Functions and constants for maintaining proxy certificates The code is derived from globus gsi, voms, and openssl-0.9.8e. The existing code for maintaining proxy certificates in OpenSSL only covers standard proxies and does not cover old Globus proxies, so here the Globus code is introduced.

Borrow the code about Attribute Certificate from VOMS The **VOMSAttribute.h** (p. ??) and **VOMSAttribute.cpp** are integration about code written by VOMS project, so here the original license follows.

5.2.2 Enumeration Type Documentation

5.2.2.1 enum ArcCredential::certType

Enumerator:

- CERT_TYPE_EEC** A end entity certificate
- CERT_TYPE_CA** A CA certificate

CERT_TYPE_GSI_3_IMPERSONATION_PROXY A X.509 Proxy Certificate Profile (pre-RFC) compliant impersonation proxy

CERT_TYPE_GSI_3_INDEPENDENT_PROXY A X.509 Proxy Certificate Profile (pre-RFC) compliant independent proxy

CERT_TYPE_GSI_3_LIMITED_PROXY A X.509 Proxy Certificate Profile (pre-RFC) compliant limited proxy

CERT_TYPE_GSI_3_RESTRICTED_PROXY A X.509 Proxy Certificate Profile (pre-RFC) compliant restricted proxy

CERT_TYPE_GSI_2_PROXY A legacy Globus impersonation proxy

CERT_TYPE_GSI_2_LIMITED_PROXY A legacy Globus limited impersonation proxy

CERT_TYPE_RFC_IMPERSONATION_PROXY A X.509 Proxy Certificate Profile RFC compliant impersonation proxy; RFC inheritAll proxy

CERT_TYPE_RFC_INDEPENDENT_PROXY A X.509 Proxy Certificate Profile RFC compliant independent proxy; RFC independent proxy

CERT_TYPE_RFC_LIMITED_PROXY A X.509 Proxy Certificate Profile RFC compliant limited proxy

CERT_TYPE_RFC_RESTRICTED_PROXY A X.509 Proxy Certificate Profile RFC compliant restricted proxy

CERT_TYPE_RFC_ANYLANGUAGE_PROXY RFC anyLanguage proxy

Chapter 6

Data Structure Documentation

6.1 ArcCredential::ACACI Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.2 ArcCredential::ACATTHOLDER Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.3 ArcCredential::ACATTR Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.4 ArcCredential::ACATTRIBUTE Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.5 ArcCredential::ACC Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.6 ArcCredential::ACCERTS Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.7 ArcCredential::ACDIGEST Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.8 ArcCredential::ACFORM Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.9 ArcCredential::ACFULLATTRIBUTES Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.10 ArcCredential::ACHOLDER Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.11 ArcCredential::ACIETFATTR Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.12 ArcCredential::ACINFO Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.13 ArcCredential::ACIS Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.14 ArcCredential::ACSEQ Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.15 ArcCredential::ACTARGET Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.16 ArcCredential::ACTARGETS Struct Reference

The documentation for this struct was generated from the following file:

- VOMSAttribute.h

6.17 ArcCredential::ACVAL Struct Reference

The documentation for this struct was generated from the following file:

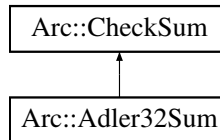
- VOMSAttribute.h

6.18 Arc::Adler32Sum Class Reference

Implementation of Adler32 checksum.

```
#include <Checksum.h>
```

Inheritance diagram for Arc::Adler32Sum:



6.18.1 Detailed Description

Implementation of Adler32 checksum.

The documentation for this class was generated from the following file:

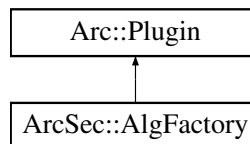
- CheckSum.h

6.19 ArcSec::AlgFactory Class Reference

Interface for algorithm factory class.

```
#include <AlgFactory.h>
```

Inheritance diagram for ArcSec::AlgFactory:



Public Member Functions

- virtual **CombiningAlg** * **createAlg** (const std::string &type)=0

6.19.1 Detailed Description

Interface for algorithm factory class. **AlgFactory** (p. 52) is in charge of creating **CombiningAlg** (p. 82) according to the algorithm type given as argument of method createAlg. This class can be inherited for implementing a factory class which can create some specific combining algorithm objects.

6.19.2 Member Function Documentation

6.19.2.1 **virtual CombiningAlg*** ArcSec::AlgFactory::createAlg (const std::string & *type*)
[pure virtual]

creat algorithm object based on the type algorithm type

Parameters

<i>type</i>	The type of combining algorithm
-------------	---------------------------------

Returns

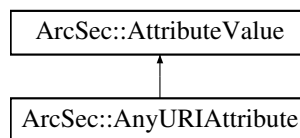
The object of **CombiningAlg** (p. 82)

The documentation for this class was generated from the following file:

- AlgFactory.h

6.20 ArcSec::AnyURIAttribute Class Reference

Inheritance diagram for ArcSec::AnyURIAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- std::string **getId** ()
- virtual std::string **getType** ()

6.20.1 Member Function Documentation

6.20.1.1 **virtual std::string** ArcSec::AnyURIAttribute::encode () [inline, virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.20.1.2 `virtual bool ArcSec::AnyURIAttribute::equal (AttributeValue * value, bool check_id = true) [virtual]`

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.20.1.3 `std::string ArcSec::AnyURIAttribute::getId () [inline, virtual]`

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.20.1.4 `virtual std::string ArcSec::AnyURIAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

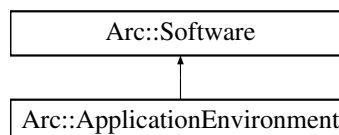
- AnyURIAttribute.h

6.21 Arc::ApplicationEnvironment Class Reference

ApplicationEnvironment (p. 54).

```
#include <ExecutionTarget.h>
```

Inheritance diagram for Arc::ApplicationEnvironment:



6.21.1 Detailed Description

ApplicationEnvironment (p. 54). The ApplicationEnvironment is closely related to the definition given in GLUE2. By extending the **Software** (p. 337) class the two GLUE2 attributes AppName and AppVersion are mapped to two private members. However these can be obtained through the inherited member methods getName and getVersion.

GLUE2 description: A description of installed application software or software environment characteristics available within one or more Execution Environments.

The documentation for this class was generated from the following file:

- ExecutionTarget.h

6.22 Arc::ApplicationType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.23 Arc::ArcLocation Class Reference

Determines ARC installation location.

```
#include <ArcLocation.h>
```

Static Public Member Functions

- static void **Init** (std::string path)
- static const std::string & **Get** ()
- static std::list< std::string > **GetPlugins** ()

6.23.1 Detailed Description

Determines ARC installation location.

6.23.2 Member Function Documentation

6.23.2.1 static std::list<std::string> Arc::ArcLocation::GetPlugins () [static]

Returns ARC plugins directory location.

Main source is value of variable ARC_PLUGIN_PATH, otherwise path is derived from installation location.

6.23.2.2 static void Arc::ArcLocation::Init (std::string path) [static]

Initializes location information.

Main source is value of variable ARC_LOCATION, otherwise path to executable provided in is used. If nothing works then warning message is sent to logger and initial installation prefix is used.

The documentation for this class was generated from the following file:

- ArcLocation.h

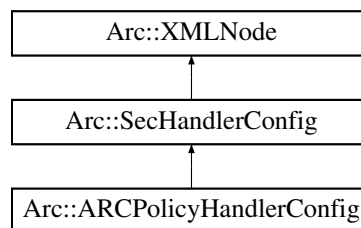
6.24 ArcSec::ArcPeriod Struct Reference

The documentation for this struct was generated from the following file:

- DateTimeAttribute.h

6.25 Arc::ARCPolicyHandlerConfig Class Reference

Inheritance diagram for Arc::ARCPolicyHandlerConfig:



The documentation for this class was generated from the following file:

- ClientInterface.h

6.26 ArcSec::Attr Struct Reference

Attr (p. 56) contains a tuple of attribute type and value.

```
#include <Request.h>
```

6.26.1 Detailed Description

Attr (p. 56) contains a tuple of attribute type and value.

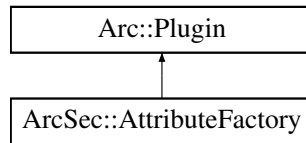
The documentation for this struct was generated from the following file:

- Request.h

6.27 ArcSec::AttributeFactory Class Reference

```
#include <AttributeFactory.h>
```

Inheritance diagram for ArcSec::AttributeFactory:



6.27.1 Detailed Description

Base attribute factory class

The documentation for this class was generated from the following file:

- AttributeFactory.h

6.28 Arc::AttributeIterator Class Reference

A const iterator class for accessing multiple values of an attribute.

```
#include <MessageAttributes.h>
```

Public Member Functions

- **AttributeIterator** ()
- const std::string & **operator*** () const
- const std::string * **operator->** () const
- const std::string & **key** (void) const
- const **AttributeIterator** & **operator++** ()
- **AttributeIterator** **operator++** (int)
- bool **hasMore** () const

Protected Member Functions

- **AttributeIterator** (**AttrConstIter** begin, **AttrConstIter** end)

Protected Attributes

- **AttrConstIter** **current_**
- **AttrConstIter** **end_**

Friends

- class **MessageAttributes**

6.28.1 Detailed Description

A const iterator class for accessing multiple values of an attribute. This is an iterator class that is used when accessing multiple values of an attribute. The `getAll()` method of the **MessageAttributes** (p. 254) class returns an **AttributeIterator** (p. 57) object that can be used to access the values of the attribute.

Typical usage is:

```
MessageAttributes attributes;
...
for (AttributeIterator iterator=attributes.getAll("Foo:Bar");
     iterator.hasMore(); ++iterator)
    std::cout << *iterator << std::endl;
```

6.28.2 Constructor & Destructor Documentation

6.28.2.1 `Arc::AttributeIterator::AttributeIterator ()`

Default constructor.

The default constructor. Does nothing since all attributes are instances of well-behaving STL classes.

6.28.2.2 `Arc::AttributeIterator::AttributeIterator (AttrConstIter begin, AttrConstIter end)` [protected]

Protected constructor used by the **MessageAttributes** (p. 254) class.

This constructor is used to create an iterator for iteration over all values of an attribute. It is not supposed to be visible externally, but is only used from within the `getAll()` method of **MessageAttributes** (p. 254) class.

Parameters

<i>begin</i>	A const_iterator pointing to the first matching key-value pair in the internal multimap of the MessageAttributes (p. 254) class.
<i>end</i>	A const_iterator pointing to the first key-value pair in the internal multimap of the MessageAttributes (p. 254) class where the key is larger than the key searched for.

6.28.3 Member Function Documentation

6.28.3.1 `bool Arc::AttributeIterator::hasMore () const`

Predicate method for iteration termination.

This method determines whether there are more values for the iterator to refer to.

Returns

Returns true if there are more values, otherwise false.

6.28.3.2 `const std::string& Arc::AttributeIterator::key (void) const`

The key of attribute.

This method returns reference to key of attribute to which iterator refers.

6.28.3.3 `const std::string& Arc::AttributeIterator::operator* () const`

The dereference operator.

This operator is used to access the current value referred to by the iterator.

Returns

A (constant reference to a) string representation of the current value.

6.28.3.4 `const AttributeIterator& Arc::AttributeIterator::operator++ ()`

The prefix advance operator.

Advances the iterator to the next value. Works intuitively.

Returns

A const reference to this iterator.

6.28.3.5 `AttributeIterator Arc::AttributeIterator::operator++ (int)`

The postfix advance operator.

Advances the iterator to the next value. Works intuitively.

Returns

An iterator referring to the value referred to by this iterator before the advance.

6.28.3.6 `const std::string* Arc::AttributeIterator::operator-> () const`

The arrow operator.

Used to call methods for value objects (strings) conveniently.

6.28.4 Friends And Related Function Documentation**6.28.4.1** `friend class MessageAttributes` [*friend*]

The `MessageAttributes` (p. 254) class is a friend.

The constructor that creates an **AttributeIterator** (p. 57) that is connected to the internal multimap of the **MessageAttributes** (p. 254) class should not be exposed to the outside, but it still needs to be accessible from the `getAll()` method of the **MessageAttributes** (p. 254) class. Therefore, that class is a friend.

6.28.5 Field Documentation

6.28.5.1 `AttrConstIter Arc::AttributeIterator::current_` [protected]

A `const_iterator` pointing to the current key-value pair.

This iterator is the internal representation of the current value. It points to the corresponding key-value pair in the internal multimap of the **MessageAttributes** (p. 254) class.

6.28.5.2 `AttrConstIter Arc::AttributeIterator::end_` [protected]

A `const_iterator` pointing beyond the last key-value pair.

A `const_iterator` pointing to the first key-value pair in the internal multimap of the **MessageAttributes** (p. 254) class where the key is larger than the key searched for.

The documentation for this class was generated from the following file:

- MessageAttributes.h

6.29 ArcSec::AttributeProxy Class Reference

Interface for creating the **AttributeValue** (p. 61) object, it will be used by **AttributeFactory** (p. 56).

```
#include <AttributeProxy.h>
```

Public Member Functions

- virtual **AttributeValue** * `getAttribute` (const **Arc::XMLNode** &node)=0

6.29.1 Detailed Description

Interface for creating the **AttributeValue** (p. 61) object, it will be used by **AttributeFactory** (p. 56). The **AttributeProxy** (p. 60) object will be insert into `AttributeFactory`; and the `getAttribute(node)` method will be called inside `AttributeFactory.createvalue(node)`, in order to create a specific **AttributeValue** (p. 61)

6.29.2 Member Function Documentation

6.29.2.1 `virtual AttributeValue* ArcSec::AttributeProxy::getAttribute (const Arc::XMLNode & node) [pure virtual]`

Create a **AttributeValue** (p. 61) object according to the information inside the XMLNode as parameter.

The documentation for this class was generated from the following file:

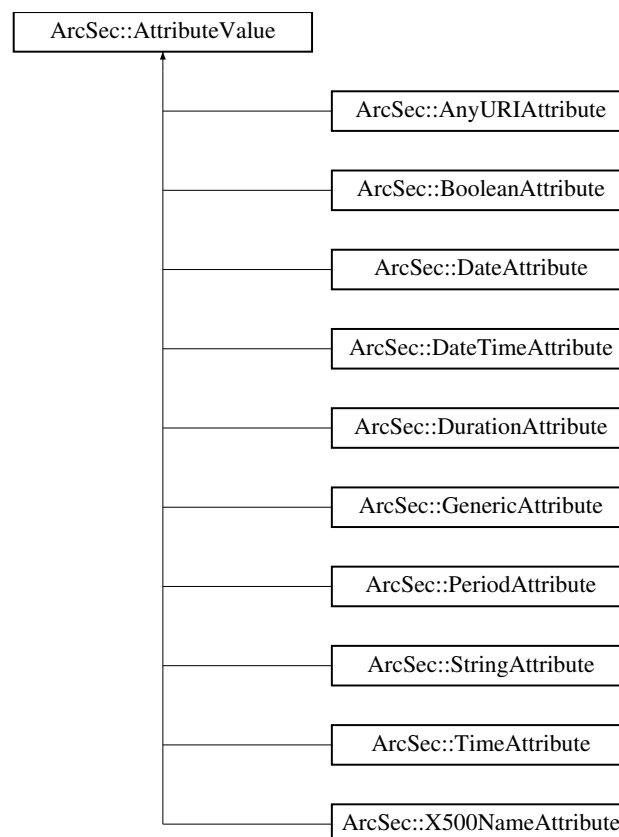
- AttributeProxy.h

6.30 ArcSec::AttributeValue Class Reference

Interface for containing different type of <Attribute> node for both policy and request.

```
#include <AttributeValue.h>
```

Inheritance diagram for ArcSec::AttributeValue:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *value, bool check_id=true)=0
- virtual std::string **encode** ()=0
- virtual std::string **getType** ()=0
- virtual std::string **getId** ()=0

6.30.1 Detailed Description

Interface for containing different type of <Attribute> node for both policy and request. <Attribute> contains different "Type" definition; Each type of <Attribute> needs different approach to compare the value. Any specific class which is for processing specific "Type" should inherit this class. The "Type" supported so far is: **StringAttribute** (p. 356), **DateAttribute** (p. 153), **TimeAttribute** (p. 377), **DurationAttribute** (p. 166), **PeriodAttribute** (p. 291), **AnyURIAttribute** (p. 53), **X500NameAttribute** (p. 452)

6.30.2 Member Function Documentation

6.30.2.1 virtual std::string ArcSec::AttributeValue::encode () [pure virtual]

encode the value in a string format

Implemented in **ArcSec::AnyURIAttribute** (p. 53), **ArcSec::BooleanAttribute** (p. 67), **ArcSec::DateTimeAttribute** (p. 154), **ArcSec::TimeAttribute** (p. 378), **ArcSec::DateAttribute** (p. 153), **ArcSec::DurationAttribute** (p. 166), **ArcSec::PeriodAttribute** (p. 291), **ArcSec::GenericAttribute** (p. 192), **ArcSec::StringAttribute** (p. 357), and **ArcSec::X500NameAttribute** (p. 452).

6.30.2.2 virtual bool ArcSec::AttributeValue::equal (AttributeValue * value, bool check_id = true) [pure virtual]

Evaluate whether "this" equals to the parameter value

Implemented in **ArcSec::AnyURIAttribute** (p. 54), **ArcSec::BooleanAttribute** (p. 67), **ArcSec::DateTimeAttribute** (p. 154), **ArcSec::TimeAttribute** (p. 378), **ArcSec::DateAttribute** (p. 153), **ArcSec::DurationAttribute** (p. 167), **ArcSec::PeriodAttribute** (p. 291), **ArcSec::GenericAttribute** (p. 192), **ArcSec::StringAttribute** (p. 357), and **ArcSec::X500NameAttribute** (p. 452).

6.30.2.3 virtual std::string ArcSec::AttributeValue::getId () [pure virtual]

Get the AttributeId of the <Attribute>

Implemented in **ArcSec::AnyURIAttribute** (p. 54), **ArcSec::BooleanAttribute** (p. 67), **ArcSec::DateTimeAttribute** (p. 154), **ArcSec::TimeAttribute** (p. 378), **ArcSec::DateAttribute** (p. 153), **ArcSec::DurationAttribute** (p. 167), **ArcSec::PeriodAttribute** (p. 291),

ArcSec::GenericAttribute (p. 192), **ArcSec::StringAttribute** (p. 357), and **ArcSec::X500NameAttribute** (p. 452).

6.30.2.4 `virtual std::string ArcSec::AttributeValue::getType () [pure virtual]`

Get the DataType of the <Attribute>

Implemented in **ArcSec::AnyURIAttribute** (p. 54), **ArcSec::BooleanAttribute** (p. 67), **ArcSec::DateTimeAttribute** (p. 155), **ArcSec::TimeAttribute** (p. 378), **ArcSec::DateAttribute** (p. 153), **ArcSec::DurationAttribute** (p. 167), **ArcSec::PeriodAttribute** (p. 292), **ArcSec::GenericAttribute** (p. 192), **ArcSec::StringAttribute** (p. 357), and **ArcSec::X500NameAttribute** (p. 452).

The documentation for this class was generated from the following file:

- AttributeValue.h

6.31 ArcSec::Attrs Class Reference

Attrs (p. 63) is a container for one or more **Attr** (p. 56).

```
#include <Request.h>
```

6.31.1 Detailed Description

Attrs (p. 63) is a container for one or more **Attr** (p. 56). **Attrs** (p. 63) includes includes methods for inserting, getting items, and counting size as well

The documentation for this class was generated from the following file:

- Request.h

6.32 ArcSec::AuthzRequest Struct Reference

The documentation for this struct was generated from the following file:

- PDP.h

6.33 ArcSec::AuthzRequestSection Struct Reference

```
#include <PDP.h>
```

6.33.1 Detailed Description

These structure are based on the request schema for **PDP** (p. 287), so far it can apply to the ArcPDP's request schema, see src/hed/pdc/Request.xsd and src/hed/pdc/Request.xml. It could also apply to the XACMLPDP's request schema, since the difference is minor.

Another approach is, the service composes/marshalls the xml structure directly, then the service should use difference code to compose for ArcPDP's request schema and XACMLPDP's schema, which is not so good.

The documentation for this struct was generated from the following file:

- PDP.h

6.34 Arc::AutoPointer< T > Class Template Reference

Wrapper for pointer with automatic destruction.

```
#include <Utils.h>
```

Public Member Functions

- **AutoPointer** (void)
- **AutoPointer** (T *o)
- **~AutoPointer** (void)
- T & **operator*** (void) const
- T * **operator->** (void) const
- **operator bool** (void) const
- bool **operator!** (void) const
- **operator T *** (void) const

6.34.1 Detailed Description

```
template<typename T> class Arc::AutoPointer< T >
```

Wrapper for pointer with automatic destruction. If ordinary pointer is wrapped in instance of this class it will be automatically destroyed when instance is destroyed. This is useful for maintaing pointers in scope of one function. Only pointers returned by new() are supported.

The documentation for this class was generated from the following file:

- Utils.h

6.35 Arc::Base64 Class Reference

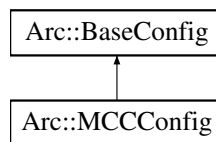
The documentation for this class was generated from the following file:

- Base64.h

6.36 Arc::BaseConfig Class Reference

```
#include <ArcConfig.h>
```

Inheritance diagram for Arc::BaseConfig:



Public Member Functions

- void **AddPluginsPath** (const std::string &path)
- void **AddPrivateKey** (const std::string &path)
- void **AddCertificate** (const std::string &path)
- void **AddProxy** (const std::string &path)
- void **AddCAFile** (const std::string &path)
- void **AddCADir** (const std::string &path)
- void **AddOverlay** (XMLNode cfg)
- void **GetOverlay** (std::string fname)
- virtual XMLNode **MakeConfig** (XMLNode cfg) const

6.36.1 Detailed Description

Configuration for client interface. It contains information which can't be expressed in class constructor arguments. Most probably common things like software installation location, identity of user, etc.

6.36.2 Member Function Documentation

6.36.2.1 void Arc::BaseConfig::AddCADir (const std::string & path)

Add CA directory

6.36.2.2 void Arc::BaseConfig::AddCAFile (const std::string & path)

Add CA file

6.36.2.3 void Arc::BaseConfig::AddCertificate (const std::string & *path*)

Add certificate

6.36.2.4 void Arc::BaseConfig::AddOverlay (XMLNode *cfg*)

Add configuration overlay

6.36.2.5 void Arc::BaseConfig::AddPluginsPath (const std::string & *path*)

Adds non-standard location of plugins

6.36.2.6 void Arc::BaseConfig::AddPrivateKey (const std::string & *path*)

Add private key

6.36.2.7 void Arc::BaseConfig::AddProxy (const std::string & *path*)

Add credentials proxy

6.36.2.8 void Arc::BaseConfig::GetOverlay (std::string *fname*)

Read overlay from file

6.36.2.9 virtual XMLNode Arc::BaseConfig::MakeConfig (XMLNode *cfg*) const
[virtual]

Adds configuration part corresponding to stored information into common configuration tree supplied in '*cfg*' argument. Returns reference to XML node representing configuration of **ModuleManager** (p. 261)

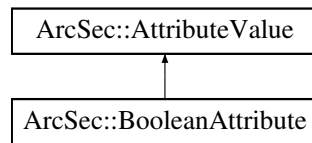
Reimplemented in **Arc::MCCCConfig** (p. 248).

The documentation for this class was generated from the following file:

- ArcConfig.h

6.37 ArcSec::BooleanAttribute Class Reference

Inheritance diagram for ArcSec::BooleanAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *o, bool check_id=true)
- virtual std::string **encode** ()
- std::string **getId** ()
- std::string **getType** ()

6.37.1 Member Function Documentation

6.37.1.1 virtual std::string ArcSec::BooleanAttribute::encode () [inline, virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.37.1.2 virtual bool ArcSec::BooleanAttribute::equal (**AttributeValue** * *value*, bool *check_id* = true) [virtual]

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.37.1.3 std::string ArcSec::BooleanAttribute::getId () [inline, virtual]

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.37.1.4 std::string ArcSec::BooleanAttribute::getType () [inline, virtual]

Get the DataType of the <Attribute>

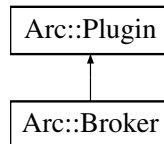
Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

- BooleanAttribute.h

6.38 Arc::Broker Class Reference

Inheritance diagram for Arc::Broker:



Public Member Functions

- const **ExecutionTarget** * **GetBestTarget** ()
- void **PreFilterTargets** (std::list< **ExecutionTarget** > &targets, const **JobDescription** &jobdesc)
- void **RegisterJobsubmission** ()

Protected Member Functions

- virtual void **SortTargets** ()=0

Protected Attributes

- std::list< **ExecutionTarget** * > **PossibleTargets**
- bool **TargetSortingDone**

6.38.1 Member Function Documentation

6.38.1.1 const **ExecutionTarget*** Arc::Broker::GetBestTarget ()

Returns next target from the list of **ExecutionTarget** (p. 175) objects.

When first called this method will sort its list of **ExecutionTarget** (p. 175) objects, which have been filled by the PreFilterTargets method, and then the first target in the list will be returned.

If this is not the first call then the next target in the list is simply returned.

If there are no targets in the list or the end of the target list have been reached the NULL pointer is returned.

Returns

The pointer to the next **ExecutionTarget** (p. 175) in the list is returned.

6.38.1.2 void Arc::Broker::PreFilterTargets (std::list< ExecutionTarget > & targets, const JobDescription & jobdesc)

Filter **ExecutionTarget** (p. 175) objects according to attributes in **JobDescription** (p. 222) object.

Each of the **ExecutionTarget** (p. 175) objects in the passed list will be matched against attributes in the passed **JobDescription** (p. 222) object. For a list of which attributes are considered for matchmaking see appendix B of the libarcclient technical manual (NORDUGRID-TECH-20). If a **ExecutionTarget** (p. 175) object matches the job description, it is added to the internal list of **ExecutionTarget** (p. 175) objects. NOTE: The list of **ExecutionTarget** (p. 175) objects must be available through out the scope of this **Broker** (p. 67) object.

Parameters

<i>targets</i>	A list of ExecutionTarget (p. 175) objects to be considered for addition to the Broker (p. 67).
<i>jobdesc</i>	JobDescription (p. 222) object holding requirements.

6.38.1.3 virtual void Arc::Broker::SortTargets () [protected, pure virtual]

Custom Brokers should implement this method.

The task is to sort the PossibleTargets list by "custom" way, for example: FastestQueueBroker, **ExecutionTarget** (p. 175) which has the shortest queue lenght will be at the begining of the PossibleTargets list

6.38.2 Field Documentation

6.38.2.1 std::list<ExecutionTarget*> Arc::Broker::PossibleTargets [protected]

This content the Prefilteres ExecutionTargets.

If an Execution Tartget has enough memory, CPU, diskspace, etc. for the actual job requirement than it will be added to the PossibleTargets list

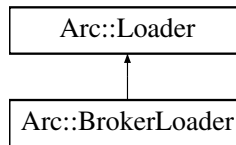
The documentation for this class was generated from the following file:

- Broker.h

6.39 Arc::BrokerLoader Class Reference

```
#include <Broker.h>
```

Inheritance diagram for Arc::BrokerLoader:



Public Member Functions

- **BrokerLoader** ()
- **~BrokerLoader** ()
- **Broker * load** (const std::string &name, const **UserConfig** &usercfg)
- const std::list< **Broker** * > & **GetBrokers** () const

6.39.1 Detailed Description

Class responsible for loading **Broker** (p. 67) plugins The **Broker** (p. 67) objects returned by a **BrokerLoader** (p. 69) must not be used after the **BrokerLoader** (p. 69) goes out of scope.

6.39.2 Constructor & Destructor Documentation

6.39.2.1 Arc::BrokerLoader::BrokerLoader ()

Constructor Creates a new **BrokerLoader** (p. 69).

6.39.2.2 Arc::BrokerLoader::~~BrokerLoader ()

Destructor Calling the destructor destroys all Brokers loaded by the **BrokerLoader** (p. 69) instance.

6.39.3 Member Function Documentation

6.39.3.1 const std::list<Broker*>& Arc::BrokerLoader::GetBrokers () const [inline]

Retrieve the list of loaded Brokers.

Returns

A reference to the list of Brokers.

6.39.3.2 Broker* Arc::BrokerLoader::load (const std::string & name, const UserConfig & usercfg)

Load a new **Broker** (p. 67)

Parameters

<i>name</i>	The name of the Broker (p. 67) to load.
<i>usercfg</i>	The UserConfig (p. 390) object for the new Broker (p. 67).

Returns

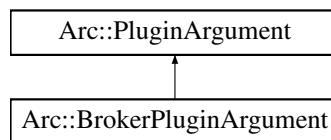
A pointer to the new **Broker** (p. 67) (NULL on error).

The documentation for this class was generated from the following file:

- Broker.h

6.40 Arc::BrokerPluginArgument Class Reference

Inheritance diagram for Arc::BrokerPluginArgument:



The documentation for this class was generated from the following file:

- Broker.h

6.41 Arc::ByteArray Class Reference

The documentation for this class was generated from the following file:

- ByteArray.h

6.42 Arc::CacheParameters Struct Reference

```
#include <FileCache.h>
```

6.42.1 Detailed Description

Contains data on the parameters of a cache.

The documentation for this struct was generated from the following file:

- FileCache.h

6.43 ArcCredential::cert_verify_context Struct Reference

The documentation for this struct was generated from the following file:

- CertUtil.h

6.44 Arc::CertEnvLocker Class Reference

The documentation for this class was generated from the following file:

- UserConfig.h

6.45 Arc::ChainContext Class Reference

Interface to chain specific functionality.

```
#include <MCCLoader.h>
```

Public Member Functions

- **operator PluginsFactory * ()**

6.45.1 Detailed Description

Interface to chain specific functionality. Object of this class is associated with every **MCCLoader** (p. 249) object. It is accessible for **MCC** (p. 242) and **Service** (p. 331) components and provides an interface to manipulate chains stored in **Loader** (p. 228). This makes it possible to modify chains dynamically - like deploying new services on demand.

6.45.2 Member Function Documentation

6.45.2.1 Arc::ChainContext::operator PluginsFactory * () [inline]

Returns associated **PluginsFactory** (p. 298) object

References Arc::Loader::factory_.

The documentation for this class was generated from the following file:

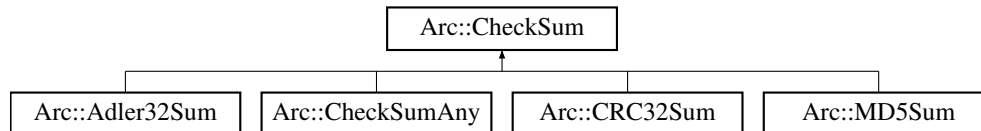
- MCCLoader.h

6.46 Arc::Checksum Class Reference

Defines interface for variuos checksum manipulations.

```
#include <Checksum.h>
```

Inheritance diagram for Arc::Checksum:



6.46.1 Detailed Description

Defines interface for variuos checksum manipulations. This class is used during data transfers through **DataBuffer** (p. 111) class

The documentation for this class was generated from the following file:

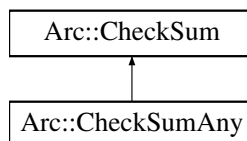
- CheckSum.h

6.47 Arc::ChecksumAny Class Reference

Wrapper for **Checksum** (p. 72) class.

```
#include <Checksum.h>
```

Inheritance diagram for Arc::ChecksumAny:



6.47.1 Detailed Description

Wrapper for **Checksum** (p. 72) class. To be used for manipulation of any supported checksum type in a transparent way.

The documentation for this class was generated from the following file:

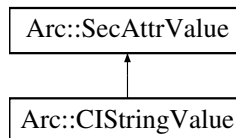
- CheckSum.h

6.48 Arc::CStringValue Class Reference

This class implements case insensitive strings as security attributes.

```
#include <CStringValue.h>
```

Inheritance diagram for Arc::CStringValue:



Public Member Functions

- **CStringValue** ()
- **CStringValue** (const char *ss)
- **CStringValue** (const std::string &ss)
- virtual **operator bool** ()

Protected Member Functions

- virtual bool **equal** (SecAttrValue &b)

6.48.1 Detailed Description

This class implements case insensitive strings as security attributes. This is an example of how to inherit **SecAttrValue** (p. 328). The class is meant to implement security attributes that are case insensitive strings.

6.48.2 Constructor & Destructor Documentation

6.48.2.1 Arc::CStringValue::CStringValue ()

Default constructor

6.48.2.2 Arc::CStringValue::CStringValue (const char * ss)

This is a constructor that takes a string literal.

6.48.2.3 Arc::CStringValue::CStringValue (const std::string & ss)

This is a constructor that takes a string object.

6.48.3 Member Function Documentation

6.48.3.1 `virtual bool Arc::CStringValue::equal (SecAttrValue & b)` [protected, virtual]

This function returns true if two strings are the same apart from letter case
Reimplemented from **Arc::SecAttrValue** (p. 328).

6.48.3.2 `virtual Arc::CStringValue::operator bool ()` [virtual]

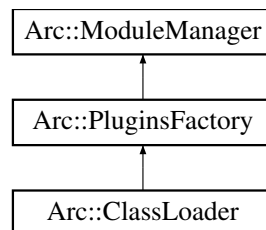
This function returns false if the string is empty or uninitialized
Reimplemented from **Arc::SecAttrValue** (p. 329).

The documentation for this class was generated from the following file:

- CStringValue.h

6.49 Arc::ClassLoader Class Reference

Inheritance diagram for Arc::ClassLoader:

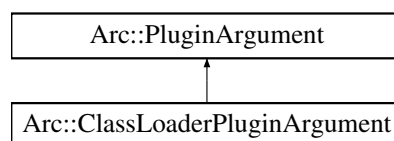


The documentation for this class was generated from the following file:

- ClassLoader.h

6.50 Arc::ClassLoaderPluginArgument Class Reference

Inheritance diagram for Arc::ClassLoaderPluginArgument:



The documentation for this class was generated from the following file:

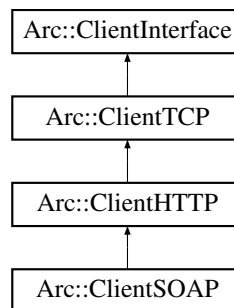
- ClassLoader.h

6.51 Arc::ClientHTTP Class Reference

Class for setting up a **MCC** (p. 242) chain for HTTP communication.

```
#include <ClientInterface.h>
```

Inheritance diagram for Arc::ClientHTTP:



6.51.1 Detailed Description

Class for setting up a **MCC** (p. 242) chain for HTTP communication. The **ClientHTTP** (p. 75) class inherits from the **ClientTCP** (p. 80) class and adds an HTTP **MCC** (p. 242) to the chain.

The documentation for this class was generated from the following file:

- ClientInterface.h

6.52 Arc::ClientHTTPwithSAML2SSO Class Reference

Public Member Functions

- **ClientHTTPwithSAML2SSO** ()
- **MCC_Status process** (const std::string &method, **PayloadRawInterface** *request, **HTTPClientInfo** *info, **PayloadRawInterface** **response, const std::string &idp_name, const std::string &username, const std::string &password, const bool reuse_authn=false)

6.52.1 Constructor & Destructor Documentation

6.52.1.1 Arc::ClientHTTPwithSAML2SSO::ClientHTTPwithSAML2SSO () [inline]

Constructor creates **MCC** (p. 242) chain and connects to server.

6.52.2 Member Function Documentation

6.52.2.1 MCC_Status Arc::ClientHTTPwithSAML2SSO::process (const std::string & *method*, PayloadRawInterface * *request*, HTTPClientInfo * *info*, PayloadRawInterface ** *response*, const std::string & *idp_name*, const std::string & *username*, const std::string & *password*, const bool *reuse_authn* = false)

Send HTTP request and receive response.

The documentation for this class was generated from the following file:

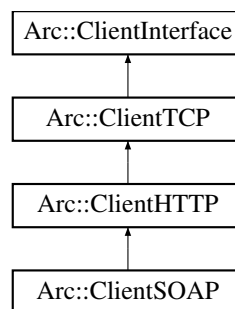
- ClientSAML2SSO.h

6.53 Arc::ClientInterface Class Reference

Utility base class for **MCC** (p. 242).

```
#include <ClientInterface.h>
```

Inheritance diagram for Arc::ClientInterface:



6.53.1 Detailed Description

Utility base class for **MCC** (p. 242). The **ClientInterface** (p. 77) class is a utility base class used for configuring a client side **Message** (p. 252) Chain Component (**MCC** (p. 242)) chain and loading it into memory. It has several specializations of increasing complexity of the **MCC** (p. 242) chains.

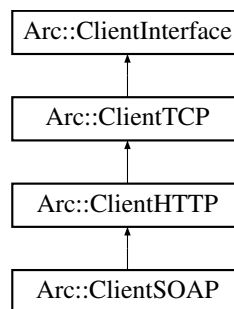
The documentation for this class was generated from the following file:

- ClientInterface.h

6.54 Arc::ClientSOAP Class Reference

```
#include <ClientInterface.h>
```

Inheritance diagram for Arc::ClientSOAP:



Public Member Functions

- **ClientSOAP** ()
- **MCC_Status process** (**PayloadSOAP** *request, **PayloadSOAP** **response)
- **MCC_Status process** (const std::string &action, **PayloadSOAP** *request, **PayloadSOAP** **response)
- **MCC * GetEntry** ()
- void **AddSecHandler** (**XMLNode** handlercfg, const std::string &libanme="", const std::string &libpath="")
- virtual bool **Load** ()

6.54.1 Detailed Description

Class with easy interface for sending/receiving SOAP messages over HTTP(S/G). It takes care of configuring **MCC** (p. 242) chain and making an entry point.

6.54.2 Constructor & Destructor Documentation

6.54.2.1 Arc::ClientSOAP::ClientSOAP () [inline]

Constructor creates **MCC** (p. 242) chain and connects to server.

6.54.3 Member Function Documentation

6.54.3.1 void Arc::ClientSOAP::AddSecHandler (XMLNode *handlercfg*, const std::string & *libname* = " ", const std::string & *libpath* = " ")

Adds security handler to configuration of SOAP MCC (p. 242)

Reimplemented from Arc::ClientHTTP (p. 75).

6.54.3.2 MCC* Arc::ClientSOAP::GetEntry () [inline]

Returns entry point to SOAP MCC (p. 242) in configured chain. To initialize entry point Load() (p. 79) method must be called.

Reimplemented from Arc::ClientHTTP (p. 75).

6.54.3.3 virtual bool Arc::ClientSOAP::Load () [virtual]

Instantiates pluggable elements according to generated configuration

Reimplemented from Arc::ClientHTTP (p. 75).

6.54.3.4 MCC_Status Arc::ClientSOAP::process (PayloadSOAP * *request*, PayloadSOAP ** *response*)

Send SOAP request and receive response.

6.54.3.5 MCC_Status Arc::ClientSOAP::process (const std::string & *action*, PayloadSOAP * *request*, PayloadSOAP ** *response*)

Send SOAP request with specified SOAP action and receive response.

The documentation for this class was generated from the following file:

- ClientInterface.h

6.55 Arc::ClientSOAPwithSAML2SSO Class Reference

Public Member Functions

- ClientSOAPwithSAML2SSO ()
- MCC_Status process (PayloadSOAP *request, PayloadSOAP **response, const std::string &idp_name, const std::string &username, const std::string &password, const bool reuse_authn=false)
- MCC_Status process (const std::string &action, PayloadSOAP *request, PayloadSOAP **response, const std::string &idp_name, const std::string &username, const std::string &password, const bool reuse_authn=false)

6.55.1 Constructor & Destructor Documentation

6.55.1.1 Arc::ClientSOAPwithSAML2SSO::ClientSOAPwithSAML2SSO () [inline]

Constructor creates **MCC** (p. 242) chain and connects to server.

6.55.2 Member Function Documentation

6.55.2.1 MCC_Status Arc::ClientSOAPwithSAML2SSO::process (PayloadSOAP * request, PayloadSOAP ** response, const std::string & idp_name, const std::string & username, const std::string & password, const bool reuse_authn = false)

Send SOAP request and receive response.

6.55.2.2 MCC_Status Arc::ClientSOAPwithSAML2SSO::process (const std::string & action, PayloadSOAP * request, PayloadSOAP ** response, const std::string & idp_name, const std::string & username, const std::string & password, const bool reuse_authn = false)

Send SOAP request with specified SOAP action and receive response.

The documentation for this class was generated from the following file:

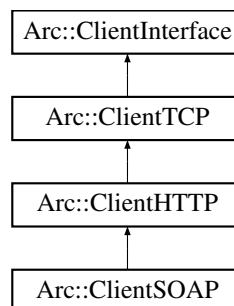
- ClientSAML2SSO.h

6.56 Arc::ClientTCP Class Reference

Class for setting up a **MCC** (p. 242) chain for TCP communication.

```
#include <ClientInterface.h>
```

Inheritance diagram for Arc::ClientTCP:



6.56.1 Detailed Description

Class for setting up a **MCC** (p. 242) chain for TCP communication. The **ClientTCP** (p. 80) class is a specialization of the **ClientInterface** (p. 77) which sets up a client **MCC** (p. 242) chain for TCP communication, and optionally with a security layer on top which can be either TLS, GSI or SSL3.

The documentation for this class was generated from the following file:

- ClientInterface.h

6.57 Arc::ClientX509Delegation Class Reference

Public Member Functions

- **ClientX509Delegation** ()
- **bool createDelegation** (DelegationType deleg, std::string &delegation_id)
- **bool acquireDelegation** (DelegationType deleg, std::string &delegation_cred, std::string &delegation_id, const std::string cred_identity="", const std::string cred_delegator_ip="", const std::string username="", const std::string password="")

6.57.1 Constructor & Destructor Documentation

6.57.1.1 Arc::ClientX509Delegation::ClientX509Delegation () [inline]

Constructor creates **MCC** (p. 242) chain and connects to server.

6.57.2 Member Function Documentation

6.57.2.1 bool Arc::ClientX509Delegation::acquireDelegation (DelegationType *deleg*, std::string & *delegation_cred*, std::string & *delegation_id*, const std::string *cred_identity* = " ", const std::string *cred_delegator_ip* = " ", const std::string *username* = " ", const std::string *password* = " ")

Acquire delegation credential from delegation service. This method should be called by intermediate service ('n+1' service as explained on above) in order to use this delegation credential on behalf of the EEC's holder.

Parameters

<i>deleg</i>	Delegation type
<i>delegation_id</i>	delegation ID which is used to look up the credential by delegation service
<i>cred_identity</i>	the identity (in case of x509 credential, it is the DN of EEC credential).

<i>cred_delegator_ip</i>	the IP address of the credential delegator. Regard of delegation, an intermediate service should accomplish three tasks: 1. Acquire 'n' level delegation credential (which is delegated by 'n-1' level delegator) from delegation service; 1. Create 'n+1' level delegation credential to delegation service; 2. Use 'n' level delegation credential to act on behalf of the EEC's holder. In case of absense of delegation_id, the 'n-1' level delegator's IP address and credential's identity are supposed to be used for look up the delegation credential from delegation service.
--------------------------	---

6.57.2.2 `bool Arc::ClientX509Delegation::createDelegation (DelegationType deleg, std::string & delegation_id)`

Create the delegation credential according to the different remote delegation service. This method should be called by holder of EEC(end entity credential) which would delegate its EEC credential, or by holder of delegated credential(normally, the holder is intermediate service) which would further delegate the credential (on behalf of the original EEC's holder) (for instance, the 'n' intermediate service creates a delegation credential, then the 'n+1' intermediate service acquires this delegation credential from the delegation service and also acts on behalf of the EEC's holder by using this delegation credential).

Parameters

<i>deleg</i>	Delegation type
<i>delegation_id</i>	For gridsite delegation service, the delegation_id is supposed to be created by client side, and sent to service side; for ARC delegation service, the delegation_id is supposed to be created by service side, and returned back. So for gridsite delegation service, this parameter is treated as input, while for ARC delegation service, it is treated as output.

The documentation for this class was generated from the following file:

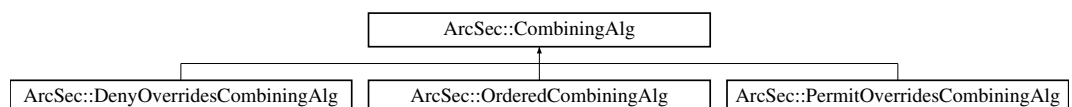
- ClientX509Delegation.h

6.58 ArcSec::CombiningAlg Class Reference

Interface for combining algrithm.

```
#include <CombiningAlg.h>
```

Inheritance diagram for ArcSec::CombiningAlg:



Public Member Functions

- virtual Result **combine** (EvaluationCtx *ctx, std::list< Policy * > policies)=0
- virtual const std::string & **getalgId** (void) const =0

6.58.1 Detailed Description

Interface for combining algorithm. This class is used to implement a specific combining algorithm for combining policies.

6.58.2 Member Function Documentation

6.58.2.1 virtual Result ArcSec::CombiningAlg::combine (EvaluationCtx * ctx, std::list< Policy * > policies) [pure virtual]

Evaluate request against policy, and if there are more than one policies, combine the evaluation results according to the combining algorithm implemented inside in the method combine(ctx, policies) itself.

Parameters

<i>ctx</i>	The information about request is included
<i>policies</i>	The "match" and "eval" method inside each policy will be called, and then those results from each policy will be combined according to the combining algorithm inside CombiningAlg class.

Implemented in **ArcSec::DenyOverridesCombiningAlg** (p. 164), and **ArcSec::PermitOverridesCombiningAlg** (p. 292).

6.58.2.2 virtual const std::string& ArcSec::CombiningAlg::getalgId (void) const [pure virtual]

Get the identifier of the combining algorithm class

Returns

The identity of the algorithm

Implemented in **ArcSec::DenyOverridesCombiningAlg** (p. 164), and **ArcSec::PermitOverridesCombiningAlg** (p. 293).

The documentation for this class was generated from the following file:

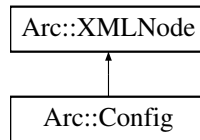
- CombiningAlg.h

6.59 Arc::Config Class Reference

Configuration element - represents (sub)tree of ARC configuration.

```
#include <ArcConfig.h>
```

Inheritance diagram for Arc::Config:



Public Member Functions

- **Config** ()
- **Config** (const char *filename)
- **Config** (const std::string &xml_str)
- **Config** (XMLNode xml)
- **Config** (long cfg_ptr_addr)
- **Config** (const **Config** &cfg)
- void **print** (void)
- void **parse** (const char *filename)
- const std::string & **getFileName** (void) const
- void **setFileName** (const std::string &filename)
- void **save** (const char *filename)

6.59.1 Detailed Description

Configuration element - represents (sub)tree of ARC configuration. This class is intended to be used to pass configuration details to various parts of HED and external modules. Currently it's just a wrapper over XML tree. But than may change in a future, although interface should be preserved. Currently it is capable of loading XML configuration document from file. In future it will be capable of loading more user-readable format and process it into tree-like structure convenient for machine processing (XML-like). So far there are no schema and/or namespaces assigned.

6.59.2 Constructor & Destructor Documentation

6.59.2.1 Arc::Config::Config () [inline]

Creates empty XML tree

6.59.2.2 Arc::Config::Config (const char * filename)

Loads configuration document from file 'filename'

6.59.2.3 Arc::Config::Config (const std::string & *xml_str*) [inline]

Parse configuration document from memory

6.59.2.4 Arc::Config::Config (XMLNode *xml*) [inline]

Acquire existing XML (sub)tree. Content is not copied. Make sure XML tree is not destroyed while in use by this object.

6.59.2.5 Arc::Config::Config (long *cfg_ptr_addr*)

Copy constructor used by language bindings

6.59.2.6 Arc::Config::Config (const Config & *cfg*)

Copy constructor used by language bindings

6.59.3 Member Function Documentation**6.59.3.1 const std::string& Arc::Config::getFileName (void) const [inline]**

Gives back file name of config file or empty string if it was generated from the **XMLNode** (p. 455) subtree

6.59.3.2 void Arc::Config::parse (const char * *filename*)

Parse configuration document from file 'filename'

6.59.3.3 void Arc::Config::print (void)

Print structure of document. For debugging purposes. Printed content is not an XML document.

6.59.3.4 void Arc::Config::save (const char * *filename*)

Save to file

6.59.3.5 void Arc::Config::setFileName (const std::string & *filename*) [inline]

Set the file name of config file

The documentation for this class was generated from the following file:

- ArcConfig.h

6.60 Arc::ConfusaCertHandler Class Reference

```
#include <ConfusaCertHandler.h>
```

Public Member Functions

- **ConfusaCertHandler** (int keysize, const std::string dn)
- std::string **getCertRequestB64** ()
- bool **createCertRequest** (std::string password="", std::string storedir=".")

6.60.1 Detailed Description

Wrapper around **Credential** (p. 98) handling the Confusa specifics.

6.60.2 Constructor & Destructor Documentation

6.60.2.1 Arc::ConfusaCertHandler::ConfusaCertHandler (int *keysize*, const std::string *dn*)

Create a new **ConfusaCertHandler** (p. 85) for DN *dn* and given *keysize* Basically Confusa cert handler wraps around **Credential** (p. 98)

6.60.3 Member Function Documentation

6.60.3.1 bool Arc::ConfusaCertHandler::createCertRequest (std::string *password* = " ", std::string *storedir* = " . / ")

Create a new end entity certificate, with a private key encrypted with password *password*. Private key and certificate will be stored in directory *storedir*.

6.60.3.2 std::string Arc::ConfusaCertHandler::getCertRequestB64 ()

Get the certificate request managed by this confusa cert handler in base 64 encoding

The documentation for this class was generated from the following file:

- ConfusaCertHandler.h

6.61 Arc::ConfusaParserUtils Class Reference

```
#include <ConfusaParserUtils.h>
```

Static Public Member Functions

- static std::string **urlencode** (const std::string url)
- static std::string **urlencode_params** (const std::string url)
- static xmlDocPtr **get_doc** (const std::string xml_file)
- static void **destroy_doc** (xmlDocPtr doc)
- static std::string **extract_body_information** (const std::string html_string)
- static std::string **handle_redirect_step** (Arc::MCCCConfig cfg, const std::string remote_url, std::string *cookies=NULL, std::multimap< std::string, std::string > *httpAttributes=NULL)
- static std::string **evaluate_path** (xmlDocPtr doc, const std::string xpathExpr, std::list< std::string > *contentList=NULL)

6.61.1 Detailed Description

Methods often needed in evaluation web pages from the Confusa WebSSO workflow

6.61.2 Member Function Documentation

6.61.2.1 static void Arc::ConfusaParserUtils::destroy_doc (xmlDocPtr doc) [static]

Destroy a libxml2 doc representation

6.61.2.2 static std::string Arc::ConfusaParserUtils::evaluate_path (xmlDocPtr doc, const std::string xpathExpr, std::list< std::string > * contentList=NULL) [static]

Evaluate the given xPathExpr on the document ptr. Return a string with the FIRST result if contentList is NULL. Return a string with the first result and all results, including the first one, in contentList if contentList is not null.

6.61.2.3 static std::string Arc::ConfusaParserUtils::extract_body_information (const std::string html_string) [static]

Get the part only within <body> and </body> in a HTML string For parsing, usually only this part is interesting.

6.61.2.4 static xmlDocPtr Arc::ConfusaParserUtils::get_doc (const std::string xml_file) [static]

Construct a libxml2 doc representation from the xml file

6.61.2.5 `static std::string Arc::ConfusaParserUtils::handle_redirect_step (Arc::MCCCConfig
cfg, const std::string remote_url, std::string * cookies = NULL, std::multimap<
std::string, std::string > * httpAttributes = NULL) [static]`

Handle a single redirect step from the SAML2 WebSSO profile. Store the received cookie in *cookie and pass the given httpAttributes to the site during redirect.

6.61.2.6 `static std::string Arc::ConfusaParserUtils::urlencode (const std::string url)
[static]`

urlencode the passed string

6.61.2.7 `static std::string Arc::ConfusaParserUtils::urlencode_params (const std::string url)
[static]`

Urlencode the passed string with respect to the parameters. The difference to urlencode is that the parameters will keep their separators, i.e. the ? and & separating parameters will be preserved.

The documentation for this class was generated from the following file:

- ConfusaParserUtils.h

6.62 Arc::CountedPointer< T > Class Template Reference

Wrapper for pointer with automatic destruction and mutiple references.

```
#include <Utils.h>
```

Data Structures

- class **Base**

Public Member Functions

- **T & operator*** (void) const
- **T * operator->** (void) const
- **operator bool** (void) const
- **bool operator!** (void) const
- **operator T *** (void) const

6.62.1 Detailed Description

```
template<typename T> class Arc::CountedPointer< T >
```

Wrapper for pointer with automatic destruction and mutiple references. If ordinary pointer is wrapped in instance of this class it will be automatically destroyed when all instances refering to it are destroyed. This is useful for maintaing pointers refered from multiple structures wihth automatic destruction of original object when last reference is destroyed. It is similar to Java approach with a difference that desctruction time is strictly defined. Only pointers returned by new() are supported. This class is not thread-safe

The documentation for this class was generated from the following file:

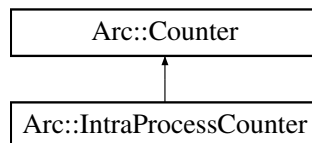
- Utils.h

6.63 Arc::Counter Class Reference

A class defining a common interface for counters.

```
#include <Counter.h>
```

Inheritance diagram for Arc::Counter:



Public Member Functions

- virtual `~Counter ()`
- virtual int `getLimit ()=0`
- virtual int `setLimit (int newLimit)=0`
- virtual int `changeLimit (int amount)=0`
- virtual int `getExcess ()=0`
- virtual int `setExcess (int newExcess)=0`
- virtual int `changeExcess (int amount)=0`
- virtual int `getValue ()=0`
- virtual `CounterTicket reserve (int amount=1, Glib::TimeVal duration=ETERNAL, bool prioritized=false, Glib::TimeVal timeOut=ETERNAL)=0`

Protected Types

- typedef unsigned long long int `IDType`

Protected Member Functions

- **Counter** ()
- virtual void **cancel** (IDType reservationID)=0
- virtual void **extend** (IDType &reservationID, Glib::TimeVal &expiryTime, Glib::TimeVal duration=**ETERNAL**)=0
- Glib::TimeVal **getCurrentTime** ()
- Glib::TimeVal **getExpiryTime** (Glib::TimeVal duration)
- **CounterTicket** **getCounterTicket** (Counter::IDType reservationID, Glib::TimeVal expiryTime, **Counter** *counter)
- **ExpirationReminder** **getExpirationReminder** (Glib::TimeVal expTime, Counter::IDType resID)

Friends

- class **CounterTicket**
- class **ExpirationReminder**

6.63.1 Detailed Description

A class defining a common interface for counters. This class defines a common interface for counters as well as some common functionality.

The purpose of a counter is to provide housekeeping some resource such as e.g. disk space, memory or network bandwidth. The counter itself will not be aware of what kind of resource it limits the use of. Neither will it be aware of what unit is being used to measure that resource. Counters are thus very similar to semaphores. Furthermore, counters are designed to handle concurrent operations from multiple threads/processes in a consistent manner.

Every counter has a limit, an excess limit and a value. The limit is a number that specifies how many units are available for reservation. The value is the number of units that are currently available for reservation, i.e. has not already been reserved. The excess limit specifies how many extra units can be reserved for high priority needs even if there are no normal units available for reservation. The excess limit is similar to the credit limit of e.g. a VISA card.

The users of the resource must thus first call the counter in order to make a reservation of an appropriate amount of the resource, then allocate and use the resource and finally call the counter again to cancel the reservation.

Typical usage is:

```
// Declare a counter. Replace XYZ by some appropriate kind of
// counter and provide required parameters. Unit is MB.
XYZCounter memory (...);
...
// Make a reservation of memory for 2000000 doubles.
CounterTicket tick = memory.reserve(2*sizeof(double));
// Use the memory.
double* A=new double[2000000];
doSomething(A);
```



```
delete[] A;
// Cancel the reservation.
tick.cancel();
```

There are also alternative ways to make reservations, including self-expiring reservations, prioritized reservations and reservations that fail if they cannot be made fast enough.

For self expiring reservations, a duration is provided in the reserve call:

```
tick = memory.reserve(2*sizeof(double), Glib::TimeVal(1,0));
```

A self-expiring reservation can be cancelled explicitly before it expires, but if it is not cancelled it will expire automatically when the duration has passed. The default value for the duration is ETERNAL, which means that the reservation will not be cancelled automatically.

Prioritized reservations may use the excess limit and succeed immediately even if there are no normal units available for reservation. The value of the counter will in this case become negative. A prioritized reservation looks like this:

```
tick = memory.reserve(2*sizeof(double), Glib::TimeVal(1,0), true);
```

Finally, a time out option can be provided for a reservation. If some task should be performed within two seconds or not at all, the reservation can look like this:

```
tick = memory.reserve(2*sizeof(double), Glib::TimeVal(1,0),
                    true, Glib::TimeVal(2,0));
if (tick.isValid())
    doSomething(...);
```

6.63.2 Member Typedef Documentation

6.63.2.1 typedef unsigned long long int Arc::Counter::IDType [protected]

A typedef of identification numbers for reservation.

This is a type that is used as identification numbers (keys) for referencing of reservations. It is used internally in counters for book keeping of reservations as well as in the **CounterTicket** (p. 96) class in order to be able to cancel and extend reservations.

6.63.3 Constructor & Destructor Documentation

6.63.3.1 Arc::Counter::Counter () [protected]

Default constructor.

This is the default constructor. Since **Counter** (p. 89) is an abstract class, it should only be used by subclasses. Therefore it is protected. Furthermore, since the **Counter** (p. 89) class has no attributes, nothing needs to be initialized and thus this constructor is empty.

6.63.3.2 virtual Arc::Counter::~~Counter () [virtual]

The destructor.

This is the destructor of the **Counter** (p. 89) class. Since the **Counter** (p. 89) class has no attributes, nothing needs to be cleaned up and thus the destructor is empty.

6.63.4 Member Function Documentation**6.63.4.1** virtual void Arc::Counter::cancel (IDType *reservationID*) [protected, pure virtual]

Cancellation of a reservation.

This method cancels a reservation. It is called by the **CounterTicket** (p. 96) that corresponds to the reservation.

Parameters

<i>reservationID</i>	The identity number (key) of the reservation to cancel.
----------------------	---

Implemented in **Arc::IntraProcessCounter** (p. 207).

6.63.4.2 virtual int Arc::Counter::changeExcess (int *amount*) [pure virtual]

Changes the excess limit of the counter.

Changes the excess limit of the counter by adding a certain amount to the current excess limit.

Parameters

<i>amount</i>	The amount by which to change the excess limit.
---------------	---

Returns

The new excess limit.

Implemented in **Arc::IntraProcessCounter** (p. 207).

6.63.4.3 virtual int Arc::Counter::changeLimit (int *amount*) [pure virtual]

Changes the limit of the counter.

Changes the limit of the counter by adding a certain amount to the current limit.

Parameters

<i>amount</i>	The amount by which to change the limit.
---------------	--

Returns

The new limit.

Implemented in **Arc::IntraProcessCounter** (p. 207).

```
6.63.4.4 virtual void Arc::Counter::extend ( IDType & reservationID, Glib::TimeVal &
      expiryTime, Glib::TimeVal duration = ETERNAL ) [protected, pure
      virtual]
```

Extension of a reservation.

This method extends a reservation. It is called by the **CounterTicket** (p. 96) that corresponds to the reservation.

Parameters

<i>reservationID</i>	Used for input as well as output. Contains the identification number of the original reservation on entry and the new identification number of the extended reservation on exit.
<i>expiryTime</i>	Used for input as well as output. Contains the expiry time of the original reservation on entry and the new expiry time of the extended reservation on exit.
<i>duration</i>	The time by which to extend the reservation. The new expiration time is computed based on the current time, NOT the previous expiration time.

Implemented in **Arc::IntraProcessCounter** (p. 208).

```
6.63.4.5 CounterTicket Arc::Counter::getCounterTicket ( Counter::IDType reservationID,
      Glib::TimeVal expiryTime, Counter * counter ) [protected]
```

A "relay method" for a constructor of the **CounterTicket** (p. 96) class.

This method acts as a relay for one of the constructors of the **CounterTicket** (p. 96) class. That constructor is private, but needs to be accessible from the subclasses of **Counter** (p. 89) (but not from anywhere else). In order not to have to declare every possible subclass of **Counter** (p. 89) as a friend of **CounterTicket** (p. 96), only the base class **Counter** (p. 89) is a friend and its subclasses access the constructor through this method. (If C++ had supported "package access", as Java does, this trick would not have been necessary.)

Parameters

<i>reservationID</i>	The identity number of the reservation corresponding to the CounterTicket (p. 96).
<i>expiryTime</i>	the expiry time of the reservation corresponding to the CounterTicket (p. 96).
<i>counter</i>	The Counter (p. 89) from which the reservation has been made.

Returns

The counter ticket that has been created.

6.63.4.6 Glib::TimeVal Arc::Counter::getCurrentTime () [protected]

Get the current time.

Returns the current time. An "adapter method" for the assign_current_time() method in the Glib::TimeVal class. return The current time.

6.63.4.7 virtual int Arc::Counter::getExcess () [pure virtual]

Returns the excess limit of the counter.

Returns the excess limit of the counter, i.e. by how much the usual limit may be exceeded by prioritized reservations.

Returns

The excess limit.

Implemented in **Arc::IntraProcessCounter** (p. 208).

6.63.4.8 ExpirationReminder Arc::Counter::getExpirationReminder (Glib::TimeVal expTime, Counter::IDType resID) [protected]

A "relay method" for the constructor of **ExpirationReminder** (p. 179).

This method acts as a relay for one of the constructors of the **ExpirationReminder** (p. 179) class. That constructor is private, but needs to be accessible from the subclasses of **Counter** (p. 89) (but not from anywhere else). In order not to have to declare every possible subclass of **Counter** (p. 89) as a friend of **ExpirationReminder** (p. 179), only the base class **Counter** (p. 89) is a friend and its subclasses access the constructor through this method. (If C++ had supported "package access", as Java does, this trick would not have been necessary.)

Parameters

<i>expTime</i>	the expiry time of the reservation corresponding to the ExpirationReminder (p. 179).
<i>resID</i>	The identity number of the reservation corresponding to the ExpirationReminder (p. 179).

Returns

The **ExpirationReminder** (p. 179) that has been created.

6.63.4.9 `Glib::TimeVal Arc::Counter::getExpiryTime (Glib::TimeVal duration)`
`[protected]`

Computes an expiry time.

This method computes an expiry time by adding a duration to the current time.

Parameters

<i>duration</i>	The duration.
-----------------	---------------

Returns

The expiry time.

6.63.4.10 `virtual int Arc::Counter::getLimit ()` `[pure virtual]`

Returns the current limit of the counter.

This method returns the current limit of the counter, i.e. how many units can be reserved simultaneously by different threads without claiming high priority.

Returns

The current limit of the counter.

Implemented in **Arc::IntraProcessCounter** (p. 208).

6.63.4.11 `virtual int Arc::Counter::getValue ()` `[pure virtual]`

Returns the current value of the counter.

Returns the current value of the counter, i.e. the number of unreserved units. Initially, the value is equal to the limit of the counter. When a reservation is made, the value is decreased. Normally, the value should never be negative, but this may happen if there are prioritized reservations. It can also happen if the limit is decreased after some reservations have been made, since reservations are never revoked.

Returns

The current value of the counter.

Implemented in **Arc::IntraProcessCounter** (p. 208).

6.63.4.12 `virtual CounterTicket Arc::Counter::reserve (int amount = 1, Glib::TimeVal duration = ETERNAL, bool prioritized = false, Glib::TimeVal timeOut = ETERNAL)` `[pure virtual]`

Makes a reservation from the counter.

This method makes a reservation from the counter. If the current value of the counter is too low to allow for the reservation, the method blocks until the reservation is possible or times out.

Parameters

<i>amount</i>	The amount to reserve, default value is 1.
<i>duration</i>	The duration of a self expiring reservation, default is that it lasts forever.
<i>prioritized</i>	Whether this reservation is prioritized and thus allowed to use the excess limit.
<i>timeOut</i>	The maximum time to block if the value of the counter is too low, default is to allow "eternal" blocking.

Returns

A **CounterTicket** (p. 96) that can be queried about the status of the reservation as well as for cancellations and extensions.

Implemented in **Arc::IntraProcessCounter** (p. 209).

6.63.4.13 `virtual int Arc::Counter::setExcess (int newExcess)` [pure virtual]

Sets the excess limit of the counter.

This method sets a new excess limit for the counter.

Parameters

<i>newExcess</i>	The new excess limit, an absolute number.
------------------	---

Returns

The new excess limit.

Implemented in **Arc::IntraProcessCounter** (p. 209).

6.63.4.14 `virtual int Arc::Counter::setLimit (int newLimit)` [pure virtual]

Sets the limit of the counter.

This method sets a new limit for the counter.

Parameters

<i>newLimit</i>	The new limit, an absolute number.
-----------------	------------------------------------

Returns

The new limit.

Implemented in **Arc::IntraProcessCounter** (p. 210).

The documentation for this class was generated from the following file:

- Counter.h

6.64 Arc::CounterTicket Class Reference

A class for "tickets" that correspond to counter reservations.

```
#include <Counter.h>
```

Public Member Functions

- **CounterTicket** ()
- bool **isValid** ()
- void **extend** (Glib::TimeVal duration)
- void **cancel** ()

Friends

- class **Counter**

6.64.1 Detailed Description

A class for "tickets" that correspond to counter reservations. This is a class for reservation tickets. When a reservation is made from a **Counter** (p. 89), a **ReservationTicket** is returned. This ticket can then be queried about the validity of a reservation. It can also be used for cancelation and extension of reservations.

Typical usage is:

```
// Declare a counter. Replace XYZ by some appropriate kind of
// counter and provide required parameters. Unit is MB.
XYZCounter memory(...);
...
// Make a reservation of memory for 2000000 doubles.
CounterTicket tick = memory.reserve(2*sizeof(double));
// Use the memory.
double* A=new double[2000000];
doSomething(A);
delete[] A;
// Cancel the reservation.
tick.cancel();
```

6.64.2 Constructor & Destructor Documentation

6.64.2.1 Arc::CounterTicket::CounterTicket ()

The default constructor.

This is the default constructor. It creates a **CounterTicket** (p. 96) that is not valid. The ticket object that is created can later be assigned a ticket that is returned by the **reserve()** method of a **Counter** (p. 89).

6.64.3 Member Function Documentation

6.64.3.1 void Arc::CounterTicket::cancel ()

Cancels a reservation.

This method is called to cancel a reservation. It may be called also for self-expiring reservations, which will then be cancelled before they were originally planned to expire.

6.64.3.2 void Arc::CounterTicket::extend (Glib::TimeVal *duration*)

Extends a reservation.

Extends a self-expiring reservation. In order to succeed the extension should be made before the previous reservation expires.

Parameters

<i>duration</i>	The time by which to extend the reservation. The new expiration time is computed based on the current time, NOT the previous expiration time.
-----------------	---

6.64.3.3 bool Arc::CounterTicket::isValid ()

Returns the validity of a **CounterTicket** (p. 96).

This method checks whether a **CounterTicket** (p. 96) is valid. The ticket was probably returned earlier by the `reserve()` method of a **Counter** (p. 89) but the corresponding reservation may have expired.

Returns

The validity of the ticket.

The documentation for this class was generated from the following file:

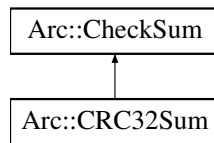
- Counter.h

6.65 Arc::CRC32Sum Class Reference

Implementation of CRC32 checksum.

```
#include <Checksum.h>
```

Inheritance diagram for Arc::CRC32Sum:



6.65.1 Detailed Description

Implementation of CRC32 checksum.

The documentation for this class was generated from the following file:

- CheckSum.h

6.66 Arc::Credential Class Reference

Public Member Functions

- **Credential** ()
- **Credential** (int keybits)
- **Credential** (const std::string &CAfile, const std::string &CAkey, const std::string &CAserial, bool CACreateserial, const std::string &extfile, const std::string &extsect, const std::string &passphrase4key="")
- **Credential** (Time start, **Period** lifetime=**Period**("PT12H"), int keybits=1024, std::string proxyversion="rfc", std::string policylang="inheritAll", std::string policy="", int pathlength=-1)
- **Credential** (const std::string &cert, const std::string &key, const std::string &cadir, const std::string &cafile, const std::string &passphrase4key="", const bool is_file=true)
- **Credential** (const **UserConfig** &usercfg, const std::string &passphrase4key="")
- void **AddCertExtObj** (std::string &sn, std::string &oid)
- void **LogError** (void) const
- bool **GetVerification** (void) const
- EVP_PKEY * **GetPrivKey** (void) const
- EVP_PKEY * **GetPubKey** (void) const
- X509 * **GetCert** (void) const
- X509_REQ * **GetCertReq** (void) const
- **STACK_OF** (X509) * **GetCertChain** (void) const
- int **GetCertNumofChain** (void) const
- Credformat **getFormat** (BIO *in, const bool is_file=true) const
- std::string **GetDN** (void) const
- std::string **GetIdentityName** (void) const
- **ArcCredential::certType** **GetType** (void) const
- std::string **GetProxyPolicy** (void) const
- void **SetProxyPolicy** (const std::string &proxyversion, const std::string &policylang, const std::string &policy, int pathlength)

- bool **OutputPrivateKey** (std::string &content, bool encryption=false, const std::string &passphrase="")
- bool **OutputPublicKey** (std::string &content)
- bool **OutputCertificate** (std::string &content, bool is_der=false)
- bool **OutputCertificateChain** (std::string &content, bool is_der=false)
- **Period GetLifeTime** (void) const
- **Time GetStartTime** () const
- **Time GetEndTime** () const
- void **SetLifeTime** (const **Period** &period)
- void **SetStartTime** (const **Time** &start_time)
- bool **IsValid** (void)
- bool **AddExtension** (std::string name, std::string data, bool crit=false)
- bool **AddExtension** (std::string name, char **binary, bool crit=false)
- bool **GenerateEECRequest** (BIO *reqbio, BIO *keybio, std::string dn="")
- bool **GenerateEECRequest** (std::string &reqcontent, std::string &keycontent, std::string dn="")
- bool **GenerateEECRequest** (const char *request_filename, const char *key_filename, std::string dn="")
- bool **GenerateRequest** (BIO *bio, bool if_der=false)
- bool **GenerateRequest** (std::string &content, bool if_der=false)
- bool **GenerateRequest** (const char *filename, bool if_der=false)
- bool **InquireRequest** (BIO *reqbio, bool if_eec=false, bool if_der=false)
- bool **InquireRequest** (std::string &content, bool if_eec=false, bool if_der=false)
- bool **InquireRequest** (const char *filename, bool if_eec=false, bool if_der=false)
- bool **SignRequest** (**Credential** *proxy, BIO *outputbio, bool if_der=false)
- bool **SignRequest** (**Credential** *proxy, std::string &content, bool if_der=false)
- bool **SignRequest** (**Credential** *proxy, const char *filename, bool foamat=false)
- bool **SignEECRequest** (**Credential** *eec, const std::string &DN, BIO *outputbio)
- bool **SignEECRequest** (**Credential** *eec, const std::string &DN, std::string &content)
- bool **SignEECRequest** (**Credential** *eec, const std::string &DN, const char *filename)

Static Public Member Functions

- static void **InitProxyCertInfo** (void)
- static bool **IsCredentialsValid** (const **UserConfig** &usercfg)

6.66.1 Constructor & Destructor Documentation

6.66.1.1 Arc::Credential::Credential ()

Default constructor, only acts as a container for inquiring certificate request, is meaningless for any other use.

6.66.1.2 Arc::Credential::Credential (int *keybits*)

Constructor with user-defined keylength. Needed for creation of EE certs, since some applications will only support keys with a certain minimum length > 1024

**6.66.1.3 Arc::Credential::Credential (const std::string & *CAfile*, const std::string & *CAkey*,
const std::string & *CAserial*, bool *CAcreateserial*, const std::string & *extfile*, const
std::string & *extsect*, const std::string & *passphrase4key* = " ")**

Constructor, specific constructor for CA certificate is meaningless for any other use.

**6.66.1.4 Arc::Credential::Credential (Time *start*, Period *lifetime* = Period ("PT12H"),
int *keybits* = 1024, std::string *proxyversion* = "rfc", std::string *policylang* =
"inheritAll", std::string *policy* = " ", int *pathlength* = -1)**

Constructor, specific constructor for proxy certificate, only acts as a container for constraining certificate signing and/or generating certificate request(only keybits is useful for creating certificate request), is meaningless for any other use. The proxyversion and policylang is for specifying the proxy certificate type and the policy language inside proxy. The definition of proxyversion and policy language is based on http://dev.globus.org/wiki/Security/ProxyCertTypes#RFC_3820_-_Proxy_Certificates The code is supposed to support proxy version: GSI2(legacy proxy), GSI3(Proxy draft) and RFC(RFC3820 proxy), and corresponding policy language. GSI2(GSI2, GSI2_LIMITED) GSI3 and RFC (IMPERSONATION_PROXY--1.3.6.1.5.5.7.21.1, INDEPENDENT_PROXY--1.3.6.1.5.5.7.21.2, LIMITED_PROXY--1.3.6.1.4.1.3536.1.1.1.9, RESTRICTED_PROXY--policy language undefined) In openssl>=0.9.8, there are three types of policy languages: id-ppl-inheritAll--1.3.6.1.5.5.7.21.1, id-ppl-independent--1.3.6.1.5.5.7.21.2, and id-ppl-anyLanguage-1.3.6.1.5.5.7.21.0

Parameters

<i>start, start</i>	time of proxy certificate
<i>life-time, lifetime</i>	of proxy certificate
<i>key-bits, modulus</i>	size for RSA key generation, it should be greater than 1024 if 'this' class is used for generating X509 request; it should be '0' if 'this' class is used for constraining certificate signing.

**6.66.1.5 Arc::Credential::Credential (const std::string & *cert*, const std::string & *key*, const
std::string & *cadir*, const std::string & *cafile*, const std::string & *passphrase4key* = " ",
const bool *is_file* = true)**

Constructor, specific constructor for usual certificate, constructing from credential files. only acts as a container for parsing the certificate and key files, is meaningless for any other use. this constructor will parse the credential information, and put them into "this" object

Parameters

<i>passphrase4key</i>	the password for decrypting private key (if needed). If value is empty then password will be asked interactively. To avoid asking for password use value provided by NoPassword() method.
<i>is_file, specifies</i>	if the cert/key are from file, otherwise they are supposed to be from string. default is from file

6.66.1.6 Arc::Credential::Credential (const UserConfig & *usercfg*, const std::string & *passphrase4key* = " ")

Constructor, specific constructor for usual certificate, constructing from information in **UserConfig** (p. 390) object. Only acts as a container for parsing the certificate and key files, is meaningless for any other use. this constructor will parse the credential * information, and put them into "this" object

Parameters

<i>is_file, specify</i>	if the cert/key are from file, otherwise they are supposed to be from string. default is from file
-------------------------	--

6.66.2 Member Function Documentation

6.66.2.1 void Arc::Credential::AddCertExtObj (std::string & *sn*, std::string & *oid*)

General method for adding a new nid into openssl's global const

6.66.2.2 bool Arc::Credential::AddExtension (std::string *name*, std::string *data*, bool *crit* = false)

Add an extension to the extension part of the certificate

Parameters

<i>name, the</i>	name of the extension, there OID related with the name should be registered into openssl firstly
<i>data, the</i>	data which will be inserted into certificate extension

6.66.2.3 bool Arc::Credential::AddExtension (std::string *name*, char ** *binary*, bool *crit* = false)

Add an extension to the extension part of the certificate

Parameters

<i>binary, the</i>	data which will be inserted into certificate extension part as a specific extension there should be specific methods defined inside specific X509V3_EXT_METHOD structure to parse the specific extension format. For example, VOMS attribute certificate is a specific extension to proxy certificate. There is specific X509V3_EXT_METHOD defined in VOMSAttribute.h (p. ??) and VOMSAttribute.c for parsing attribute certificate. In openssl, the specific X509V3_EXT_METHOD can be got according to the extension name/id, see X509V3_EXT_get_nid(ext_nid)
--------------------	---

6.66.2.4 `bool Arc::Credential::GenerateEECRequest (std::string & reqcontent, std::string & keycontent, std::string dn = " ")`

Generate an EEC request, output the certificate request to a string

6.66.2.5 `bool Arc::Credential::GenerateEECRequest (const char * request.filename, const char * key.filename, std::string dn = " ")`

Generate an EEC request, output the certificate request and the key to a file

6.66.2.6 `bool Arc::Credential::GenerateEECRequest (BIO * reqbio, BIO * keybio, std::string dn = " ")`

Generate an EEC request, based on the keybits and signing algorithm information inside this object output the certificate request to output BIO

The user will be asked for a private key password

6.66.2.7 `bool Arc::Credential::GenerateRequest (BIO * bio, bool if_der = false)`

Generate a proxy request, base on the keybits and signing algorithm information inside this object output the certificate request to output BIO

6.66.2.8 `bool Arc::Credential::GenerateRequest (std::string & content, bool if_der = false)`

Generate a proxy request, output the certificate request to a string

6.66.2.9 `bool Arc::Credential::GenerateRequest (const char * filename, bool if_der = false)`

Generate a proxy request, output the certificate request to a file

6.66.2.10 `X509* Arc::Credential::GetCert (void) const`

Get the certificate attached to this object

6.66.2.11 int Arc::Credential::GetCertNumofChain (void) const

Get the number of certificates in the certificate chain attached to this object

6.66.2.12 X509_REQ* Arc::Credential::GetCertReq (void) const

Get the certificate request, if there is any

6.66.2.13 std::string Arc::Credential::GetDN (void) const

Get the DN of the certificate attached to this object

6.66.2.14 Time Arc::Credential::GetEndTime () const

Returns validity end time of certificate or proxy

6.66.2.15 Credformat Arc::Credential::getFormat (BIO * in, const bool *is_file* = true) const

Get the certificate format, PEM PKCS12 or DER BIO could be memory or file, they should be processed differently.

6.66.2.16 std::string Arc::Credential::GetIdentityName (void) const

Get the Identity name of the certificate attached to this object, the result will not include proxy CN

6.66.2.17 Period Arc::Credential::GetLifeTime (void) const

Returns lifetime of certificate or proxy

6.66.2.18 EVP_PKEY* Arc::Credential::GetPrivKey (void) const

Get the private key attached to this object

6.66.2.19 std::string Arc::Credential::GetProxyPolicy (void) const

Get the proxy policy attached to the "proxy certificate information" extension of the proxy certificate

6.66.2.20 EVP_PKEY* Arc::Credential::GetPubKey (void) const

Get the public key attached to this object

6.66.2.21 Time Arc::Credential::GetStartTime () const

Returns validity start time of certificate or proxy

6.66.2.22 ArcCredential::certType Arc::Credential::GetType (void) const

Get type of the certificate attached to this object

6.66.2.23 bool Arc::Credential::GetVerification (void) const [inline]

Get the verification result about certificate chain checking

6.66.2.24 static void Arc::Credential::InitProxyCertInfo (void) [static]

Initiate nid for proxy certificate extension

6.66.2.25 bool Arc::Credential::InquireRequest (const char * filename, bool if_eec = false, bool if_der = false)

Inquire the certificate request from a file

6.66.2.26 bool Arc::Credential::InquireRequest (BIO * reqbio, bool if_eec = false, bool if_der = false)

Inquire the certificate request from BIO, and put the request information to X509_REQ inside this object, and parse the certificate type from the PROXYCERTINFO of request' extension

Parameters

<i>if_der</i>	false for PEM; true for DER
---------------	-----------------------------

6.66.2.27 bool Arc::Credential::InquireRequest (std::string & content, bool if_eec = false, bool if_der = false)

Inquire the certificate request from a string

6.66.2.28 static bool Arc::Credential::IsCredentialsValid (const UserConfig & usercfg) [static]

Returns true if credentials are valid. Credentials are read from locations specified in **UserConfig** (p.390) object. This method is deprecated. **User** (p.390) per-instance method **IsValid()** (p. 105) instead.

6.66.2.29 bool Arc::Credential::IsValid (void)

Returns true if credentials are valid

6.66.2.30 void Arc::Credential::LogError (void) const

Log error information related with openssl

6.66.2.31 bool Arc::Credential::OutputCertificate (std::string & content, bool is_der = false)

Output the certificate into string

Parameters

<i>is_der</i>	false for PEM, true for DER
---------------	-----------------------------

6.66.2.32 bool Arc::Credential::OutputCertificateChain (std::string & content, bool is_der = false)

Output the certificate chain into string

Parameters

<i>is_der</i>	false for PEM, true for DER
---------------	-----------------------------

6.66.2.33 bool Arc::Credential::OutputPrivatekey (std::string & content, bool encryption = false, const std::string & passphrase = " ")

Output the private key into string

Parameters

<i>encryption, whether</i>	encrypt the output private key or not
<i>passphrase, the</i>	passphrase to encrypt the output private key

6.66.2.34 bool Arc::Credential::OutputPublickey (std::string & content)

Output the public key into string

6.66.2.35 void Arc::Credential::SetLifeTime (const Period & period)

Set lifetime of certificate or proxy

6.66.2.36 void Arc::Credential::SetProxyPolicy (const std::string & *proxyversion*, const std::string & *policylang*, const std::string & *policy*, int *pathlength*)

Set the proxy policy attached to the "proxy certificate information" extension of the proxy certificate

6.66.2.37 void Arc::Credential::SetStartTime (const Time & *start.time*)

Set start time of certificate or proxy

6.66.2.38 bool Arc::Credential::SignEECRequest (Credential * *eec*, const std::string & *DN*, BIO * *outputbio*)

Sign eec request, and output the signed certificate to output BIO

6.66.2.39 bool Arc::Credential::SignEECRequest (Credential * *eec*, const std::string & *DN*, const char * *filename*)

Sign request and output the signed certificate to a file

6.66.2.40 bool Arc::Credential::SignEECRequest (Credential * *eec*, const std::string & *DN*, std::string & *content*)

Sign request and output the signed certificate to a string

6.66.2.41 bool Arc::Credential::SignRequest (Credential * *proxy*, BIO * *outputbio*, bool *if_der = false*)

Sign request based on the information inside proxy, and output the signed certificate to output BIO

Parameters

<i>if_der</i>	false for PEM, true for DER
---------------	-----------------------------

6.66.2.42 bool Arc::Credential::SignRequest (Credential * *proxy*, const char * *filename*, bool *foamat = false*)

Sign request and output the signed certificate to a file

Parameters

<i>if_der</i>	false for PEM, true for DER
---------------	-----------------------------

6.66.2.43 `bool Arc::Credential::SignRequest (Credential * proxy, std::string & content, bool if_der = false)`

Sign request and output the signed certificate to a string

Parameters

<i>if_der</i>	false for PEM, true for DER
---------------	-----------------------------

6.66.2.44 `Arc::Credential::STACK_OF (X509) const`

Get the certificate chain attached to this object

The documentation for this class was generated from the following file:

- Credential.h

6.67 Arc::CredentialError Class Reference

```
#include <Credential.h>
```

Public Member Functions

- **CredentialError** (const std::string &what="")

6.67.1 Detailed Description

This is an exception class that is used to handle runtime errors discovered in the **Credential** (p. 98) class.

6.67.2 Constructor & Destructor Documentation

6.67.2.1 `Arc::CredentialError::CredentialError (const std::string & what = " ")`

This is the constructor of the **CredentialError** (p. 108) class.

Parameters

<i>what</i>	An explanation of the error.
-------------	------------------------------

The documentation for this class was generated from the following file:

- Credential.h

6.68 Arc::CredentialStore Class Reference

```
#include <CredentialStore.h>
```

6.68.1 Detailed Description

This class provides functionality for storing delegated credentials and retrieving them from some store services. This is very preliminary implementation and currently support only one type of credentials - X.509 proxies, and only one type of store service - MyProxy. Later it will be extended to support at least following services: ARC delegation service, VOMS service, local file system.

The documentation for this class was generated from the following file:

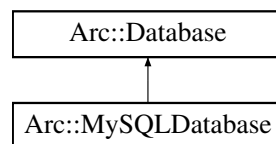
- CredentialStore.h

6.69 Arc::Database Class Reference

Interface for calling database client library.

```
#include <DBInterface.h>
```

Inheritance diagram for Arc::Database:



Public Member Functions

- **Database** ()
- **Database** (std::string &server, int port)
- **Database** (const **Database** &other)
- virtual ~**Database** ()
- virtual bool **connect** (std::string &dbname, std::string &user, std::string &password)=0
- virtual bool **isconnected** () const =0
- virtual void **close** ()=0
- virtual bool **enable_ssl** (const std::string keyfile="", const std::string certfile="", const std::string cafile="", const std::string capath="")=0
- virtual bool **shutdown** ()=0

6.69.1 Detailed Description

Interface for calling database client library. For different types of database client library, different classes should be implemented by implementing this interface.

6.69.2 Constructor & Destructor Documentation

6.69.2.1 `Arc::Database::Database ()` [inline]

Default constructor

6.69.2.2 `Arc::Database::Database (std::string & server, int port)` [inline]

Constructor which uses the server's name(or IP address) and port as parametes

6.69.2.3 `Arc::Database::Database (const Database & other)` [inline]

Copy constructor

6.69.2.4 `virtual Arc::Database::~~Database ()` [inline, virtual]

Deconstructor

6.69.3 Member Function Documentation

6.69.3.1 `virtual void Arc::Database::close ()` [pure virtual]

Close the connection with database server

Implemented in `Arc::MySQLDatabase` (p. 265).

6.69.3.2 `virtual bool Arc::Database::connect (std::string & dbname, std::string & user, std::string & password)` [pure virtual]

Do connection with database server

Parameters

<i>dbname</i>	The database name which will be used.
<i>user</i>	The username which will be used to access database.
<i>password</i>	The password which will be used to access database.

Implemented in `Arc::MySQLDatabase` (p. 265).

6.69.3.3 `virtual bool Arc::Database::enable_ssl (const std::string keyfile = " ", const std::string certfile = " ", const std::string cafile = " ", const std::string capath = " ") [pure virtual]`

Enable ssl communication for the connection

Parameters

<i>keyfile</i>	The location of key file.
<i>certfile</i>	The location of certificate file.
<i>cafile</i>	The location of ca file.
<i>capath</i>	The location of ca directory

Implemented in **Arc::MySQLDatabase** (p. 265).

6.69.3.4 `virtual bool Arc::Database::isconnected () const [pure virtual]`

Get the connection status

Implemented in **Arc::MySQLDatabase** (p. 266).

6.69.3.5 `virtual bool Arc::Database::shutdown () [pure virtual]`

Ask database server to shutdown

Implemented in **Arc::MySQLDatabase** (p. 266).

The documentation for this class was generated from the following file:

- DBInterface.h

6.70 Arc::DataBuffer Class Reference

Represents set of buffers.

```
#include <DataBuffer.h>
```

Data Structures

- struct **buf_desc**
- class **checksum_desc**

Public Member Functions

- **operator bool** () const
- **DataBuffer** (unsigned int size=65536, int blocks=3)
- **DataBuffer** (**Checksum** *cksum, unsigned int size=65536, int blocks=3)

- **~DataBuffer** ()
- **bool set** (**Checksum** *cksum=NULL, unsigned int size=65536, int blocks=3)
- **int add** (**Checksum** *cksum)
- **char * operator[]** (int n)
- **bool for_read** (int &handle, unsigned int &length, bool wait)
- **bool for_read** ()
- **bool is_read** (int handle, unsigned int length, unsigned long long int offset)
- **bool is_read** (char *buf, unsigned int length, unsigned long long int offset)
- **bool for_write** (int &handle, unsigned int &length, unsigned long long int &offset, bool wait)
- **bool for_write** ()
- **bool is_written** (int handle)
- **bool is_written** (char *buf)
- **bool is_notwritten** (int handle)
- **bool is_notwritten** (char *buf)
- **void eof_read** (bool v)
- **void eof_write** (bool v)
- **void error_read** (bool v)
- **void error_write** (bool v)
- **bool eof_read** ()
- **bool eof_write** ()
- **bool error_read** ()
- **bool error_write** ()
- **bool error_transfer** ()
- **bool error** ()
- **bool wait_any** ()
- **bool wait_used** ()
- **bool checksum_valid** () const
- **const Checksum * checksum_object** () const
- **bool wait_eof_read** ()
- **bool wait_read** ()
- **bool wait_eof_write** ()
- **bool wait_write** ()
- **bool wait_eof** ()
- **unsigned long long int eof_position** () const
- **unsigned int buffer_size** () const

Data Fields

- **DataSpeed** speed

6.70.1 Detailed Description

Represents set of buffers. This class is used during data transfer using **DataPoint** (p. 120) classes.

6.70.2 Constructor & Destructor Documentation

6.70.2.1 Arc::DataBuffer::DataBuffer (unsigned int *size* = 65536, int *blocks* = 3)

Constructor

Parameters

<i>size</i>	size of every buffer in bytes.
<i>blocks</i>	number of buffers.

6.70.2.2 Arc::DataBuffer::DataBuffer (CheckSum * *cksum*, unsigned int *size* = 65536, int *blocks* = 3)

Constructor

Parameters

<i>size</i>	size of every buffer in bytes.
<i>blocks</i>	number of buffers.
<i>cksum</i>	object which will compute checksum. Should not be destroyed till DataBuffer (p. 111) itself.

6.70.3 Member Function Documentation

6.70.3.1 int Arc::DataBuffer::add (CheckSum * *cksum*)

Add a checksum object which will compute checksum of buffer.

Parameters

<i>cksum</i>	object which will compute checksum. Should not be destroyed till DataBuffer (p. 111) itself.
--------------	---

Returns

integer position in the list of checksum objects.

6.70.3.2 unsigned int Arc::DataBuffer::buffer_size () const

Returns size of buffer in object. If not initialized then this number represents size of default buffer.

6.70.3.3 const CheckSum* Arc::DataBuffer::checksum_object () const

Returns **CheckSum** (p. 72) object specified in constructor, returns NULL if index is not in list.

Parameters

<i>index</i>	of the checksum in question.
--------------	------------------------------

6.70.3.4 bool Arc::DataBuffer::checksum_valid () const

Returns true if checksum was successfully computed, returns false if index is not in list.

Parameters

<i>index</i>	of the checksum in question.
--------------	------------------------------

6.70.3.5 bool Arc::DataBuffer::eof_read ()

Returns true if object was informed about end of transfer on 'read' side.

6.70.3.6 void Arc::DataBuffer::eof_read (bool v)

Informs object if there will be no more request for 'read' buffers. v true if no more requests.

6.70.3.7 void Arc::DataBuffer::eof_write (bool v)

Informs object if there will be no more request for 'write' buffers. v true if no more requests.

6.70.3.8 bool Arc::DataBuffer::eof_write ()

Returns true if object was informed about end of transfer on 'write' side.

6.70.3.9 bool Arc::DataBuffer::error ()

Returns true if object was informed about error or internal error occurred.

6.70.3.10 void Arc::DataBuffer::error_read (bool v)

Informs object if error occurred on 'read' side.

Parameters

<i>v</i>	true if error.
----------	----------------

6.70.3.11 void Arc::DataBuffer::error_write (bool v)

Informs object if error accured on 'write' side.

Parameters

<i>v</i>	true if error.
----------	----------------

6.70.3.12 bool Arc::DataBuffer::for_read (int & *handle*, unsigned int & *length*, bool *wait*)

Request buffer for READING INTO it.

Parameters

<i>handle</i>	returns buffer's number.
<i>length</i>	returns size of buffer
<i>wait</i>	if true and there are no free buffers, method will wait for one.

Returns

true on success

6.70.3.13 bool Arc::DataBuffer::for_read ()

Check if there are buffers which can be taken by **for_read()** (p. 115). This function checks only for buffers and does not take eof and error conditions into account.

6.70.3.14 bool Arc::DataBuffer::for_write (int & *handle*, unsigned int & *length*, unsigned long long int & *offset*, bool *wait*)

Request buffer for WRITING FROM it.

Parameters

<i>handle</i>	returns buffer's number.
<i>length</i>	returns size of buffer
<i>wait</i>	if true and there are no free buffers, method will wait for one.

6.70.3.15 bool Arc::DataBuffer::for_write ()

Check if there are buffers which can be taken by **for_write()** (p. 115). This function checks only for buffers and does not take eof and error conditions into account.

6.70.3.16 bool Arc::DataBuffer::is_notwritten (int *handle*)

Informs object that data was NOT written from buffer (and releases buffer).

Parameters

<i>handle</i>	buffer's number.
---------------	------------------

6.70.3.17 bool Arc::DataBuffer::is_notwritten (char * *buf*)

Inform object that data was NOT written from buffer (and releases buffer).

Parameters

<i>buf</i>	- address of buffer
------------	---------------------

6.70.3.18 bool Arc::DataBuffer::is_read (char * *buf*, unsigned int *length*, unsigned long long int *offset*)

Inform object that data was read into buffer.

Parameters

<i>buf</i>	- address of buffer
<i>length</i>	amount of data.
<i>offset</i>	offset in stream, file, etc.

6.70.3.19 bool Arc::DataBuffer::is_read (int *handle*, unsigned int *length*, unsigned long long int *offset*)

Inform object that data was read into buffer.

Parameters

<i>handle</i>	buffer's number.
<i>length</i>	amount of data.
<i>offset</i>	offset in stream, file, etc.

6.70.3.20 bool Arc::DataBuffer::is_written (int *handle*)

Inform object that data was written from buffer.

Parameters

<i>handle</i>	buffer's number.
---------------	------------------

6.70.3.21 bool Arc::DataBuffer::is_written (char * *buf*)

Inform object that data was written from buffer.

Parameters

<i>buf</i>	- address of buffer
------------	---------------------

6.70.3.22 `bool Arc::DataBuffer::set (CheckSum * cksum = NULL, unsigned int size = 65536, int blocks = 3)`

Reinitialize buffers with different parameters.

Parameters

<i>size</i>	size of every buffer in bytes.
<i>blocks</i>	number of buffers.
<i>cksum</i>	object which will compute checksum. Should not be destroyed till DataBuffer (p. 111) itself.

6.70.3.23 `bool Arc::DataBuffer::wait.any ()`

Wait (max 60 sec.) till any action happens in object. Returns true if action is eof on any side.

The documentation for this class was generated from the following file:

- DataBuffer.h

6.71 Arc::DataCallback Class Reference

```
#include <DataCallback.h>
```

6.71.1 Detailed Description

This class is used by **DataHandle** (p. 117) to report missing space on local filesystem. One of 'cb' functions here will be called if operation initiated by **DataHandle::start_**-reading runs out of disk space.

The documentation for this class was generated from the following file:

- DataCallback.h

6.72 Arc::DataHandle Class Reference

This class is a wrapper around the **DataPoint** (p. 120) class.

```
#include <DataHandle.h>
```

6.72.1 Detailed Description

This class is a wrapper around the **DataPoint** (p. 120) class. It simplifies the construction, use and destruction of **DataPoint** (p. 120) objects.

The documentation for this class was generated from the following file:

- DataHandle.h

6.73 Arc::DataMover Class Reference

```
#include <DataMover.h>
```

Public Member Functions

- **DataMover** ()
- **~DataMover** ()
- **DataStatus Transfer** (**DataPoint** &source, **DataPoint** &destination, **FileCache** &cache, const **URLMap** &map, callback cb=NULL, void *arg=NULL, const char *prefix=NULL)
- **DataStatus Transfer** (**DataPoint** &source, **DataPoint** &destination, **FileCache** &cache, const **URLMap** &map, unsigned long long int min_speed, time_t min_speed_time, unsigned long long int min_average_speed, time_t max_inactivity_time, callback cb=NULL, void *arg=NULL, const char *prefix=NULL)
- bool **verbose** ()
- void **verbose** (bool)
- void **verbose** (const std::string &prefix)
- bool **retry** ()
- void **retry** (bool)
- void **secure** (bool)
- void **passive** (bool)
- void **force_to_meta** (bool)
- bool **checks** ()
- void **checks** (bool v)
- void **set_default_min_speed** (unsigned long long int min_speed, time_t min_speed_time)
- void **set_default_min_average_speed** (unsigned long long int min_average_speed)
- void **set_default_max_inactivity_time** (time_t max_inactivity_time)

6.73.1 Detailed Description

A purpose of this class is to provide an interface that moves data between two locations specified by URLs. It's main action is represented by methods **DataMover::Transfer** (p. 119). Instance represents only attributes used during transfer.

6.73.2 Member Function Documentation

6.73.2.1 bool Arc::DataMover::checks ()

Check if check for existance of remote file is done before initiating 'reading' and 'writing' operations.

6.73.2.2 void Arc::DataMover::checks (bool v)

Set if to make check for existance of remote file (and probably other checks too) before initiating 'reading' and 'writing' operations.

Parameters

v	true if allowed (default is true).
---	------------------------------------

6.73.2.3 void Arc::DataMover::force_to_meta (bool)

Set if file should be transferred and registered even if such LFN is already registered and source is not one of registered locations.

6.73.2.4 void Arc::DataMover::secure (bool)

Set if high level of security (encryption) will be used during transfer if available.

6.73.2.5 void Arc::DataMover::set_default_max_inactivity_time (time_t max_inactivity_time) [inline]

Set maximal allowed time for waiting for any data. For more information see description of **DataSpeed** (p. 147) class.

6.73.2.6 void Arc::DataMover::set_default_min_average_speed (unsigned long long int min_average_speed) [inline]

Set minimal allowed average transfer speed (default is 0 averaged over whole time of transfer. For more information see description of **DataSpeed** (p. 147) class.

6.73.2.7 void Arc::DataMover::set_default_min_speed (unsigned long long int min_speed, time_t min_speed_time) [inline]

Set minimal allowed transfer speed (default is 0) to 'min_speed'. If speed drops below for time longer than 'min_speed_time' error is raised. For more information see description of **DataSpeed** (p. 147) class.

6.73.2.8 DataStatus Arc::DataMover::Transfer (DataPoint & source, DataPoint & destination, FileCache & cache, const URLMap & map, callback cb = NULL, void * arg = NULL, const char * prefix = NULL)

Initiates transfer from 'source' to 'destination'.

Parameters

<i>source</i>	source URL (p. 379).
<i>destination</i>	destination URL (p. 379).
<i>cache</i>	controls caching of downloaded files (if destination url is "file://"). If caching is not needed default constructor FileCache() can be used.
<i>map</i>	URL (p. 379) mapping/conversion table (for 'source' URL (p. 379)).
<i>cb</i>	if not NULL, transfer is done in separate thread and 'cb' is called after transfer completes/fails.
<i>arg</i>	passed to 'cb'.
<i>prefix</i>	if 'verbose' is activated this information will be printed before each line representing current transfer status.

6.73.2.9 DataStatus Arc::DataMover::Transfer (DataPoint & source, DataPoint & destination, FileCache & cache, const URLMap & map, unsigned long long int min_speed, time_t min_speed_time, unsigned long long int min_average_speed, time_t max_inactivity_time, callback cb = NULL, void * arg = NULL, const char * prefix = NULL)

Initiates transfer from 'source' to 'destination'.

Parameters

<i>min_speed</i>	minimal allowed current speed.
<i>min_speed_time</i>	time for which speed should be less than 'min_speed' before transfer fails.
<i>min_average_speed</i>	minimal allowed average speed.
<i>max_inactivity_time</i>	time for which should be no activity before transfer fails.

6.73.2.10 void Arc::DataMover::verbose (const std::string & prefix)

Activate printing information about transfer status.

Parameters

<i>prefix</i>	use this string if 'prefix' in DataMover::Transfer (p. 119) is NULL.
---------------	---

The documentation for this class was generated from the following file:

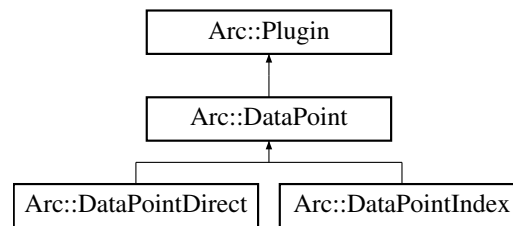
- DataMover.h

6.74 Arc::DataPoint Class Reference

This base class is an abstraction of **URL** (p. 379).

```
#include <DataPoint.h>
```

Inheritance diagram for Arc::DataPoint:



Public Types

- enum **DataPointAccessLatency** { **ACCESS_LATENCY_ZERO**, **ACCESS_LATENCY_SMALL**, **ACCESS_LATENCY_LARGE** }
- enum **DataPointInfoType** { ,
INFO_TYPE_NAME = 1, **INFO_TYPE_TYPE** = 2, **INFO_TYPE_TIMES** = 4, **INFO_TYPE_CONTENT** = 8,
INFO_TYPE_ACCESS = 16, **INFO_TYPE_STRUCT** = 32, **INFO_TYPE_REST** = 64, **INFO_TYPE_ALL** = 127 }

Public Member Functions

- **DataPoint** (const **URL** &url, const **UserConfig** &usercfg)
- virtual ~**DataPoint** ()
- virtual const **URL** & **GetURL** () const
- virtual const **UserConfig** & **GetUserConfig** () const
- virtual bool **SetURL** (const **URL** &url)
- virtual std::string **str** () const
- virtual **operator bool** () const
- virtual bool **operator!** () const
- virtual **DataStatus PrepareReading** (unsigned int timeout, unsigned int &wait_time)
- virtual **DataStatus PrepareWriting** (unsigned int timeout, unsigned int &wait_time)
- virtual **DataStatus StartReading** (**DataBuffer** &buffer)=0
- virtual **DataStatus StartWriting** (**DataBuffer** &buffer, **DataCallback** *space_cb=NULL)=0

- virtual **DataStatus StopReading** ()=0
- virtual **DataStatus StopWriting** ()=0
- virtual **DataStatus FinishReading** (bool error=false)
- virtual **DataStatus FinishWriting** (bool error=false)
- virtual **DataStatus Check** ()=0
- virtual **DataStatus Remove** ()=0
- virtual **DataStatus Stat** (**FileInfo** &file, **DataPointInfoType** verb=INFO_TYPE_-ALL)=0
- virtual **DataStatus List** (std::list< **FileInfo** > &files, **DataPointInfoType** verb=INFO_TYPE_-TYPE_ALL)=0
- virtual void **ReadOutOfOrder** (bool v)=0
- virtual bool **WriteOutOfOrder** ()=0
- virtual void **SetAdditionalChecks** (bool v)=0
- virtual bool **GetAdditionalChecks** () const =0
- virtual void **SetSecure** (bool v)=0
- virtual bool **GetSecure** () const =0
- virtual void **Passive** (bool v)=0
- virtual **DataStatus GetFailureReason** (void) const
- virtual void **Range** (unsigned long long int start=0, unsigned long long int end=0)=0
- virtual **DataStatus Resolve** (bool source)=0
- virtual bool **Registered** () const =0
- virtual **DataStatus PreRegister** (bool replication, bool force=false)=0
- virtual **DataStatus PostRegister** (bool replication)=0
- virtual **DataStatus PreUnregister** (bool replication)=0
- virtual **DataStatus Unregister** (bool all)=0
- virtual bool **CheckSize** () const
- virtual void **SetSize** (const unsigned long long int val)
- virtual unsigned long long int **GetSize** () const
- virtual bool **CheckChecksum** () const
- virtual void **SetChecksum** (const std::string &val)
- virtual const std::string & **GetChecksum** () const
- virtual const std::string **DefaultChecksum** () const
- virtual bool **CheckCreated** () const
- virtual void **SetCreated** (const **Time** &val)
- virtual const **Time** & **GetCreated** () const
- virtual bool **CheckValid** () const
- virtual void **SetValid** (const **Time** &val)
- virtual const **Time** & **GetValid** () const
- virtual void **SetAccessLatency** (const **DataPointAccessLatency** &latency)
- virtual **DataPointAccessLatency GetAccessLatency** () const
- virtual long long int **BufSize** () const =0
- virtual int **BufNum** () const =0
- virtual bool **Cache** () const
- virtual bool **Local** () const =0
- virtual int **GetTries** () const
- virtual void **SetTries** (const int n)

- virtual void **NextTry** (void)
- virtual bool **IsIndex** () const =0
- virtual bool **IsStageable** () const
- virtual bool **AcceptsMeta** ()=0
- virtual bool **ProvidesMeta** ()=0
- virtual void **SetMeta** (const **DataPoint** &p)
- virtual bool **CompareMeta** (const **DataPoint** &p) const
- virtual std::vector< **URL** > **TransferLocations** () const
- virtual const **URL** & **CurrentLocation** () const =0
- virtual const std::string & **CurrentLocationMetadata** () const =0
- virtual **DataStatus** **CompareLocationMetadata** () const =0
- virtual bool **NextLocation** ()=0
- virtual bool **LocationValid** () const =0
- virtual bool **LastLocation** ()=0
- virtual bool **HaveLocations** () const =0
- virtual **DataStatus** **AddLocation** (const **URL** &url, const std::string &meta)=0
- virtual **DataStatus** **RemoveLocation** ()=0
- virtual **DataStatus** **RemoveLocations** (const **DataPoint** &p)=0
- virtual int **AddChecksumObject** (**Checksum** *cksum)=0
- virtual void **SortLocations** (const std::string &pattern, const **URLMap** &url_map)=0

Protected Attributes

- std::list< std::string > **valid_url_options**

6.74.1 Detailed Description

This base class is an abstraction of **URL** (p. 379). Specializations should be provided for different kind of direct access URLs (`file://`, `ftp://`, `gsiftp://`, `http://`, `https://`, `httpg://`, ...) or indexing service URLs (`rls://`, `lfc://`, ...). **DataPoint** (p. 120) provides means to resolve an indexing service **URL** (p. 379) into multiple URLs and to loop through them.

6.74.2 Member Enumeration Documentation

6.74.2.1 enum Arc::DataPoint::DataPointAccessLatency

Describes the latency to access this **URL** (p. 379).

For now this value is one of a small set specified by the enumeration. In the future with more sophisticated protocols or information it could be replaced by a more fine-grained list of possibilities such as an int value.

Enumerator:

ACCESS_LATENCY_ZERO **URL** (p. 379) can be accessed instantly.

ACCESS_LATENCY_SMALL URL (p. 379) has low (but non-zero) access latency, for example staged from disk.

ACCESS_LATENCY_LARGE URL (p. 379) has a large access latency, for example staged from tape.

6.74.2.2 enum Arc::DataPoint::DataPointInfoType

Describes type of information about **URL** (p. 379) to request.

Enumerator:

INFO_TYPE_NAME Whatever protocol can get with no additional effort.

INFO_TYPE_TYPE Only name of object (relative).

INFO_TYPE_TIMES Type of object - currently file or dir.

INFO_TYPE_CONTENT Timestamps associated with object.

INFO_TYPE_ACCESS Metadata describing content, like size, checksum, etc.

INFO_TYPE_STRUCT Access control - ownership, permission, etc.

INFO_TYPE_REST Fine structure - replicas, transfer locations, redirections.

INFO_TYPE_ALL All the other parameters.

6.74.3 Constructor & Destructor Documentation

6.74.3.1 Arc::DataPoint::DataPoint (const URL & url, const UserConfig & usercfg)

Constructor requires **URL** (p. 379) to be provided.

Reference to usercfg argument is stored internally and hence corresponding objects must stay available during whole lifetime of this instance. TODO: do we really need it?

6.74.4 Member Function Documentation

6.74.4.1 virtual int Arc::DataPoint::AddChecksumObject (CheckSum * cksum) [pure virtual]

Add a checksum object which will compute checksum during transmission.

Parameters

<i>cksum</i>	object which will compute checksum. Should not be destroyed till Data-Pointer itself.
--------------	---

Returns

integer position in the list of checksum objects.

Implemented in **Arc::DataPointDirect** (p. 134), and **Arc::DataPointIndex** (p. 140).

6.74.4.2 `virtual DataStatus Arc::DataPoint::AddLocation (const URL & url, const std::string & meta) [pure virtual]`

Add **URL** (p. 379) to list.

Parameters

<i>url</i>	Location URL (p. 379) to add.
<i>meta</i>	Location meta information.

Implemented in **Arc::DataPointDirect** (p. 135), and **Arc::DataPointIndex** (p. 140).

6.74.4.3 `virtual DataStatus Arc::DataPoint::Check () [pure virtual]`

Query (p. 306) the **DataPoint** (p. 120) to check if object is accessible.

If possible this method will also try to provide meta information about the object. It returns positive response if object's content can be retrieved.

Implemented in **Arc::DataPointIndex** (p. 141).

6.74.4.4 `virtual DataStatus Arc::DataPoint::CompareLocationMetadata () const [pure virtual]`

Compare metadata of **DataPoint** (p. 120) and current location.

Returns inconsistency error or error encountered during operation, or success

Implemented in **Arc::DataPointDirect** (p. 135), and **Arc::DataPointIndex** (p. 141).

6.74.4.5 `virtual bool Arc::DataPoint::CompareMeta (const DataPoint & p) const [virtual]`

Compare meta information from another object.

Undefined values are not used for comparison.

Parameters

<i>p</i>	object to which to compare.
----------	-----------------------------

6.74.4.6 `virtual const std::string& Arc::DataPoint::CurrentLocationMetadata () const [pure virtual]`

Returns meta information used to create current **URL** (p. 379).

Usage differs between different indexing services.

Implemented in **Arc::DataPointDirect** (p. 135), and **Arc::DataPointIndex** (p. 141).

6.74.4.7 `virtual DataStatus Arc::DataPoint::FinishReading (bool error = false)`
`[virtual]`

Finish reading from the **URL** (p. 379).

Must be called after transfer of physical file has completed and if **PrepareReading()** (p. 127) was called, to free resources, release requests that were made during preparation etc.

Parameters

<i>error</i>	If true then action is taken depending on the error.
--------------	--

Reimplemented in **Arc::DataPointIndex** (p. 141).

6.74.4.8 `virtual DataStatus Arc::DataPoint::FinishWriting (bool error = false)`
`[virtual]`

Finish writing to the **URL** (p. 379).

Must be called after transfer of physical file has completed and if **PrepareWriting()** (p. 127) was called, to free resources, release requests that were made during preparation etc.

Parameters

<i>error</i>	If true then action is taken depending on the error.
--------------	--

Reimplemented in **Arc::DataPointIndex** (p. 142).

6.74.4.9 `virtual DataStatus Arc::DataPoint::GetFailureReason (void) const` `[virtual]`

Returns reason of transfer failure, as reported by callbacks. This could be different from the failure returned by the methods themselves.

6.74.4.10 `virtual DataStatus Arc::DataPoint::List (std::list< FileInfo > & files,
DataPointInfoType verb = INFO_TYPE_ALL)` `[pure virtual]`

List hierarchical content of this object.

If the **DataPoint** (p. 120) represents a directory or something similar its contents will be listed.

Parameters

<i>files</i>	will contain list of file names and requested attributes. There may be more attributes than requested. There may be less if object can't provide particular information.
--------------	--

<i>verb</i>	defines attribute types which method must try to retrieve. It is not a failure if some attributes could not be retrieved due to limitation of protocol or access control.
-------------	---

6.74.4.11 virtual bool Arc::DataPoint::NextLocation () [pure virtual]

Switch to next location in list of URLs.

At last location switch to first if number of allowed retries is not exceeded. Returns false if no retries left.

Implemented in **Arc::DataPointDirect** (p. 135), and **Arc::DataPointIndex** (p. 142).

6.74.4.12 virtual void Arc::DataPoint::Passive (bool v) [pure virtual]

Request passive transfers for FTP-like protocols.

Parameters

<i>true</i>	to request.
-------------	-------------

Implemented in **Arc::DataPointDirect** (p. 135), and **Arc::DataPointIndex** (p. 142).

6.74.4.13 virtual DataStatus Arc::DataPoint::PostRegister (bool replication) [pure virtual]

Index **Service** (p. 331) postregistration.

Used for same purpose as PreRegister. Should be called after actual transfer of file successfully finished.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in Indexing Service (p. 331) under same name.
--------------------	---

Implemented in **Arc::DataPointDirect** (p. 136).

6.74.4.14 virtual DataStatus Arc::DataPoint::PrepareReading (unsigned int timeout, unsigned int & wait.time) [virtual]

Prepare **DataPoint** (p. 120) for reading.

This method should be implemented by protocols which require preparation or staging of physical files for reading. It can act synchronously or asynchronously (if protocol supports it). In the first case the method will block until the file is prepared or the specified timeout has passed. In the second case the method can return with a Read-PrepareWait status before the file is prepared. The caller should then wait some time (a

hint from the remote service may be given in `wait_time`) and call **PrepareReading()** (p. 127) again to poll for the preparation status, until the file is prepared. In this case it is also up to the caller to decide when the request has taken too long and if so cancel it by calling **FinishReading()** (p. 125). When file preparation has finished, the physical file(s) to read from can be found from **TransferLocations()** (p. 132).

Parameters

<i>timeout</i>	If non-zero, this method will block until either the file has been prepared successfully or the timeout has passed. A zero value means that the caller would like to call and poll for status.
<i>wait_time</i>	If timeout is zero (caller would like asynchronous operation) and <code>ReadPrepareWait</code> is returned, a hint for how long to wait before a subsequent call may be given in <code>wait_time</code> .

Reimplemented in **Arc::DataPointIndex** (p. 142).

6.74.4.15 `virtual DataStatus Arc::DataPoint::PrepareWriting (unsigned int timeout, unsigned int & wait_time) [virtual]`

Prepare **DataPoint** (p. 120) for writing.

This method should be implemented by protocols which require preparation of physical files for writing. It can act synchronously or asynchronously (if protocol supports it). In the first case the method will block until the file is prepared or the specified timeout has passed. In the second case the method can return with a `WritePrepareWait` status before the file is prepared. The caller should then wait some time (a hint from the remote service may be given in `wait_time`) and call **PrepareWriting()** (p. 127) again to poll for the preparation status, until the file is prepared. In this case it is also up to the caller to decide when the request has taken too long and if so cancel or abort it by calling `FinishWriting(true)`. When file preparation has finished, the physical file(s) to write to can be found from **TransferLocations()** (p. 132).

Parameters

<i>timeout</i>	If non-zero, this method will block until either the file has been prepared successfully or the timeout has passed. A zero value means that the caller would like to call and poll for status.
<i>wait_time</i>	If timeout is zero (caller would like asynchronous operation) and <code>WritePrepareWait</code> is returned, a hint for how long to wait before a subsequent call may be given in <code>wait_time</code> .

Reimplemented in **Arc::DataPointIndex** (p. 143).

6.74.4.16 `virtual DataStatus Arc::DataPoint::PreRegister (bool replication, bool force = false) [pure virtual]`

Index service preregistration.

This function registers the physical location of a file into an indexing service. It should

be called **before** the actual transfer to that location happens.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in the indexing service under same name.
<i>force</i>	if true, perform registration of a new file even if it already exists. Should be used to fix failures in Indexing Service (p. 331).

Implemented in **Arc::DataPointDirect** (p. 136).

6.74.4.17 `virtual DataStatus Arc::DataPoint::PreUnregister (bool replication) [pure virtual]`

Index **Service** (p. 331) preunregistration.

Should be called if file transfer failed. It removes changes made by PreRegister.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in Indexing Service (p. 331) under same name.
--------------------	---

Implemented in **Arc::DataPointDirect** (p. 136).

6.74.4.18 `virtual bool Arc::DataPoint::ProvidesMeta () [pure virtual]`

If endpoint can provide at least some meta information directly.

Implemented in **Arc::DataPointDirect** (p. 136), and **Arc::DataPointIndex** (p. 143).

6.74.4.19 `virtual void Arc::DataPoint::Range (unsigned long long int start = 0, unsigned long long int end = 0) [pure virtual]`

Set range of bytes to retrieve.

Default values correspond to whole file.

Implemented in **Arc::DataPointDirect** (p. 137), and **Arc::DataPointIndex** (p. 143).

6.74.4.20 `virtual void Arc::DataPoint::ReadOutOfOrder (bool v) [pure virtual]`

Allow/disallow **DataPoint** (p. 120) to produce scattered data during reading* operation.

Parameters

<i>v</i>	true if allowed (default is false).
----------	-------------------------------------

Implemented in **Arc::DataPointDirect** (p. 137), and **Arc::DataPointIndex** (p. 144).

6.74.4.21 `virtual bool Arc::DataPoint::Registered () const` [pure virtual]

Check if file is registered in Indexing **Service** (p. 331).

Proper value is obtainable only after Resolve.

Implemented in **Arc::DataPointDirect** (p. 137), and **Arc::DataPointIndex** (p. 144).

6.74.4.22 `virtual DataStatus Arc::DataPoint::Resolve (bool source)` [pure virtual]

Resolves index service **URL** (p. 379) into list of ordinary URLs.

Also obtains meta information about the file.

Parameters

<i>source</i>	true if DataPoint (p. 120) object represents source of information.
---------------	--

Implemented in **Arc::DataPointDirect** (p. 137).

6.74.4.23 `virtual void Arc::DataPoint::SetAdditionalChecks (bool v)` [pure virtual]

Allow/disallow additional checks.

Check for existence of remote file (and probably other checks too) before initiating reading and writing operations.

Parameters

<i>v</i>	true if allowed (default is true).
----------	------------------------------------

Implemented in **Arc::DataPointDirect** (p. 137), and **Arc::DataPointIndex** (p. 144).

6.74.4.24 `virtual void Arc::DataPoint::SetMeta (const DataPoint & p)` [virtual]

Copy meta information from another object.

Already defined values are not overwritten.

Parameters

<i>p</i>	object from which information is taken.
----------	---

Reimplemented in **Arc::DataPointIndex** (p. 144).

6.74.4.25 `virtual void Arc::DataPoint::SetSecure (bool v)` [pure virtual]

Allow/disallow heavy security during data transfer.

Parameters

<i>v</i>	true if allowed (default depends on protocol).
----------	--

Implemented in **Arc::DataPointDirect** (p. 138), and **Arc::DataPointIndex** (p. 144).

6.74.4.26 virtual bool Arc::DataPoint::SetURL (const URL & url) [virtual]

Assigns new **URL** (p. 379). Main purpose of this method is to reuse existing connection for accessing different object at same server. Implementation does not have to implement this method. If supplied **URL** (p. 379) is not suitable or method is not implemented false is returned.

6.74.4.27 virtual void Arc::DataPoint::SortLocations (const std::string & pattern, const URLMap & url_map) [pure virtual]

Sort locations according to the specified pattern.

Parameters

<i>pattern</i>	a set of strings, separated by , to match against.
----------------	---

Implemented in **Arc::DataPointDirect** (p. 138), and **Arc::DataPointIndex** (p. 145).

6.74.4.28 virtual DataStatus Arc::DataPoint::StartReading (DataBuffer & buffer) [pure virtual]

Start reading data from **URL** (p. 379).

Separate thread to transfer data will be created. No other operation can be performed while reading is in progress.

Parameters

<i>buffer</i>	operation will use this buffer to put information into. Should not be destroyed before stop_reading was called and returned.
---------------	--

Implemented in **Arc::DataPointIndex** (p. 145).

6.74.4.29 virtual DataStatus Arc::DataPoint::StartWriting (DataBuffer & buffer, DataCallback * space_cb = NULL) [pure virtual]

Start writing data to **URL** (p. 379).

Separate thread to transfer data will be created. No other operation can be performed while writing is in progress.

Parameters

<i>buffer</i>	operation will use this buffer to get information from. Should not be destroyed before stop_writing was called and returned.
<i>space_cb</i>	callback which is called if there is not enough space to store data. May not implemented for all protocols.

Implemented in **Arc::DataPointIndex** (p. 145).

6.74.4.30 `virtual DataStatus Arc::DataPoint::Stat (FileInfo & file, DataPointInfoType verb = INFO_TYPE_ALL) [pure virtual]`

Retrieve information about this object.

If the **DataPoint** (p. 120) represents a directory or something similar its contents will be listed.

Parameters

<i>file</i>	will contain object name and requested attributes. There may be more attributes than requested. There may be less if object can't provide particular information.
<i>verb</i>	defines attribute types which method must try to retrieve. It is not a failure if some attributes could not be retrieved due to limitation of protocol or access control.

6.74.4.31 `virtual DataStatus Arc::DataPoint::StopReading () [pure virtual]`

Stop reading.

Must be called after corresponding start_reading method, either after all data is transferred or to cancel transfer. Use buffer object to find out when data is transferred. Must return failure if any happened during transfer.

Implemented in **Arc::DataPointIndex** (p. 146).

6.74.4.32 `virtual DataStatus Arc::DataPoint::StopWriting () [pure virtual]`

Stop writing.

Must be called after corresponding start_writing method, either after all data is transferred or to cancel transfer. Use buffer object to find out when data is transferred. Must return failure if any happened during transfer.

Implemented in **Arc::DataPointIndex** (p. 146).

6.74.4.33 `virtual std::vector<URL> Arc::DataPoint::TransferLocations () const [virtual]`

Returns physical file(s) to read/write, if different from **CurrentLocation()** (p. 122)

To be used with protocols which re-direct to different URLs such as Transport URLs (TURLs). The list is initially filled by PrepareReading and PrepareWriting. If this list is non-empty then real transfer should use a **URL** (p. 379) from this list. It is up to the caller to choose the best **URL** (p. 379) and instantiate new **DataPoint** (p. 120) for handling it. For consistency protocols which do not require redirections return original **URL** (p. 379). For protocols which need redirection calling StartReading and StartWriting will use first **URL** (p. 379) in the list.

Reimplemented in **Arc::DataPointIndex** (p. 146).

6.74.4.34 `virtual DataStatus Arc::DataPoint::Unregister (bool all)` [pure virtual]

Index **Service** (p. 331) unregistration.

Remove information about file registered in Indexing **Service** (p. 331).

Parameters

<i>all</i>	if true, information about file itself is (LFN) is removed. Otherwise only particular physical instance is unregistered.
------------	--

Implemented in **Arc::DataPointDirect** (p. 138).

6.74.4.35 `virtual bool Arc::DataPoint::WriteOutOfOrder ()` [pure virtual]

Returns true if **URL** (p. 379) can accept scattered data for *writing* operation.

Implemented in **Arc::DataPointDirect** (p. 138), and **Arc::DataPointIndex** (p. 146).

6.74.5 Field Documentation

6.74.5.1 `std::list<std::string> Arc::DataPoint::valid_url_options` [protected]

Subclasses should add their own specific options to this list

The documentation for this class was generated from the following file:

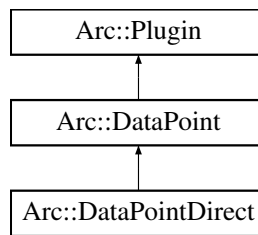
- DataPoint.h

6.75 Arc::DataPointDirect Class Reference

This is a kind of generalized file handle.

```
#include <DataPointDirect.h>
```

Inheritance diagram for Arc::DataPointDirect:



Public Member Functions

- virtual bool **IsIndex** () const
- virtual bool **IsStageable** () const
- virtual long long int **BufSize** () const
- virtual int **BufNum** () const
- virtual bool **Local** () const
- virtual void **ReadOutOfOrder** (bool v)
- virtual bool **WriteOutOfOrder** ()
- virtual void **SetAdditionalChecks** (bool v)
- virtual bool **GetAdditionalChecks** () const
- virtual void **SetSecure** (bool v)
- virtual bool **GetSecure** () const
- virtual void **Passive** (bool v)
- virtual void **Range** (unsigned long long int start=0, unsigned long long int end=0)
- virtual int **AddChecksumObject** (**Checksum** *cksum)
- virtual **DataStatus** **Resolve** (bool source)
- virtual bool **Registered** () const
- virtual **DataStatus** **PreRegister** (bool replication, bool force=false)
- virtual **DataStatus** **PostRegister** (bool replication)
- virtual **DataStatus** **PreUnregister** (bool replication)
- virtual **DataStatus** **Unregister** (bool all)
- virtual bool **AcceptsMeta** ()
- virtual bool **ProvidesMeta** ()
- virtual const **URL** & **CurrentLocation** () const
- virtual const std::string & **CurrentLocationMetadata** () const
- virtual **DataStatus** **CompareLocationMetadata** () const
- virtual bool **NextLocation** ()
- virtual bool **LocationValid** () const
- virtual bool **HaveLocations** () const
- virtual bool **LastLocation** ()
- virtual **DataStatus** **AddLocation** (const **URL** &url, const std::string &meta)
- virtual **DataStatus** **RemoveLocation** ()
- virtual **DataStatus** **RemoveLocations** (const **DataPoint** &p)
- virtual void **SortLocations** (const std::string &, const **URLMap** &)

6.75.1 Detailed Description

This is a kind of generalized file handle. Differently from file handle it does not support operations `read()` and `write()`. Instead it initiates operation and uses object of class **DataBuffer** (p. 111) to pass actual data. It also provides other operations like querying parameters of remote object. It is used by higher-level classes `DataMove` and `DataMovePar` to provide data transfer service for application.

6.75.2 Member Function Documentation

6.75.2.1 `virtual int Arc::DataPointDirect::AddChecksumObject (CheckSum * cksum)`
[virtual]

Add a checksum object which will compute checksum during transmission.

Parameters

<i>cksum</i>	object which will compute checksum. Should not be destroyed till Data-Pointer itself.
--------------	---

Returns

integer position in the list of checksum objects.

Implements **Arc::DataPoint** (p. 124).

6.75.2.2 `virtual DataStatus Arc::DataPointDirect::AddLocation (const URL & url, const std::string & meta)` [virtual]

Add **URL** (p. 379) to list.

Parameters

<i>url</i>	Location URL (p. 379) to add.
<i>meta</i>	Location meta information.

Implements **Arc::DataPoint** (p. 124).

6.75.2.3 `virtual DataStatus Arc::DataPointDirect::CompareLocationMetadata () const`
[virtual]

Compare metadata of **DataPoint** (p. 120) and current location.

Returns inconsistency error or error encountered during operation, or success

Implements **Arc::DataPoint** (p. 125).

6.75.2.4 `virtual const std::string& Arc::DataPointDirect::CurrentLocationMetadata () const`
[virtual]

Returns meta information used to create current **URL** (p. 379).

Usage differs between different indexing services.

Implements **Arc::DataPoint** (p. 125).

6.75.2.5 `virtual bool Arc::DataPointDirect::NextLocation ()` [virtual]

Switch to next location in list of URLs.

At last location switch to first if number of allowed retries is not exceeded. Returns false if no retries left.

Implements **Arc::DataPoint** (p. 126).

6.75.2.6 `virtual void Arc::DataPointDirect::Passive (bool v)` [virtual]

Request passive transfers for FTP-like protocols.

Parameters

<i>true</i>	to request.
-------------	-------------

Implements **Arc::DataPoint** (p. 126).

6.75.2.7 `virtual DataStatus Arc::DataPointDirect::PostRegister (bool replication)`
[virtual]

Index **Service** (p. 331) postregistration.

Used for same purpose as PreRegister. Should be called after actual transfer of file successfully finished.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in Indexing Service (p. 331) under same name.
--------------------	---

Implements **Arc::DataPoint** (p. 127).

6.75.2.8 `virtual DataStatus Arc::DataPointDirect::PreRegister (bool replication, bool force = false)` [virtual]

Index service preregistration.

This function registers the physical location of a file into an indexing service. It should be called *before* the actual transfer to that location happens.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in the indexing service under same name.
<i>force</i>	if true, perform registration of a new file even if it already exists. Should be used to fix failures in Indexing Service (p. 331).

Implements **Arc::DataPoint** (p. 128).

6.75.2.9 `virtual DataStatus Arc::DataPointDirect::PreUnregister (bool replication)`
[virtual]

Index **Service** (p. 331) preunregistration.

Should be called if file transfer failed. It removes changes made by PreRegister.

Parameters

<i>replication</i>	if true, the file is being replicated between two locations registered in Indexing Service (p. 331) under same name.
--------------------	---

Implements **Arc::DataPoint** (p. 128).

6.75.2.10 `virtual bool Arc::DataPointDirect::ProvidesMeta ()` [virtual]

If endpoint can provide at least some meta information directly.

Implements **Arc::DataPoint** (p. 129).

6.75.2.11 `virtual void Arc::DataPointDirect::Range (unsigned long long int start = 0, unsigned long long int end = 0)` [virtual]

Set range of bytes to retrieve.

Default values correspond to whole file.

Implements **Arc::DataPoint** (p. 129).

6.75.2.12 `virtual void Arc::DataPointDirect::ReadOutOfOrder (bool v)` [virtual]

Allow/disallow **DataPoint** (p. 120) to produce scattered data during reading* operation.

Parameters

<i>v</i>	true if allowed (default is false).
----------	-------------------------------------

Implements **Arc::DataPoint** (p. 129).

6.75.2.13 `virtual bool Arc::DataPointDirect::Registered () const` [virtual]

Check if file is registered in Indexing **Service** (p. 331).

Proper value is obtainable only after Resolve.

Implements **Arc::DataPoint** (p. 129).

6.75.2.14 `virtual DataStatus Arc::DataPointDirect::Resolve (bool source)` [virtual]

Resolves index service **URL** (p. 379) into list of ordinary URLs.

Also obtains meta information about the file.

Parameters

<i>source</i>	true if DataPoint (p. 120) object represents source of information.
---------------	--

Implements **Arc::DataPoint** (p. 129).

6.75.2.15 `virtual void Arc::DataPointDirect::SetAdditionalChecks (bool v)` [virtual]

Allow/disallow additional checks.

Check for existence of remote file (and probably other checks too) before initiating reading and writing operations.

Parameters

<i>v</i>	true if allowed (default is true).
----------	------------------------------------

Implements **Arc::DataPoint** (p. 129).

6.75.2.16 `virtual void Arc::DataPointDirect::SetSecure (bool v)` [virtual]

Allow/disallow heavy security during data transfer.

Parameters

<i>v</i>	true if allowed (default depends on protocol).
----------	--

Implements **Arc::DataPoint** (p. 130).

6.75.2.17 `virtual void Arc::DataPointDirect::SortLocations (const std::string & pattern, const URLMap & url.map)` [inline, virtual]

Sort locations according to the specified pattern.

Parameters

<i>pattern</i>	a set of strings, separated by , to match against.
----------------	---

Implements **Arc::DataPoint** (p. 130).

6.75.2.18 `virtual DataStatus Arc::DataPointDirect::Unregister (bool all)` [virtual]

Index **Service** (p. 331) unregistration.

Remove information about file registered in Indexing **Service** (p. 331).

Parameters

<i>all</i>	if true, information about file itself is (LFN) is removed. Otherwise only particular physical instance is unregistered.
------------	--

Implements **Arc::DataPoint** (p. 132).

6.75.2.19 `virtual bool Arc::DataPointDirect::WriteOutOfOrder ()` [virtual]

Returns true if **URL** (p. 379) can accept scattered data for *writing* operation.

Implements **Arc::DataPoint** (p. 132).

The documentation for this class was generated from the following file:

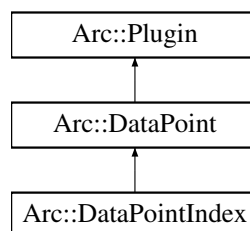
- DataPointDirect.h

6.76 Arc::DataPointIndex Class Reference

Complements **DataPoint** (p. 120) with attributes common for Indexing **Service** (p. 331) URLs.

```
#include <DataPointIndex.h>
```

Inheritance diagram for Arc::DataPointIndex:



Public Member Functions

- virtual const **URL & CurrentLocation** () const
- virtual const std::string & **CurrentLocationMetadata** () const
- virtual **DataStatus CompareLocationMetadata** () const

- virtual bool **NextLocation** ()
- virtual bool **LocationValid** () const
- virtual bool **HaveLocations** () const
- virtual bool **LastLocation** ()
- virtual **DataStatus RemoveLocation** ()
- virtual **DataStatus RemoveLocations** (const **DataPoint** &p)
- virtual **DataStatus AddLocation** (const **URL** &url, const std::string &meta)
- virtual void **SortLocations** (const std::string &pattern, const **URLMap** &url_map)
- virtual bool **IsIndex** () const
- virtual bool **IsStageable** () const
- virtual bool **AcceptsMeta** ()
- virtual bool **ProvidesMeta** ()
- virtual void **SetMeta** (const **DataPoint** &p)
- virtual void **SetChecksum** (const std::string &val)
- virtual void **SetSize** (const unsigned long long int val)
- virtual bool **Registered** () const
- virtual void **SetTries** (const int n)
- virtual long long int **BufSize** () const
- virtual int **BufNum** () const
- virtual bool **Local** () const
- virtual **DataStatus PrepareReading** (unsigned int timeout, unsigned int &wait_time)
- virtual **DataStatus PrepareWriting** (unsigned int timeout, unsigned int &wait_time)
- virtual **DataStatus StartReading** (**DataBuffer** &buffer)
- virtual **DataStatus StartWriting** (**DataBuffer** &buffer, **DataCallback** *space_cb=NULL)
- virtual **DataStatus StopReading** ()
- virtual **DataStatus StopWriting** ()
- virtual **DataStatus FinishReading** (bool error=false)
- virtual **DataStatus FinishWriting** (bool error=false)
- virtual std::vector< **URL** > **TransferLocations** () const
- virtual **DataStatus Check** ()
- virtual **DataStatus Remove** ()
- virtual void **ReadOutOfOrder** (bool v)
- virtual bool **WriteOutOfOrder** ()
- virtual void **SetAdditionalChecks** (bool v)
- virtual bool **GetAdditionalChecks** () const
- virtual void **SetSecure** (bool v)
- virtual bool **GetSecure** () const
- virtual **DataPointAccessLatency GetAccessLatency** () const
- virtual void **Passive** (bool v)
- virtual void **Range** (unsigned long long int start=0, unsigned long long int end=0)
- virtual int **AddChecksumObject** (**Checksum** *cksum)

6.76.1 Detailed Description

Complements **DataPoint** (p. 120) with attributes common for Indexing **Service** (p. 331) URLs. It should never be used directly. Instead inherit from it to provide a class for specific a Indexing **Service** (p. 331).

6.76.2 Member Function Documentation

6.76.2.1 `virtual int Arc::DataPointIndex::AddChecksumObject (CheckSum * cksum)`
[virtual]

Add a checksum object which will compute checksum during transmission.

Parameters

<i>cksum</i>	object which will compute checksum. Should not be destroyed till Data-Pointer itself.
--------------	---

Returns

integer position in the list of checksum objects.

Implements **Arc::DataPoint** (p. 124).

6.76.2.2 `virtual DataStatus Arc::DataPointIndex::AddLocation (const URL & url, const std::string & meta)` [virtual]

Add **URL** (p. 379) to list.

Parameters

<i>url</i>	Location URL (p. 379) to add.
<i>meta</i>	Location meta information.

Implements **Arc::DataPoint** (p. 124).

6.76.2.3 `virtual DataStatus Arc::DataPointIndex::Check ()` [virtual]

Query (p. 306) the **DataPoint** (p. 120) to check if object is accessible.

If possible this method will also try to provide meta information about the object. It returns positive response if object's content can be retrieved.

Implements **Arc::DataPoint** (p. 124).

6.76.2.4 `virtual DataStatus Arc::DataPointIndex::CompareLocationMetadata () const`
[virtual]

Compare metadata of **DataPoint** (p. 120) and current location.

Returns inconsistency error or error encountered during operation, or success

Implements **Arc::DataPoint** (p. 125).

6.76.2.5 `virtual const std::string& Arc::DataPointIndex::CurrentLocationMetadata () const`
[virtual]

Returns meta information used to create current **URL** (p. 379).

Usage differs between different indexing services.

Implements **Arc::DataPoint** (p. 125).

6.76.2.6 `virtual DataStatus Arc::DataPointIndex::FinishReading (bool error = false)`
[virtual]

Finish reading from the **URL** (p. 379).

Must be called after transfer of physical file has completed and if **PrepareReading()** (p. 142) was called, to free resources, release requests that were made during preparation etc.

Parameters

<i>error</i>	If true then action is taken depending on the error.
--------------	--

Reimplemented from **Arc::DataPoint** (p. 125).

6.76.2.7 `virtual DataStatus Arc::DataPointIndex::FinishWriting (bool error = false)`
[virtual]

Finish writing to the **URL** (p. 379).

Must be called after transfer of physical file has completed and if **PrepareWriting()** (p. 143) was called, to free resources, release requests that were made during preparation etc.

Parameters

<i>error</i>	If true then action is taken depending on the error.
--------------	--

Reimplemented from **Arc::DataPoint** (p. 125).

6.76.2.8 `virtual bool Arc::DataPointIndex::NextLocation ()` [virtual]

Switch to next location in list of URLs.

At last location switch to first if number of allowed retries is not exceeded. Returns false if no retries left.

Implements **Arc::DataPoint** (p. 126).

6.76.2.9 virtual void Arc::DataPointIndex::Passive (bool *v*) [virtual]

Request passive transfers for FTP-like protocols.

Parameters

<i>true</i>	to request.
-------------	-------------

Implements **Arc::DataPoint** (p. 126).

6.76.2.10 virtual DataStatus Arc::DataPointIndex::PrepareReading (unsigned int *timeout*, unsigned int & *wait_time*) [virtual]

Prepare **DataPoint** (p. 120) for reading.

This method should be implemented by protocols which require preparation or staging of physical files for reading. It can act synchronously or asynchronously (if protocol supports it). In the first case the method will block until the file is prepared or the specified timeout has passed. In the second case the method can return with a ReadPrepareWait status before the file is prepared. The caller should then wait some time (a hint from the remote service may be given in *wait_time*) and call **PrepareReading()** (p. 142) again to poll for the preparation status, until the file is prepared. In this case it is also up to the caller to decide when the request has taken too long and if so cancel it by calling **FinishReading()** (p. 141). When file preparation has finished, the physical file(s) to read from can be found from **TransferLocations()** (p. 146).

Parameters

<i>timeout</i>	If non-zero, this method will block until either the file has been prepared successfully or the timeout has passed. A zero value means that the caller would like to call and poll for status.
<i>wait_time</i>	If timeout is zero (caller would like asynchronous operation) and ReadPrepareWait is returned, a hint for how long to wait before a subsequent call may be given in <i>wait_time</i> .

Reimplemented from **Arc::DataPoint** (p. 127).

6.76.2.11 virtual DataStatus Arc::DataPointIndex::PrepareWriting (unsigned int *timeout*, unsigned int & *wait_time*) [virtual]

Prepare **DataPoint** (p. 120) for writing.

This method should be implemented by protocols which require preparation of physical files for writing. It can act synchronously or asynchronously (if protocol supports it). In the first case the method will block until the file is prepared or the specified timeout has passed. In the second case the method can return with a WritePrepareWait status before the file is prepared. The caller should then wait some time (a hint from the remote service may be given in *wait_time*) and call **PrepareWriting()** (p. 143) again to poll for the preparation status, until the file is prepared. In this case it is also up to the caller to decide when the request has taken too long and if so cancel or abort it by

calling `FinishWriting(true)`. When file preparation has finished, the physical file(s) to write to can be found from **TransferLocations()** (p. 146).

Parameters

<i>timeout</i>	If non-zero, this method will block until either the file has been prepared successfully or the timeout has passed. A zero value means that the caller would like to call and poll for status.
<i>wait_time</i>	If timeout is zero (caller would like asynchronous operation) and <code>WritePrepareWait</code> is returned, a hint for how long to wait before a subsequent call may be given in <code>wait_time</code> .

Reimplemented from **Arc::DataPoint** (p. 127).

6.76.2.12 `virtual bool Arc::DataPointIndex::ProvidesMeta () [virtual]`

If endpoint can provide at least some meta information directly.

Implements **Arc::DataPoint** (p. 129).

6.76.2.13 `virtual void Arc::DataPointIndex::Range (unsigned long long int start = 0, unsigned long long int end = 0) [virtual]`

Set range of bytes to retrieve.

Default values correspond to whole file.

Implements **Arc::DataPoint** (p. 129).

6.76.2.14 `virtual void Arc::DataPointIndex::ReadOutOfOrder (bool v) [virtual]`

Allow/disallow **DataPoint** (p. 120) to produce scattered data during reading* operation.

Parameters

<i>v</i>	true if allowed (default is false).
----------	-------------------------------------

Implements **Arc::DataPoint** (p. 129).

6.76.2.15 `virtual bool Arc::DataPointIndex::Registered () const [virtual]`

Check if file is registered in Indexing **Service** (p. 331).

Proper value is obtainable only after `Resolve`.

Implements **Arc::DataPoint** (p. 129).

6.76.2.16 virtual void Arc::DataPointIndex::SetAdditionalChecks (bool *v*) [virtual]

Allow/disallow additional checks.

Check for existence of remote file (and probably other checks too) before initiating reading and writing operations.

Parameters

<i>v</i>	true if allowed (default is true).
----------	------------------------------------

Implements **Arc::DataPoint** (p. 129).

6.76.2.17 virtual void Arc::DataPointIndex::SetMeta (const DataPoint & *p*) [virtual]

Copy meta information from another object.

Already defined values are not overwritten.

Parameters

<i>p</i>	object from which information is taken.
----------	---

Reimplemented from **Arc::DataPoint** (p. 130).

6.76.2.18 virtual void Arc::DataPointIndex::SetSecure (bool *v*) [virtual]

Allow/disallow heavy security during data transfer.

Parameters

<i>v</i>	true if allowed (default depends on protocol).
----------	--

Implements **Arc::DataPoint** (p. 130).

6.76.2.19 virtual void Arc::DataPointIndex::SortLocations (const std::string & *pattern*, const URLMap & *url_map*) [virtual]

Sort locations according to the specified pattern.

Parameters

<i>pattern</i>	a set of strings, separated by , to match against.
----------------	---

Implements **Arc::DataPoint** (p. 130).

6.76.2.20 `virtual DataStatus Arc::DataPointIndex::StartReading (DataBuffer & buffer)` [virtual]

Start reading data from **URL** (p. 379).

Separate thread to transfer data will be created. No other operation can be performed while reading is in progress.

Parameters

<i>buffer</i>	operation will use this buffer to put information into. Should not be destroyed before stop_reading was called and returned.
---------------	--

Implements **Arc::DataPoint** (p. 131).

6.76.2.21 `virtual DataStatus Arc::DataPointIndex::StartWriting (DataBuffer & buffer, DataCallback * space_cb = NULL)` [virtual]

Start writing data to **URL** (p. 379).

Separate thread to transfer data will be created. No other operation can be performed while writing is in progress.

Parameters

<i>buffer</i>	operation will use this buffer to get information from. Should not be destroyed before stop_writing was called and returned.
<i>space_cb</i>	callback which is called if there is not enough space to store data. May not implemented for all protocols.

Implements **Arc::DataPoint** (p. 131).

6.76.2.22 `virtual DataStatus Arc::DataPointIndex::StopReading ()` [virtual]

Stop reading.

Must be called after corresponding start_reading method, either after all data is transferred or to cancel transfer. Use buffer object to find out when data is transferred. Must return failure if any happened during transfer.

Implements **Arc::DataPoint** (p. 132).

6.76.2.23 `virtual DataStatus Arc::DataPointIndex::StopWriting ()` [virtual]

Stop writing.

Must be called after corresponding start_writing method, either after all data is transferred or to cancel transfer. Use buffer object to find out when data is transferred. Must return failure if any happened during transfer.

Implements **Arc::DataPoint** (p. 132).

6.76.2.24 `virtual std::vector<URL> Arc::DataPointIndex::TransferLocations () const`
`[virtual]`

Returns physical file(s) to read/write, if different from **CurrentLocation()** (p. 139)

To be used with protocols which re-direct to different URLs such as Transport URLs (TURLs). The list is initially filled by PrepareReading and PrepareWriting. If this list is non-empty then real transfer should use a **URL** (p. 379) from this list. It is up to the caller to choose the best **URL** (p. 379) and instantiate new **DataPoint** (p. 120) for handling it. For consistency protocols which do not require redirections return original **URL** (p. 379). For protocols which need redirection calling StartReading and StartWriting will use first **URL** (p. 379) in the list.

Reimplemented from **Arc::DataPoint** (p. 132).

6.76.2.25 `virtual bool Arc::DataPointIndex::WriteOutOfOrder ()` `[virtual]`

Returns true if **URL** (p. 379) can accept scattered data for *writing* operation.

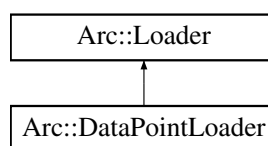
Implements **Arc::DataPoint** (p. 132).

The documentation for this class was generated from the following file:

- DataPointIndex.h

6.77 Arc::DataPointLoader Class Reference

Inheritance diagram for Arc::DataPointLoader:

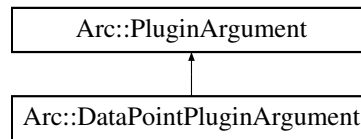


The documentation for this class was generated from the following file:

- DataPoint.h

6.78 Arc::DataPointPluginArgument Class Reference

Inheritance diagram for Arc::DataPointPluginArgument:



The documentation for this class was generated from the following file:

- DataPoint.h

6.79 Arc::DataSpeed Class Reference

Keeps track of average and instantaneous transfer speed.

```
#include <DataSpeed.h>
```

Public Member Functions

- **DataSpeed** (time_t base=DATASPEED_AVERAGING_PERIOD)
- **DataSpeed** (unsigned long long int min_speed, time_t min_speed_time, unsigned long long int min_average_speed, time_t max_inactivity_time, time_t base=DATASPEED_AVERAGING_PERIOD)
- **~DataSpeed** (void)
- void **verbose** (bool val)
- void **verbose** (const std::string &prefix)
- bool **verbose** (void)
- void **set_min_speed** (unsigned long long int min_speed, time_t min_speed_time)
- void **set_min_average_speed** (unsigned long long int min_average_speed)
- void **set_max_inactivity_time** (time_t max_inactivity_time)
- time_t **get_max_inactivity_time** ()
- void **set_base** (time_t base=DATASPEED_AVERAGING_PERIOD)
- void **set_max_data** (unsigned long long int max=0)
- void **set_progress_indicator** (show_progress_t func=NULL)
- void **reset** (void)
- bool **transfer** (unsigned long long int n=0)
- void **hold** (bool disable)
- bool **min_speed_failure** ()
- bool **min_average_speed_failure** ()
- bool **max_inactivity_time_failure** ()
- unsigned long long int **transferred_size** (void)

6.79.1 Detailed Description

Keeps track of average and instantaneous transfer speed. Also detects data transfer inactivity and other transfer timeouts.

6.79.2 Constructor & Destructor Documentation

6.79.2.1 `Arc::DataSpeed::DataSpeed (time.t base = DATASPEED_AVERAGING_PERIOD)`

Constructor

Parameters

<i>base</i>	time period used to average values (default 1 minute).
-------------	--

6.79.2.2 `Arc::DataSpeed::DataSpeed (unsigned long long int min_speed, time.t min_speed_time, unsigned long long int min_average_speed, time.t max_inactivity_time, time.t base = DATASPEED_AVERAGING_PERIOD)`

Constructor

Parameters

<i>base</i>	time period used to average values (default 1 minute).
<i>min_speed</i>	minimal allowed speed (Butes per second). If speed drops and holds below threshold for <i>min_speed_time_</i> seconds error is triggered.
<i>min_speed_time</i>	
<i>min_average_speed</i>	minimal average speed (Bytes per second) to trigger error. Averaged over whole current transfer time.
<i>max_inactivity_time</i>	- if no data is passing for specified amount of time (seconds), error is triggered.

6.79.3 Member Function Documentation

6.79.3.1 `void Arc::DataSpeed::hold (bool disable)`

Turn off speed control.

Parameters

<i>disable</i>	true to turn off.
----------------	-------------------

6.79.3.2 `void Arc::DataSpeed::set_base (time.t base_ = DATASPEED_AVERAGING_PERIOD)`

Set averaging time period.

Parameters

<i>base</i>	time period used to average values (default 1 minute).
-------------	--

6.79.3.3 void Arc::DataSpeed::set_max_data (unsigned long long int *max* = 0)

Set amount of data to be transferred. Used in verbose messages.

Parameters

<i>max</i>	amount of data in bytes.
------------	--------------------------

6.79.3.4 void Arc::DataSpeed::set_max_inactivity_time (time_t *max_inactivity_time*)

Set inactivity timeout.

Parameters

<i>max_inactivity_time</i>	- if no data is passing for specified amount of time (seconds), error is triggered.
----------------------------	---

6.79.3.5 void Arc::DataSpeed::set_min_average_speed (unsigned long long int *min_average_speed*)

Set minimal average speed.

Parameters

<i>min_average_speed</i>	minimal average speed (Bytes per second) to trigger error. Averaged over whole current transfer time.
--------------------------	---

6.79.3.6 void Arc::DataSpeed::set_min_speed (unsigned long long int *min_speed*, time_t *min_speed_time*)

Set minimal allowed speed.

Parameters

<i>min_speed</i>	minimal allowed speed (Bytes per second). If speed drops and holds below threshold for <i>min_speed_time</i> seconds error is triggered.
<i>min_speed_time</i>	

6.79.3.7 void Arc::DataSpeed::set_progress_indicator (show_progress_t *func* = NULL)

Specify which external function will print verbose messages. If not specified internal one is used.

Parameters

<i>pointer</i>	to function which prints information.
----------------	---------------------------------------

6.79.3.8 bool Arc::DataSpeed::transfer (unsigned long long int *n* = 0)

Inform object, about amount of data has been transferred. All errors are triggered by this method. To make them work application must call this method periodically even with zero value.

Parameters

<i>n</i>	amount of data transferred (bytes).
----------	-------------------------------------

6.79.3.9 void Arc::DataSpeed::verbose (bool *val*)

Activate printing information about current time speeds, amount of transferred data.

6.79.3.10 void Arc::DataSpeed::verbose (const std::string & *prefix*)

Print information about current speed and amount of data.

Parameters

<i>'prefix'</i>	add this string at the beginning of every string.
-----------------	---

The documentation for this class was generated from the following file:

- DataSpeed.h

6.80 Arc::DataStatus Class Reference

```
#include <DataStatus.h>
```

Public Types

- enum **DataStatusType** {
Success = 0, **ReadAcquireError** = 1 , **WriteAcquireError** = 2 , **ReadResolveError** = 3 ,
WriteResolveError = 4 , **ReadStartError** = 5 , **WriteStartError** = 6 , **ReadError** = 7 ,
WriteError = 8 , **TransferError** = 9 , **ReadStopError** = 10 , **WriteStopError** = 11 ,
PreRegisterError = 12 , **PostRegisterError** = 13 , **UnregisterError** = 14 ,
CacheError = 15 ,

CredentialsExpiredError = 16, **DeleteError** = 17 , **NoLocationError** = 18,
LocationAlreadyExistsError = 19,
NotSupportedForDirectDataPointsError = 20, **UnimplementedError** = 21,
IsReadingError = 22, **IsWritingError** = 23,
CheckError = 24 , **ListError** = 25 , **StatError** = 27 , **NotInitializedError** =
29,
SystemError = 30, **StageError** = 31 , **InconsistentMetadataError** = 32, **Read-
PrepareError** = 32 ,
ReadPrepareWait = 33, **WritePrepareError** = 34 , **WritePrepareWait** = 35,
ReadFinishError = 36 ,
WriteFinishError = 37 , **SuccessCached** = 38, **UnknownError** = 39 }

6.80.1 Detailed Description

A class to be used for return types of all major data handling methods. It describes the outcome of the method.

6.80.2 Member Enumeration Documentation

6.80.2.1 enum Arc::DataStatus::DataStatusType

Enumerator:

Success Operation completed successfully.
ReadAcquireError Source is bad **URL** (p. 379) or can't be used due to some reason.
WriteAcquireError Destination is bad **URL** (p. 379) or can't be used due to some reason.
ReadResolveError Resolving of index service **URL** (p. 379) for source failed.
WriteResolveError Resolving of index service **URL** (p. 379) for destination failed.

ReadStartError Can't read from source.
WriteStartError Can't write to destination.
ReadError Failed while reading from source.
WriteError Failed while writing to destination.
TransferError Failed while transferring data (mostly timeout)
ReadStopError Failed while finishing reading from source.
WriteStopError Failed while finishing writing to destination.
PreRegisterError First stage of registration of index service **URL** (p. 379) failed.

PostRegisterError Last stage of registration of index service **URL** (p. 379) failed.

UnregisterError Unregistration of index service **URL** (p. 379) failed.

CacheError Error in caching procedure.

CredentialsExpiredError Error due to provided credentials are expired.

DeleteError Error deleting location or **URL** (p. 379).

NoLocationError No valid location available.

LocationAlreadyExistsError No valid location available.

NotSupportedForDirectDataPointsError Operation has no sense for this kind of **URL** (p. 379).

UnimplementedError Feature is unimplemented.

IsReadingError **DataPoint** (p. 120) is already reading.

IsWritingError **DataPoint** (p. 120) is already writing.

CheckError Access check failed.

ListError File listing failed.

StatError File/dir stating failed.

NotInitializedError Object initialization failed.

SystemError Error in OS.

StageError Staging error.

InconsistentMetadataError Inconsistent metadata.

ReadPrepareError Can't prepare source.

ReadPrepareWait Wait for source to be prepared.

WritePrepareError Can't prepare destination.

WritePrepareWait Wait for destination to be prepared.

ReadFinishError Can't finish source.

WriteFinishError Can't finish destination.

SuccessCached Data was already cached.

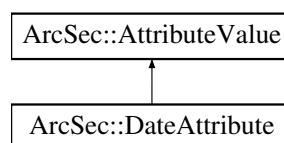
UnknownError Undefined.

The documentation for this class was generated from the following file:

- DataStatus.h

6.81 ArcSec::DateAttribute Class Reference

Inheritance diagram for ArcSec::DateAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.81.1 Member Function Documentation

6.81.1.1 virtual std::string ArcSec::DateAttribute::encode () [virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.81.1.2 virtual bool ArcSec::DateAttribute::equal (**AttributeValue** * value, bool check_id = true) [virtual]

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.81.1.3 virtual std::string ArcSec::DateAttribute::getId () [inline, virtual]

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.81.1.4 virtual std::string ArcSec::DateAttribute::getType () [inline, virtual]

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

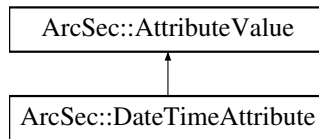
The documentation for this class was generated from the following file:

- DateTimeAttribute.h

6.82 ArcSec::DateTimeAttribute Class Reference

```
#include <DateTimeAttribute.h>
```

Inheritance diagram for ArcSec::DateTimeAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.82.1 Detailed Description

Format: YYYYMMDDHHMMSSZ Day Month DD HH:MM:SS YYYY YYYY-MM-DD HH:MM:SS YYYY-MM-DDTHH:MM:SS+HH:MM YYYY-MM-DDTHH:MM:SSZ

6.82.2 Member Function Documentation

6.82.2.1 virtual std::string ArcSec::DateTimeAttribute::encode () [virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.82.2.2 virtual bool ArcSec::DateTimeAttribute::equal (**AttributeValue** * value, bool check_id=true) [virtual]

Evaluate whether "this" equale to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.82.2.3 virtual std::string ArcSec::DateTimeAttribute::getId () [inline, virtual]

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.82.2.4 virtual std::string ArcSec::DateTimeAttribute::getType () [inline, virtual]

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

- DateTimeAttribute.h

6.83 Arc::DBranch Class Reference

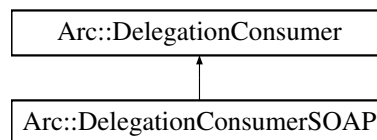
The documentation for this class was generated from the following file:

- DBranch.h

6.84 Arc::DelegationConsumer Class Reference

```
#include <DelegationInterface.h>
```

Inheritance diagram for Arc::DelegationConsumer:



Public Member Functions

- **DelegationConsumer** (void)
- **DelegationConsumer** (const std::string &content)
- const std::string & **ID** (void)
- bool **Backup** (std::string &content)
- bool **Restore** (const std::string &content)
- bool **Request** (std::string &content)
- bool **Acquire** (std::string &content)
- bool **Acquire** (std::string &content, std::string &identity)

Protected Member Functions

- bool **Generate** (void)
- void **LogError** (void)

6.84.1 Detailed Description

A consumer of delegated X509 credentials. During delegation procedure this class acquires delegated credentials aka proxy - certificate, private key and chain of previous certificates. Delegation procedure consists of calling **Request()** (p. 157) method for generating certificate request followed by call to **Acquire()** (p. 156) method for making complete credentials from certificate chain.

6.84.2 Constructor & Destructor Documentation

6.84.2.1 Arc::DelegationConsumer::DelegationConsumer (void)

Creates object with new private key

6.84.2.2 Arc::DelegationConsumer::DelegationConsumer (const std::string & *content*)

Creates object with provided private key

6.84.3 Member Function Documentation

6.84.3.1 bool Arc::DelegationConsumer::Acquire (std::string & *content*)

Ads private key into certificates chain in 'content' On exit content contains complete delegated credentials.

6.84.3.2 bool Arc::DelegationConsumer::Acquire (std::string & *content*, std::string & *identity*)

Includes the functionality in Acquire(content); pluse extracting the credential identity

6.84.3.3 bool Arc::DelegationConsumer::Backup (std::string & *content*)

Stores content of this object into a string

6.84.3.4 bool Arc::DelegationConsumer::Generate (void) [protected]

Private key

6.84.3.5 const std::string& Arc::DelegationConsumer::ID (void)

Return identifier of this object - not implemented

6.84.3.6 void Arc::DelegationConsumer::LogError (void) [protected]

Creates private key

6.84.3.7 bool Arc::DelegationConsumer::Request (std::string & *content*)

Make X509 certificate request from internal private key

6.84.3.8 bool Arc::DelegationConsumer::Restore (const std::string & content)

Restores content of object from string

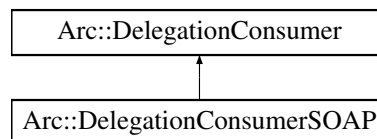
The documentation for this class was generated from the following file:

- DelegationInterface.h

6.85 Arc::DelegationConsumerSOAP Class Reference

```
#include <DelegationInterface.h>
```

Inheritance diagram for Arc::DelegationConsumerSOAP:



Public Member Functions

- **DelegationConsumerSOAP** (void)
- **DelegationConsumerSOAP** (const std::string &content)
- bool **DelegateCredentialsInit** (const std::string &id, const SOAPEnvelope &in, SOAPEnvelope &out)
- bool **UpdateCredentials** (std::string &credentials, const SOAPEnvelope &in, SOAPEnvelope &out)
- bool **UpdateCredentials** (std::string &credentials, std::string &identity, const SOAPEnvelope &in, SOAPEnvelope &out)
- bool **DelegatedToken** (std::string &credentials, **XMLNode** token)

6.85.1 Detailed Description

This class extends **DelegationConsumer** (p. 155) to support SOAP message exchange. Implements WS interface <http://www.nordugrid.org/schemas/delegation> described in delegation.wsdl.

6.85.2 Constructor & Destructor Documentation

6.85.2.1 Arc::DelegationConsumerSOAP::DelegationConsumerSOAP (void)

Creates object with new private key

6.85.2.2 Arc::DelegationConsumerSOAP::DelegationConsumerSOAP (const std::string & *content*)

Creates object with specified private key

6.85.3 Member Function Documentation

6.85.3.1 bool Arc::DelegationConsumerSOAP::DelegateCredentialsInit (const std::string & *id*, const SOAPEnvelope & *in*, SOAPEnvelope & *out*)

Process SOAP message which starts delegation. Generated message in 'out' is meant to be sent back to DelagationProviderSOAP. Argument 'id' contains identifier of procedure and is used only to produce SOAP message.

6.85.3.2 bool Arc::DelegationConsumerSOAP::DelegatedToken (std::string & *credentials*, XMLNode *token*)

Similar to UpdateCredentials but takes only DelegatedToken XML element

6.85.3.3 bool Arc::DelegationConsumerSOAP::UpdateCredentials (std::string & *credentials*, std::string & *identity*, const SOAPEnvelope & *in*, SOAPEnvelope & *out*)

Includes the functionality in above UpdateCredentials method; plus extracting the credential identity

6.85.3.4 bool Arc::DelegationConsumerSOAP::UpdateCredentials (std::string & *credentials*, const SOAPEnvelope & *in*, SOAPEnvelope & *out*)

Accepts delegated credentials. Process 'in' SOAP message and stores full proxy credentials in 'credentials'. 'out' message is generated for sending to DelagationProviderSOAP.

The documentation for this class was generated from the following file:

- DelegationInterface.h

6.86 Arc::DelegationContainerSOAP Class Reference

```
#include <DelegationInterface.h>
```

Public Member Functions

- bool **DelegateCredentialsInit** (const SOAPEnvelope &in, SOAPEnvelope &out, const std::string &client="")

- bool **UpdateCredentials** (std::string &credentials, const SOAPEnvelope &in, SOAPEnvelope &out, const std::string &client="")
- bool **DelegatedToken** (std::string &credentials, XMLNode token, const std::string &client="")

Protected Attributes

- int **max_size_**
- int **max_duration_**
- int **max_usage_**
- bool **context_lock_**

6.86.1 Detailed Description

Manages multiple delegated credentials. Delegation consumers are created automatically with `DelegateCredentialsInit` method up to `max_size_` and assigned unique identifier. It's methods are similar to those of **DelegationConsumerSOAP** (p. 157) with identifier included in SOAP message used to route execution to one of managed **DelegationConsumerSOAP** (p. 157) instances.

6.86.2 Member Function Documentation

6.86.2.1 bool Arc::DelegationContainerSOAP::DelegateCredentialsInit (const SOAPEnvelope & *in*, SOAPEnvelope & *out*, const std::string & *client* = " ")

See **DelegationConsumerSOAP::DelegateCredentialsInit** (p. 158) If 'client' is not empty then all subsequent calls involving access to generated credentials must contain same value in their 'client' arguments.

6.86.2.2 bool Arc::DelegationContainerSOAP::DelegatedToken (std::string & *credentials*, XMLNode *token*, const std::string & *client* = " ")

See **DelegationConsumerSOAP::DelegatedToken** (p. 158)

6.86.2.3 bool Arc::DelegationContainerSOAP::UpdateCredentials (std::string & *credentials*, const SOAPEnvelope & *in*, SOAPEnvelope & *out*, const std::string & *client* = " ")

See **DelegationConsumerSOAP::UpdateCredentials** (p. 158)

6.86.3 Field Documentation

6.86.3.1 bool Arc::DelegationContainerSOAP::context_lock_ [protected]

If true delegation consumer is deleted when connection context is destroyed

6.86.3.2 `int Arc::DelegationContainerSOAP::max_duration_` [protected]

Lifetime of unused delegation consumer

6.86.3.3 `int Arc::DelegationContainerSOAP::max_size_` [protected]

Max. number of delegation consumers

6.86.3.4 `int Arc::DelegationContainerSOAP::max_usage_` [protected]

Max. times same delegation consumer may accept credentials

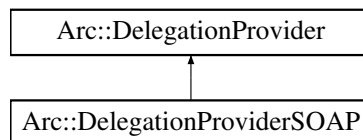
The documentation for this class was generated from the following file:

- DelegationInterface.h

6.87 Arc::DelegationProvider Class Reference

```
#include <DelegationInterface.h>
```

Inheritance diagram for Arc::DelegationProvider:



Public Member Functions

- **DelegationProvider** (const std::string &credentials)
- **DelegationProvider** (const std::string &cert_file, const std::string &key_file, std::istream *inpwd=NULL)
- std::string **Delegate** (const std::string &request, const DelegationRestrictions &restrictions=DelegationRestrictions())

6.87.1 Detailed Description

A provider of delegated credentials. During delegation procedure this class generates new credential to be used in proxy/delegated credential.

6.87.2 Constructor & Destructor Documentation

6.87.2.1 Arc::DelegationProvider::DelegationProvider (const std::string & *credentials*)

Creates instance from provided credentials. Credentials are used to sign delegated credentials. Arguments should contain PEM-encoded certificate, private key and optionally certificates chain.

6.87.2.2 Arc::DelegationProvider::DelegationProvider (const std::string & *cert_file*, const std::string & *key_file*, std::istream * *inpwd* = NULL)

Creates instance from provided credentials. Credentials are used to sign delegated credentials. Arguments should contain filesystem path to PEM-encoded certificate and private key. Optionally *cert_file* may contain certificates chain.

6.87.3 Member Function Documentation

6.87.3.1 std::string Arc::DelegationProvider::Delegate (const std::string & *request*, const DelegationRestrictions & *restrictions* = DelegationRestrictions())

Perform delegation. Takes X509 certificate request and creates proxy credentials excluding private key. Result is then to be fed into **DelegationConsumer::Acquire** (p. 156)

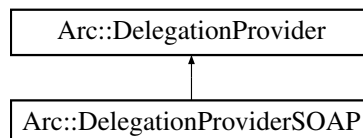
The documentation for this class was generated from the following file:

- DelegationInterface.h

6.88 Arc::DelegationProviderSOAP Class Reference

```
#include <DelegationInterface.h>
```

Inheritance diagram for Arc::DelegationProviderSOAP:



Public Member Functions

- **DelegationProviderSOAP** (const std::string &credentials)
- **DelegationProviderSOAP** (const std::string &cert_file, const std::string &key_file, std::istream *inpwd=NULL)

- bool **DelegateCredentialsInit** (MCCInterface &mcc_interface, MessageContext *context)
- bool **DelegateCredentialsInit** (MCCInterface &mcc_interface, MessageAttributes *attributes_in, MessageAttributes *attributes_out, MessageContext *context)
- bool **UpdateCredentials** (MCCInterface &mcc_interface, MessageContext *context, const DelegationRestrictions &restrictions=DelegationRestrictions())
- bool **UpdateCredentials** (MCCInterface &mcc_interface, MessageAttributes *attributes_in, MessageAttributes *attributes_out, MessageContext *context, const DelegationRestrictions &restrictions=DelegationRestrictions())
- bool **DelegatedToken** (XMLNode parent)
- const std::string & **ID** (void)

6.88.1 Detailed Description

Extension of **DelegationProvider** (p. 160) with SOAP exchange interface. This class is also a temporary container for intermediate information used during delegation procedure.

6.88.2 Constructor & Destructor Documentation

6.88.2.1 Arc::DelegationProviderSOAP::DelegationProviderSOAP (const std::string & *credentials*)

Creates instance from provided credentials. Credentials are used to sign delegated credentials.

6.88.2.2 Arc::DelegationProviderSOAP::DelegationProviderSOAP (const std::string & *cert_file*, const std::string & *key_file*, std::istream * *inpwd* = NULL)

Creates instance from provided credentials. Credentials are used to sign delegated credentials. Arguments should contain filesystem path to PEM-encoded certificate and private key. Optionally *cert_file* may contain certificates chain.

6.88.3 Member Function Documentation

6.88.3.1 bool Arc::DelegationProviderSOAP::DelegateCredentialsInit (MCCInterface & *mcc_interface*, MessageContext * *context*)

Performs DelegateCredentialsInit SOAP operation. As result request for delegated credentials is received by this instance and stored internally. Call to UpdateCredentials should follow.

6.88.3.2 `bool Arc::DelegationProviderSOAP::DelegateCredentialsInit (MCCInterface & mcc_interface, MessageAttributes * attributes_in, MessageAttributes * attributes_out, MessageContext * context)`

Extended version of **DelegateCredentialsInit(MCCInterface&,MessageContext*)** (p. 162). Additionally takes attributes for request and response message to make fine control on message processing possible.

6.88.3.3 `bool Arc::DelegationProviderSOAP::DelegatedToken (XMLNode parent)`

Generates DelegatedToken element. Element is created as child of provided XML element and contains structure described in delegation.wsdl.

6.88.3.4 `const std::string& Arc::DelegationProviderSOAP::ID (void) [inline]`

Returns the identifier by service accepting delegated credentials. This identifier may then be used to refer to credentials stored at service.

6.88.3.5 `bool Arc::DelegationProviderSOAP::UpdateCredentials (MCCInterface & mcc_interface, MessageAttributes * attributes_in, MessageAttributes * attributes_out, MessageContext * context, const DelegationRestrictions & restrictions =DelegationRestrictions())`

Extended version of UpdateCredentials(MCCInterface&,MessageContext*). Additionally takes attributes for request and response message to make fine control on message processing possible.

6.88.3.6 `bool Arc::DelegationProviderSOAP::UpdateCredentials (MCCInterface & mcc_interface, MessageContext * context, const DelegationRestrictions & restrictions =DelegationRestrictions())`

Performs UpdateCredentials SOAP operation. This concludes delegation procedure and passes delegated credentials to **DelegationConsumerSOAP** (p. 157) instance.

The documentation for this class was generated from the following file:

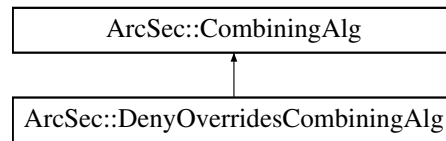
- DelegationInterface.h

6.89 ArcSec::DenyOverridesCombiningAlg Class Reference

Implement the "Deny-Overrides" algorithm.

```
#include <DenyOverridesAlg.h>
```

Inheritance diagram for ArcSec::DenyOverridesCombiningAlg:



Public Member Functions

- virtual Result **combine** (EvaluationCtx *ctx, std::list< Policy * > policies)
- virtual const std::string & **getalgId** (void) const

6.89.1 Detailed Description

Implement the "Deny-Overrides" algorithm. Deny-Overrides, scans the policy set which is given as the parameters of "combine" method, if gets "deny" result from any policy, then stops scanning and gives "deny" as result, otherwise gives "permit".

6.89.2 Member Function Documentation

6.89.2.1 virtual Result ArcSec::DenyOverridesCombiningAlg::combine (EvaluationCtx * ctx, std::list< Policy * > policies) [virtual]

If there is one policy which return negative evaluation result, then omit the other policies and return DECISION_DENY

Parameters

<i>ctx</i>	This object contains request information which will be used to evaluated against policy.
<i>policies</i>	This is a container which contains policy objects.

Returns

The combined result according to the algorithm.

Implements **ArcSec::CombiningAlg** (p. 83).

6.89.2.2 virtual const std::string& ArcSec::DenyOverridesCombiningAlg::getalgId (void) const [inline, virtual]

Get the identifier

Implements **ArcSec::CombiningAlg** (p. 83).

The documentation for this class was generated from the following file:

- DenyOverridesAlg.h

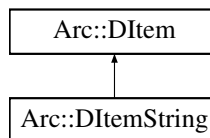
6.90 Arc::DiskSpaceRequirementType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.91 Arc::DItem Class Reference

Inheritance diagram for Arc::DItem:

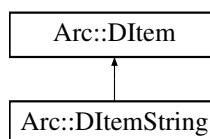


The documentation for this class was generated from the following file:

- DBranch.h

6.92 Arc::DItemString Class Reference

Inheritance diagram for Arc::DItemString:

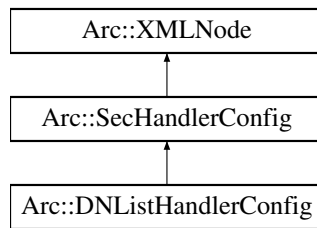


The documentation for this class was generated from the following file:

- DBranch.h

6.93 Arc::DNListHandlerConfig Class Reference

Inheritance diagram for Arc::DNListHandlerConfig:



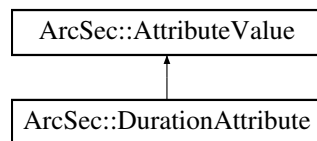
The documentation for this class was generated from the following file:

- ClientInterface.h

6.94 ArcSec::DurationAttribute Class Reference

```
#include <DateTimeAttribute.h>
```

Inheritance diagram for ArcSec::DurationAttribute:



Public Member Functions

- virtual bool **equal** (AttributeValue *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.94.1 Detailed Description

Format: P??Y??M??DT??H??M??S

6.94.2 Member Function Documentation

6.94.2.1 virtual std::string ArcSec::DurationAttribute::encode () [virtual]

encode the value in a string format

Implements ArcSec::AttributeValue (p. 62).

6.94.2.2 `virtual bool ArcSec::DurationAttribute::equal (AttributeValue * value, bool check_id = true) [virtual]`

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.94.2.3 `virtual std::string ArcSec::DurationAttribute::getId () [inline, virtual]`

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.94.2.4 `virtual std::string ArcSec::DurationAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

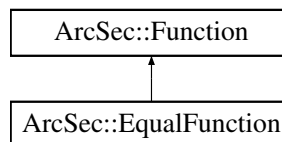
- DateTimeAttribute.h

6.95 ArcSec::EqualFunction Class Reference

Evaluate whether the two values are equal.

```
#include <EqualFunction.h>
```

Inheritance diagram for ArcSec::EqualFunction:



Public Member Functions

- virtual **AttributeValue** * **evaluate** (**AttributeValue** *arg0, **AttributeValue** *arg1, bool check_id=true)
- virtual std::list< **AttributeValue** * > **evaluate** (std::list< **AttributeValue** * > args, bool check_id=true)

Static Public Member Functions

- static std::string **getFunctionName** (std::string datatype)

6.95.1 Detailed Description

Evaluate whether the two values are equal.

6.95.2 Member Function Documentation

6.95.2.1 `virtual AttributeValue* ArcSec::EqualFunction::evaluate (AttributeValue *
arg0, AttributeValue * arg1, bool check_id=true) [virtual]`

Evaluate two **AttributeValue** (p. 61) objects, and return one **AttributeValue** (p. 61) object

Implements **ArcSec::Function** (p. 191).

6.95.2.2 `virtual std::list<AttributeValue*> ArcSec::EqualFunction::evaluate (std::list<
AttributeValue * > args, bool check_id=true) [virtual]`

Evaluate a list of **AttributeValue** (p. 61) objects, and return a list of Attribute objects

Implements **ArcSec::Function** (p. 191).

6.95.2.3 `static std::string ArcSec::EqualFunction::getFunctionName (std::string datatype)
[static]`

help function to get the FunctionName

The documentation for this class was generated from the following file:

- EqualFunction.h

6.96 ArcSec::EvalResult Struct Reference

Struct to record the xml node and effect, which will be used by **Evaluator** (p. 169) to get the information about which rule/policy(in xmlnode) is satisfied.

```
#include <Result.h>
```

6.96.1 Detailed Description

Struct to record the xml node and effect, which will be used by **Evaluator** (p. 169) to get the information about which rule/policy(in xmlnode) is satisfied.

The documentation for this struct was generated from the following file:

- Result.h

6.97 ArcSec::EvaluationCtx Class Reference

EvaluationCtx (p. 169), in charge of storing some context information for.

```
#include <EvaluationCtx.h>
```

Public Member Functions

- **EvaluationCtx** (**Request** *request)

6.97.1 Detailed Description

EvaluationCtx (p. 169), in charge of storing some context information for.

6.97.2 Constructor & Destructor Documentation

6.97.2.1 ArcSec::EvaluationCtx::EvaluationCtx (Request * request) [inline]

Construct a new **EvaluationCtx** (p. 169) based on the given request

The documentation for this class was generated from the following file:

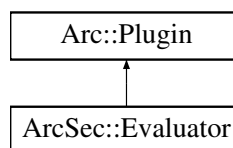
- EvaluationCtx.h

6.98 ArcSec::Evaluator Class Reference

Interface for policy evaluation. Execute the policy evaluation, based on the request and policy.

```
#include <Evaluator.h>
```

Inheritance diagram for ArcSec::Evaluator:



Public Member Functions

- virtual **Response** * **evaluate** (**Request** *request)=0
- virtual **Response** * **evaluate** (const **Source** &request)=0
- virtual **Response** * **evaluate** (**Request** *request, const **Source** &policy)=0
- virtual **Response** * **evaluate** (const **Source** &request, const **Source** &policy)=0

- virtual **Response** * **evaluate** (**Request** *request, **Policy** *policyobj)=0
- virtual **Response** * **evaluate** (const **Source** &request, **Policy** *policyobj)=0
- virtual **AttributeFactory** * **getAttrFactory** ()=0
- virtual **FnFactory** * **getFnFactory** ()=0
- virtual **AlgFactory** * **getAlgFactory** ()=0
- virtual void **addPolicy** (const **Source** &policy, const std::string &id="")=0
- virtual void **addPolicy** (**Policy** *policy, const std::string &id="")=0
- virtual void **setCombiningAlg** (**EvaluatorCombiningAlg** alg)=0
- virtual void **setCombiningAlg** (**CombiningAlg** *alg=NULL)=0
- virtual const char * **getName** (void) const =0

Protected Member Functions

- virtual **Response** * **evaluate** (**EvaluationCtx** *ctx)=0

6.98.1 Detailed Description

Interface for policy evaluation. Execute the policy evaluation, based on the request and policy.

6.98.2 Member Function Documentation

6.98.2.1 virtual void **ArcSec::Evaluator::addPolicy** (const **Source** & *policy*, const std::string & *id* = " ") [pure virtual]

Add policy from specified source to the evaluator. **Policy** (p. 300) will be marked with id.

6.98.2.2 virtual void **ArcSec::Evaluator::addPolicy** (**Policy** * *policy*, const std::string & *id* = " ") [pure virtual]

Add policy to the evaluator. **Policy** (p. 300) will be marked with id. The policy object is taken over by this instance and will be destroyed in destructor.

6.98.2.3 virtual **Response*** **ArcSec::Evaluator::evaluate** (const **Source** & *request*, const **Source** & *policy*) [pure virtual]

Evaluate the request from specified source against the policy from specified source. In some implementations all of the existing policie inside the evaluator may be destroyed by this method.

6.98.2.4 `virtual Response* ArcSec::Evaluator::evaluate (Request * request)` [pure virtual]

Evaluates the request by using a **Request** (p. 311) object. Evaluation is done till at least one of policies is satisfied.

6.98.2.5 `virtual Response* ArcSec::Evaluator::evaluate (Request * request, Policy * policyobj)` [pure virtual]

Evaluate the specified request against the specified policy. In some implementations all of the existing policy inside the evaluator may be destroyed by this method.

6.98.2.6 `virtual Response* ArcSec::Evaluator::evaluate (const Source & request)` [pure virtual]

Evaluates the request by using a specified source

6.98.2.7 `virtual Response* ArcSec::Evaluator::evaluate (Request * request, const Source & policy)` [pure virtual]

Evaluate the specified request against the policy from specified source. In some implementations all of the existing policies inside the evaluator may be destroyed by this method.

6.98.2.8 `virtual Response* ArcSec::Evaluator::evaluate (const Source & request, Policy * policyobj)` [pure virtual]

Evaluate the request from specified source against the specified policy. In some implementations all of the existing policies inside the evaluator may be destroyed by this method.

6.98.2.9 `virtual Response* ArcSec::Evaluator::evaluate (EvaluationCtx * ctx)` [protected, pure virtual]

Evaluate the request by using the **EvaluationCtx** (p. 169) object (which includes the information about request). The ctx is destroyed inside this method (why?!?!?).

6.98.2.10 `virtual AlgFactory* ArcSec::Evaluator::getAlgFactory ()` [pure virtual]

Get the **AlgFactory** (p. 52) object

6.98.2.11 `virtual AttributeFactory* ArcSec::Evaluator::getAttrFactory ()` [pure virtual]

Get the **AttributeFactory** (p. 56) object

6.98.2.12 `virtual FnFactory* ArcSec::Evaluator::getFnFactory ()` [pure virtual]

Get the **FnFactory** (p. 189) object

6.98.2.13 `virtual const char* ArcSec::Evaluator::getName (void) const` [pure virtual]

Get the name of this evaluator

6.98.2.14 `virtual void ArcSec::Evaluator::setCombiningAlg (EvaluatorCombiningAlg alg)` [pure virtual]

Specifies one of simple combining algorithms. In case of multiple policies their results will be combined using this algorithm.

6.98.2.15 `virtual void ArcSec::Evaluator::setCombiningAlg (CombiningAlg * alg = NULL)` [pure virtual]

Specifies loadable combining algorithms. In case of multiple policies their results will be combined using this algorithm. To switch to simple algorithm specify NULL argument.

The documentation for this class was generated from the following file:

- Evaluator.h

6.99 ArcSec::EvaluatorContext Class Reference

Context for evaluator. It includes the factories which will be used to create related objects.

```
#include <Evaluator.h>
```

Public Member Functions

- `operator AttributeFactory * ()`
- `operator FnFactory * ()`
- `operator AlgFactory * ()`

6.99.1 Detailed Description

Context for evaluator. It includes the factories which will be used to create related objects.

6.99.2 Member Function Documentation

6.99.2.1 ArcSec::EvaluatorContext::operator AlgFactory * () [inline]

Returns associated **AlgFactory** (p. 52) object

6.99.2.2 ArcSec::EvaluatorContext::operator AttributeFactory * () [inline]

Returns associated **AttributeFactory** (p. 56) object

6.99.2.3 ArcSec::EvaluatorContext::operator FnFactory * () [inline]

Returns associated **FnFactory** (p. 189) object

The documentation for this class was generated from the following file:

- Evaluator.h

6.100 ArcSec::EvaluatorLoader Class Reference

EvaluatorLoader (p. 173) is implemented as a helper class for loading different **Evaluator** (p. 169) objects, like ArcEvaluator.

```
#include <EvaluatorLoader.h>
```

Public Member Functions

- **Evaluator** * **getEvaluator** (const std::string &classname)
- **Evaluator** * **getEvaluator** (const **Policy** *policy)
- **Evaluator** * **getEvaluator** (const **Request** *request)
- **Request** * **getRequest** (const std::string &classname, const **Source** &request-source)
- **Request** * **getRequest** (const **Source** &requestsource)
- **Policy** * **getPolicy** (const std::string &classname, const **Source** &polycysource)
- **Policy** * **getPolicy** (const **Source** &polycysource)

6.100.1 Detailed Description

EvaluatorLoader (p. 173) is implemented as a helper class for loading different **Evaluator** (p. 169) objects, like ArcEvaluator. The object loading is based on the configuration information about evaluator, including information for factory class, request, policy and evaluator itself

6.100.2 Member Function Documentation

6.100.2.1 Evaluator* ArcSec::EvaluatorLoader::getEvaluator (const std::string & *classname*)

Get evaluator object according to the class name

6.100.2.2 Evaluator* ArcSec::EvaluatorLoader::getEvaluator (const Policy * *policy*)

Get evaluator object suitable for presented policy

6.100.2.3 Evaluator* ArcSec::EvaluatorLoader::getEvaluator (const Request * *request*)

Get evaluator object suitable for presented request

6.100.2.4 Policy* ArcSec::EvaluatorLoader::getPolicy (const Source & *polycysource*)

Get proper policy object according to the policy source

6.100.2.5 Policy* ArcSec::EvaluatorLoader::getPolicy (const std::string & *classname*, const Source & *polycysource*)

Get policy object according to the class name, based on the policy source

6.100.2.6 Request* ArcSec::EvaluatorLoader::getRequest (const std::string & *classname*, const Source & *requestsource*)

Get request object according to the class name, based on the request source

6.100.2.7 Request* ArcSec::EvaluatorLoader::getRequest (const Source & *requestsource*)

Get request object according to the request source

The documentation for this class was generated from the following file:

- EvaluatorLoader.h

6.101 Arc::ExecutableType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.102 Arc::ExecutionTarget Class Reference

ExecutionTarget (p. 175).

```
#include <ExecutionTarget.h>
```

Public Member Functions

- **ExecutionTarget** ()
- **ExecutionTarget** (const **ExecutionTarget** &target)
- **ExecutionTarget** (const long int addrptr)
- **ExecutionTarget** & **operator=** (const **ExecutionTarget** &target)
- **Submitter** * **GetSubmitter** (const **UserConfig** &ucfg) const
- void **Update** (const **JobDescription** &jobdesc)
- void **Print** (bool longlist) const
- void **SaveToStream** (std::ostream &out, bool longlist) const

Data Fields

- std::string **ComputingShareName**
- int64_t **MaxMainMemory**
- int64_t **MaxVirtualMemory**
- int64_t **MaxDiskSpace**
- std::map< **Period**, int > **FreeSlotsWithDuration**
- **Software OperatingSystem**
- std::list< **ApplicationEnvironment** > **ApplicationEnvironments**

6.102.1 Detailed Description

ExecutionTarget (p. 175). This class describe a target which accept computing jobs. All of the members contained in this class, with a few exceptions, are directly linked to attributes defined in the GLUE Specification v. 2.0 (GFD-R-P.147).

6.102.2 Constructor & Destructor Documentation

6.102.2.1 Arc::ExecutionTarget::ExecutionTarget ()

Create an **ExecutionTarget** (p. 175).

Default constructor to create an **ExecutionTarget** (p. 175). Takes no arguments.

6.102.2.2 Arc::ExecutionTarget::ExecutionTarget (const ExecutionTarget & target)

Create an **ExecutionTarget** (p. 175).

Copy constructor.

Parameters

<i>target</i>	ExecutionTarget (p. 175) to copy.
---------------	--

6.102.2.3 Arc::ExecutionTarget::ExecutionTarget (const long int *addrptr*)

Create an **ExecutionTarget** (p. 175).

Copy constructor? Needed from Python?

Parameters

<i>addrptr</i>	
----------------	--

6.102.3 Member Function Documentation**6.102.3.1 Submitter* Arc::ExecutionTarget::GetSubmitter (const UserConfig & *ucfg*) const**

Get **Submitter** (p. 357) to the computing resource represented by the **ExecutionTarget** (p. 175).

Method which returns a specialized **Submitter** (p. 357) which can be used for submitting jobs to the computing resource represented by the **ExecutionTarget** (p. 175). In order to return the correct specialized **Submitter** (p. 357) the GridFlavour variable must be correctly set.

Parameters

<i>ucfg</i>	UserConfig (p. 390) object with paths to user credentials etc.
-------------	---

6.102.3.2 ExecutionTarget& Arc::ExecutionTarget::operator= (const ExecutionTarget & *target*)

Create an **ExecutionTarget** (p. 175).

Assignment operator

Parameters

<i>target</i>	is ExecutionTarget (p. 175) to copy.
---------------	---

6.102.3.3 void Arc::ExecutionTarget::Print (bool *longlist*) const

DEPRECATED: Print the **ExecutionTarget** (p. 175) information to std::cout.

This method is deprecated, use the SaveToStream method instead. Method to print the **ExecutionTarget** (p. 175) attributes to std::cout

Parameters

<i>longlist</i>	is true for long list printing.
-----------------	---------------------------------

See also

SaveToStream (p. 177)

6.102.3.4 void Arc::ExecutionTarget::SaveToStream (std::ostream & out, bool longlist) const

Print the **ExecutionTarget** (p. 175) information to a std::ostream object.

Method to print the **ExecutionTarget** (p. 175) attributes to a std::ostream object.

Parameters

<i>out</i>	is the std::ostream to print the attributes to.
<i>longlist</i>	should be set to true for printing a long list.

6.102.3.5 void Arc::ExecutionTarget::Update (const JobDescription & jobdesc)

Update **ExecutionTarget** (p. 175) after succesful job submission.

Method to update the **ExecutionTarget** (p. 175) after a job succesfully has been submitted to the computing resource it represents. E.g. if a job is sent to the computing resource and is expected to enter the queue, then the WaitingJobs attribute is incremented with 1.

Parameters

<i>jobdesc</i>	contains all information about the job submitted.
----------------	---

6.102.4 Field Documentation**6.102.4.1 std::list<ApplicationEnvironment>
Arc::ExecutionTarget::ApplicationEnvironments**

ApplicationEnvironments.

The ApplicationEnvironments member is a list of ApplicationEnvironment's, defined in section 6.7 GLUE2.

6.102.4.2 std::string Arc::ExecutionTarget::ComputingShareName

ComputingShareName String 0..1.

Human-readable name. This variable represents the ComputingShare.Name attribute of GLUE2.

6.102.4.3 std::map<Period, int> Arc::ExecutionTarget::FreeSlotsWithDuration

FreeSlotsWithDuration std::map<Period, int>

This attribute express the number of free slots with their time limits. The keys in the std::map are the time limit (**Period** (p. 288)) for the number of free slots stored as the value (int). If no time limit has been specified for a set of free slots then the key will equal Period(LONG_MAX).

6.102.4.4 int64_t Arc::ExecutionTarget::MaxDiskSpace

MaxDiskSpace UInt64 0..1 GB.

The maximum disk space that a job is allowed use in the working; if the limit is hit, then the LRMS MAY kill the job. A negative value specifies that this member is undefined.

6.102.4.5 int64_t Arc::ExecutionTarget::MaxMainMemory

MaxMainMemory UInt64 0..1 MB.

The maximum physical RAM that a job is allowed to use; if the limit is hit, then the LRMS MAY kill the job. A negative value specifies that this member is undefined.

6.102.4.6 int64_t Arc::ExecutionTarget::MaxVirtualMemory

MaxVirtualMemory UInt64 0..1 MB.

The maximum total memory size (RAM plus swap) that a job is allowed to use; if the limit is hit, then the LRMS MAY kill the job. A negative value specifies that this member is undefined.

6.102.4.7 Software Arc::ExecutionTarget::OperatingSystem

OperatingSystem.

The OperatingSystem member is not present in GLUE2 but contains the three GLUE2 attributes OSFamily, OSName and OSVersion.

- OSFamily OSFamily_t 1 * The general family to which the Execution Environment operating * system belongs.
- OSName OSName_t 0..1 * The specific name of the operating sytem
- OSVersion String 0..1 * The version of the operating system, as defined by the vendor.

The documentation for this class was generated from the following file:

- ExecutionTarget.h

6.103 Arc::ExpirationReminder Class Reference

A class intended for internal use within counters.

```
#include <Counter.h>
```

Public Member Functions

- **bool operator<** (const **ExpirationReminder** &other) const
- **Glib::TimeVal getExpiryTime** () const
- **Counter::IDType getReservationID** () const

Friends

- class **Counter**

6.103.1 Detailed Description

A class intended for internal use within counters. This class is used for "reminder objects" that are used for automatic deallocation of self-expiring reservations.

6.103.2 Member Function Documentation

6.103.2.1 Glib::TimeVal Arc::ExpirationReminder::getExpiryTime () const

Returns the expiry time.

This method returns the expiry time of the reservation that this **ExpirationReminder** (p. 179) is associated with.

Returns

The expiry time.

6.103.2.2 Counter::IDType Arc::ExpirationReminder::getReservationID () const

Returns the identification number of the reservation.

This method returns the identification number of the self-expiring reservation that this **ExpirationReminder** (p. 179) is associated with.

Returns

The identification number.

6.103.2.3 `bool Arc::ExpirationReminder::operator< (const ExpirationReminder & other) const`

Less than operator, compares "soonness".

This is the less than operator for the **ExpirationReminder** (p. 179) class. It compares the priority of such objects with respect to which reservation expires first. It is used when reminder objects are inserted in a priority queue in order to allways place the next reservation to expire at the top.

The documentation for this class was generated from the following file:

- Counter.h

6.104 Arc::FileCache Class Reference

```
#include <FileCache.h>
```

Public Member Functions

- **FileCache** (std::string cache_path, std::string id, uid_t job_uid, gid_t job_gid)
- **FileCache** (std::vector< std::string > caches, std::string id, uid_t job_uid, gid_t job_gid)
- **FileCache** (std::vector< std::string > caches, std::vector< std::string > remote_caches, std::vector< std::string > draining_caches, std::string id, uid_t job_uid, gid_t job_gid, int cache_max=100, int cache_min=100)
- **FileCache** ()
- bool **Start** (std::string url, bool &available, bool &is_locked, bool use_remote=true)
- bool **Stop** (std::string url)
- bool **StopAndDelete** (std::string url)
- std::string **File** (std::string url)
- bool **Link** (std::string link_path, std::string url, bool copy, bool executable, bool switch_user)
- bool **Copy** (std::string dest_path, std::string url, bool executable=false)
- bool **Release** ()
- bool **AddDN** (std::string url, std::string DN, **Time** expiry_time)
- bool **CheckDN** (std::string url, std::string DN)
- bool **CheckCreated** (std::string url)
- **Time GetCreated** (std::string url)
- bool **CheckValid** (std::string url)
- **Time GetValid** (std::string url)
- bool **SetValid** (std::string url, **Time** val)
- **operator bool** ()
- bool **operator==** (const **FileCache** &a)

6.104.1 Detailed Description

FileCache (p. 180) provides an interface to all cache operations to be used by external classes. An instance should be created per job, and all files within the job are managed by that instance. When it is decided a file should be downloaded to the cache, **Start()** (p. 185) should be called, so that the cache file can be prepared and locked. When a transfer has finished successfully, **Link()** (p. 184) should be called to create a hard link to a per-job directory in the cache and then soft link, or copy the file directly to the session directory so it can be accessed from the user's job. **Stop()** (p. 185) must then be called to release any locks on the cache file.

The cache directory(ies) and the optional directory to link to when the soft-links are made are set in the global configuration file. The names of cache files are formed from a hash of the **URL** (p. 379) specified as input to the job. To ease the load on the file system, the cache files are split into subdirectories based on the first two characters in the hash. For example the file with hash 76f11edda169848038efbd9fa3df5693 is stored in 76/f11edda169848038efbd9fa3df5693. A cache filename can be found by passing the **URL** (p. 379) to **Find()**. For more information on the structure of the cache, see the Grid Manager Administration Guide.

A metadata file with the '.meta' suffix is stored next to each cache file. This contains the **URL** (p. 379) corresponding to the cache file and the expiry time, if it is available. For example lfc://lfc1.ndgf.org/grid/atlas/test/test1 20081007151045Z

While cache files are downloaded, they are locked using the **FileLock** (p. 187) class, which creates a lock file with the '.lock' suffix next to the cache file. Calling **Start()** (p. 185) creates this lock and **Stop()** (p. 185) releases it. All processes calling **Start()** (p. 185) must wait until they successfully obtain the lock before downloading can begin. Once a process obtains a lock it must later release it by calling **Stop()** (p. 185) or **StopAndDelete()** (p. 186).

6.104.2 Constructor & Destructor Documentation

6.104.2.1 `Arc::FileCache::FileCache (std::string cache_path, std::string id, uid_t job_uid, gid_t job_gid)`

Create a new **FileCache** (p. 180) instance.

Parameters

<i>cache_path</i>	The format is "cache_dir[link_path]". path is the path to the cache directory and the optional link_path is used to create a link in case the cache directory is visible under a different name during actual usage. When linking from the session dir this path is used instead of cache_path.
<i>id</i>	the job id. This is used to create the per-job dir which the job's cache files will be hard linked from
<i>job_uid</i>	owner of job. The per-job dir will only be readable by this user
<i>job_gid</i>	owner group of job

6.104.2.2 Arc::FileCache::FileCache (std::vector< std::string > *caches*, std::string *id*, uid_t *job_uid*, gid_t *job_gid*)

Create a new **FileCache** (p. 180) instance with multiple cache dirs

Parameters

<i>caches</i>	a vector of strings describing caches. The format of each string is "cache_dir[link_path]".
<i>id</i>	the job id. This is used to create the per-job dir which the job's cache files will be hard linked from
<i>job_uid</i>	owner of job. The per-job dir will only be readable by this user
<i>job_gid</i>	owner group of job

6.104.2.3 Arc::FileCache::FileCache (std::vector< std::string > *caches*, std::vector< std::string > *remote_caches*, std::vector< std::string > *draining_caches*, std::string *id*, uid_t *job_uid*, gid_t *job_gid*, int *cache_max* = 100, int *cache_min* = 100)

Create a new **FileCache** (p. 180) instance with multiple cache dirs, remote caches and draining cache directories.

Parameters

<i>caches</i>	a vector of strings describing caches. The format of each string is "cache_dir[link_path]".
<i>remote_caches</i>	Same format as caches. These are the paths to caches which are under the control of other Grid Managers and are read-only for this process.
<i>draining_caches</i>	Same format as caches. These are the paths to caches which are to be drained.
<i>id</i>	the job id. This is used to create the per-job dir which the job's cache files will be hard linked from
<i>job_uid</i>	owner of job. The per-job dir will only be readable by this user
<i>job_gid</i>	owner group of job
<i>cache_max</i>	maximum used space by cache, as percentage of the file system
<i>cache_min</i>	minimum used space by cache, as percentage of the file system

6.104.2.4 Arc::FileCache::FileCache () [inline]

Default constructor. Invalid cache.

6.104.3 Member Function Documentation

6.104.3.1 bool Arc::FileCache::AddDN (std::string *url*, std::string *DN*, Time *expiry_time*)

Add the given DN to the list of cached DNs with the given expiry time

Parameters

<i>url</i>	the url corresponding to the cache file to which we want to add a cached DN
<i>DN</i>	the DN of the user
<i>expiry_time</i>	the expiry time of this DN in the DN cache

6.104.3.2 bool Arc::FileCache::CheckCreated (std::string url)

Check if there is an information about creation time. Returns true if the file exists in the cache, since the creation time is the creation time of the cache file.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to know if the creation date exists
------------	---

6.104.3.3 bool Arc::FileCache::CheckDN (std::string url, std::string DN)

Check if the given DN is cached for authorisation.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to check the cached DN
<i>DN</i>	the DN of the user

6.104.3.4 bool Arc::FileCache::CheckValid (std::string url)

Check if there is an information about expiry time.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to know if the expiration time exists
------------	---

6.104.3.5 bool Arc::FileCache::Copy (std::string dest_path, std::string url, bool executable = false)

Copy the cache file corresponding to url to the dest_path. The session directory is accessed under the uid passed in the constructor, and switching uid involves holding a global lock. Therefore care must be taken in a multi-threaded environment.

This method is deprecated - **Link()** (p. 184) should be used instead with copy set to true.

6.104.3.6 `std::string Arc::FileCache::File (std::string url)`

Returns the full pathname of the file in the cache which corresponds to the given url.

6.104.3.7 `Time Arc::FileCache::GetCreated (std::string url)`

Get the creation time of a cached file. If the cache file does not exist, 0 is returned.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to know the creation date
------------	---

6.104.3.8 `Time Arc::FileCache::GetValid (std::string url)`

Get expiry time of a cached file. If the time is not available, a time equivalent to 0 is returned.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to know the expiry time
------------	---

6.104.3.9 `bool Arc::FileCache::Link (std::string link_path, std::string url, bool copy, bool executable, bool switch_user)`

Create a hard-link to the per-job dir from the cache dir, and then a soft-link from here to the session directory. This is effectively 'claiming' the file for the job, so even if the original cache file is deleted, eg by some external process, the hard link still exists until it is explicitly released by calling **Release()** (p. 185).

If `cache_link_path` is set to "." then files will be copied directly to the session directory rather than via the hard link.

The session directory is accessed under the uid passed in the constructor if `switch_user` is true. Switching uid involves holding a global lock, therefore care must be taken in a multi-threaded environment.

Parameters

<i>link_path</i>	path to the session dir for soft-link or new file
<i>url</i>	url of file to link to or copy
<i>copy</i>	If true the file is copied rather than soft-linked to the session dir
<i>executable</i>	If true then file is copied and given execute permissions in the session dir
<i>switch_user</i>	If true then the session dir is accessed under the uid passed in the constructor. Should be set to false in DataMover (p. 117).

6.104.3.10 `Arc::FileCache::operator bool (void) [inline]`

Returns true if object is useable.

6.104.3.11 `bool Arc::FileCache::operator== (const FileCache & a)`

Return true if all attributes are equal

6.104.3.12 `bool Arc::FileCache::Release ()`

Release claims on input files for the job specified by id. For each cache directory the per-job directory with the hard-links will be deleted.

6.104.3.13 `bool Arc::FileCache::SetValid (std::string url, Time val)`

Set expiry time.

Parameters

<i>url</i>	the url corresponding to the cache file for which we want to set the expiry time
<i>val</i>	expiry time

6.104.3.14 `bool Arc::FileCache::Start (std::string url, bool & available, bool & is_locked, bool use_remote = true)`

Prepare cache for downloading file, and lock the cached file. On success returns true. If there is another process downloading the same url, false is returned and is_locked is set to true. In this case the client should wait and retry later. If the lock has expired this process will take over the lock and the method will return as if no lock was present, ie available and is_locked are false.

Parameters

<i>url</i>	url that is being downloaded
<i>available</i>	true on exit if the file is already in cache
<i>is_locked</i>	true on exit if the file is already locked, ie cannot be used by this process
<i>remote_caches</i>	Same format as caches. These are the paths to caches which are under the control of other Grid Managers and are read-only for this process.

6.104.3.15 `bool Arc::FileCache::Stop (std::string url)`

This method (or stopAndDelete) must be called after file was downloaded or download failed, to release the lock on the cache file. **Stop()** (p. 185) does not delete the cache file. It returns false if the lock file does not exist, or another pid was found inside the

lock file (this means another process took over the lock so this process must go back to **Start()** (p. 185)), or if it fails to delete the lock file.

Parameters

<i>url</i>	the url of the file that was downloaded
------------	---

6.104.3.16 bool Arc::FileCache::StopAndDelete (std::string url)

Release the cache file and delete it, because for example a failed download left an incomplete copy, or it has expired. This method also deletes the meta file which contains the url corresponding to the cache file. The logic of the return value is the same as **Stop()** (p. 185).

Parameters

<i>url</i>	the url corresponding to the cache file that has to be released and deleted
------------	---

The documentation for this class was generated from the following file:

- FileCache.h

6.105 FileCacheHash Class Reference

```
#include <FileCacheHash.h>
```

Static Public Member Functions

- static std::string **getHash** (std::string url)
- static int **maxLength** ()

6.105.1 Detailed Description

FileCacheHash (p. 186) provides methods to make hashes from strings. Currently the md5 hash from the openssl library is used.

6.105.2 Member Function Documentation

6.105.2.1 static std::string FileCacheHash::getHash (std::string url) [static]

Return a hash of the given URL, according to the current hash scheme.

6.105.2.2 static int FileCacheHash::maxLength () [inline, static]

Return the maximum length of a hash string.

The documentation for this class was generated from the following file:

- FileCacheHash.h

6.106 Arc::FileInfo Class Reference

FileInfo (p. 187) stores information about files (metadata).

```
#include <FileInfo.h>
```

6.106.1 Detailed Description

FileInfo (p. 187) stores information about files (metadata).

The documentation for this class was generated from the following file:

- FileInfo.h

6.107 Arc::FileLock Class Reference

A general file locking class.

```
#include <FileLock.h>
```

Public Member Functions

- **FileLock** (const std::string &filename, unsigned int timeout=**DEFAULT_LOCK_TIMEOUT**, bool use_pid=true)
- bool **acquire** (bool &lock_removed)
- bool **acquire** ()
- bool **release** (bool force=false)

Static Public Member Functions

- static std::string **getLockSuffix** ()

Static Public Attributes

- static const int **DEFAULT_LOCK_TIMEOUT**
- static const std::string **LOCK_SUFFIX**

6.107.1 Detailed Description

A general file locking class. This class can be used when protected access is required to files which are used by multiple processes or threads. Call **acquire()** (p. 189) to obtain a lock and **release()** (p. 189) to release it when finished. Locks are independent of **FileLock** (p. 187) objects - locks are only created and destroyed through **acquire()** (p. 189) and **release()** (p. 189), not on creation or destruction of **FileLock** (p. 187) objects.

Unless `use_pid` is set false, the process ID and hostname of the calling process are stored in a file `filename.lock` in the form `pid`. This information is used to determine whether a lock is still valid. It is also possible to specify a timeout on the lock.

To ensure an atomic locking operation, **acquire()** (p. 189) first creates a temporary lock file `filename.lock.XXXXXX`, then attempts to rename this file to `filename.lock`. After a successful rename the lock file is checked to make sure the correct process ID and hostname are inside. This eliminates race conditions where multiple processes compete to obtain the lock.

6.107.2 Constructor & Destructor Documentation

6.107.2.1 `Arc::FileLock::FileLock (const std::string & filename, unsigned int timeout = DEFAULT_LOCK_TIMEOUT, bool use_pid = true)`

Create a new **FileLock** (p. 187) object.

Parameters

<i>filename</i>	The name of the file to be locked
<i>timeout</i>	The timeout of the lock
<i>use_pid</i>	If true, use process id in the lock and to determine lock validity

6.107.3 Member Function Documentation

6.107.3.1 `bool Arc::FileLock::acquire (bool & lock_removed)`

Acquire the lock.

Returns true if the lock was acquired successfully. Locks are acquired if no lock file currently exists, or if the current lock file is invalid. A lock is invalid if the process ID inside the lock no longer exists on the host inside the lock, or the age of the lock file is greater than the lock timeout.

Parameters

<i>lock_removed</i>	Set to true if an existing lock was removed due to being invalid. In this case the caller may decide to check or delete the file as it is potentially corrupted.
---------------------	--

Returns

True if lock is successfully acquired

6.107.3.2 `bool Arc::FileLock::acquire ()`

Acquire the lock.

Callers can use this version of **acquire()** (p. 189) if they do not care whether an invalid lock was removed in the process of obtaining the lock.

6.107.3.3 `bool Arc::FileLock::release (bool force = false)`

Release the lock.

Parameters

<i>force</i>	Remove the lock without checking ownership or timeout
--------------	---

The documentation for this class was generated from the following file:

- FileLock.h

6.108 `Arc::FileType` Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.109 `Arc::FinderLoader` Class Reference

The documentation for this class was generated from the following file:

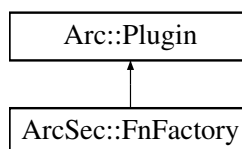
- FinderLoader.h

6.110 `ArcSec::FnFactory` Class Reference

Interface for function factory class.

```
#include <FnFactory.h>
```

Inheritance diagram for `ArcSec::FnFactory`:



Public Member Functions

- virtual **Function** * **createFn** (const std::string &type)=0

6.110.1 Detailed Description

Interface for function factory class. **FnFactory** (p. 189) is in charge of creating **Function** (p. 190) object according to the algorithm type given as argument of method **createFn**. This class can be inherited for implementing a factory class which can create some specific **Function** (p. 190) objects.

6.110.2 Member Function Documentation

6.110.2.1 virtual **Function*** **ArcSec::FnFactory::createFn** (const std::string & *type*)
[pure virtual]

creat algorithm object based on the type algorithm type

Parameters

<i>type</i>	The type of Function (p. 190)
-------------	--------------------------------------

Returns

The object of **Function** (p. 190)

The documentation for this class was generated from the following file:

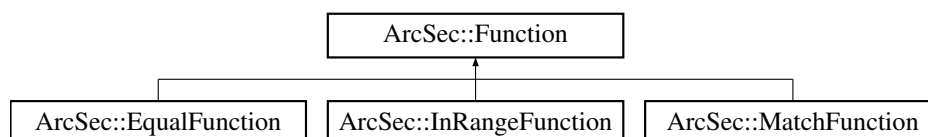
- FnFactory.h

6.111 ArcSec::Function Class Reference

Interface for function, which is in charge of evaluating two **AttributeValue** (p. 61).

```
#include <Function.h>
```

Inheritance diagram for ArcSec::Function:



Public Member Functions

- virtual **AttributeValue** * **evaluate** (**AttributeValue** *arg0, **AttributeValue** *arg1, bool check_id=true)=0

- virtual std::list< **AttributeValue** * > **evaluate** (std::list< **AttributeValue** * > args, bool check_id=true)=0

6.111.1 Detailed Description

Interface for function, which is in charge of evaluating two **AttributeValue** (p. 61).

6.111.2 Member Function Documentation

- 6.111.2.1 **virtual AttribueValue* ArcSec::Function::evaluate (AttribueValue * arg0, AttribueValue * arg1, bool check_id = true)** [pure virtual]

Evaluate two **AttribueValue** (p. 61) objects, and return one **AttribueValue** (p. 61) object

Implemented in **ArcSec::EqualFunction** (p. 168), **ArcSec::InRangeFunction** (p. 205), and **ArcSec::MatchFunction** (p. 242).

- 6.111.2.2 **virtual std::list<AttribueValue*> ArcSec::Function::evaluate (std::list< AttribueValue * > args, bool check_id = true)** [pure virtual]

Evaluate a list of **AttribueValue** (p. 61) objects, and return a list of Attribute objects

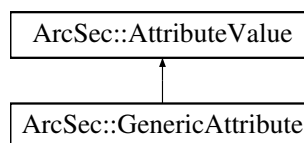
Implemented in **ArcSec::EqualFunction** (p. 168), **ArcSec::InRangeFunction** (p. 205), and **ArcSec::MatchFunction** (p. 242).

The documentation for this class was generated from the following file:

- Function.h

6.112 ArcSec::GenericAttribute Class Reference

Inheritance diagram for ArcSec::GenericAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.112.1 Member Function Documentation

6.112.1.1 `virtual std::string ArcSec::GenericAttribute::encode () [inline, virtual]`

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.112.1.2 `virtual bool ArcSec::GenericAttribute::equal (AttributeValue * value, bool check_id = true) [virtual]`

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.112.1.3 `virtual std::string ArcSec::GenericAttribute::getId () [inline, virtual]`

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.112.1.4 `virtual std::string ArcSec::GenericAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

- GenericAttribute.h

6.113 Arc::GlobusResult Class Reference

The documentation for this class was generated from the following file:

- GlobusErrorUtils.h

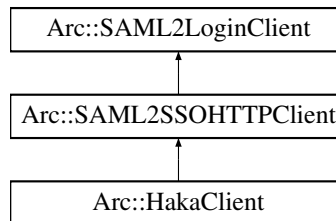
6.114 Arc::GSSCredential Class Reference

The documentation for this class was generated from the following file:

- GSSCredential.h

6.115 Arc::HakaClient Class Reference

Inheritance diagram for Arc::HakaClient:



Protected Member Functions

- **MCC_Status processIdPLogin** (const std::string username, const std::string password)
- **MCC_Status processConsent** ()
- **MCC_Status processIdP2Confusa** ()

6.115.1 Member Function Documentation

6.115.1.1 MCC_Status Arc::HakaClient::processConsent () [protected, virtual]

If the IdP has a consent module and the user has not saved her consent, this method will ask the user for consent to transmission of her data to Confusa

Implements **Arc::SAML2SSOHTTPClient** (p. 321).

6.115.1.2 MCC_Status Arc::HakaClient::processIdP2Confusa () [protected, virtual]

Redirects the user back from identity provider to the Confusa SP

Implements **Arc::SAML2SSOHTTPClient** (p. 321).

6.115.1.3 MCC_Status Arc::HakaClient::processIdPLogin (const std::string *username*, const std::string *password*) [protected, virtual]

Actual identity provider parsers for next three methods implemented in subdirectory idp/

Parse identity provider login page and submit username and password in the previous way

Implements **Arc::SAML2SSOHTTPClient** (p. 322).

The documentation for this class was generated from the following file:

- HakaClient.h

6.116 Arc::HTTPClientInfo Struct Reference

The documentation for this struct was generated from the following file:

- ClientInterface.h

6.117 Arc::InfoCache Class Reference

Stores XML document in filesystem split into parts.

```
#include <InfoCache.h>
```

Public Member Functions

- **InfoCache** (const **Config** &cfg, const std::string &service_id)

6.117.1 Detailed Description

Stores XML document in filesystem split into parts.

6.117.2 Constructor & Destructor Documentation

6.117.2.1 Arc::InfoCache::InfoCache (const **Config** &cfg, const std::string &service_id)

Creates object according to configuration (see InfoCacheConfig.xsd)

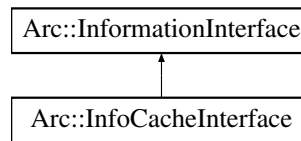
XML configuration is passed in cfg. Argument service_id is used to distinguish between various documents stored under same path - corresponding files will be stored in subdirectory with service_id name.

The documentation for this class was generated from the following file:

- InfoCache.h

6.118 Arc::InfoCacheInterface Class Reference

Inheritance diagram for Arc::InfoCacheInterface:



Protected Member Functions

- virtual void **Get** (const std::list< std::string > &path, **XMLNodeContainer** &result)

6.118.1 Member Function Documentation

6.118.1.1 virtual void **Arc::InfoCacheInterface::Get** (const std::list< std::string > & *path*, **XMLNodeContainer** & *result*) [protected, virtual]

This method is called by this object's Process method. Real implementation of this class should return (sub)tree of XML document. This method may be called multiple times per single Process call. Here is a set on XML element names specifying how to reach requested node(s).

Reimplemented from **Arc::InformationInterface** (p. 202).

The documentation for this class was generated from the following file:

- InfoCache.h

6.119 Arc::InfoFilter Class Reference

Filters information document according to identity of requestor.

```
#include <InfoFilter.h>
```

Public Member Functions

- **InfoFilter** (**MessageAuth** &id)
- bool **Filter** (**XMLNode** doc) const
- bool **Filter** (**XMLNode** doc, const InfoFilterPolicies &policies, const **NS** &ns) const

6.119.1 Detailed Description

Filters information document according to identity of requestor. Identity is compared to policies stored inside information document and external ones. Parts of document which do not pass policy evaluation are removed.

6.119.2 Constructor & Destructor Documentation

6.119.2.1 Arc::InfoFilter::InfoFilter (MessageAuth & *id*)

Creates object and associates identity.

Associated identity is not copied, hence passed argument must not be destroyed while this method is used.

6.119.3 Member Function Documentation

6.119.3.1 bool Arc::InfoFilter::Filter (XMLNode *doc*) const

Filter information document according to internal policies.

In provided document all policies and nodes which have their policies evaluated to negative result are removed.

6.119.3.2 bool Arc::InfoFilter::Filter (XMLNode *doc*, const InfoFilterPolicies & *policies*, const NS & *ns*) const

Filter information document according to internal and external policies.

In provided document all policies and nodes which have their policies evaluated to negative result are removed. External policies are provided in policies argument. First element of every pair is XPath defining to which XML node policy must be applied. Second element is policy itself. Argument ns defines XML namespaces for XPath evaluation.

The documentation for this class was generated from the following file:

- InfoFilter.h

6.120 Arc::InfoRegister Class Reference

Registration to ISIS interface.

```
#include <InfoRegister.h>
```

6.120.1 Detailed Description

Registration to ISIS interface. This class represents service registering to Information Indexing **Service** (p. 331). It does not perform registration itself. It only collects configuration information. Configuration is as described in InfoRegisterConfig.xsd for element InfoRegistration.

The documentation for this class was generated from the following file:

- InfoRegister.h

6.121 Arc::InfoRegisterContainer Class Reference

```
#include <InfoRegister.h>
```

Public Member Functions

- **InfoRegistrar** * **addRegistrar** (**XMLNode** doc)
- void **addService** (**InfoRegister** *reg, const std::list< std::string > &ids, **XMLNode** cfg=**XMLNode**())
- void **removeService** (**InfoRegister** *reg)

6.121.1 Detailed Description

Singleton class for scanning configuration and storing refernces to registration elements.

6.121.2 Member Function Documentation

6.121.2.1 InfoRegistrar* Arc::InfoRegisterContainer::addRegistrar (XMLNode doc)

Adds ISISes to list of handled services.

Supplied configuration document is scanned for **InfoRegistrar** (p. 198) elements and those are turned into **InfoRegistrar** (p. 198) classes for handling connection to ISIS service each.

6.121.2.2 void Arc::InfoRegisterContainer::addService (InfoRegister * reg, const std::list< std::string > & ids, XMLNode cfg = XMLNode ())

Adds service to list of handled.

This method must be called first time after last addRegistrar was called - services will be only associated with ISISes which are already added. Argument ids contains list of ISIS identifiers to which service is associated. If ids is empty then service is associated to all ISISes currently added. If argument cfg is available and no ISISes are configured then addRegistrars is called with cfg used as configuration document.

6.121.2.3 void Arc::InfoRegisterContainer::removeService (InfoRegister * reg)

This method must be called if service being destroyed.

The documentation for this class was generated from the following file:

- InfoRegister.h

6.122 Arc::InfoRegisters Class Reference

Handling multiple registrations to ISISes.

```
#include <InfoRegister.h>
```

Public Member Functions

- **InfoRegisters** (XMLNode &cfg, Service *service_)

6.122.1 Detailed Description

Handling multiple registrations to ISISes.

6.122.2 Constructor & Destructor Documentation

6.122.2.1 Arc::InfoRegisters::InfoRegisters (XMLNode & cfg, Service * service_)

Constructor creates **InfoRegister** (p. 196) objects according to configuration.

Inside cfg elements InfoRegistration are found and for each corresponding **InfoRegister** (p. 196) object is created. Those objects are destroyed in destructor of this class.

The documentation for this class was generated from the following file:

- InfoRegister.h

6.123 Arc::InfoRegistrar Class Reference

Registration process associated with particular ISIS.

```
#include <InfoRegister.h>
```

Public Member Functions

- void **registration** (void)
- bool **addService** (InfoRegister *, XMLNode &)
- bool **removeService** (InfoRegister *)

6.123.1 Detailed Description

Registration process associated with particular ISIS. Instance of this class starts thread which takes care passing information about associated services to ISIS service defined in configuration. Configuration is as described in InfoRegister.xsd for element **InfoRegistrar** (p. 198).

6.123.2 Member Function Documentation

6.123.2.1 `bool Arc::InfoRegistrar::addService (InfoRegister *, XMLNode &)`

Adds new service to list of handled services.

Service (p. 331) is described by it's **InfoRegister** (p. 196) object which must be valid as long as this object is functional.

6.123.2.2 `void Arc::InfoRegistrar::registration (void)`

Performs registartion in a loop.

Never exits unless there is a critical error or requested by destructor.

The documentation for this class was generated from the following file:

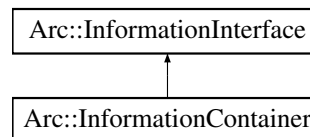
- InfoRegister.h

6.124 Arc::InformationContainer Class Reference

Information System document container and processor.

```
#include <InformationInterface.h>
```

Inheritance diagram for Arc::InformationContainer:



Public Member Functions

- **InformationContainer** (**XMLNode** doc, bool copy=false)
- **XMLNode Acquire** (void)
- void **Assign** (**XMLNode** doc, bool copy=false)

Protected Member Functions

- virtual void **Get** (const std::list< std::string > &path, **XMLNodeContainer** &result)

Protected Attributes

- **XMLNode doc_**

6.124.1 Detailed Description

Information System document container and processor. This class inherits from **InformationInterface** (p. 201) and offers container for storing informational XML document.

6.124.2 Constructor & Destructor Documentation

6.124.2.1 Arc::InformationContainer::InformationContainer (XMLNode doc, bool copy = false)

Creates an instance with XML document . If is true this method makes a copy of for internal use.

6.124.3 Member Function Documentation

6.124.3.1 XMLNode Arc::InformationContainer::Acquire (void)

Get a lock on contained XML document. To be used in multi-threaded environment. Do not forget to release it with Release()

6.124.3.2 void Arc::InformationContainer::Assign (XMLNode doc, bool copy = false)

Replaces internal XML document with . If is true this method makes a copy of for internal use.

6.124.3.3 virtual void Arc::InformationContainer::Get (const std::list< std::string > & path, XMLNodeContainer & result) [protected, virtual]

This method is called by this object's Process method. Real implementation of this class should return (sub)tree of XML document. This method may be called multiple times per single Process call. Here is a set on XML element names specifying how to reach requested node(s).

Reimplemented from **Arc::InformationInterface** (p. 202).

6.124.4 Field Documentation

6.124.4.1 XMLNode Arc::InformationContainer::doc_ [protected]

Either link or container of XML document

The documentation for this class was generated from the following file:

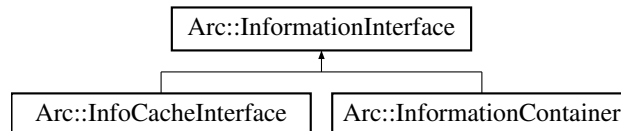
- InformationInterface.h

6.125 Arc::InformationInterface Class Reference

Information System message processor.

```
#include <InformationInterface.h>
```

Inheritance diagram for Arc::InformationInterface:



Public Member Functions

- **InformationInterface** (bool safe=true)

Protected Member Functions

- virtual void **Get** (const std::list< std::string > &path, **XMLNodeContainer** &result)

Protected Attributes

- Glib::Mutex **lock_**

6.125.1 Detailed Description

Information System message processor. This class provides callback for 2 operations of WS-ResourceProperties and convenient parsing/generation of corresponding SOAP messages. In a future it may extend range of supported specifications.

6.125.2 Constructor & Destructor Documentation

6.125.2.1 Arc::InformationInterface::InformationInterface (bool *safe* = true)

Constructor. If 'safe' is true all calls to Get will be locked.

6.125.3 Member Function Documentation

6.125.3.1 `virtual void Arc::InformationInterface::Get (const std::list< std::string > & path, XMLNodeContainer & result)` [protected, virtual]

This method is called by this object's Process method. Real implementation of this class should return (sub)tree of XML document. This method may be called multiple times per single Process call. Here is a set on XML element names specifying how to reach requested node(s).

Reimplemented in **Arc::InfoCacheInterface** (p. 195), and **Arc::InformationContainer** (p. 200).

6.125.4 Field Documentation

6.125.4.1 `Glib::Mutex Arc::InformationInterface::lock_` [protected]

Mutex used to protect access to Get methods in multi-threaded env.

The documentation for this class was generated from the following file:

- InformationInterface.h

6.126 Arc::InformationRequest Class Reference

Request for information in InfoSystem.

```
#include <InformationInterface.h>
```

Public Member Functions

- **InformationRequest** (void)
- **InformationRequest** (const std::list< std::string > &path)
- **InformationRequest** (const std::list< std::list< std::string > > &paths)
- **InformationRequest** (XMLNode query)
- SOAPEnvelope * **SOAP** (void)

6.126.1 Detailed Description

Request for information in InfoSystem. This is a convenience wrapper creating proper WS-ResourceProperties request targeted InfoSystem interface of service.

6.126.2 Constructor & Destructor Documentation

6.126.2.1 `Arc::InformationRequest::InformationRequest (void)`

Dummy constructor

6.126.2.2 `Arc::InformationRequest::InformationRequest (const std::list< std::string > & path)`

Request for attribute specified by elements of path. Currently only first element is used.

6.126.2.3 `Arc::InformationRequest::InformationRequest (const std::list< std::list< std::string > > & paths)`

Request for attribute specified by elements of paths. Currently only first element of every path is used.

6.126.2.4 `Arc::InformationRequest::InformationRequest (XMLNode query)`

Request for attributes specified by XPath query.

6.126.3 Member Function Documentation

6.126.3.1 `SOAPEnvelope* Arc::InformationRequest::SOAP (void)`

Returns generated SOAP message

The documentation for this class was generated from the following file:

- `InformationInterface.h`

6.127 `Arc::InformationResponse` Class Reference

Informational response from InfoSystem.

```
#include <InformationInterface.h>
```

Public Member Functions

- **InformationResponse** (SOAPEnvelope &soap)
- `std::list< XMLNode > Result` (void)

6.127.1 Detailed Description

Informational response from InfoSystem. This is a convenience wrapper analyzing WS-ResourceProperties response from InfoSystem interface of service.

6.127.2 Constructor & Destructor Documentation

6.127.2.1 Arc::InformationResponse::InformationResponse (SOAPEnvelope & soap)

Constructor parses WS-ResourceProperties response. Provided SOAPEnvelope object must be valid as long as this object is in use.

6.127.3 Member Function Documentation

6.127.3.1 std::list<XMLNode> Arc::InformationResponse::Result (void)

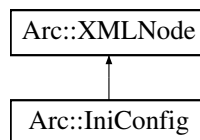
Returns set of attributes which were in SOAP message passed to constructor.

The documentation for this class was generated from the following file:

- InformationInterface.h

6.128 Arc::IniConfig Class Reference

Inheritance diagram for Arc::IniConfig:



The documentation for this class was generated from the following file:

- IniConfig.h

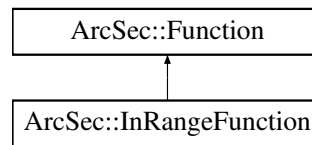
6.129 Arc::initializeCredentialsType Class Reference

The documentation for this class was generated from the following file:

- UserConfig.h

6.130 ArcSec::InRangeFunction Class Reference

Inheritance diagram for ArcSec::InRangeFunction:



Public Member Functions

- virtual **AttributeValue** * **evaluate** (**AttributeValue** *arg0, **AttributeValue** *arg1, bool check_id=true)
- virtual std::list< **AttributeValue** * > **evaluate** (std::list< **AttributeValue** * > args, bool check_id=true)

6.130.1 Member Function Documentation

6.130.1.1 virtual **AttributeValue*** **ArcSec::InRangeFunction::evaluate** (**AttributeValue** * *arg0*, **AttributeValue** * *arg1*, bool *check_id* = true) [virtual]

Evaluate two **AttributeValue** (p. 61) objects, and return one **AttributeValue** (p. 61) object

Implements **ArcSec::Function** (p. 191).

6.130.1.2 virtual std::list<**AttributeValue***> **ArcSec::InRangeFunction::evaluate** (std::list< **AttributeValue** * > *args*, bool *check_id* = true) [virtual]

Evaluate a list of **AttributeValue** (p. 61) objects, and return a list of Attribute objects

Implements **ArcSec::Function** (p. 191).

The documentation for this class was generated from the following file:

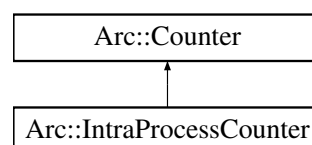
- InRangeFunction.h

6.131 Arc::IntraProcessCounter Class Reference

A class for counters used by threads within a single process.

```
#include <IntraProcessCounter.h>
```

Inheritance diagram for Arc::IntraProcessCounter:



Public Member Functions

- **IntraProcessCounter** (int limit, int excess)
- virtual **~IntraProcessCounter** ()
- virtual int **getLimit** ()
- virtual int **setLimit** (int newLimit)
- virtual int **changeLimit** (int amount)
- virtual int **getExcess** ()
- virtual int **setExcess** (int newExcess)
- virtual int **changeExcess** (int amount)
- virtual int **getValue** ()
- virtual **CounterTicket reserve** (int amount=1, Glib::TimeVal duration=**ETERNAL**, bool prioritized=false, Glib::TimeVal timeOut=**ETERNAL**)

Protected Member Functions

- virtual void **cancel** (IDType reservationID)
- virtual void **extend** (IDType &reservationID, Glib::TimeVal &expiryTime, Glib::TimeVal duration=**ETERNAL**)

6.131.1 Detailed Description

A class for counters used by threads within a single process. This is a class for shared among different threads within a single process. See the **Counter** (p. 89) class for further information about counters and examples of usage.

6.131.2 Constructor & Destructor Documentation

6.131.2.1 Arc::IntraProcessCounter::IntraProcessCounter (int *limit*, int *excess*)

Creates an **IntraProcessCounter** (p. 205) with specified limit and excess.

This constructor creates a counter with the specified limit (amount of resources available for reservation) and excess limit (an extra amount of resources that may be used for prioritized reservations).

Parameters

<i>limit</i>	The limit of the counter.
<i>excess</i>	The excess limit of the counter.

6.131.2.2 virtual Arc::IntraProcessCounter::~~IntraProcessCounter () [virtual]

Destructor.

This is the destructor of the **IntraProcessCounter** (p. 205) class. Does not need to do anything.

6.131.3 Member Function Documentation

6.131.3.1 `virtual void Arc::IntraProcessCounter::cancel (IDType reservationID)`
[protected, virtual]

Cancellation of a reservation.

This method cancels a reservation. It is called by the **CounterTicket** (p.96) that corresponds to the reservation.

Parameters

<i>reservationID</i>	The identity number (key) of the reservation to cancel.
----------------------	---

Implements **Arc::Counter** (p.91).

6.131.3.2 `virtual int Arc::IntraProcessCounter::changeExcess (int amount)` [virtual]

Changes the excess limit of the counter.

Changes the excess limit of the counter by adding a certain amount to the current excess limit.

Parameters

<i>amount</i>	The amount by which to change the excess limit.
---------------	---

Returns

The new excess limit.

Implements **Arc::Counter** (p.92).

6.131.3.3 `virtual int Arc::IntraProcessCounter::changeLimit (int amount)` [virtual]

Changes the limit of the counter.

Changes the limit of the counter by adding a certain amount to the current limit.

Parameters

<i>amount</i>	The amount by which to change the limit.
---------------	--

Returns

The new limit.

Implements **Arc::Counter** (p.92).

6.131.3.4 `virtual void Arc::IntraProcessCounter::extend (IDType & reservationID, Glib::TimeVal & expiryTime, Glib::TimeVal duration = ETERNAL)`
`[protected, virtual]`

Extension of a reservation.

This method extends a reservation. It is called by the **CounterTicket** (p. 96) that corresponds to the reservation.

Parameters

<i>reservationID</i>	Used for input as well as output. Contains the identification number of the original reservation on entry and the new identification number of the extended reservation on exit.
<i>expiryTime</i>	Used for input as well as output. Contains the expiry time of the original reservation on entry and the new expiry time of the extended reservation on exit.
<i>duration</i>	The time by which to extend the reservation. The new expiration time is computed based on the current time, NOT the previous expiration time.

Implements **Arc::Counter** (p. 92).

6.131.3.5 `virtual int Arc::IntraProcessCounter::getExcess ()` `[virtual]`

Returns the excess limit of the counter.

Returns the excess limit of the counter, i.e. by how much the usual limit may be exceeded by prioritized reservations.

Returns

The excess limit.

Implements **Arc::Counter** (p. 93).

6.131.3.6 `virtual int Arc::IntraProcessCounter::getLimit ()` `[virtual]`

Returns the current limit of the counter.

This method returns the current limit of the counter, i.e. how many units can be reserved simultaneously by different threads without claiming high priority.

Returns

The current limit of the counter.

Implements **Arc::Counter** (p. 94).

6.131.3.7 `virtual int Arc::IntraProcessCounter::getValue ()` `[virtual]`

Returns the current value of the counter.

Returns the current value of the counter, i.e. the number of unreserved units. Initially, the value is equal to the limit of the counter. When a reservation is made, the the value is decreased. Normally, the value should never be negative, but this may happen if there are prioritized reservations. It can also happen if the limit is decreased after some reservations have been made, since reservations are never revoked.

Returns

The current value of the counter.

Implements **Arc::Counter** (p. 95).

6.131.3.8 `virtual CounterTicket Arc::IntraProcessCounter::reserve (int amount = 1, Glib::TimeVal duration = ETERNAL, bool prioritized = false, Glib::TimeVal timeOut = ETERNAL) [virtual]`

Makes a reservation from the counter.

This method makes a reservation from the counter. If the current value of the counter is too low to allow for the reservation, the method blocks until the reservation is possible or times out.

Parameters

<i>amount</i>	The amount to reserve, default value is 1.
<i>duration</i>	The duration of a self expiring reservation, default is that it lasts forever.
<i>prioritized</i>	Whether this reservation is prioritized and thus allowed to use the excess limit.
<i>timeOut</i>	The maximum time to block if the value of the counter is too low, default is to allow "eternal" blocking.

Returns

A **CounterTicket** (p. 96) that can be queried about the status of the reservation as well as for cancellations and extensions.

Implements **Arc::Counter** (p. 95).

6.131.3.9 `virtual int Arc::IntraProcessCounter::setExcess (int newExcess) [virtual]`

Sets the excess limit of the counter.

This method sets a new excess limit for the counter.

Parameters

<i>newExcess</i>	The new excess limit, an absolute number.
------------------	---

Returns

The new excess limit.

Implements **Arc::Counter** (p. 95).

6.131.3.10 `virtual int Arc::IntraProcessCounter::setLimit (int newLimit) [virtual]`

Sets the limit of the counter.

This method sets a new limit for the counter.

Parameters

<i>newLimit</i>	The new limit, an absolute number.
-----------------	------------------------------------

Returns

The new limit.

Implements **Arc::Counter** (p. 96).

The documentation for this class was generated from the following file:

- IntraProcessCounter.h

6.132 Arc::ISIS_description Struct Reference

The documentation for this struct was generated from the following file:

- InfoRegister.h

6.133 Arc::IString Class Reference

The documentation for this class was generated from the following file:

- IString.h

6.134 Arc::JobDescriptionParserLoader::iterator Class Reference

The documentation for this class was generated from the following file:

- JobDescriptionParser.h

6.135 Arc::Job Class Reference

Job (p. 210).

```
#include <Job.h>
```

Public Member Functions

- **Job** ()
- void **Print** (bool longlist) const
- void **SaveToStream** (std::ostream &out, bool longlist) const
- **Job** & **operator=** (XMLNode job)
- void **ToXML** (XMLNode job) const

Static Public Member Functions

- static bool **ReadAllJobsFromFile** (const std::string &filename, std::list< **Job** > &jobs, unsigned nTries=10, unsigned tryInterval=500000)
- static bool **WriteJobsToTruncatedFile** (const std::string &filename, const std::list< **Job** > &jobs, unsigned nTries=10, unsigned tryInterval=500000)
- static bool **WriteJobsToFile** (const std::string &filename, const std::list< **Job** > &jobs, unsigned nTries=10, unsigned tryInterval=500000)
- static bool **WriteJobsToFile** (const std::string &filename, const std::list< **Job** > &jobs, std::list< const **Job** * > &newJobs, unsigned nTries=10, unsigned tryInterval=500000)
- static bool **RemoveJobsFromFile** (const std::string &filename, const std::list< **URL** > &jobids, unsigned nTries=10, unsigned tryInterval=500000)

6.135.1 Detailed Description

Job (p. 210). This class describe a Grid job. Most of the members contained in this class are directly linked to the ComputingActivity defined in the GLUE Specification v. 2.0 (GFD-R-P.147).

6.135.2 Constructor & Destructor Documentation

6.135.2.1 Arc::Job::Job ()

Create a **Job** (p. 210) object.

Default constructor. Takes no arguments.

6.135.3 Member Function Documentation

6.135.3.1 Job& Arc::Job::operator= (XMLNode job)

Set **Job** (p. 210) attributes from a **XMLNode** (p. 455).

The attributes of the **Job** (p. 210) object is set to the values specified in the **XMLNode** (p. 455). The **XMLNode** (p. 455) should be a ComputingActivity type using the GLUE2 XML hierarchical rendering, see <http://forge.gridforum.org/sf/wiki/do/viewPage/> for more information. Note that associations are not parsed.

Parameters

<i>job</i>	is a XMLNode (p. 455) of GLUE2 ComputingActivity type.
------------	---

See also

ToXML (p. 214)

6.135.3.2 void Arc::Job::Print (bool *longlist*) const

DEPRECATED: Print the **Job** (p. 210) information to std::cout.

This method is DEPRECATED, use the SaveToStream method instead. Method to print the **Job** (p. 210) attributes to std::cout

Parameters

<i>longlist</i>	is boolean for long listing (more details).
-----------------	---

See also

SaveToStream (p. 214)

6.135.3.3 static bool Arc::Job::ReadAllJobsFromFile (const std::string & *filename*, std::list< Job > & *jobs*, unsigned *nTries* = 10, unsigned *tryInterval* = 500000) [static]

Read all jobs from file.

This static method will read jobs (in XML format) from the specified file, and they will be stored in the referenced list of jobs. The XML element in the file representing a job should be named "Job", and have the same format as accepted by the **operator=(XMLNode)** (p. 211) method. To avoid simultaneous use (writing and reading) of the file, reading will not be initiated before a lock on the file has been acquired. For this purpose the **FileLock** (p. 187) class is used. *nTries* specifies the maximal number of times the method will try to acquire a lock on the file, with an interval of *tryInterval* micro seconds between each attempt. If a lock is not acquired this method returns false. The method will also return false if the content of file is not in XML format. Otherwise it returns true.

Parameters

<i>filename</i>	is the filename of the job list to read jobs from.
<i>jobs</i>	is a reference to a list of Job (p. 210) objects, which will be filled with the jobs read from file (cleared before use).
<i>nTries</i>	specifies the maximal number of times the method will try to acquire a lock on file to read.
<i>tryInterval</i>	specifies the interval (in micro seconds) between each attempt to acquire a lock.

Returns

true in case of success, otherwise false.

See also

operator=(XMLNode) (p. 211)
WriteJobsToTruncatedFile (p. 215)
WriteJobsToFile (p. 215)
RemoveJobsFromFile (p. 213)
FileLock (p. 187)
XMLNode::ReadFromFile (p. 466)

```
6.135.3.4 static bool Arc::Job::RemoveJobsFromFile ( const std::string & filename, const
std::list< URL > & jobids, unsigned nTries = 10, unsigned tryInterval = 500000
) [static]
```

Truncate file and write jobs to it.

This static method will remove the jobs having IDFromEndpoint identical to any of those in the passed list jobids. To avoid simultaneous use (writing and reading) of the file, writing will not be initiated before a lock on the file has been acquired. For this purpose the **FileLock** (p. 187) class is used. nTries specifies the maximal number of times the method will try to acquire a lock on the file, with an interval of tryInterval micro seconds between each attempt. If a lock is not acquired this method returns false. The method will also return false if reading from or writing jobs to the file fails. Otherwise it returns true.

Parameters

<i>filename</i>	is the filename of the job list to write jobs to.
<i>jobids</i>	is a list of URL (p. 379) objects which specifies which jobs from the file to remove.
<i>nTries</i>	specifies the maximal number of times the method will try to acquire a lock on file to read.
<i>tryInterval</i>	specifies the interval (in micro seconds) between each attempt to acquire a lock.

Returns

true in case of success, otherwise false.

See also

ReadAllJobsFromFile (p. 212)
WriteJobsToTruncatedFile (p. 215)
WriteJobsToFile (p. 215)
FileLock (p. 187)
XMLNode::ReadFromFile (p. 466)
XMLNode::SaveToFile (p. 466)

6.135.3.5 void Arc::Job::SaveToStream (std::ostream & out, bool longlist) const

Write job information to a std::ostream object.

This method will write job information to the passed std::ostream object. The longlist boolean specifies whether more (true) or less (false) information should be printed.

Parameters

<i>out</i>	is the std::ostream object to print the attributes to.
<i>longlist</i>	is a boolean for switching on long listing (more details).

6.135.3.6 void Arc::Job::ToXML (XMLNode job) const

Add job information to a **XMLNode** (p. 455).

Child nodes of GLUE ComputingActivity type containing job information of this object will be added to the passed **XMLNode** (p. 455).

Parameters

<i>job</i>	is the XMLNode (p. 455) to add job information to in form of GLUE2 ComputingActivity type child nodes.
------------	---

See also

operator=

6.135.3.7 static bool Arc::Job::WriteJobsToFile (const std::string & filename, const std::list< Job > & jobs, std::list< const Job * > & newJobs, unsigned nTries = 10, unsigned tryInterval = 500000) [static]

Write jobs to file.

This static method will write (appending) the passed list of jobs to the specified file. Jobs will be written in XML format as returned by the ToXML method, and each job will be contained in a element named "Job". The passed list of jobs must not contain two identical jobs (i.e. IDFromEndpoint identical), if that is the case false will be returned. If on the other hand a job in the list is identical to one in file, the one in file will be overwritten. A pointer (no new) to those jobs from the list which are not in the file will be added to newJobs list, thus these pointers goes out of scope when jobs list goes out of scope. To avoid simultaneous use (writing and reading) of the file, writing will not be initiated before a lock on the file has been acquired. For this purpose the **FileLock** (p. 187) class is used. nTries specifies the maximal number of times the method will try to acquire a lock on the file, with an interval of tryInterval micro seconds between each attempt. If a lock is not acquired this method returns false. The method will also return false if writing jobs to the file fails. Otherwise it returns true.

Parameters

<i>filename</i>	is the filename of the job list to write jobs to.
<i>jobs</i>	is the list of Job (p. 210) objects which should be written to file.
<i>newJobs</i>	is a reference to a list of pointers to Job (p. 210) objects which are not duplicates (cleared before use).
<i>nTries</i>	specifies the maximal number of times the method will try to acquire a lock on file to read.
<i>tryInterval</i>	specifies the interval (in micro seconds) between each attempt to acquire a lock.

Returns

true in case of success, otherwise false.

See also

ToXML (p. 214)
ReadAllJobsFromFile (p. 212)
WriteJobsToTruncatedFile (p. 215)
RemoveJobsFromFile (p. 213)
FileLock (p. 187)
XMLNode::SaveToFile (p. 466)

```
6.135.3.8 static bool Arc::Job::WriteJobsToFile ( const std::string & filename, const std::list<
Job > & jobs, unsigned nTries = 10, unsigned tryInterval = 500000 )
[static]
```

Write jobs to file.

This method is in all respects identical to the **WriteJobsToFile(const std::string&, const std::list<Job>&, std::list<const Job*>&, unsigned, unsigned)** (p. 214) method, except for the information about new jobs which is disregarded.

See also

WriteJobsToFile(const std::string&, const std::list<Job>&, std::list<const Job*>&, unsigned, unsigned) (p. 214)

```
6.135.3.9 static bool Arc::Job::WriteJobsToTruncatedFile ( const std::string & filename, const
std::list< Job > & jobs, unsigned nTries = 10, unsigned tryInterval = 500000 )
[static]
```

Truncate file and write jobs to it.

This static method will write the passed list of jobs to the specified file, but before writing the file will be truncated. Jobs will be written in XML format as returned by the **ToXML** method, and each job will be contained in a element named "Job". The passed list of jobs must not contain two identical jobs (i.e. **IDFromEndpoint** identical), if that is the case false will be returned. To avoid simultaneous use (writing and reading)

of the file, writing will not be initiated before a lock on the file has been acquired. For this purpose the **FileLock** (p. 187) class is used. *nTries* specifies the maximal number of times the method will try to acquire a lock on the file, with an interval of *tryInterval* micro seconds between each attempt. If a lock is not acquired this method returns false. The method will also return false if writing jobs to the file fails. Otherwise it returns true.

Parameters

<i>filename</i>	is the filename of the job list to write jobs to.
<i>jobs</i>	is the list of Job (p. 210) objects which should be written to file.
<i>nTries</i>	specifies the maximal number of times the method will try to acquire a lock on file to read.
<i>tryInterval</i>	specifies the interval (in micro seconds) between each attempt to acquire a lock.

Returns

true in case of success, otherwise false.

See also

ToXML (p. 214)
ReadAllJobsFromFile (p. 212)
WriteJobsToFile (p. 215)
RemoveJobsFromFile (p. 213)
FileLock (p. 187)
XMLNode::SaveToFile (p. 466)

The documentation for this class was generated from the following file:

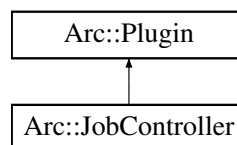
- Job.h

6.136 Arc::JobController Class Reference

Base class for the JobControllers.

```
#include <JobController.h>
```

Inheritance diagram for Arc::JobController:



Public Member Functions

- void **FillJobStore** (const std::list< **URL** > &jobids)

- bool **Cat** (const std::list< std::string > &status, const std::string &whichfile)
- bool **Cat** (std::ostream &out, const std::list< std::string > &status, const std::string &whichfile)
- bool **PrintJobStatus** (const std::list< std::string > &status, const bool longlist)
- bool **SaveJobStatusToStream** (std::ostream &out, const std::list< std::string > &status, bool longlist)
- bool **Migrate** (**TargetGenerator** &targetGen, **Broker** *broker, const **UserConfig** &usercfg, const bool forcemigration, std::list< **URL** > &migratedJobIDs)

6.136.1 Detailed Description

Base class for the JobControllers. The **JobController** (p. 216) is the base class for middleware specialized derived classes. The **JobController** (p. 216) base class is also the implementer of all public functionality that should be offered by the middleware specific specializations. In other words all virtual functions of the **JobController** (p. 216) are private. The initialization of a (specialized) **JobController** (p. 216) object takes two steps. First the **JobController** (p. 216) specialization for the required grid flavour must be loaded by the **JobControllerLoader** (p. 220), which sees to that the **JobController** (p. 216) receives information about its Grid flavour and the local joblist file containing information about all active jobs (flavour independent). The next step is the filling of the **JobController** (p. 216) job pool (JobStore) which is the pool of jobs that the **JobController** (p. 216) can manage. Must be specialized for each supported middleware flavour.

6.136.2 Member Function Documentation

6.136.2.1 bool Arc::JobController::Cat (const std::list< std::string > & *status*, const std::string & *whichfile*)

DEPRECATED: Catenate a log-file to standard out.

This method is DEPRECATED, use the **Cat**(std::ostream&, const std::list<std::string>&, const std::string&) (p. 218) instead.

This method is not supposed to be overloaded by extending classes.

Parameters

<i>status</i>	a list of strings representing states to be considered.
<i>longlist</i>	a boolean indicating whether verbose job information should be printed.

Returns

This method always returns true.

See also

Cat(std::ostream&, const std::list<std::string>&, const std::string&) (p. 218)
GetJobInformation
JobState (p. 227)

6.136.2.2 `bool Arc::JobController::Cat (std::ostream & out, const std::list< std::string > & status, const std::string & whichfile)`

Catenate a output log-file to a std::ostream object.

The method catenates one of the log-files standard out or error, or the job log file from the CE for each of the jobs contained in this object. A file can only be catenated if the location relative to the session directory are set in Job::StdOut, Job::StdErr and Job::LogDir respectively, and if supported so in the specialised ACC module. If the status parameter is non-empty only jobs having a job status specified in this list will be considered. The whichfile parameter specifies what log-file to catenate. Possible values are "stdout", "stderr" and "joblog" respectively specifying standard out, error and job log file.

This method is not supposed to be overloaded by extending classes.

Parameters

<i>status</i>	a list of strings representing states to be considered.
<i>longlist</i>	a boolean indicating whether verbose job information should be printed.

Returns

This method always returns true.

See also

SaveJobStatusToStream (p. 219)
GetJobInformation
JobState (p. 227)

6.136.2.3 `void Arc::JobController::FillJobStore (const std::list< URL > & jobids)`

Fill jobstore.

Method to fill the jobstore with jobs that should be managed.

Parameters

<i>jobids</i>	List of jobids to be loaded to the jobstore. If empty all jobs of the specialized grid flavour present in the joblist file (given through the usercfg to the constructor) will be loaded to the jobstore.
---------------	---

6.136.2.4 `bool Arc::JobController::Migrate (TargetGenerator & targetGen, Broker * broker, const UserConfig & usercfg, const bool forcemigration, std::list< URL > & migratedJobIDs)`

Migrate job from cluster A to Cluster B.

Method to migrate the jobs contained in the jobstore.

Parameters

<i>targetGen</i>	TargetGenerator (p. 360) with targets to migrate the job to.
<i>broker</i>	Broker (p. 67) to be used when selecting target.
<i>forcemigration</i>	boolean which specifies whether a migrated job should persist if the new cluster does not succeed sending a kill/terminate request for the job.

6.136.2.5 `bool Arc::JobController::PrintJobStatus (const std::list< std::string > & status, const bool longlist)`

DEPRECATED: Print job status to std::cout.

This method is DEPRECATED, use the SaveJobStatusToStream instead.

This method is not supposed to be overloaded by extending classes.

Parameters

<i>status</i>	a list of strings representing states to be considered.
<i>longlist</i>	a boolean indicating whether verbose job information should be printed.

Returns

This method always returns true.

See also

SaveJobStatusToStream (p. 219)
GetJobInformation
JobState (p. 227)

6.136.2.6 `bool Arc::JobController::SaveJobStatusToStream (std::ostream & out, const std::list< std::string > & status, bool longlist)`

Print job status to a std::ostream object.

The job status is printed to a std::ostream object when calling this method. More specifically the **Job::SaveToStream** (p. 214) method is called on each of the **Job** (p. 210) objects stored in this object, and the boolean argument *longlist* is passed directly to the method indicating whether verbose job status should be printed. The *status* argument is a list of strings each representing a job state (**JobState** (p. 227)) which is used to indicate that only jobs with a job state in the list should be considered. If the list *status* is empty all jobs will be considered.

This method is not supposed to be overloaded by extending classes.

Parameters

<i>out</i>	a std::ostream object to direct job status information to.
<i>status</i>	a list of strings representing states to be considered.
<i>longlist</i>	a boolean indicating whether verbose job information should be printed.

Returns

This method always returns true.

See also

`GetJobInformation`

Job::SaveToStream (p. 214)

JobState (p. 227)

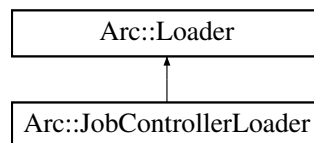
The documentation for this class was generated from the following file:

- JobController.h

6.137 Arc::JobControllerLoader Class Reference

```
#include <JobController.h>
```

Inheritance diagram for Arc::JobControllerLoader:

**Public Member Functions**

- **JobControllerLoader** ()
- **~JobControllerLoader** ()
- **JobController * load** (const std::string &name, const **UserConfig** &usercfg)
- const std::list< **JobController** * > & **GetJobControllers** () const

6.137.1 Detailed Description

Class responsible for loading **JobController** (p. 216) plugins The **JobController** (p. 216) objects returned by a **JobControllerLoader** (p. 220) must not be used after the **JobControllerLoader** (p. 220) goes out of scope.

6.137.2 Constructor & Destructor Documentation**6.137.2.1 Arc::JobControllerLoader::JobControllerLoader ()**

Constructor Creates a new **JobControllerLoader** (p. 220).

6.137.2.2 Arc::JobControllerLoader::~~JobControllerLoader ()

Destructor Calling the destructor destroys all JobControllers loaded by the **JobControllerLoader** (p. 220) instance.

6.137.3 Member Function Documentation

6.137.3.1 const std::list<JobController*> & Arc::JobControllerLoader::GetJobControllers () const [inline]

Retrieve the list of loaded JobControllers.

Returns

A reference to the list of JobControllers.

Referenced by Arc::JobSupervisor::GetJobControllers().

6.137.3.2 JobController* Arc::JobControllerLoader::load (const std::string & name, const UserConfig & usercfg)

Load a new **JobController** (p. 216)

Parameters

<i>name</i>	The name of the JobController (p. 216) to load.
<i>usercfg</i>	The UserConfig (p. 390) object for the new JobController (p. 216).

Returns

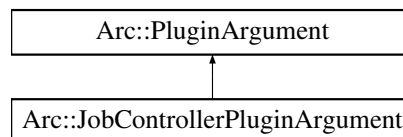
A pointer to the new **JobController** (p. 216) (NULL on error).

The documentation for this class was generated from the following file:

- JobController.h

6.138 Arc::JobControllerPluginArgument Class Reference

Inheritance diagram for Arc::JobControllerPluginArgument:



The documentation for this class was generated from the following file:

- JobController.h

6.139 Arc::JobDescription Class Reference

Public Member Functions

- **operator bool** () const
- bool **Parse** (const std::string &source, const std::string &language="", const std::string &dialect="")
- bool **Parse** (const **XMLNode** &xmlSource)
- std::string **UnParse** (const std::string &language="nordugrid.jsdl") const
- bool **UnParse** (std::string &product, std::string language, const std::string &dialect="") const
- const std::string & **GetSourceLanguage** () const
- void **Print** (bool longlist=false) const
- bool **SaveToStream** (std::ostream &out, const std::string &format) const

Static Public Member Functions

- static bool **Parse** (const std::string &source, std::list< **JobDescription** > &job-descs, const std::string &language="", const std::string &dialect="")

Data Fields

- std::map< std::string, std::string > **OtherAttributes**

6.139.1 Member Function Documentation

6.139.1.1 const std::string& Arc::JobDescription::GetSourceLanguage () const [inline]

Get input source language.

If this object was created by a **JobDescriptionParser** (p. 225), then this method returns a string which indicates the job description language of the parsed source. If not created by a **JobDescriptionParser** the string returned is empty.

Returns

const std::string& source language of parsed input source.

6.139.1.2 Arc::JobDescription::operator bool () const

DEPRECATED: Check whether **JobDescription** (p. 222) is valid.

The **JobDescription** (p. 222) class itself is not able to tell whether its objects are valid or not. Instead when parsing/outputting, **JobDescriptionParser** (p. 225) classes checks the validity. Thus the Parse and UnParse methods should be used for this purpose.

6.139.1.3 `static bool Arc::JobDescription::Parse (const std::string & source, std::list< JobDescription > & jobdescs, const std::string & language = " ", const std::string & dialect = " ") [static]`

Parse string into **JobDescription** (p. 222) objects.

The passed string will be tried parsed into the list of **JobDescription** (p. 222) objects. The available specialized JobDescriptionParser classes will be tried one by one, parsing the string, and if one succeeds the list of **JobDescription** (p. 222) objects is filled with the parsed contents and true is returned, otherwise false is returned. If no language specified, each **JobDescriptionParser** (p. 225) will try all its supported languages. On the other hand if a language is specified, only the **JobDescriptionParser** (p. 225) supporting that language will be tried. A dialect can also be specified, which only has an effect on the parsing if the **JobDescriptionParser** (p. 225) supports that dialect.

Parameters

<i>source</i>	
<i>jobdescs</i>	
<i>language</i>	
<i>dialect</i>	

Returns

true if the passed string can be parsed successfully by any of the available parsers.

6.139.1.4 `bool Arc::JobDescription::Parse (const std::string & source, const std::string & language = " ", const std::string & dialect = " ")`

DEPRECATED: Parse source string.

This method is deprecated, use the **Parse(const std::string&, std::list<JobDescription>&, const std::string&, const std::string&)** (p. 223) method instead.

6.139.1.5 `bool Arc::JobDescription::Parse (const XMLNode & xmlSource)`

DEPRECATED: Parse source string.

This method is deprecated, use the **Parse(const std::string&, std::list<JobDescription>&, const std::string&, const std::string&)** (p. 223) method instead.

6.139.1.6 `void Arc::JobDescription::Print (bool longlist = false) const`

DEPRECATED: Print all values to standard output.

This method is DEPRECATED, use the SaveToStream method instead.

Parameters

<i>longlist</i>	
-----------------	--

See also

SaveToStream (p. 224)

6.139.1.7 `bool Arc::JobDescription::SaveToStream (std::ostream & out, const std::string & format) const`

Print job description to a std::ostream object.

The job description will be written to the passed std::ostream object out in the format indicated by the format parameter. The format parameter should specify the format of one of the job description languages supported by the library. Or by specifying the special "user" or "userlong" format the job description will be written as a attribute/value pair list with respectively less or more attributes.

The mote

Returns

true if writing the job description to the out object succeeds, otherwise false.

Parameters

<i>out</i>	a std::ostream reference specifying the ostream to write the job description to.
<i>format</i>	specifies the format the job description should written in.

6.139.1.8 `std::string Arc::JobDescription::UnParse (const std::string & language = "nordugrid:jsdl") const`

DEPRECATED: Output contents in the specified language.

This method is deprecated, use the UnParse(std::string&, std::string, const std::string&) method instead.

6.139.1.9 `bool Arc::JobDescription::UnParse (std::string & product, std::string language, const std::string & dialect = " ") const`

Output contents in the specified language.

Parameters

<i>product</i>	
<i>language</i>	
<i>dialect</i>	

Returns**6.139.2 Field Documentation****6.139.2.1 `std::map<std::string, std::string>` `Arc::JobDescription::OtherAttributes`**

Holds attributes not fitting into this class.

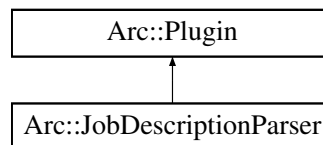
This member is used by **JobDescriptionParser** (p. 225) classes to store attribute/-value pairs not fitting into attributes stored in this class. The form of the attribute (the key in the map) should be as follows: <language>;<attribute-name> E.g.: "nordugrid:xrsl;hostname".

The documentation for this class was generated from the following file:

- JobDescription.h

6.140 Arc::JobDescriptionParser Class Reference

Inheritance diagram for Arc::JobDescriptionParser:



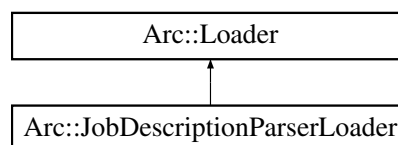
The documentation for this class was generated from the following file:

- JobDescriptionParser.h

6.141 Arc::JobDescriptionParserLoader Class Reference

```
#include <JobDescriptionParser.h>
```

Inheritance diagram for Arc::JobDescriptionParserLoader:



Data Structures

- class **iterator**

Public Member Functions

- **JobDescriptionParserLoader** ()
- **~JobDescriptionParserLoader** ()
- **JobDescriptionParser * load** (const std::string &name)
- const std::list< **JobDescriptionParser** * > & **GetJobDescriptionParsers** () const

6.141.1 Detailed Description

Class responsible for loading **JobDescriptionParser** (p. 225) plugins The **JobDescriptionParser** (p. 225) objects returned by a **JobDescriptionParserLoader** (p. 225) must not be used after the **JobDescriptionParserLoader** (p. 225) goes out of scope.

6.141.2 Constructor & Destructor Documentation

6.141.2.1 Arc::JobDescriptionParserLoader::JobDescriptionParserLoader ()

Constructor Creates a new **JobDescriptionParserLoader** (p. 225).

6.141.2.2 Arc::JobDescriptionParserLoader::~~JobDescriptionParserLoader ()

Destructor Calling the destructor destroys all **JobDescriptionParser** (p. 225) object loaded by the **JobDescriptionParserLoader** (p. 225) instance.

6.141.3 Member Function Documentation

6.141.3.1 const std::list<JobDescriptionParser*>& Arc::JobDescriptionParserLoader::GetJobDescriptionParsers () const [inline]

Retrieve the list of loaded **JobDescriptionParser** (p. 225) objects.

Returns

A reference to the list of **JobDescriptionParser** (p. 225) objects.

6.141.3.2 JobDescriptionParser* Arc::JobDescriptionParserLoader::load (const std::string & name)

Load a new **JobDescriptionParser** (p. 225)

Parameters

<i>name</i>	The name of the JobDescriptionParser (p. 225) to load.
-------------	---

Returns

A pointer to the new **JobDescriptionParser** (p. 225) (NULL on error).

The documentation for this class was generated from the following file:

- JobDescriptionParser.h

6.142 Arc::JobIdentificationType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.143 Arc::JobState Class Reference

```
#include <JobState.h>
```

6.143.1 Detailed Description

ARC general state model. The class comprise the general state model of the ARC-lib, and are herein used to compare job states from the different middlewares supported by the plugin structure of the ARC-lib. Which is why every ACC plugin should contain a class derived from this class. The derived class should consist of a constructor and a mapping function (a JobStateMap) which maps a std::string to a **JobState** (p. 227):StateType. An example of a constructor in a plugin could be: JobStatePlugin::JobStatePlugging(const std::string& state) : JobState(state, &pluginStateMap) {} where &pluginStateMap is a reference to the JobStateMap defined by the derived class.

The documentation for this class was generated from the following file:

- JobState.h

6.144 Arc::JobSupervisor Class Reference

% **JobSupervisor** (p. 227) class

```
#include <JobSupervisor.h>
```

Public Member Functions

- **JobSupervisor** (const **UserConfig** &usercfg, const std::list< std::string > &jobs)
- const std::list< **JobController** * > &**GetJobControllers** ()

6.144.1 Detailed Description

% **JobSupervisor** (p. 227) class The **JobSupervisor** (p. 227) class is tool for loading **JobController** (p. 216) plugins for managing Grid jobs.

6.144.2 Constructor & Destructor Documentation

6.144.2.1 Arc::JobSupervisor::JobSupervisor (const UserConfig & *usercfg*, const std::list< std::string > & *jobs*)

Create a **JobSupervisor** (p. 227) object.

Default constructor to create a **JobSupervisor** (p. 227). Automatically loads **JobController** (p. 216) plugins based upon the input jobids.

Parameters

<i>usercfg</i>	Reference to UserConfig (p. 390) object with information about user credentials and joblistfile.
<i>jobs</i>	List of jobs(jobid or job name) to be managed.

6.144.3 Member Function Documentation

6.144.3.1 const std::list<JobController*> & Arc::JobSupervisor::GetJobControllers () [inline]

Get list of JobControllers.

Method to get the list of JobControllers loaded by constructor.

References Arc::JobControllerLoader::GetJobControllers().

The documentation for this class was generated from the following file:

- JobSupervisor.h

6.145 Arc::LoadableModuleDescription Class Reference

The documentation for this class was generated from the following file:

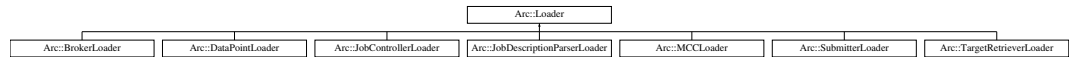
- ModuleManager.h

6.146 Arc::Loader Class Reference

Plugins loader.

```
#include <Loader.h>
```

Inheritance diagram for Arc::Loader:



Public Member Functions

- **Loader** (XMLNode cfg)
- **~Loader** ()

Protected Attributes

- **PluginsFactory** * **factory_**

6.146.1 Detailed Description

Plugins loader. This class processes XML configuration and loads specified plugins. Accepted configuration is defined by XML schema mcc.xsd. "Plugins" elements are parsed by this class and corresponding libraries are loaded.

6.146.2 Constructor & Destructor Documentation

6.146.2.1 Arc::Loader::Loader (XMLNode cfg)

Constructor that takes whole XML configuration and performs common configuration part

6.146.2.2 Arc::Loader::~~Loader ()

Destructor destroys all components created by constructor

6.146.3 Field Documentation

6.146.3.1 PluginsFactory* Arc::Loader::factory_ [protected]

Link to Factory responsible for loading and creation of **Plugin** (p.295) and derived objects

Referenced by Arc::ChainContext::operator PluginsFactory *().

The documentation for this class was generated from the following file:

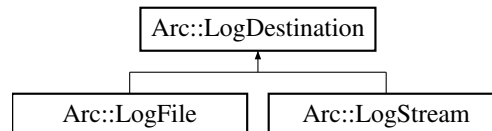
- Loader.h

6.147 Arc::LogDestination Class Reference

A base class for log destinations.

```
#include <Logger.h>
```

Inheritance diagram for Arc::LogDestination:



Public Member Functions

- virtual void **log** (const **LogMessage** &message)=0

Protected Member Functions

- **LogDestination** ()
- **LogDestination** (const std::string &locale)

6.147.1 Detailed Description

A base class for log destinations. This class defines an interface for LogDestinations. **LogDestination** (p. 230) objects will typically contain synchronization mechanisms and should therefore never be copied.

6.147.2 Constructor & Destructor Documentation

6.147.2.1 Arc::LogDestination::LogDestination () [protected]

Default constructor.

This destination will use the default locale.

6.147.2.2 Arc::LogDestination::LogDestination (const std::string & locale) [protected]

Constructor with specific locale.

This destination will use the specified locale.

The documentation for this class was generated from the following file:

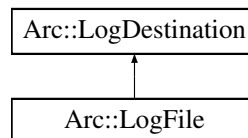
- Logger.h

6.148 Arc::LogFile Class Reference

A class for logging to files.

```
#include <Logger.h>
```

Inheritance diagram for Arc::LogFile:



Public Member Functions

- **LogFile** (const std::string &path)
- **LogFile** (const std::string &path, const std::string &locale)
- void **setMaxSize** (int newsize)
- void **setBackups** (int newbackup)
- void **setReopen** (bool newreopen)
- **operator bool** (void)
- bool **operator!** (void)
- virtual void **log** (const **LogMessage** &message)

6.148.1 Detailed Description

A class for logging to files. This class is used for logging to files. It provides synchronization in order to prevent different LogMessages to appear mixed with each other in the stream. It is possible to limit size of created file. Whenever specified size is exceeded file is deleted and new one is created. Old files may be moved into backup files instead of being deleted. Those files have names same as initial file with additional number suffix - similar to those found in /var/log of many Unix-like systems.

6.148.2 Constructor & Destructor Documentation

6.148.2.1 Arc::LogFile::LogFile (const std::string & path)

Creates a **LogFile** (p. 231) connected to a file.

Creates a **LogFile** (p. 231) connected to the file located at specified path. In order not to break synchronization, it is important not to connect more than one **LogFile** (p. 231) object to a certain file. If file does not exist it will be created.

Parameters

<i>path</i>	The path to file to which to write LogMessages.
-------------	---

6.148.2.2 Arc::LogFile::LogFile (const std::string & *path*, const std::string & *locale*)

Creates a **LogFile** (p. 231) connected to a file.

Creates a **LogFile** (p. 231) connected to the file located at specified path. The output will be localised to the specified locale.

6.148.3 Member Function Documentation

6.148.3.1 virtual void Arc::LogFile::log (const LogMessage & *message*) [virtual]

Writes a **LogMessage** (p. 237) to the file.

This method writes a **LogMessage** (p. 237) to the file that is connected to this **LogFile** (p. 231) object. If after writitng size of file exceeds one set by **setMaxSize()** (p. 232) file is moved to backup and new one is created.

Parameters

<i>message</i>	The LogMessage (p. 237) to write.
----------------	--

Implements **Arc::LogDestination** (p. 230).

6.148.3.2 void Arc::LogFile::setBackups (int *newbackup*)

Set number of backups to store.

Set number of backups to store. When file size exceeds one specified with **setMaxSize()** (p. 232) file is closed and moved to one named path.1. If path.1 exists it is moved to path.2 and so on. Number of path.# files is one set in newbackup.

Parameters

<i>newbackup</i>	Number of backup files.
------------------	-------------------------

6.148.3.3 void Arc::LogFile::setMaxSize (int *newsiz*e)

Set maximal allowed size of file.

Set maximal allowed size of file. This value is not obeyed exactly. Spesified size may be exceeded by amount of one **LogMessage** (p. 237). To disable limit specify -1.

Parameters

<i>newsiz</i> e	Max size of log file.
-----------------	-----------------------

6.148.3.4 void Arc::LogFile::setReopen (bool *newreopen*)

Set file reopen on every write.

Set file reopen on every write. If set to true file is opened before writing every log record and closed afterward.

Parameters

<i>newreopen</i>	If file to be reopened for every log record.
------------------	--

The documentation for this class was generated from the following file:

- `Logger.h`

6.149 Arc::Logger Class Reference

A logger class.

```
#include <Logger.h>
```

Public Member Functions

- **Logger** (**Logger** &parent, const std::string &subdomain)
- **Logger** (**Logger** &parent, const std::string &subdomain, **LogLevel** threshold)
- **~Logger** ()
- void **addDestination** (**LogDestination** &destination)
- void **addDestinations** (const std::list< **LogDestination** * > &destinations)
- const std::list< **LogDestination** * > & **getDestinations** (void) const
- void **removeDestinations** (void)
- void **setThreshold** (**LogLevel** threshold)
- **LogLevel** **getThreshold** () const
- void **setThreadContext** (void)
- void **msg** (**LogMessage** message)
- void **msg** (**LogLevel** level, const std::string &str)

Static Public Member Functions

- static **Logger** & **getRootLogger** ()
- static void **setThresholdForDomain** (**LogLevel** threshold, const std::list< std::string > &subdomains)
- static void **setThresholdForDomain** (**LogLevel** threshold, const std::string &domain)

6.149.1 Detailed Description

A logger class. This class defines a **Logger** (p. 233) to which LogMessages can be sent.

Every **Logger** (p. 233) (except for the rootLogger) has a parent **Logger** (p. 233). The domain of a **Logger** (p. 233) (a string that indicates the origin of LogMessages) is composed by adding a subdomain to the domain of its parent **Logger** (p. 233).

A **Logger** (p. 233) also has a threshold. Every **LogMessage** (p. 237) that have a level that is greater than or equal to the threshold is forwarded to any **LogDestination** (p. 230) connected to this **Logger** (p. 233) as well as to the parent **Logger** (p. 233).

Typical usage of the **Logger** (p. 233) class is to declare a global **Logger** (p. 233) object for each library/module/component to be used by all classes and methods there.

6.149.2 Constructor & Destructor Documentation

6.149.2.1 Arc::Logger::Logger (**Logger** & *parent*, const std::string & *subdomain*)

Creates a logger.

Creates a logger. The threshold is inherited from its parent **Logger** (p. 233).

Parameters

<i>parent</i>	The parent Logger (p. 233) of the new Logger (p. 233).
<i>subdomain</i>	The subdomain of the new logger.

6.149.2.2 Arc::Logger::Logger (**Logger** & *parent*, const std::string & *subdomain*, LogLevel *threshold*)

Creates a logger.

Creates a logger.

Parameters

<i>parent</i>	The parent Logger (p. 233) of the new Logger (p. 233).
<i>subdomain</i>	The subdomain of the new logger.
<i>threshold</i>	The threshold of the new logger.

6.149.2.3 Arc::Logger::~~Logger ()

Destroys a logger.

Destructor

6.149.3 Member Function Documentation

6.149.3.1 void Arc::Logger::addDestination (**LogDestination** & *destination*)

Adds a **LogDestination** (p. 230).

Adds a **LogDestination** (p. 230) to which to forward LogMessages sent to this logger (if they pass the threshold). Since LogDestinatoin's should not be copied, the new **LogDestination** (p. 230) is passed by reference and a pointer to it is kept for later use. It is therefore important that the **LogDestination** (p. 230) passed to this **Logger** (p. 233) exists at least as long as the **Logger** (p. 233) itself.

6.149.3.2 `void Arc::Logger::addDestinations (const std::list< LogDestination * > & destinations)`

Adds LogDestinations.

See `addDestination(LogDestination& destination)` (p. 234).

6.149.3.3 `const std::list<LogDestination*>& Arc::Logger::getDestinations (void) const`

Obtains current LogDestinations.

Returns list of pointers to **LogDestination** (p. 230) objects. Returned result refers directly to internal member of **Logger** (p. 233) instance. Hence it should not be used after this **Logger** (p. 233) is destroyed.

6.149.3.4 `static Logger& Arc::Logger::getRootLogger () [static]`

The root **Logger** (p. 233).

This is the root **Logger** (p. 233). It is an ancestor of any other **Logger** (p. 233) and always exists.

6.149.3.5 `LogLevel Arc::Logger::getThreshold () const`

Returns the threshold.

Returns the threshold.

Returns

The threshold of this **Logger** (p. 233).

6.149.3.6 `void Arc::Logger::msg (LogMessage message)`

Sends a **LogMessage** (p. 237).

Sends a **LogMessage** (p. 237).

Parameters

<i>The</i>	LogMessage (p. 237) to send.
------------	-------------------------------------

Referenced by `msg()`, and `Arc::stringto()`.

6.149.3.7 void Arc::Logger::msg (LogLevel *level*, const std::string & *str*) [inline]

Logs a message text.

Logs a message text string at the specified LogLevel. This is a convenience method to save some typing. It simply creates a **LogMessage** (p. 237) and sends it to the other **msg()** (p. 235) method.

Parameters

<i>level</i>	The level of the message.
<i>str</i>	The message text.

References msg().

6.149.3.8 void Arc::Logger::setThreadContext (void)

Creates per-thread context.

Creates new context for this logger which becomes effective for operations initiated by this thread. All new threads started by this one will inherit new context. Context stores current threshold and pointers to destinations. Hence new context is identical to current one. One can modify new context using **setThreshold()** (p. 236), **removeDestinations()** (p. 233) and **addDestination()** (p. 234). All such operations will not affect old context.

6.149.3.9 void Arc::Logger::setThreshold (LogLevel *threshold*)

Sets the threshold.

This method sets the threshold of the **Logger** (p. 233). Any message sent to this **Logger** (p. 233) that has a level below this threshold will be discarded.

Parameters

<i>The</i>	threshold
------------	-----------

6.149.3.10 static void Arc::Logger::setThresholdForDomain (LogLevel *threshold*, const std::string & *domain*) [static]

Sets the threshold for domain.

This method sets the default threshold of the domain. All new loggers created with specified domain will have specified threshold set by default. The domain is composed of all subdomains of all loggers in chain by merging them with '.' as separator.

Parameters

<i>threshold</i>	The threshold
<i>domain</i>	The domain of logger

6.149.3.11 `static void Arc::Logger::setThresholdForDomain (LogLevel threshold, const std::list< std::string > & subdomains) [static]`

Sets the threshold for domain.

This method sets the default threshold of the domain. All new loggers created with specified domain will have specified threshold set by default. The subdomains of all loggers in chain are matched against list of provided subdomains.

Parameters

<i>threshold</i>	The threshold
<i>subdomains</i>	The subdomains of all loggers in chain

The documentation for this class was generated from the following file:

- Logger.h

6.150 Arc::LoggerContext Class Reference

Container for logger configuration.

```
#include <Logger.h>
```

6.150.1 Detailed Description

Container for logger configuration.

The documentation for this class was generated from the following file:

- Logger.h

6.151 Arc::LoggerFormat Struct Reference

The documentation for this struct was generated from the following file:

- Logger.h

6.152 Arc::LogMessage Class Reference

A class for log messages.

```
#include <Logger.h>
```

Public Member Functions

- **LogMessage** (**LogLevel** level, const **IString** &message)
- **LogMessage** (**LogLevel** level, const **IString** &message, const std::string &identifier)
- **LogLevel** getLevel () const

Protected Member Functions

- void setIdentifier (std::string identifier)

Friends

- class **Logger**
- std::ostream & **operator**<< (std::ostream &os, const **LogMessage** &message)

6.152.1 Detailed Description

A class for log messages. This class is used to represent log messages internally. It contains the time the message was created, its level, from which domain it was sent, an identifier and the message text itself.

6.152.2 Constructor & Destructor Documentation

6.152.2.1 Arc::LogMessage::LogMessage (**LogLevel** level, const **IString** & message)

Creates a **LogMessage** (p. 237) with the specified level and message text.

This constructor creates a **LogMessage** (p. 237) with the specified level and message text. The time is set automatically, the domain is set by the **Logger** (p. 233) to which the **LogMessage** (p. 237) is sent and the identifier is composed from the process ID and the address of the Thread object corresponding to the calling thread.

Parameters

<i>level</i>	The level of the LogMessage (p. 237).
<i>message</i>	The message text.

6.152.2.2 Arc::LogMessage::LogMessage (**LogLevel** level, const **IString** & message, const std::string & identifier)

Creates a **LogMessage** (p. 237) with the specified attributes.

This constructor creates a **LogMessage** (p. 237) with the specified level, message text and identifier. The time is set automatically and the domain is set by the **Logger** (p. 233) to which the **LogMessage** (p. 237) is sent.

Parameters

<i>level</i>	The level of the LogMessage (p. 237).
<i>message</i>	The message text.
<i>ident</i>	The identifier of the LogMessage (p. 237).

6.152.3 Member Function Documentation**6.152.3.1 LogLevel Arc::LogMessage::getLevel () const**

Returns the level of the **LogMessage** (p. 237).

Returns the level of the **LogMessage** (p. 237).

Returns

The level of the **LogMessage** (p. 237).

6.152.3.2 void Arc::LogMessage::setIdentifier (std::string identifier) [protected]

Sets the identifier of the **LogMessage** (p. 237).

The purpose of this method is to allow subclasses (in case there are any) to set the identifier of a **LogMessage** (p. 237).

Parameters

<i>The</i>	identifier.
------------	-------------

6.152.4 Friends And Related Function Documentation**6.152.4.1 friend class Logger [friend]**

The **Logger** (p. 233) class is a friend.

The **Logger** (p. 233) class must have some privileges (e.g. ability to call the setDomain() method), therefore it is a friend.

6.152.4.2 std::ostream& operator<< (std::ostream & os, const LogMessage & message) [friend]

Printing of LogMessages to ostreams.

Output operator so that LogMessages can be printed conveniently by LogDestinations.

The documentation for this class was generated from the following file:

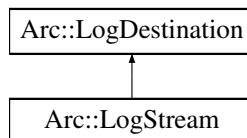
- Logger.h

6.153 Arc::LogStream Class Reference

A class for logging to ostreams.

```
#include <Logger.h>
```

Inheritance diagram for Arc::LogStream:



Public Member Functions

- **LogStream** (std::ostream &destination)
- **LogStream** (std::ostream &destination, const std::string &locale)
- virtual void **log** (const **LogMessage** &message)

6.153.1 Detailed Description

A class for logging to ostreams. This class is used for logging to ostreams (cout, cerr, files). It provides synchronization in order to prevent different LogMessages to appear mixed with each other in the stream. In order not to break the synchronization, LogStreams should never be copied. Therefore the copy constructor and assignment operator are private. Furthermore, it is important to keep a **LogStream** (p. 240) object as long as the **Logger** (p. 233) to which it has been registered.

6.153.2 Constructor & Destructor Documentation

6.153.2.1 Arc::LogStream::LogStream (std::ostream & *destination*)

Creates a **LogStream** (p. 240) connected to an ostream.

Creates a **LogStream** (p. 240) connected to the specified ostream. In order not to break synchronization, it is important not to connect more than one **LogStream** (p. 240) object to a certain stream.

Parameters

<i>destination</i>	The ostream to which to erite LogMessages.
--------------------	--

6.153.2.2 Arc::LogStream::LogStream (std::ostream & *destination*, const std::string & *locale*)

Creates a **LogStream** (p. 240) connected to an ostream.

Creates a **LogStream** (p. 240) connected to the specified ostream. The output will be localised to the specified locale.

6.153.3 Member Function Documentation

6.153.3.1 `virtual void Arc::LogStream::log (const LogMessage & message)` [virtual]

Writes a **LogMessage** (p. 237) to the stream.

This method writes a **LogMessage** (p. 237) to the ostream that is connected to this **LogStream** (p. 240) object. It is synchronized so that not more than one **LogMessage** (p. 237) can be written at a time.

Parameters

<i>message</i>	The LogMessage (p. 237) to write.
----------------	--

Implements **Arc::LogDestination** (p. 230).

The documentation for this class was generated from the following file:

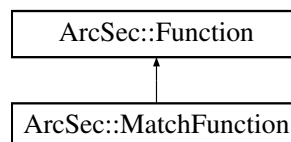
- Logger.h

6.154 ArcSec::MatchFunction Class Reference

Evaluate whether arg1 (value in regular expression) matched arg0 (lable in regular expression)

```
#include <MatchFunction.h>
```

Inheritance diagram for ArcSec::MatchFunction:



Public Member Functions

- virtual **AttributeValue** * **evaluate** (**AttributeValue** *arg0, **AttributeValue** *arg1, bool check_id=true)
- virtual std::list< **AttributeValue** * > **evaluate** (std::list< **AttributeValue** * > args, bool check_id=true)

Static Public Member Functions

- static std::string **getFunctionName** (std::string datatype)

6.154.1 Detailed Description

Evaluate whether `arg1` (value in regular expression) matched `arg0` (label in regular expression)

6.154.2 Member Function Documentation

6.154.2.1 `virtual AttributeValue* ArcSec::MatchFunction::evaluate (AttributeValue *
arg0, AttributeValue * arg1, bool check_id=true) [virtual]`

Evaluate two `AttributeValue` (p. 61) objects, and return one `AttributeValue` (p. 61) object

Implements `ArcSec::Function` (p. 191).

6.154.2.2 `virtual std::list<AttributeValue*> ArcSec::MatchFunction::evaluate (std::list<
AttributeValue * > args, bool check_id=true) [virtual]`

Evaluate a list of `AttributeValue` (p. 61) objects, and return a list of Attribute objects

Implements `ArcSec::Function` (p. 191).

6.154.2.3 `static std::string ArcSec::MatchFunction::getFunctionName (std::string datatype)
[static]`

help function to get the FunctionName

The documentation for this class was generated from the following file:

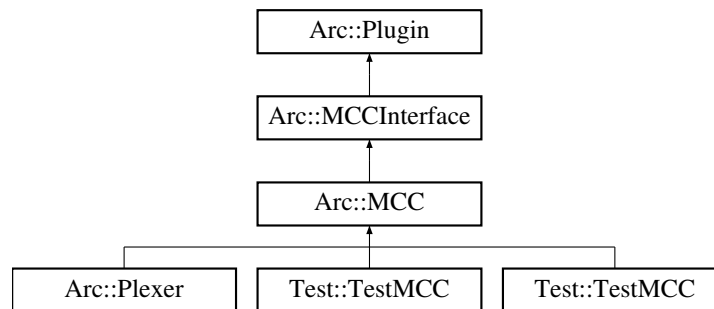
- MatchFunction.h

6.155 Arc::MCC Class Reference

Message (p. 252) Chain Component - base class for every **MCC** (p. 242) plugin.

```
#include <MCC.h>
```

Inheritance diagram for `Arc::MCC`:



Public Member Functions

- **MCC** (**Config** *)
- virtual void **Next** (**MCCInterface** *next, const std::string &label="")
- virtual void **AddSecHandler** (**Config** *cfg, **ArcSec::SecHandler** *sechandler, const std::string &label="")
- virtual void **Unlink** ()
- virtual **MCC_Status** process (**Message** &, **Message** &)

Protected Member Functions

- bool **ProcessSecHandlers** (**Message** &message, const std::string &label="") const

Protected Attributes

- std::map< std::string, **MCCInterface** * > **next_**
- std::map< std::string, std::list< **ArcSec::SecHandler** * > > **sechandlers_**

Static Protected Attributes

- static **Logger** **logger**

6.155.1 Detailed Description

Message (p. 252) Chain Component - base class for every **MCC** (p. 242) plugin. This is partially virtual class which defines interface and common functionality for every **MCC** (p. 242) plugin needed for managing of component in a chain.

6.155.2 Constructor & Destructor Documentation

6.155.2.1 **Arc::MCC::MCC** (**Config** *) [inline]

Example constructor - **MCC** (p. 242) takes at least it's configuration subtree

6.155.3 Member Function Documentation

6.155.3.1 `virtual void Arc::MCC::AddSecHandler (Config * cfg, ArcSec::SecHandler * sechandler, const std::string & label = " ") [virtual]`

Add security components/handlers to this **MCC** (p. 242). Security handlers are stacked into a few queues with each queue identified by its label. The queue labelled 'incoming' is executed for every 'request' message after the message is processed by the **MCC** (p. 242) on the service side and before processing on the client side. The queue labelled 'outgoing' is run for response message before it is processed by **MCC** (p. 242) algorithms on the service side and after processing on the client side. Those labels are just a matter of agreement and some MCCs may implement different queues executed at various message processing steps.

6.155.3.2 `virtual void Arc::MCC::Next (MCCInterface * next, const std::string & label = " ") [virtual]`

Add reference to next **MCC** (p. 242) in chain. This method is called by **Loader** (p. 228) for every potentially labeled link to next component which implements **MCCInterface** (p. 248). If next is NULL corresponding link is removed.

Reimplemented in **Arc::Plexer** (p. 294).

6.155.3.3 `virtual MCC_Status Arc::MCC::process (Message & , Message &) [inline, virtual]`

Dummy **Message** (p. 252) processing method. Just a placeholder.

Implements **Arc::MCCInterface** (p. 249).

Reimplemented in **Arc::Plexer** (p. 294).

6.155.3.4 `bool Arc::MCC::ProcessSecHandlers (Message & message, const std::string & label = " ") const [protected]`

Executes security handlers of specified queue. Returns true if the message is authorized for further processing or if there are no security handlers which implement authorization functionality. This is a convenience method and has to be called by the implementation of the **MCC** (p. 242).

6.155.3.5 `virtual void Arc::MCC::Unlink () [virtual]`

Removing all links. Useful for destroying chains.

6.155.4 Field Documentation

6.155.4.1 Logger `Arc::MCC::logger` [static, protected]

A logger for MCCs.

A logger intended to be the parent of loggers in the different MCCs.

Reimplemented in `Arc::Plexer` (p. 295).

6.155.4.2 `std::map<std::string, MCCInterface *> Arc::MCC::next_` [protected]

Set of labeled "next" components. Each implemented `MCC` (p. 242) must call `process()` (p. 244) method of corresponding `MCCInterface` (p. 248) from this set in own `process()` (p. 244) method.

6.155.4.3 `std::map<std::string, std::list<ArcSec::SecHandler *> > Arc::MCC::sechandlers_` [protected]

Set of labeled authentication and authorization handlers. `MCC` (p. 242) calls sequence of handlers at specific point depending on associated identifier. In most cases those are "in" and "out" for incoming and outgoing messages correspondingly.

The documentation for this class was generated from the following file:

- `MCC.h`

6.156 `Arc::MCC_Status` Class Reference

A class for communication of `MCC` (p. 242) processing results.

```
#include <MCC_Status.h>
```

Public Member Functions

- `MCC_Status (StatusKind kind=STATUS_UNDEFINED, const std::string &origin="???", const std::string &explanation="No explanation.")`
- `bool isOk () const`
- `StatusKind getKind () const`
- `const std::string & getOrigin () const`
- `const std::string & getExplanation () const`
- `operator std::string () const`
- `operator bool (void) const`
- `bool operator! (void) const`

6.156.1 Detailed Description

A class for communication of **MCC** (p. 242) processing results. This class is used to communicate result status between MCCs. It contains a status kind, a string specifying the origin (**MCC** (p. 242)) of the status object and an explanation.

6.156.2 Constructor & Destructor Documentation

6.156.2.1 `Arc::MCC_Status::MCC_Status (StatusKind kind = STATUS_UNDEFINED, const std::string & origin = "???", const std::string & explanation = "No explanation.")`

The constructor.

Creates a **MCC_Status** (p. 245) object.

Parameters

<i>kind</i>	The StatusKind (default: STATUS_UNDEFINED)
<i>origin</i>	The origin MCC (p. 242) (default: "??")
<i>explanation</i>	An explanation (default: "No explanation.")

6.156.3 Member Function Documentation

6.156.3.1 `const std::string& Arc::MCC_Status::getExplanation () const`

Returns an explanation.

This method returns an explanation of this object.

Returns

An explanation of this object.

6.156.3.2 `StatusKind Arc::MCC_Status::getKind () const`

Returns the status kind.

Returns the status kind of this object.

Returns

The status kind of this object.

6.156.3.3 `const std::string& Arc::MCC_Status::getOrigin () const`

Returns the origin.

This method returns a string specifying the origin **MCC** (p. 242) of this object.

Returns

A string specifying the origin **MCC** (p. 242) of this object.

6.156.3.4 `bool Arc::MCC_Status::isOk () const`

Is the status kind ok?

This method returns true if the status kind of this object is **STATUS_OK**

Returns

true if kind==**STATUS_OK**

Referenced by operator `bool()`, and operator `!()`.

6.156.3.5 `Arc::MCC_Status::operator bool (void) const` `[inline]`

Is the status kind ok?

This method returns true if the status kind of this object is **STATUS_OK**

Returns

true if kind==**STATUS_OK**

References `isOk()`.

6.156.3.6 `Arc::MCC_Status::operator std::string () const`

Conversion to string.

This operator converts a **MCC_Status** (p. 245) object to a string.

6.156.3.7 `bool Arc::MCC_Status::operator! (void) const` `[inline]`

not operator

Returns true if the status kind is not **OK**

Returns

true if kind!=**STATUS_OK**

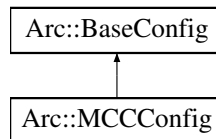
References `isOk()`.

The documentation for this class was generated from the following file:

- `MCC_Status.h`

6.157 Arc::MCCConfig Class Reference

Inheritance diagram for Arc::MCCConfig:



Public Member Functions

- virtual **XMLNode** **MakeConfig** (**XMLNode** cfg) const

6.157.1 Member Function Documentation

6.157.1.1 virtual **XMLNode** Arc::MCCConfig::MakeConfig (**XMLNode** cfg) const
[virtual]

Adds configuration part corresponding to stored information into common configuration tree supplied in 'cfg' argument. Returns reference to XML node representing configuration of **ModuleManager** (p. 261)

Reimplemented from **Arc::BaseConfig** (p. 66).

The documentation for this class was generated from the following file:

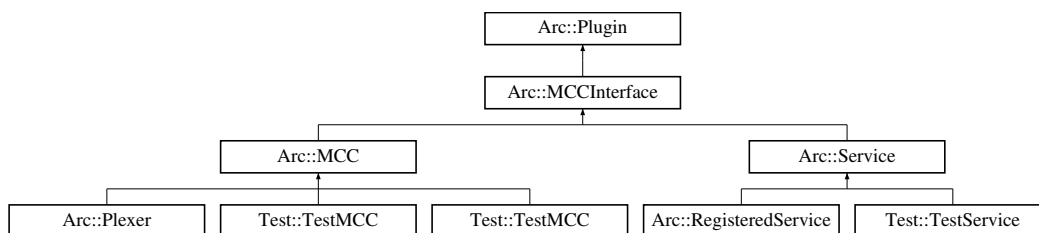
- MCC.h

6.158 Arc::MCCInterface Class Reference

Interface for communication between **MCC** (p. 242), **Service** (p. 331) and **Plexer** (p. 293) objects.

```
#include <MCC.h>
```

Inheritance diagram for Arc::MCCInterface:



Public Member Functions

- virtual **MCC_Status** process (**Message** &request, **Message** &response)=0

6.158.1 Detailed Description

Interface for communication between **MCC** (p. 242), **Service** (p. 331) and **Plexer** (p. 293) objects. The Interface consists of the method **process()** (p. 249) which is called by the previous **MCC** (p. 242) in the chain. For memory management policies please read the description of the **Message** (p. 252) class.

6.158.2 Member Function Documentation

6.158.2.1 virtual **MCC_Status** Arc::MCCInterface::process (**Message** & *request*, **Message** & *response*) [pure virtual]

Method for processing of requests and responses. This method is called by preceding **MCC** (p. 242) in chain when a request needs to be processed. This method must call similar method of next **MCC** (p. 242) in chain unless any failure happens. Result returned by call to next **MCC** (p. 242) should be processed and passed back to previous **MCC** (p. 242). In case of failure this method is expected to generate valid error response and return it back to previous **MCC** (p. 242) without calling the next one.

Parameters

<i>request</i>	The request that needs to be processed.
<i>response</i>	A Message (p. 252) object that will contain the response of the request when the method returns.

Returns

An object representing the status of the call.

Implemented in **Test::TestService** (p. 371), **Arc::MCC** (p. 244), and **Arc::Plexer** (p. 294).

The documentation for this class was generated from the following file:

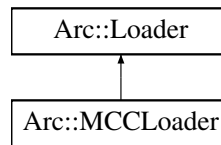
- MCC.h

6.159 Arc::MCCLoader Class Reference

Creator of **Message** (p. 252) Component Chains (**MCC** (p. 242)).

```
#include <MCCLoader.h>
```

Inheritance diagram for Arc::MCCLoader:



Public Member Functions

- **MCCLoader** (**Config** &cfg)
- **~MCCLoader** ()
- **MCC** * **operator[]** (const std::string &id)

6.159.1 Detailed Description

Creator of **Message** (p. 252) Component Chains (**MCC** (p. 242)). This class processes XML configuration and creates message chains. Accepted configuration is defined by XML schema mcc.xsd. Supported components are of types **MCC** (p. 242), **Service** (p. 331) and **Plexer** (p. 293). **MCC** (p. 242) and **Service** (p. 331) are loaded from dynamic libraries. For **Plexer** (p. 293) only internal implementation is supported. This object is also a container for loaded componets. All components and chains are destroyed if this object is destroyed. Chains are created in 2 steps. First all components are loaded and corresponding objects are created. Constructors are supplied with corresponding configuration subtrees. During next step components are linked together by calling their Next() methods. Each call creates labeled link to next component in a chain. 2 step method has an advantage over single step because it allows loops in chains and makes loading procedure more simple. But that also means during short period of time components are only partly configured. Components in such state must produce proper error response if **Message** (p. 252) arrives. Note: Current implementation requires all components and links to be labeled. All labels must be unique. Future implementation will be able to assign labels automatically.

6.159.2 Constructor & Destructor Documentation

6.159.2.1 Arc::MCCLoader::MCCLoader (Config & cfg)

Constructor that takes whole XML configuration and creates component chains

6.159.2.2 Arc::MCCLoader::~~MCCLoader ()

Destructor destroys all components created by constructor

6.159.3 Member Function Documentation

6.159.3.1 `MCC* Arc::MCCLoader::operator[] (const std::string & id)`

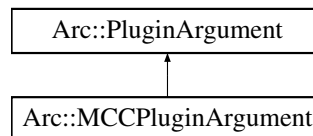
Access entry MCCs in chains. Those are components exposed for external access using 'entry' attribute

The documentation for this class was generated from the following file:

- MCCLoader.h

6.160 Arc::MCCPluginArgument Class Reference

Inheritance diagram for Arc::MCCPluginArgument:



The documentation for this class was generated from the following file:

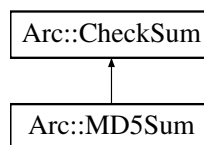
- MCC.h

6.161 Arc::MD5Sum Class Reference

Implementation of MD5 checksum.

```
#include <CheckSum.h>
```

Inheritance diagram for Arc::MD5Sum:



6.161.1 Detailed Description

Implementation of MD5 checksum.

The documentation for this class was generated from the following file:

- CheckSum.h

6.162 Arc::MemoryAllocationException Class Reference

The documentation for this class was generated from the following file:

- ByteArray.h

6.163 Arc::Message Class Reference

Object being passed through chain of MCCs.

```
#include <Message.h>
```

Public Member Functions

- **Message** (void)
- **Message** (**Message** &msg)
- **Message** (long msg_ptr_addr)
- **~Message** (void)
- **Message & operator=** (**Message** &msg)
- **MessagePayload * Payload** (void)
- **MessagePayload * Payload** (**MessagePayload** *payload)
- **MessageAttributes * Attributes** (void)
- **MessageAuth * Auth** (void)
- **MessageContext * Context** (void)
- **MessageAuthContext * AuthContext** (void)
- void **Context** (**MessageContext** *ctx)
- void **AuthContext** (**MessageAuthContext** *auth_ctx)

6.163.1 Detailed Description

Object being passed through chain of MCCs. An instance of this class refers to objects with main content (**MessagePayload** (p. 260)), authentication/authorization information (**MessageAuth** (p. 258)) and common purpose attributes (**MessageAttributes** (p. 254)). **Message** (p. 252) class does not manage pointers to objects and their content. It only serves for grouping those objects. **Message** (p. 252) objects are supposed to be processed by MCCs and Services implementing **MCCInterface** (p. 248) method process(). All objects constituting content of **Message** (p. 252) object are subject to following policies:

1. All objects created inside call to process() method using new command must be explicitly destroyed within same call using delete command with following exceptions. a) Objects which are assigned to 'response' **Message** (p. 252). b) Objects whose management is completely acquired by objects assigned to 'response' **Message** (p. 252).
2. All objects not created inside call to process() method are not explicitly destroyed within that call with following exception. a) Objects which are part of 'response'

Method returned from call to next's process() method. Unless those objects are passed further to calling process(), of course.

3. It is not allowed to make 'response' point to same objects as 'request' does on entry to process() method. That is needed to avoid double destruction of same object. (Note: if in a future such need arises it may be solved by storing additional flags in **Message** (p. 252) object).

4. It is allowed to change content of pointers of 'request' **Message** (p. 252). Calling process() method must not rely on that object to stay intact.

5. Called process() method should either fill 'response' **Message** (p. 252) with pointers to valid objects or to keep them intact. This makes it possible for calling process() to preload 'response' with valid error message.

6.163.2 Constructor & Destructor Documentation

6.163.2.1 **Arc::Message::Message (void)** [inline]

true if auth_ctx_ was created internally Dummy constructor

6.163.2.2 **Arc::Message::Message (Message & msg)** [inline]

Copy constructor. Ensures shallow copy.

6.163.2.3 **Arc::Message::Message (long msg_ptr_addr)**

Copy constructor. Used by language bindings

6.163.2.4 **Arc::Message::~Message (void)** [inline]

Destructor does not affect referred objects except those created internally

6.163.3 Member Function Documentation

6.163.3.1 **MessageAttributes* Arc::Message::Attributes (void)** [inline]

Returns a pointer to the current attributes object or creates it if no attributes object has been assigned.

6.163.3.2 **MessageAuth* Arc::Message::Auth (void)** [inline]

Returns a pointer to the current authentication/authorization object or creates it if no object has been assigned.

6.163.3.3 MessageAuthContext* Arc::Message::AuthContext (void) [inline]

Returns a pointer to the current auth* context object or creates it if no object has been assigned.

6.163.3.4 void Arc::Message::AuthContext (MessageAuthContext * auth.ctx) [inline]

Assigns auth* context object

6.163.3.5 void Arc::Message::Context (MessageContext * ctx) [inline]

Assigns message context object

6.163.3.6 MessageContext* Arc::Message::Context (void) [inline]

Returns a pointer to the current context object or creates it if no object has been assigned. Last case should happen only if first MCC (p. 242) in a chain is connectionless like one implementing UDP protocol.

6.163.3.7 Message& Arc::Message::operator= (Message & msg) [inline]

Assignment. Ensures shallow copy.

6.163.3.8 MessagePayload* Arc::Message::Payload (void) [inline]

Returns pointer to current payload or NULL if no payload assigned.

6.163.3.9 MessagePayload* Arc::Message::Payload (MessagePayload * payload) [inline]

Replaces payload with new one. Returns the old one.

The documentation for this class was generated from the following file:

- Message.h

6.164 Arc::MessageAttributes Class Reference

A class for storage of attribute values.

```
#include <MessageAttributes.h>
```

Public Member Functions

- **MessageAttributes** ()
- void **set** (const std::string &key, const std::string &value)
- void **add** (const std::string &key, const std::string &value)
- void **removeAll** (const std::string &key)
- void **remove** (const std::string &key, const std::string &value)
- int **count** (const std::string &key) const
- const std::string & **get** (const std::string &key) const
- **AttributeIterator** **getAll** (const std::string &key) const
- **AttributeIterator** **getAll** (void) const

Protected Attributes

- **AttrMap** **attributes_**

6.164.1 Detailed Description

A class for storage of attribute values. This class is used to store attributes of messages. All attribute keys and their corresponding values are stored as strings. Any key or value that is not a string must thus be represented as a string during storage. Furthermore, an attribute is usually a key-value pair with a unique key, but there may also be multiple such pairs with equal keys.

The key of an attribute is composed by the name of the **Message** (p. 252) Chain Component (**MCC** (p. 242)) which produce it and the name of the attribute itself with a colon (:) in between, i.e. `MCC_Name:Attribute_Name`. For example, the key of the "Content-Length" attribute of the HTTP **MCC** (p. 242) is thus "HTTP:Content-Length".

There are also "global attributes", which may be produced by different MCCs depending on the configuration. The keys of such attributes are NOT prefixed by the name of the producing **MCC** (p. 242). Before any new global attribute is introduced, it must be agreed upon by the core development team and added below. The global attributes decided so far are:

- `Request-URI` Identifies the service to which the message shall be sent. This attribute is produced by e.g. the HTTP **MCC** (p. 242) and used by the plexer for routing the message to the appropriate service.

6.164.2 Constructor & Destructor Documentation

6.164.2.1 `Arc::MessageAttributes::MessageAttributes ()`

The default constructor.

This is the default constructor of the **MessageAttributes** (p. 254) class. It constructs an empty object that initially contains no attributes.

6.164.3 Member Function Documentation

6.164.3.1 void Arc::MessageAttributes::add (const std::string & *key*, const std::string & *value*)

Adds a value to an attribute.

This method adds a new value to an attribute. Any previous value will be preserved, i.e. the attribute may become multiple valued.

Parameters

<i>key</i>	The key of the attribute.
<i>value</i>	The (new) value of the attribute.

6.164.3.2 int Arc::MessageAttributes::count (const std::string & *key*) const

Returns the number of values of an attribute.

Returns the number of values of an attribute that matches a certain key.

Parameters

<i>key</i>	The key of the attribute for which to count values.
------------	---

Returns

The number of values that corresponds to the key.

6.164.3.3 const std::string& Arc::MessageAttributes::get (const std::string & *key*) const

Returns the value of a single-valued attribute.

This method returns the value of a single-valued attribute. If the attribute is not single valued (i.e. there is no such attribute or it is a multiple-valued attribute) an empty string is returned.

Parameters

<i>key</i>	The key of the attribute for which to return the value.
------------	---

Returns

The value of the attribute.

6.164.3.4 AttributeIterator Arc::MessageAttributes::getAll (const std::string & *key*) const

Access the value(s) of an attribute.

This method returns an **AttributeIterator** (p. 57) that can be used to access the values of an attribute.

Parameters

<i>key</i>	The key of the attribute for which to return the values.
------------	--

Returns

An **AttributeIterator** (p. 57) for access of the values of the attribute.

6.164.3.5 `void Arc::MessageAttributes::remove (const std::string & key, const std::string & value)`

Removes one value of an attribute.

This method removes a certain value from the attribute that matches a certain key.

Parameters

<i>key</i>	The key of the attribute from which the value shall be removed.
<i>value</i>	The value to remove.

6.164.3.6 `void Arc::MessageAttributes::removeAll (const std::string & key)`

Removes all attributes with a certain key.

This method removes all attributes that match a certain key.

Parameters

<i>key</i>	The key of the attributes to remove.
------------	--------------------------------------

6.164.3.7 `void Arc::MessageAttributes::set (const std::string & key, const std::string & value)`

Sets a unique value of an attribute.

This method removes any previous value of an attribute and sets the new value as the only value.

Parameters

<i>key</i>	The key of the attribute.
<i>value</i>	The (new) value of the attribute.

6.164.4 Field Documentation

6.164.4.1 `AttrMap Arc::MessageAttributes::attributes_` `[protected]`

Internal storage of attributes.

An AttrMap (multimap) in which all attributes (key-value pairs) are stored.

The documentation for this class was generated from the following file:

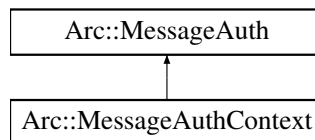
- MessageAttributes.h

6.165 Arc::MessageAuth Class Reference

Contains authenticity information, authorization tokens and decisions.

```
#include <MessageAuth.h>
```

Inheritance diagram for Arc::MessageAuth:



Public Member Functions

- void **set** (const std::string &key, **SecAttr** *value)
- void **remove** (const std::string &key)
- **SecAttr** * **get** (const std::string &key)
- **SecAttr** * **operator[]** (const std::string &key)
- bool **Export** (**SecAttrFormat** format, **XMLNode** &val) const
- **MessageAuth** * **Filter** (const std::list< std::string > &selected_keys, const std::list< std::string > &rejected_keys)

6.165.1 Detailed Description

Contains authenticity information, authorization tokens and decisions. This class only supports string keys and **SecAttr** (p. 326) values.

6.165.2 Member Function Documentation

6.165.2.1 bool Arc::MessageAuth::Export (**SecAttrFormat** *format*, **XMLNode** & *val*) const

Returns properly catenated attributes in specified format.

Content of XML node at is replaced with generated information if XML tree is empty. If tree at is not empty then **Export()** (p. 258) tries to merge generated information to already existing like everything would be generated inside same **Export()** (p. 258) method. If does not represent valid node then new XML tree is created.

6.165.2.2 `MessageAuth* Arc::MessageAuth::Filter (const std::list< std::string > & selected_keys, const std::list< std::string > & rejected_keys)`

Creates new instance of **MessageAuth** (p. 258) with attributes filtered.

In new instance all attributes with keys listed in are removed. If is not empty only corresponding attributes are transferred to new instance. Created instance does not own referred attributes. Hence parent instance must not be deleted as long as this one is in use.

The documentation for this class was generated from the following file:

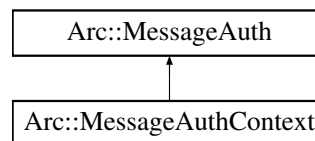
- MessageAuth.h

6.166 `Arc::MessageAuthContext` Class Reference

Handler for content of message auth* context.

```
#include <Message.h>
```

Inheritance diagram for `Arc::MessageAuthContext`:



6.166.1 Detailed Description

Handler for content of message auth* context. This class is a container for authorization and authentication information. It gets associated with **Message** (p. 252) object usually by first **MCC** (p. 242) in a chain and is kept as long as connection persists.

The documentation for this class was generated from the following file:

- Message.h

6.167 `Arc::MessageContext` Class Reference

Handler for content of message context.

```
#include <Message.h>
```

Public Member Functions

- void **Add** (const std::string &name, **MessageContextElement** *element)

6.167.1 Detailed Description

Handler for content of message context. This class is a container for objects derived from **MessageContextElement** (p. 260). It gets associated with **Message** (p. 252) object usually by first **MCC** (p. 242) in a chain and is kept as long as connection persists.

6.167.2 Member Function Documentation

6.167.2.1 void Arc::MessageContext::Add (const std::string & *name*, MessageContextElement * *element*)

Provided element is taken over by this class. It is remembered by it and destroyed when this class is destroyed.

The documentation for this class was generated from the following file:

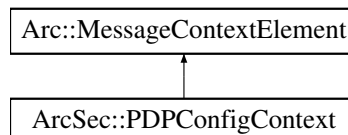
- Message.h

6.168 Arc::MessageContextElement Class Reference

Top class for elements contained in message context.

```
#include <Message.h>
```

Inheritance diagram for Arc::MessageContextElement:



6.168.1 Detailed Description

Top class for elements contained in message context. Objects of classes inherited with this one may be stored in **MessageContext** (p. 259) container.

The documentation for this class was generated from the following file:

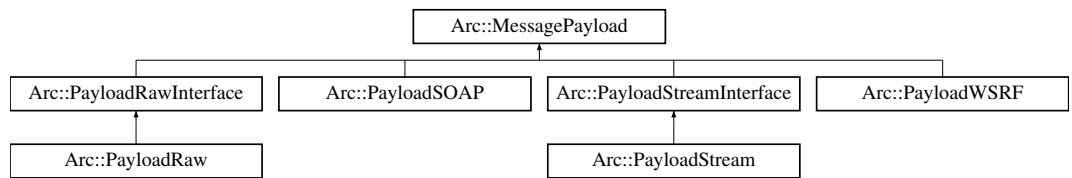
- Message.h

6.169 Arc::MessagePayload Class Reference

Base class for content of message passed through chain.

```
#include <Message.h>
```

Inheritance diagram for Arc::MessagePayload:



6.169.1 Detailed Description

Base class for content of message passed through chain. It's not intended to be used directly. Instead functional classes must be derived from it.

The documentation for this class was generated from the following file:

- Message.h

6.170 Arc::ModuleDesc Class Reference

Description of loadable module.

```
#include <Plugin.h>
```

6.170.1 Detailed Description

Description of loadable module. This class is used for reports

The documentation for this class was generated from the following file:

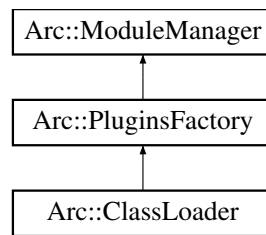
- Plugin.h

6.171 Arc::ModuleManager Class Reference

Manager of shared libraries.

```
#include <ModuleManager.h>
```

Inheritance diagram for Arc::ModuleManager:



Public Member Functions

- **ModuleManager** (XMLNode cfg)
- Glib::Module * **load** (const std::string &name, bool probe=false)
- std::string **find** (const std::string &name)
- Glib::Module * **reload** (Glib::Module *module)
- void **unload** (Glib::Module *module)
- void **unload** (const std::string &name)
- std::string **findLocation** (const std::string &name)
- bool **makePersistent** (Glib::Module *module)
- bool **makePersistent** (const std::string &name)
- void **setCfg** (XMLNode cfg)

6.171.1 Detailed Description

Manager of shared libraries. This class loads shared libraries/modules. There supposed to be created one instance of it per executable. In such circumstances it would cache handles to loaded modules and not load them multiple times.

6.171.2 Constructor & Destructor Documentation

6.171.2.1 Arc::ModuleManager::ModuleManager (XMLNode *cfg*)

Cache of handles of loaded modules Constructor. It is supposed to process correponding configuration subtree and tune module loading parameters accordingly.

6.171.3 Member Function Documentation

6.171.3.1 std::string Arc::ModuleManager::find (const std::string & *name*)

Finds loadable module by 'name' looking in same places as **load()** (p. 262) does, but does not load it.

6.171.3.2 std::string Arc::ModuleManager::findLocation (const std::string & *name*)

Finds shared library corresponding to module 'name' and returns path to it

6.171.3.3 `Glib::Module* Arc::ModuleManager::load (const std::string & name, bool probe = false)`

Finds module 'name' in cache or loads corresponding loadable module

6.171.3.4 `bool Arc::ModuleManager::makePersistent (const std::string & name)`

Make sure this module is never unloaded. Even if **unload()** (p. 263) is called.

6.171.3.5 `bool Arc::ModuleManager::makePersistent (Glib::Module * module)`

Make sure this module is never unloaded. Even if **unload()** (p. 263) is called.

6.171.3.6 `Glib::Module* Arc::ModuleManager::reload (Glib::Module * module)`

Reload module previously loaded in probe mode. New module is loaded with all symbols resolved and old module handler is unloaded. In case of error old module is not unloaded.

6.171.3.7 `void Arc::ModuleManager::setCfg (XMLNode cfg)`

Input the configuration subtree, and trigger the module loading (do almost the same as the Constructor); It is function desgined for **ClassLoader** (p. 75) to adopt the singleton pattern

6.171.3.8 `void Arc::ModuleManager::unload (const std::string & name)`

Unload module by its name

6.171.3.9 `void Arc::ModuleManager::unload (Glib::Module * module)`

Unload module by its identifier

The documentation for this class was generated from the following file:

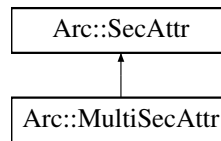
- ModuleManager.h

6.172 Arc::MultiSecAttr Class Reference

Container of multiple **SecAttr** (p. 326) attributes.

```
#include <SecAttr.h>
```

Inheritance diagram for Arc::MultiSecAttr:



Public Member Functions

- virtual **operator bool** () const
- virtual bool **Export** (**SecAttrFormat** format, **XMLNode** &val) const

6.172.1 Detailed Description

Container of multiple **SecAttr** (p. 326) attributes. This class combines multiple attributes. It's export/import methods catenate results of underlying objects. Primary meaning of this class is to serve as base for classes implementing multi level hierarchical tree-like descriptions of user identity. It may also be used for collecting information of same source or kind. Like all information extracted from X509 certificate.

6.172.2 Member Function Documentation

6.172.2.1 virtual bool **Arc::MultiSecAttr::Export** (**SecAttrFormat** *format*, **XMLNode** & *val*) const [virtual]

Convert internal structure into specified format. Returns false if format is not supported/suitable for this attribute. XML node referenced by is turned into top level element of specified format.

Reimplemented from **Arc::SecAttr** (p. 327).

6.172.2.2 virtual **Arc::MultiSecAttr::operator bool** () const [virtual]

This function should return false if the value is to be considered null, e.g. if it hasn't been set or initialized. In other cases it should return true.

Reimplemented from **Arc::SecAttr** (p. 327).

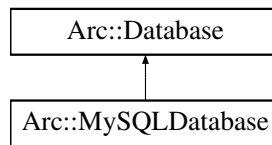
The documentation for this class was generated from the following file:

- SecAttr.h

6.173 Arc::MySQLDatabase Class Reference

```
#include <MysqlWrapper.h>
```

Inheritance diagram for Arc::MySQLDatabase:



Public Member Functions

- virtual bool **connect** (std::string &dbname, std::string &user, std::string &password)
- virtual bool **isconnected** () const
- virtual void **close** ()
- virtual bool **enable_ssl** (const std::string keyfile="", const std::string certfile="", const std::string cafile="", const std::string capath="")
- virtual bool **shutdown** ()

6.173.1 Detailed Description

Implement the database accessing interface in **DBInterface.h** (p. ??) by using mysql client library for accessing mysql database

6.173.2 Member Function Documentation

6.173.2.1 virtual void Arc::MySQLDatabase::close () [virtual]

Close the connection with database server

Implements **Arc::Database** (p. 110).

6.173.2.2 virtual bool Arc::MySQLDatabase::connect (std::string & dbname, std::string & user, std::string & password) [virtual]

Do connection with database server

Parameters

<i>dbname</i>	The database name which will be used.
<i>user</i>	The username which will be used to access database.
<i>password</i>	The password which will be used to access database.

Implements **Arc::Database** (p. 110).

6.173.2.3 `virtual bool Arc::MySQLDatabase::enable_ssl (const std::string keyfile = " ", const std::string certfile = " ", const std::string cafile = " ", const std::string capath = " ") [virtual]`

Enable ssl communication for the connection

Parameters

<i>keyfile</i>	The location of key file.
<i>certfile</i>	The location of certificate file.
<i>cafile</i>	The location of ca file.
<i>capath</i>	The location of ca directory

Implements **Arc::Database** (p. 110).

6.173.2.4 `virtual bool Arc::MySQLDatabase::isconnected () const [inline, virtual]`

Get the connection status

Implements **Arc::Database** (p. 110).

6.173.2.5 `virtual bool Arc::MySQLDatabase::shutdown () [virtual]`

Ask database server to shutdown

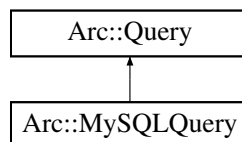
Implements **Arc::Database** (p. 111).

The documentation for this class was generated from the following file:

- MysqlWrapper.h

6.174 Arc::MySQLQuery Class Reference

Inheritance diagram for Arc::MySQLQuery:



Public Member Functions

- virtual int **get_num_columns** ()
- virtual int **get_num_rows** ()
- virtual bool **execute** (const std::string &sqlstr)

- virtual QueryRowResult **get_row** (int row_number) const
- virtual QueryRowResult **get_row** () const
- virtual std::string **get_row_field** (int row_number, std::string &field_name)
- virtual bool **get_array** (std::string &sqlstr, QueryArrayResult &result, std::vector< std::string > &arguments)

6.174.1 Member Function Documentation

6.174.1.1 virtual bool Arc::MySQLQuery::execute (const std::string & *sqlstr*) [virtual]

Execute the query

Parameters

<i>sqlstr</i>	The sql sentence used to query
---------------	--------------------------------

Implements **Arc::Query** (p. 307).

6.174.1.2 virtual bool Arc::MySQLQuery::get_array (std::string & *sqlstr*, QueryArrayResult & *result*, std::vector< std::string > & *arguments*) [virtual]

Query (p. 306) the database by using some parameters into sql sentence e.g. "select table.value from table where table.name = ?"

Parameters

<i>sqlstr</i>	The sql sentence with some parameters marked with "?".
<i>result</i>	The result in an array which includes all of the value in query result.
<i>arguments</i>	The argument list which should exactly correspond with the parametes in sql sentence.

Implements **Arc::Query** (p. 307).

6.174.1.3 virtual int Arc::MySQLQuery::get_num_columns () [virtual]

Get the colum number in the query result

Implements **Arc::Query** (p. 307).

6.174.1.4 virtual int Arc::MySQLQuery::get_num_rows () [virtual]

Get the row number in the query result

Implements **Arc::Query** (p. 308).

6.174.1.5 `virtual QueryRowResult Arc::MySQLQuery::get_row (int row_number) const`
`[virtual]`

Get the value of one row in the query result

Parameters

<i>row_number</i>	The number of the row
-------------------	-----------------------

Returns

A vector includes all the values in the row

Implements **Arc::Query** (p. 308).

6.174.1.6 `virtual QueryRowResult Arc::MySQLQuery::get_row () const` `[virtual]`

Get the value of one row in the query result, the row number will be automatically increased each time the method is called

Implements **Arc::Query** (p. 308).

6.174.1.7 `virtual std::string Arc::MySQLQuery::get_row_field (int row_number, std::string & field_name)` `[virtual]`

Get the value of one specific field in one specific row

Parameters

<i>row_number</i>	The row number inside the query result
<i>field_name</i>	The field name for the value which will be return

Returns

The value of the specified filed in the specified row

Implements **Arc::Query** (p. 308).

The documentation for this class was generated from the following file:

- MysqlWrapper.h

6.175 Arc::NotificationType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.176 Arc::NS Class Reference

Public Member Functions

- **NS** (void)
- **NS** (const char *prefix, const char *uri)
- **NS** (const char *nslist[][2])

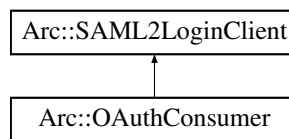
The documentation for this class was generated from the following file:

- XMLNode.h

6.177 Arc::OAuthConsumer Class Reference

```
#include <OAuthConsumer.h>
```

Inheritance diagram for Arc::OAuthConsumer:



Public Member Functions

- **OAuthConsumer** (const **MCCConfig** cfg, const **URL** url, std::list< std::string > idp_stack)
- **MCC_Status parseDN** (std::string *dn)
- **MCC_Status approveCSR** (const std::string approve_page)
- **MCC_Status pushCSR** (const std::string b64_pub_key, const std::string pub_key_hash, std::string *approve_page)
- **MCC_Status storeCert** (const std::string cert_path, const std::string auth_token, const std::string b64_dn)

Protected Member Functions

- **MCC_Status processLogin** (const std::string username="", const std::string password="")

6.177.1 Detailed Description

The OAuth functionality depends on the availability of the liboauth C-bindings library

6.177.2 Constructor & Destructor Documentation

6.177.2.1 Arc::OAuthConsumer::OAuthConsumer (const MCCCConfig *cfg*, const URL *url*, std::list< std::string > *idp_stack*)

Construct an OAuth consumer with *url* as service provider. *idp_name* is currently ignored, since the idp to which the SAML2 redirect will take place is presently a hard-coded value on the SAML2 SP side. This is expected to change in the future.

6.177.3 Member Function Documentation

6.177.3.1 MCC_Status Arc::OAuthConsumer::approveCSR (const std::string *approve_page*) [virtual]

Unsupported placeholder function until Confusa supports OAuth.

Implements Arc::SAML2LoginClient (p. 319).

6.177.3.2 MCC_Status Arc::OAuthConsumer::parseDN (std::string * *dn*) [virtual]

Unsupported placeholder function until Confusa supports OAuth.

Implements Arc::SAML2LoginClient (p. 319).

6.177.3.3 MCC_Status Arc::OAuthConsumer::processLogin (const std::string *username* = "", const std::string *password* = "") [protected, virtual]

Main function performing all the OAuth login steps. Username and password will be ignored.

Implements Arc::SAML2LoginClient (p. 320).

6.177.3.4 MCC_Status Arc::OAuthConsumer::pushCSR (const std::string *b64_pub_key*, const std::string *pub_key_hash*, std::string * *approve_page*) [virtual]

Unsupported placeholder function until Confusa supports OAuth.

Implements Arc::SAML2LoginClient (p. 319).

6.177.3.5 MCC_Status Arc::OAuthConsumer::storeCert (const std::string *cert_path*, const std::string *auth_token*, const std::string *b64_dn*) [virtual]

Unsupported placeholder function until Confusa supports OAuth.

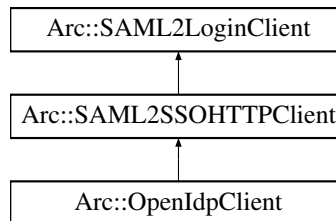
Implements Arc::SAML2LoginClient (p. 319).

The documentation for this class was generated from the following file:

- OAuthConsumer.h

6.178 Arc::OpenIdpClient Class Reference

Inheritance diagram for Arc::OpenIdpClient:



Protected Member Functions

- **MCC_Status processIdPLogin** (const std::string username, const std::string password)
- **MCC_Status processConsent** ()
- **MCC_Status processIdP2Confusa** ()

6.178.1 Member Function Documentation

6.178.1.1 MCC_Status Arc::OpenIdpClient::processConsent () [protected, virtual]

If the IdP has a consent module and the user has not saved her consent, this method will ask the user for consent to transmission of her data to Confusa

Implements **Arc::SAML2SSOHTTPClient** (p. 321).

6.178.1.2 MCC_Status Arc::OpenIdpClient::processIdP2Confusa () [protected, virtual]

Redirects the user back from identity provider to the Confusa SP

Implements **Arc::SAML2SSOHTTPClient** (p. 321).

6.178.1.3 MCC_Status Arc::OpenIdpClient::processIdPLogin (const std::string *username*, const std::string *password*) [protected, virtual]

Actual identity provider parsers for next three methods implemented in subdirectory idp/

Parse identity provider login page and submit username and password in the previous way

Implements **Arc::SAML2SSOHTTPClient** (p. 322).

The documentation for this class was generated from the following file:

- OpenIdpClient.h

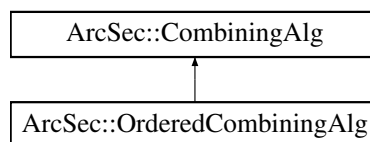
6.179 Arc::OptionParser Class Reference

The documentation for this class was generated from the following file:

- OptionParser.h

6.180 ArcSec::OrderedCombiningAlg Class Reference

Inheritance diagram for ArcSec::OrderedCombiningAlg:



The documentation for this class was generated from the following file:

- OrderedAlg.h

6.181 passwd Struct Reference

The documentation for this struct was generated from the following file:

- win32.h

6.182 Arc::PathIterator Class Reference

Class to iterate through elements of path.

```
#include <URL.h>
```

Public Member Functions

- **PathIterator** (const std::string &path, bool end=false)
- **PathIterator** & **operator++** ()
- **PathIterator** & **operator--** ()
- **operator bool** () const
- std::string **operator*** () const
- std::string **Rest** () const

6.182.1 Detailed Description

Class to iterate through elements of path.

6.182.2 Constructor & Destructor Documentation

6.182.2.1 `Arc::PathIterator::PathIterator (const std::string & path, bool end = false)`

Constructor accepts path and stores it internally. If end is set to false iterator is pointing at first element in path. Otherwise selected element is one before last.

6.182.3 Member Function Documentation

6.182.3.1 `Arc::PathIterator::operator bool () const`

Return false when iterator moved outside path elements

6.182.3.2 `std::string Arc::PathIterator::operator* () const`

Returns part of initial path from first till and including current

6.182.3.3 `PathIterator& Arc::PathIterator::operator++ ()`

Advances iterator to point at next path element

6.182.3.4 `PathIterator& Arc::PathIterator::operator-- ()`

Moves iterator to element before current

6.182.3.5 `std::string Arc::PathIterator::Rest () const`

Returns part of initial path from one after current till end

The documentation for this class was generated from the following file:

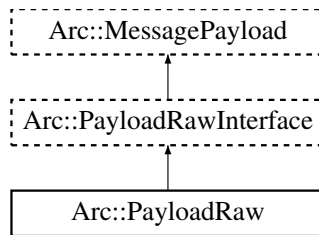
- `URL.h`

6.183 Arc::PayloadRaw Class Reference

Raw byte multi-buffer.

```
#include <PayloadRaw.h>
```

Inheritance diagram for Arc::PayloadRaw:



Public Member Functions

- **PayloadRaw** (void)
- virtual **~PayloadRaw** (void)
- virtual char **operator[]** (Size_t pos) const
- virtual char * **Content** (Size_t pos=-1)
- virtual Size_t **Size** (void) const
- virtual char * **Insert** (Size_t pos=0, Size_t size=0)
- virtual char * **Insert** (const char *s, Size_t pos=0, Size_t size=-1)
- virtual char * **Buffer** (unsigned int num=0)
- virtual Size_t **BufferSize** (unsigned int num=0) const
- virtual Size_t **BufferPos** (unsigned int num=0) const
- virtual bool **Truncate** (Size_t size)

6.183.1 Detailed Description

Raw byte multi-buffer. This is implementation of **PayloadRawInterface** (p. 276). Buffers are memory blocks logically placed one after another.

6.183.2 Constructor & Destructor Documentation

6.183.2.1 Arc::PayloadRaw::PayloadRaw (void) [inline]

List of handled buffers. Constructor. Created object contains no buffers.

6.183.2.2 virtual Arc::PayloadRaw::~~PayloadRaw (void) [virtual]

Destructor. Frees allocated buffers.

6.183.3 Member Function Documentation

6.183.3.1 virtual char* Arc::PayloadRaw::Buffer (unsigned int num = 0) [virtual]

Returns pointer to num'th buffer

Implements **Arc::PayloadRawInterface** (p. 277).

6.183.3.2 `virtual Size_t Arc::PayloadRaw::BufferPos (unsigned int num = 0) const`
`[virtual]`

Returns position of *num*'th buffer

Implements **Arc::PayloadRawInterface** (p. 277).

6.183.3.3 `virtual Size_t Arc::PayloadRaw::BufferSize (unsigned int num = 0) const`
`[virtual]`

Returns length of *num*'th buffer

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.4 `virtual char* Arc::PayloadRaw::Content (Size_t pos = -1)` `[virtual]`

Get pointer to buffer content at global position '*pos*'. By default to beginning of main buffer whatever that means.

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.5 `virtual char* Arc::PayloadRaw::Insert (Size_t pos = 0, Size_t size = 0)`
`[virtual]`

Create new buffer at global position '*pos*' of size '*size*'.

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.6 `virtual char* Arc::PayloadRaw::Insert (const char * s, Size_t pos = 0, Size_t size = -1)` `[virtual]`

Create new buffer at global position '*pos*' of size '*size*'. Created buffer is filled with content of memory at '*s*'. If '*size*' is negative content at '*s*' is expected to be null-terminated.

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.7 `virtual char Arc::PayloadRaw::operator[] (Size_t pos) const` `[virtual]`

Returns content of byte at specified position. Specified position '*pos*' is treated as global one and goes through all buffers placed one after another.

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.8 `virtual Size_t Arc::PayloadRaw::Size (void) const` `[virtual]`

Returns logical size of whole structure.

Implements **Arc::PayloadRawInterface** (p. 278).

6.183.3.9 virtual bool Arc::PayloadRaw::Truncate (Size_t size) [virtual]

Change size of stored information. If size exceeds end of allocated buffer, buffers are not re-allocated, only logical size is extended. Buffers with location behind new size are deallocated.

Implements **Arc::PayloadRawInterface** (p. 279).

The documentation for this class was generated from the following file:

- PayloadRaw.h

6.184 Arc::PayloadRawBuf Struct Reference**Data Fields**

- int **size**
- int **length**
- bool **allocated**

6.184.1 Field Documentation**6.184.1.1** bool Arc::PayloadRawBuf::allocated

size of used memory - size of buffer

6.184.1.2 int Arc::PayloadRawBuf::length

size of allocated memory

6.184.1.3 int Arc::PayloadRawBuf::size

pointer to buffer in memory

The documentation for this struct was generated from the following file:

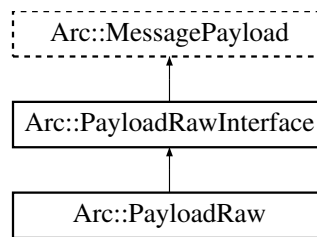
- PayloadRaw.h

6.185 Arc::PayloadRawInterface Class Reference

Random Access Payload for **Message** (p. 252) objects.

```
#include <PayloadRaw.h>
```

Inheritance diagram for Arc::PayloadRawInterface:



Public Member Functions

- virtual char **operator[]** (Size_t pos) const =0
- virtual char * **Content** (Size_t pos=-1)=0
- virtual Size_t **Size** (void) const =0
- virtual char * **Insert** (Size_t pos=0, Size_t size=0)=0
- virtual char * **Insert** (const char *s, Size_t pos=0, Size_t size=-1)=0
- virtual char * **Buffer** (unsigned int num)=0
- virtual Size_t **BufferSize** (unsigned int num) const =0
- virtual Size_t **BufferPos** (unsigned int num) const =0
- virtual bool **Truncate** (Size_t size)=0

6.185.1 Detailed Description

Random Access Payload for **Message** (p. 252) objects. This class is a virtual interface for managing **Message** (p. 252) payload with arbitrarily accessible content. Inheriting classes are supposed to implement memory-resident or memory-mapped content made of optionally multiple chunks/buffers. Every buffer has own size and offset. This class is purely virtual.

6.185.2 Member Function Documentation

6.185.2.1 virtual char* Arc::PayloadRawInterface::Buffer (unsigned int *num*) [pure virtual]

Returns pointer to num'th buffer

Implemented in **Arc::PayloadRaw** (p. 274).

6.185.2.2 virtual Size_t Arc::PayloadRawInterface::BufferPos (unsigned int *num*) const [pure virtual]

Returns position of num'th buffer

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.3 `virtual Size_t Arc::PayloadRawInterface::BufferSize (unsigned int num) const`
[pure virtual]

Returns length of num'th buffer

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.4 `virtual char* Arc::PayloadRawInterface::Content (Size_t pos = -1)` [pure virtual]

Get pointer to buffer content at global position 'pos'. By default to beginning of main buffer whatever that means.

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.5 `virtual char* Arc::PayloadRawInterface::Insert (Size_t pos = 0, Size_t size = 0)`
[pure virtual]

Create new buffer at global position 'pos' of size 'size'.

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.6 `virtual char* Arc::PayloadRawInterface::Insert (const char * s, Size_t pos = 0, Size_t size = -1)` [pure virtual]

Create new buffer at global position 'pos' of size 'size'. Created buffer is filled with content of memory at 's'. If 'size' is negative content at 's' is expected to be null-terminated.

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.7 `virtual char Arc::PayloadRawInterface::operator[] (Size_t pos) const` [pure virtual]

Returns content of byte at specified position. Specified position 'pos' is treated as global one and goes through all buffers placed one after another.

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.8 `virtual Size_t Arc::PayloadRawInterface::Size (void) const` [pure virtual]

Returns logical size of whole structure.

Implemented in **Arc::PayloadRaw** (p. 275).

6.185.2.9 `virtual bool Arc::PayloadRawInterface::Truncate (Size_t size) [pure virtual]`

Change size of stored information. If size exceeds end of allocated buffer, buffers are not re-allocated, only logical size is extended. Buffers with location behind new size are deallocated.

Implemented in **Arc::PayloadRaw** (p. 276).

The documentation for this class was generated from the following file:

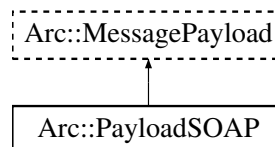
- PayloadRaw.h

6.186 Arc::PayloadSOAP Class Reference

Payload of **Message** (p. 252) with SOAP content.

```
#include <PayloadSOAP.h>
```

Inheritance diagram for Arc::PayloadSOAP:



Public Member Functions

- **PayloadSOAP** (const **NS** &ns, bool fault=false)
- **PayloadSOAP** (const SOAPEnvelope &soap)
- **PayloadSOAP** (const **MessagePayload** &source)

6.186.1 Detailed Description

Payload of **Message** (p. 252) with SOAP content. This class combines **MessagePayload** (p. 260) with SOAPEnvelope to make it possible to pass SOAP messages through **MCC** (p. 242) chain.

6.186.2 Constructor & Destructor Documentation

6.186.2.1 `Arc::PayloadSOAP::PayloadSOAP (const NS & ns, bool fault = false)`

Constructor - creates new **Message** (p. 252) payload

6.186.2.2 Arc::PayloadSOAP::PayloadSOAP (const SOAPEnvelope & soap)

Constructor - creates **Message** (p. 252) payload from SOAP document. Provided SOAP document is copied to new object.

6.186.2.3 Arc::PayloadSOAP::PayloadSOAP (const MessagePayload & source)

Constructor - creates SOAP message from payload. **PayloadRawInterface** (p. 276) and derived classes are supported.

The documentation for this class was generated from the following file:

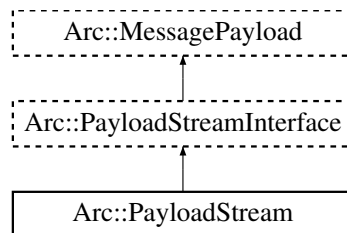
- PayloadSOAP.h

6.187 Arc::PayloadStream Class Reference

POSIX handle as Payload.

```
#include <PayloadStream.h>
```

Inheritance diagram for Arc::PayloadStream:



Public Member Functions

- **PayloadStream** (int h=-1)
- virtual **~PayloadStream** (void)
- virtual bool **Get** (char *buf, int &size)
- virtual bool **Get** (std::string &buf)
- virtual std::string **Get** (void)
- virtual bool **Put** (const char *buf, Size_t size)
- virtual bool **Put** (const std::string &buf)
- virtual bool **Put** (const char *buf)
- virtual **operator bool** (void)
- virtual bool **operator!** (void)
- virtual int **Timeout** (void) const
- virtual void **Timeout** (int to)
- virtual Size_t **Pos** (void) const
- virtual Size_t **Size** (void) const
- virtual Size_t **Limit** (void) const

Protected Attributes

- int **handle_**
- bool **seekable_**

6.187.1 Detailed Description

POSIX handle as Payload. This is an implemetation of **PayloadStreamInterface** (p. 283) for generic POSIX handle.

6.187.2 Constructor & Destructor Documentation

6.187.2.1 **Arc::PayloadStream::PayloadStream (int *h* = -1)**

true if lseek operation is applicable to open handle Constructor. Attaches to already open handle. Handle is not managed by this class and must be closed by external code.

6.187.2.2 **virtual Arc::PayloadStream::~~PayloadStream (void)** [inline, virtual]

Destructor.

6.187.3 Member Function Documentation

6.187.3.1 **virtual bool Arc::PayloadStream::Get (char * *buf*, int & *size*)** [virtual]

Extracts information from stream up to 'size' bytes. 'size' contains number of read bytes on exit. Returns true in case of success.

Implements **Arc::PayloadStreamInterface** (p. 284).

6.187.3.2 **virtual bool Arc::PayloadStream::Get (std::string & *buf*)** [virtual]

Read as many as possible (sane amount) of bytes into buf.

Implements **Arc::PayloadStreamInterface** (p. 284).

6.187.3.3 **virtual std::string Arc::PayloadStream::Get (void)** [inline, virtual]

Read as many as possible (sane amount) of bytes.

Implements **Arc::PayloadStreamInterface** (p. 285).

References Get().

Referenced by Get().

6.187.3.4 `virtual Size_t Arc::PayloadStream::Limit (void) const [inline, virtual]`

Returns position at which stream reading will stop if supported. That may be not same as **Size()** (p.283) if instance is meant to provide access to only part of underlying object.

Implements **Arc::PayloadStreamInterface** (p.285).

6.187.3.5 `virtual Arc::PayloadStream::operator bool (void) [inline, virtual]`

Returns true if stream is valid.

Implements **Arc::PayloadStreamInterface** (p.285).

References `handle_`.

6.187.3.6 `virtual bool Arc::PayloadStream::operator! (void) [inline, virtual]`

Returns true if stream is invalid.

Implements **Arc::PayloadStreamInterface** (p.285).

References `handle_`.

6.187.3.7 `virtual Size_t Arc::PayloadStream::Pos (void) const [inline, virtual]`

Returns current position in stream if supported.

Implements **Arc::PayloadStreamInterface** (p.285).

6.187.3.8 `virtual bool Arc::PayloadStream::Put (const char * buf, Size_t size) [virtual]`

Push 'size' bytes from 'buf' into stream. Returns true on success.

Implements **Arc::PayloadStreamInterface** (p.285).

6.187.3.9 `virtual bool Arc::PayloadStream::Put (const char * buf) [inline, virtual]`

Push null terminated information from 'buf' into stream. Returns true on success.

Implements **Arc::PayloadStreamInterface** (p.285).

References `Put()`.

Referenced by `Put()`.

6.187.3.10 `virtual bool Arc::PayloadStream::Put (const std::string & buf) [inline, virtual]`

Push information from 'buf' into stream. Returns true on success.

Implements **Arc::PayloadStreamInterface** (p. 286).

References **Put()**.

Referenced by **Put()**.

6.187.3.11 `virtual Size_t Arc::PayloadStream::Size (void) const` [inline, virtual]

Returns size of underlying object if supported.

Implements **Arc::PayloadStreamInterface** (p. 286).

6.187.3.12 `virtual int Arc::PayloadStream::Timeout (void) const` [inline, virtual]

Query (p. 306) current timeout for **Get()** (p. 281) and **Put()** (p. 282) operations.

Implements **Arc::PayloadStreamInterface** (p. 286).

6.187.3.13 `virtual void Arc::PayloadStream::Timeout (int to)` [inline, virtual]

Set current timeout for **Get()** (p. 281) and **Put()** (p. 282) operations.

Implements **Arc::PayloadStreamInterface** (p. 286).

6.187.4 Field Documentation

6.187.4.1 `int Arc::PayloadStream::handle_` [protected]

Timeout for read/write operations

Referenced by operator **bool()**, and operator **!()**.

6.187.4.2 `bool Arc::PayloadStream::seekable_` [protected]

Handle for operations

The documentation for this class was generated from the following file:

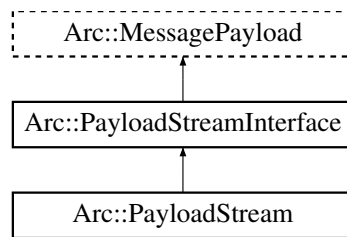
- PayloadStream.h

6.188 Arc::PayloadStreamInterface Class Reference

Stream-like Payload for **Message** (p. 252) object.

```
#include <PayloadStream.h>
```

Inheritance diagram for **Arc::PayloadStreamInterface**:



Public Member Functions

- virtual bool **Get** (char *buf, int &size)=0
- virtual bool **Get** (std::string &buf)=0
- virtual std::string **Get** (void)=0
- virtual bool **Put** (const char *buf, Size_t size)=0
- virtual bool **Put** (const std::string &buf)=0
- virtual bool **Put** (const char *buf)=0
- virtual **operator bool** (void)=0
- virtual bool **operator!** (void)=0
- virtual int **Timeout** (void) const =0
- virtual void **Timeout** (int to)=0
- virtual Size_t **Pos** (void) const =0
- virtual Size_t **Size** (void) const =0
- virtual Size_t **Limit** (void) const =0

6.188.1 Detailed Description

Stream-like Payload for **Message** (p. 252) object. This class is a virtual interface for managing stream-like source and destination. It's supposed to be passed through **MCC** (p. 242) chain as payload of **Message** (p. 252). It must be treated by MCCs and Services as dynamic payload. This class is purely virtual.

6.188.2 Member Function Documentation

6.188.2.1 virtual bool Arc::PayloadStreamInterface::Get (char * buf, int & size) [pure virtual]

Extracts information from stream up to 'size' bytes. 'size' contains number of read bytes on exit. Returns true in case of success.

Implemented in **Arc::PayloadStream** (p. 281).

6.188.2.2 virtual bool Arc::PayloadStreamInterface::Get (std::string & buf) [pure virtual]

Read as many as possible (sane amount) of bytes into buf.

Implemented in **Arc::PayloadStream** (p. 281).

6.188.2.3 `virtual std::string Arc::PayloadStreamInterface::Get (void) [pure virtual]`

Read as many as possible (sane amount) of bytes.

Implemented in **Arc::PayloadStream** (p. 281).

6.188.2.4 `virtual Size_t Arc::PayloadStreamInterface::Limit (void) const [pure virtual]`

Returns position at which stream reading will stop if supported. That may be not same as **Size()** (p. 286) if instance is meant to provide access to only part of underlying object.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.5 `virtual Arc::PayloadStreamInterface::operator bool (void) [pure virtual]`

Returns true if stream is valid.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.6 `virtual bool Arc::PayloadStreamInterface::operator! (void) [pure virtual]`

Returns true if stream is invalid.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.7 `virtual Size_t Arc::PayloadStreamInterface::Pos (void) const [pure virtual]`

Returns current position in stream if supported.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.8 `virtual bool Arc::PayloadStreamInterface::Put (const char * buf, Size_t size) [pure virtual]`

Push 'size' bytes from 'buf' into stream. Returns true on success.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.9 `virtual bool Arc::PayloadStreamInterface::Put (const char * buf) [pure virtual]`

Push null terminated information from 'buf' into stream. Returns true on success.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.10 `virtual bool Arc::PayloadStreamInterface::Put (const std::string & buf) [pure virtual]`

Push information from 'buf' into stream. Returns true on success.

Implemented in **Arc::PayloadStream** (p. 282).

6.188.2.11 `virtual Size_t Arc::PayloadStreamInterface::Size (void) const [pure virtual]`

Returns size of underlying object if supported.

Implemented in **Arc::PayloadStream** (p. 283).

6.188.2.12 `virtual int Arc::PayloadStreamInterface::Timeout (void) const [pure virtual]`

Query (p. 306) current timeout for **Get()** (p. 285) and **Put()** (p. 285) operations.

Implemented in **Arc::PayloadStream** (p. 283).

6.188.2.13 `virtual void Arc::PayloadStreamInterface::Timeout (int to) [pure virtual]`

Set current timeout for **Get()** (p. 285) and **Put()** (p. 285) operations.

Implemented in **Arc::PayloadStream** (p. 283).

The documentation for this class was generated from the following file:

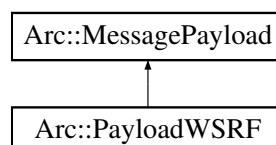
- PayloadStream.h

6.189 Arc::PayloadWSRF Class Reference

This class combines **MessagePayload** (p. 260) with **WSRF** (p. 431).

```
#include <PayloadWSRF.h>
```

Inheritance diagram for Arc::PayloadWSRF:



Public Member Functions

- **PayloadWSRF** (const SOAPEnvelope &soap)

- **PayloadWSRF** (**WSRF** &wsrp)
- **PayloadWSRF** (const **MessagePayload** &source)

6.189.1 Detailed Description

This class combines **MessagePayload** (p. 260) with **WSRF** (p. 431). It's intention is to make it possible to pass **WSRF** (p. 431) messages through **MCC** (p. 242) chain as one more Payload type.

6.189.2 Constructor & Destructor Documentation

6.189.2.1 **Arc::PayloadWSRF::PayloadWSRF** (const **SOAPEnvelope** & *soap*)

Constructor - creates **Message** (p. 252) payload from SOAP message. Returns invalid **WSRF** (p. 431) if SOAP does not represent WS-ResourceProperties

6.189.2.2 **Arc::PayloadWSRF::PayloadWSRF** (**WSRF** & *wsrp*)

Constructor - creates **Message** (p. 252) payload with acquired **WSRF** (p. 431) message. **WSRF** (p. 431) message will be destroyed by destructor of this object.

6.189.2.3 **Arc::PayloadWSRF::PayloadWSRF** (const **MessagePayload** & *source*)

Constructor - creates **WSRF** (p. 431) message from payload. All classes derived from **SOAPEnvelope** are supported.

The documentation for this class was generated from the following file:

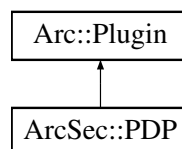
- PayloadWSRF.h

6.190 ArcSec::PDP Class Reference

Base class for **Policy** (p. 300) Decision Point plugins.

```
#include <PDP.h>
```

Inheritance diagram for ArcSec::PDP:



6.190.1 Detailed Description

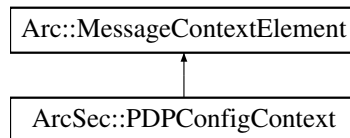
Base class for **Policy** (p. 300) Decision Point plugins. This virtual class defines method `isPermitted()` which processes security related information/attributes in `Message` and makes security decision - permit (true) or deny (false). Configuration of **PDP** (p. 287) is consumed during creation of instance through XML subtree fed to constructor.

The documentation for this class was generated from the following file:

- `PDP.h`

6.191 ArcSec::PDPCfgContext Class Reference

Inheritance diagram for `ArcSec::PDPCfgContext`:

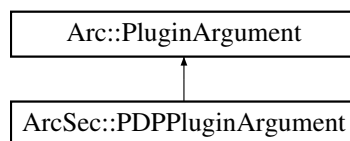


The documentation for this class was generated from the following file:

- `PDP.h`

6.192 ArcSec::PDPPluginArgument Class Reference

Inheritance diagram for `ArcSec::PDPPluginArgument`:



The documentation for this class was generated from the following file:

- `PDP.h`

6.193 Arc::Period Class Reference

Public Member Functions

- `Period ()`

- **Period** (time_t)
- **Period** (time_t seconds, uint32_t nanoseconds)
- **Period** (const std::string &, PeriodBase base=PeriodSeconds)
- **Period & operator=** (time_t)
- **Period & operator=** (const **Period** &)
- void **SetPeriod** (time_t)
- time_t **GetPeriod** () const
- const sigc::slot< const char * > * **istr** () const
- **operator std::string** () const
- bool **operator<** (const **Period** &) const
- bool **operator>** (const **Period** &) const
- bool **operator<=** (const **Period** &) const
- bool **operator>=** (const **Period** &) const
- bool **operator==** (const **Period** &) const
- bool **operator!=** (const **Period** &) const

6.193.1 Constructor & Destructor Documentation

6.193.1.1 Arc::Period::Period ()

Default constructor. The period is set to 0 length.

6.193.1.2 Arc::Period::Period (time_t)

Constructor that takes a time_t variable and stores it.

6.193.1.3 Arc::Period::Period (time_t seconds, uint32_t nanoseconds)

Constructor that takes seconds and nanoseconds and stores them.

6.193.1.4 Arc::Period::Period (const std::string & , PeriodBase base =PeriodSeconds)

Constructor that tries to convert a string.

6.193.2 Member Function Documentation

6.193.2.1 time_t Arc::Period::GetPeriod () const

gets the period

6.193.2.2 const sigc::slot<const char*>* Arc::Period::istr () const

For use with **IString** (p. 210)

6.193.2.3 Arc::Period::operator std::string () const

Returns a string representation of the period.

6.193.2.4 bool Arc::Period::operator!= (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.5 bool Arc::Period::operator< (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.6 bool Arc::Period::operator<= (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.7 Period& Arc::Period::operator= (time_t)

Assignment operator from a time_t.

6.193.2.8 Period& Arc::Period::operator= (const Period &)

Assignment operator from a **Period** (p. 288).

6.193.2.9 bool Arc::Period::operator== (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.10 bool Arc::Period::operator> (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.11 bool Arc::Period::operator>= (const Period &) const

Comparing two **Period** (p. 288) objects.

6.193.2.12 void Arc::Period::SetPeriod (time_t)

sets the period

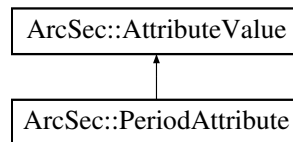
The documentation for this class was generated from the following file:

- DateTime.h

6.194 ArcSec::PeriodAttribute Class Reference

```
#include <DateTimeAttribute.h>
```

Inheritance diagram for ArcSec::PeriodAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.194.1 Detailed Description

Formate: datetime/"duration datetime"/"datetime duration"/"datetime

6.194.2 Member Function Documentation

6.194.2.1 virtual std::string ArcSec::PeriodAttribute::encode () [virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.194.2.2 virtual bool ArcSec::PeriodAttribute::equal (**AttributeValue** * value, bool check_id =true) [virtual]

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.194.2.3 virtual std::string ArcSec::PeriodAttribute::getId () [inline, virtual]

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.194.2.4 `virtual std::string ArcSec::PeriodAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

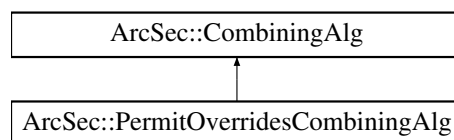
- DateTimeAttribute.h

6.195 ArcSec::PermitOverridesCombiningAlg Class Reference

Implement the "Permit-Overrides" algorithm.

```
#include <PermitOverridesAlg.h>
```

Inheritance diagram for ArcSec::PermitOverridesCombiningAlg:



Public Member Functions

- virtual Result **combine** (EvaluationCtx *ctx, std::list< Policy * > policies)
- virtual const std::string & **getalgId** (void) const

6.195.1 Detailed Description

Implement the "Permit-Overrides" algorithm. Permit-Overrides, scans the policy set which is given as the parameters of "combine" method, if gets "permit" result from any policy, then stops scanning and gives "permit" as result, otherwise gives "deny".

6.195.2 Member Function Documentation

6.195.2.1 `virtual Result ArcSec::PermitOverridesCombiningAlg::combine (EvaluationCtx * ctx, std::list< Policy * > policies) [virtual]`

If there is one policy which return positive evaluation result, then omit the other policies and return DECISION_PERMIT

Parameters

<i>ctx</i>	This object contains request information which will be used to evaluated against policy.
<i>policies</i>	This is a container which contains policy objects.

Returns

The combined result according to the algorithm.

Implements **ArcSec::CombiningAlg** (p. 83).

6.195.2.2 `virtual const std::string& ArcSec::PermitOverridesCombiningAlg::getalgId (void)`
`const [inline, virtual]`

Get the identifier

Implements **ArcSec::CombiningAlg** (p. 83).

The documentation for this class was generated from the following file:

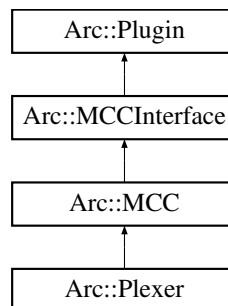
- PermitOverridesAlg.h

6.196 Arc::Plexer Class Reference

The **Plexer** (p. 293) class, used for routing messages to services.

```
#include <Plexer.h>
```

Inheritance diagram for Arc::Plexer:

**Public Member Functions**

- **Plexer** (**Config** *cfg)
- virtual **~Plexer** ()
- virtual void **Next** (**MCCInterface** *next, const std::string &label)
- virtual **MCC_Status** **process** (**Message** &request, **Message** &response)

Static Public Attributes

- static **Logger** **logger**

6.196.1 Detailed Description

The **Plexer** (p. 293) class, used for routing messages to services. This is the **Plexer** (p. 293) class. Its purpose is to route incoming messages to appropriate Services and **MCC** (p. 242) chains.

6.196.2 Constructor & Destructor Documentation

6.196.2.1 Arc::Plexer::Plexer (Config * *cfg*)

The constructor.

This is the constructor. Since all member variables are instances of "well-behaving" STL classes, nothing needs to be done.

6.196.2.2 virtual Arc::Plexer::~Plexer () [virtual]

The destructor.

This is the destructor. Since all member variables are instances of "well-behaving" STL classes, nothing needs to be done.

6.196.3 Member Function Documentation

6.196.3.1 virtual void Arc::Plexer::Next (MCCInterface * *next*, const std::string & *label*) [virtual]

Add reference to next **MCC** (p. 242) in chain.

This method is called by **Loader** (p. 228) for every potentially labeled link to next component which implements **MCCInterface** (p. 248). If next is set NULL corresponding link is removed.

Reimplemented from **Arc::MCC** (p. 244).

6.196.3.2 virtual MCC_Status Arc::Plexer::process (Message & *request*, Message & *response*) [virtual]

Route request messages to appropriate services.

Routes the request message to the appropriate service. Routing is based on the path part of value of the ENDPOINT attribute. Routed message is assigned following attributes: PLEXER:PATTERN - matched pattern, PLEXER:EXTENSION - last unmatched part of ENDPOINT path.

Reimplemented from **Arc::MCC** (p. 244).

6.196.4 Field Documentation

6.196.4.1 `Logger Arc::Plexer::logger` [static]

A logger for MCCs.

A logger intended to be the parent of loggers in the different MCCs.

Reimplemented from `Arc::MCC` (p. 245).

The documentation for this class was generated from the following file:

- `Plexer.h`

6.197 `Arc::PlexerEntry` Class Reference

A pair of label (regex) and pointer to `MCC` (p. 242).

```
#include <Plexer.h>
```

6.197.1 Detailed Description

A pair of label (regex) and pointer to `MCC` (p. 242). A helper class that stores a label (regex) and a pointer to a service.

The documentation for this class was generated from the following file:

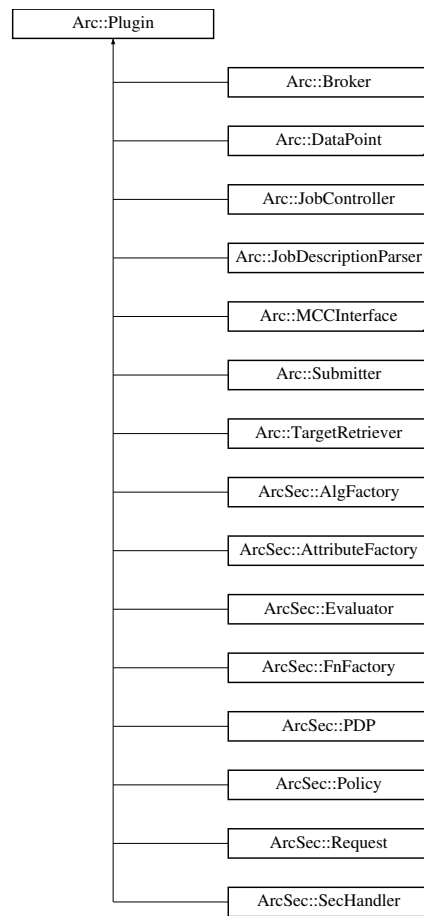
- `Plexer.h`

6.198 `Arc::Plugin` Class Reference

Base class for loadable ARC components.

```
#include <Plugin.h>
```

Inheritance diagram for `Arc::Plugin`:



6.198.1 Detailed Description

Base class for loadable ARC components. All classes representing loadable ARC components must be either descendants of this class or be wrapped by its offspring.

The documentation for this class was generated from the following file:

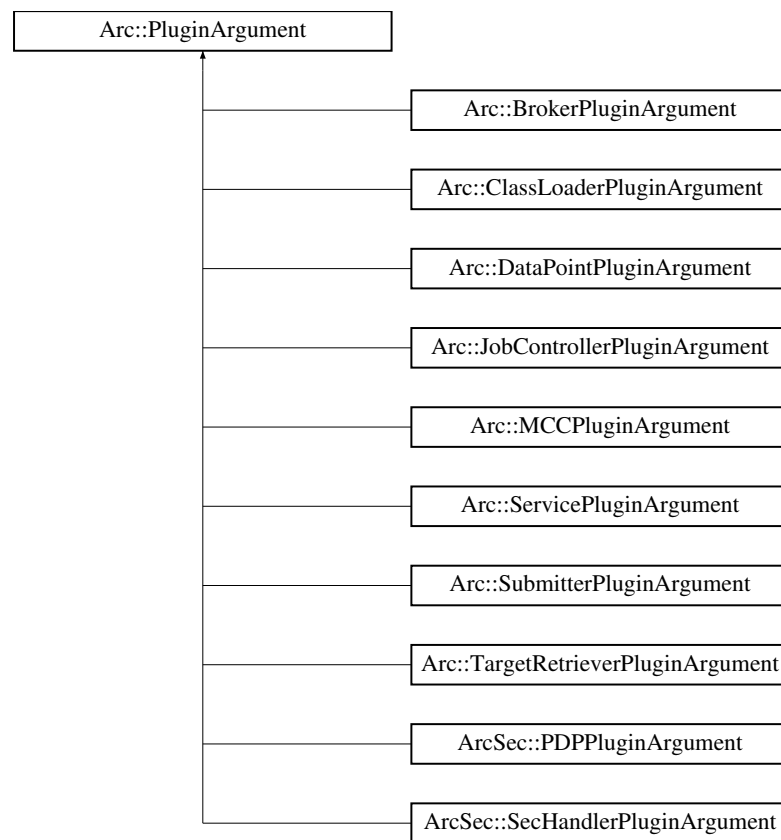
- `Plugin.h`

6.199 Arc::PluginArgument Class Reference

Base class for passing arguments to loadable ARC components.

```
#include <Plugin.h>
```

Inheritance diagram for `Arc::PluginArgument`:



Public Member Functions

- **PluginsFactory * get_factory** (void)
- **Glib::Module * get_module** (void)

6.199.1 Detailed Description

Base class for passing arguments to loadable ARC components. During its creation constructor function of ARC loadable component expects instance of class inherited from this one or wrapped in it. Then dynamic type casting is used for obtaining class of expected kind.

6.199.2 Member Function Documentation

6.199.2.1 PluginsFactory* Arc::PluginArgument::get_factory (void)

Returns pointer to factory which instantiated plugin.

Because factory usually destroys/unloads plugins in its destructor it should be safe to keep this pointer inside plugin for later use. But one must always check.

6.199.2.2 Glib::Module* Arc::PluginArgument::get_module (void)

Returns pointer to loadable module/library which contains plugin.

Corresponding factory keeps list of modules till itself is destroyed. So it should be safe to keep that pointer. But care must be taken if module contains persistent plugins. Such modules stay in memory after factory is destroyed. So it is advisable to use obtained pointer only in constructor function of plugin.

The documentation for this class was generated from the following file:

- Plugin.h

6.200 Arc::PluginDesc Class Reference

Description of plugin.

```
#include <Plugin.h>
```

6.200.1 Detailed Description

Description of plugin. This class is used for reports

The documentation for this class was generated from the following file:

- Plugin.h

6.201 Arc::PluginDescriptor Struct Reference

Description of ARC loadable component.

```
#include <Plugin.h>
```

6.201.1 Detailed Description

Description of ARC loadable component.

The documentation for this struct was generated from the following file:

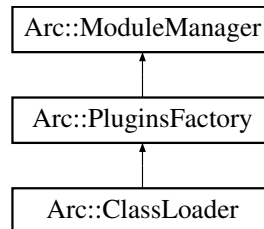
- Plugin.h

6.202 Arc::PluginsFactory Class Reference

Generic ARC plugins loader.

```
#include <Plugin.h>
```

Inheritance diagram for Arc::PluginsFactory:



Public Member Functions

- **PluginsFactory** (**XMLNode** cfg)
- void **TryLoad** (bool v=true)
- bool **load** (const std::string &name)
- bool **scan** (const std::string &name, **ModuleDesc** &desc)
- void **report** (std::list< **ModuleDesc** > &descs)

Static Public Member Functions

- static void **FilterByKind** (const std::string &kind, std::list< **ModuleDesc** > &descs)

6.202.1 Detailed Description

Generic ARC plugins loader. The instance of this class provides functionality of loading pluggable ARC components stored in shared libraries. For more information please check HED documentation. This class is thread-safe - its methods are protected from simultaneous use from multiple threads. Current thread protection implementation is suboptimal and will be revised in future.

6.202.2 Constructor & Destructor Documentation

6.202.2.1 Arc::PluginsFactory::PluginsFactory (XMLNode cfg)

Constructor - accepts configuration (not yet used) meant to tune loading of modules.

6.202.3 Member Function Documentation

6.202.3.1 static void Arc::PluginsFactory::FilterByKind (const std::string & kind, std::list< **ModuleDesc** > & desc) [static]

Filter list of modules by kind.

6.202.3.2 `bool Arc::PluginsFactory::load (const std::string & name)`

These methods load module named lib'name' and check if it contains ARC plugin(s) of specified 'kind' and 'name'. If there are no specified plugins or module does not contain any ARC plugins it is unloaded. All loaded plugins are also registered in internal list of this instance of **PluginsFactory** (p. 298) class. Returns true if any plugin was loaded.

6.202.3.3 `void Arc::PluginsFactory::report (std::list< ModuleDesc > & desc)`

Provides information about currently loaded modules and plugins.

6.202.3.4 `bool Arc::PluginsFactory::scan (const std::string & name, ModuleDesc & desc)`

Collect information about plugins stored in module(s) with specified names. Returns true if any of specified modules has plugins.

6.202.3.5 `void Arc::PluginsFactory::TryLoad (bool v=true) [inline]`

These methods load module named lib'name', locate plugin constructor functions of specified 'kind' and 'name' (if specified) and call it. Supplied argument affects way plugin instance is created in plugin-specific way. If name of plugin is not specified then all plugins of specified kind are tried with supplied argument till valid instance is created. All loaded plugins are also registered in internal list of this instance of **PluginsFactory** (p. 298) class. If search is set to false then no attempt is made to find plugins in loadable modules. Only plugins already loaded with previous calls to `get_instance()` and `load()` are checked. Returns created instance or NULL if failed. Specifies if loadable module may be loaded while looking for analyzing its content. If set to false only *.apd files are checked. Modules without corresponding *.apd will be ignored. Default is true;

The documentation for this class was generated from the following file:

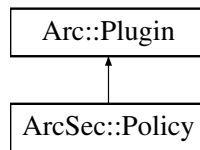
- Plugin.h

6.203 ArcSec::Policy Class Reference

Interface for containing and processing different types of policy.

```
#include <Policy.h>
```

Inheritance diagram for ArcSec::Policy:



Public Member Functions

- **Policy** ()
- **Policy** (const **Arc::XMLNode**)
- **Policy** (const **Arc::XMLNode**, **EvaluatorContext** *)
- virtual **operator bool** (void) const =0
- virtual **MatchResult** **match** (**EvaluationCtx** *)=0
- virtual **Result** **eval** (**EvaluationCtx** *)=0
- virtual void **addPolicy** (**Policy** *pl)
- virtual void **setEvaluatorContext** (**EvaluatorContext** *)
- virtual void **make_policy** ()
- virtual std::string **getEffect** () const =0
- virtual **EvalResult** & **getEvalResult** ()=0
- virtual void **setEvalResult** (**EvalResult** &res)=0
- virtual const char * **getEvalName** () const =0
- virtual const char * **getName** () const =0

6.203.1 Detailed Description

Interface for containing and processing different types of policy. Basically, each policy object is a container which includes a few elements e.g., **ArcPolicySet** objects includes a few **ArcPolicy** objects; **ArcPolicy** object includes a few **ArcRule** objects. There is logical relationship between **ArcRules** or **ArcPolicies**, which is called combining algorithm. According to algorithm, evaluation results from the elements are combined, and then the combined evaluation result is returned to the up-level.

6.203.2 Constructor & Destructor Documentation

6.203.2.1 **ArcSec::Policy::Policy** (const **Arc::XMLNode**) [inline]

Template constructor - creates policy based on XML document.

If XML document is empty then empty policy is created. If it is not empty then it must be valid policy document - otherwise created object should be invalid.

6.203.2.2 **ArcSec::Policy::Policy** (const **Arc::XMLNode** , **EvaluatorContext** *) [inline]

Template constructor - creates policy based on XML document.

If XML document is empty then empty policy is created. If it is not empty then it must be valid policy document - otherwise created object should be invalid. This constructor is based on the policy node and i the **EvaluatorContext** (p. 172) which includes the factory objects for combining algorithm and function

6.203.3 Member Function Documentation

6.203.3.1 `virtual void ArcSec::Policy::addPolicy (Policy * pl) [inline, virtual]`

Add a policy element to into "this" object

6.203.3.2 `virtual Result ArcSec::Policy::eval (EvaluationCtx *) [pure virtual]`

Evaluate policy For the <Rule> of **Arc** (p. 23), only get the "Effect" from rules; For the <Policy> of **Arc** (p. 23), combine the evaluation result from <Rule>; For the <Rule> of XACML, evaluate the <Condition> node by using information from request, and use the "Effect" attribute of <Rule>; For the <Policy> of XACML, combine the evaluation result from <Rule>

6.203.3.3 `virtual std::string ArcSec::Policy::getEffect () const [pure virtual]`

Get the "Effect" attribute

6.203.3.4 `virtual const char* ArcSec::Policy::getEvalName () const [pure virtual]`

Get the name of **Evaluator** (p. 169) which can evaluate this policy

6.203.3.5 `virtual EvalResult& ArcSec::Policy::getEvalResult () [pure virtual]`

Get eveluation result

6.203.3.6 `virtual const char* ArcSec::Policy::getName () const [pure virtual]`

Get the name of this policy

6.203.3.7 `virtual void ArcSec::Policy::make_policy () [inline, virtual]`

Parse XMLNode, and construct the low-level Rule object

6.203.3.8 `virtual void ArcSec::Policy::setEvalResult (EvalResult & res) [pure virtual]`

Set eveluation result

6.203.3.9 `virtual void ArcSec::Policy::setEvaluatorContext (EvaluatorContext *)`
`[inline, virtual]`

Set **Evaluator** (p. 169) Context for the usage in creating low-level policy object

The documentation for this class was generated from the following file:

- Policy.h

6.204 ArcSec::PolicyStore::PolicyElement Class Reference

The documentation for this class was generated from the following file:

- PolicyStore.h

6.205 ArcSec::PolicyParser Class Reference

A interface which will isolate the policy object from actual policy storage (files, urls, database)

```
#include <PolicyParser.h>
```

Public Member Functions

- virtual **Policy** * **parsePolicy** (const **Source** &source, std::string policyclassname, **EvaluatorContext** *ctx)

6.205.1 Detailed Description

A interface which will isolate the policy object from actual policy storage (files, urls, database) Parse the policy from policy source (e.g. files, urls, database, etc.).

6.205.2 Member Function Documentation

6.205.2.1 `virtual Policy* ArcSec::PolicyParser::parsePolicy (const Source & source, std::string policyclassname, EvaluatorContext * ctx)` `[virtual]`

Parse policy

Parameters

<i>source</i>	location of the policy
<i>policyclass-name</i>	name of the policy for ClassLoader
<i>ctx</i>	EvaluatorContext (p. 172) which includes the **Factory

The documentation for this class was generated from the following file:

- PolicyParser.h

6.206 ArcSec::PolicyStore Class Reference

Storage place for policy objects.

```
#include <PolicyStore.h>
```

Data Structures

- class **PolicyElement**

Public Member Functions

- **PolicyStore** (const std::string &alg, const std::string &policyclassname, **EvaluatorContext** *ctx)

6.206.1 Detailed Description

Storage place for policy objects.

6.206.2 Constructor & Destructor Documentation

6.206.2.1 ArcSec::PolicyStore::PolicyStore (const std::string &alg, const std::string &policyclassname, EvaluatorContext * ctx)

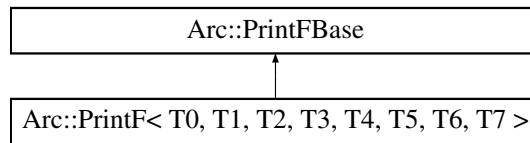
Creates policy store with specified combining algorithm (alg - not used yet), policy name (policyclassname) and context (ctx)

The documentation for this class was generated from the following file:

- PolicyStore.h

6.207 Arc::Printf< T0, T1, T2, T3, T4, T5, T6, T7 > Class Template Reference

Inheritance diagram for Arc::Printf< T0, T1, T2, T3, T4, T5, T6, T7 >:



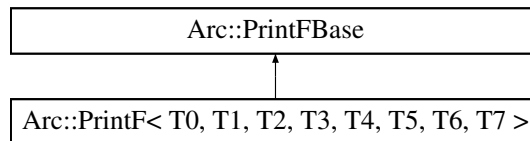
```
template<class T0 = int, class T1 = int, class T2 = int, class T3 = int, class T4 = int, class T5 = int,
class T6 = int, class T7 = int> class Arc::Printf< T0, T1, T2, T3, T4, T5, T6, T7 >
```

The documentation for this class was generated from the following file:

- IString.h

6.208 Arc::PrintfBase Class Reference

Inheritance diagram for Arc::PrintfBase:

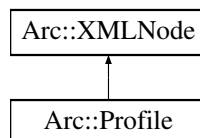


The documentation for this class was generated from the following file:

- IString.h

6.209 Arc::Profile Class Reference

Inheritance diagram for Arc::Profile:



The documentation for this class was generated from the following file:

- Profile.h

6.210 ArcCredential::PROXYCERTINFO_st Struct Reference

The documentation for this struct was generated from the following file:

- Proxycertinfo.h

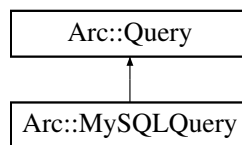
6.211 ArcCredential::PROXYPOLICY_st Struct Reference

The documentation for this struct was generated from the following file:

- Proxycertinfo.h

6.212 Arc::Query Class Reference

Inheritance diagram for Arc::Query:



Public Member Functions

- **Query** ()
- **Query** (Database *db)
- virtual ~**Query** ()
- virtual int **get_num_columns** ()=0
- virtual int **get_num_rows** ()=0
- virtual bool **execute** (const std::string &sqlstr)=0
- virtual QueryRowResult **get_row** (int row_number) const =0
- virtual QueryRowResult **get_row** () const =0
- virtual std::string **get_row_field** (int row_number, std::string &field_name)=0
- virtual bool **get_array** (std::string &sqlstr, QueryArrayResult &result, std::vector< std::string > &arguments)=0

6.212.1 Constructor & Destructor Documentation

6.212.1.1 Arc::Query::Query () [inline]

Default constructor

6.212.1.2 Arc::Query::Query (Database * db) [inline]

Constructor

Parameters

<i>db</i>	The database object which will be used by Query (p. 306) class to get the database connection
-----------	--

6.212.1.3 virtual Arc::Query::~~Query () [inline, virtual]

Deconstructor

6.212.2 Member Function Documentation**6.212.2.1 virtual bool Arc::Query::execute (const std::string & sqlstr) [pure virtual]**

Execute the query

Parameters

<i>sqlstr</i>	The sql sentence used to query
---------------	--------------------------------

Implemented in **Arc::MySQLQuery** (p. 266).

6.212.2.2 virtual bool Arc::Query::get_array (std::string & sqlstr, QueryArrayResult & result, std::vector< std::string > & arguments) [pure virtual]

Query (p. 306) the database by using some parameters into sql sentence e.g. "select table.value from table where table.name = ?"

Parameters

<i>sqlstr</i>	The sql sentence with some parameters marked with "?".
<i>result</i>	The result in an array which includes all of the value in query result.
<i>arguments</i>	The argument list which should exactly correspond with the parametes in sql sentence.

Implemented in **Arc::MySQLQuery** (p. 267).

6.212.2.3 virtual int Arc::Query::get_num_columns () [pure virtual]

Get the colum number in the query result

Implemented in **Arc::MySQLQuery** (p. 267).

6.212.2.4 `virtual int Arc::Query::get_num_rows () [pure virtual]`

Get the row number in the query result

Implemented in **Arc::MySQLQuery** (p. 267).

6.212.2.5 `virtual QueryRowResult Arc::Query::get_row (int row_number) const [pure virtual]`

Get the value of one row in the query result

Parameters

<i>row_number</i>	The number of the row
-------------------	-----------------------

Returns

A vector includes all the values in the row

Implemented in **Arc::MySQLQuery** (p. 267).

6.212.2.6 `virtual QueryRowResult Arc::Query::get_row () const [pure virtual]`

Get the value of one row in the query result, the row number will be automatically increased each time the method is called

Implemented in **Arc::MySQLQuery** (p. 267).

6.212.2.7 `virtual std::string Arc::Query::get_row_field (int row_number, std::string & field_name) [pure virtual]`

Get the value of one specific field in one specific row

Parameters

<i>row_number</i>	The row number inside the query result
<i>field_name</i>	The field name for the value which will be return

Returns

The value of the specified filed in the specified row

Implemented in **Arc::MySQLQuery** (p. 268).

The documentation for this class was generated from the following file:

- DBInterface.h

6.213 Arc::Range< T > Class Template Reference

```
template<class T> class Arc::Range< T >
```

The documentation for this class was generated from the following file:

- JobDescription.h

6.214 Arc::Register_Info_Type Struct Reference

The documentation for this struct was generated from the following file:

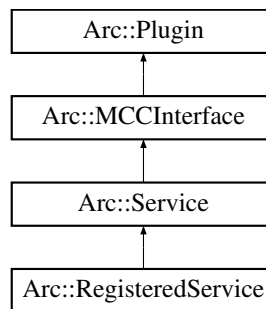
- InfoRegister.h

6.215 Arc::RegisteredService Class Reference

RegisteredService (p. 309) - extension of **Service** (p. 331) performing self-registration.

```
#include <RegisteredService.h>
```

Inheritance diagram for Arc::RegisteredService:



Public Member Functions

- **RegisteredService** (Config *)

6.215.1 Detailed Description

RegisteredService (p. 309) - extension of **Service** (p. 331) performing self-registration.

6.215.2 Constructor & Destructor Documentation

6.215.2.1 Arc::RegisteredService::RegisteredService (Config *)

Example contructor - Server takes at least it's configuration subtree

The documentation for this class was generated from the following file:

- RegisteredService.h

6.216 Arc::RegularExpression Class Reference

A regular expression class.

```
#include <ArcRegex.h>
```

Public Member Functions

- **RegularExpression** ()
- **RegularExpression** (std::string pattern)
- **RegularExpression** (const **RegularExpression** ®ex)
- **~RegularExpression** ()
- const **RegularExpression** & **operator=** (const **RegularExpression** ®ex)
- bool **isOk** ()
- bool **hasPattern** (std::string str)
- bool **match** (const std::string &str) const
- bool **match** (const std::string &str, std::list< std::string > &unmatched, std::list< std::string > &matched) const
- std::string **getPattern** () const

6.216.1 Detailed Description

A regular expression class. This class is a wrapper around the functions provided in regex.h.

6.216.2 Member Function Documentation

6.216.2.1 bool Arc::RegularExpression::match (const std::string & str, std::list< std::string > & unmatched, std::list< std::string > & matched) const

Returns true if this regex matches the string provided.

Unmatched parts of the string are stored in 'unmatched'. Matched parts of the string are stored in 'matched'. The first entry in matched is the string that matched the regex, and the following entries are parenthesised elements of the regex

The documentation for this class was generated from the following file:

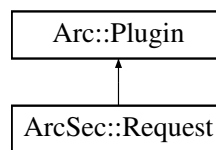
- ArcRegex.h

6.217 ArcSec::Request Class Reference

Base class/Interface for request, includes a container for RequestItems and some operations.

```
#include <Request.h>
```

Inheritance diagram for ArcSec::Request:



Public Member Functions

- virtual ReqItemList **getRequestItems** () const
- virtual void **setRequestItems** (ReqItemList)
- virtual void **addRequestItem** (Attrs &, Attrs &, Attrs &, Attrs &)
- virtual void **setAttributeFactory** (AttributeFactory *attributefactory)=0
- virtual void **make_request** ()=0
- virtual const char * **getEvalName** () const =0
- virtual const char * **getName** () const =0
- **Request** ()
- **Request** (const Source &)

6.217.1 Detailed Description

Base class/Interface for request, includes a container for RequestItems and some operations. A **Request** (p.311) object can has a few <subjects, actions, objects> tuples, i.e. **RequestItem** (p.313) The **Request** (p.311) class and any customized class which inherit from it, should be loadable, which means these classes can be dynamically loaded according to the configuration information, see the example configuration below: <Service name="pdp.service" id="pdp_service"> <pdp:PDPCConfig> <.....> <pdp:**Request** (p.311) name="arc.request" /> <.....> </pdp:PDPCConfig> </Service>

There can be different types of subclass which inherit **Request** (p.311), such like XACMLRequest, ArcRequest, GACLRequest

6.217.2 Constructor & Destructor Documentation

6.217.2.1 ArcSec::Request::Request () [inline]

Default constructor

6.217.2.2 ArcSec::Request::Request (const Source &) [inline]

Constructor: Parse request information from a xml stucture in memory

6.217.3 Member Function Documentation

6.217.3.1 virtual void ArcSec::Request::addRequestItem (Attrs & , Attrs & , Attrs & , Attrs &) [inline, virtual]

Add request tuple from non-XMLNode

6.217.3.2 virtual const char* ArcSec::Request::getEvalName () const [pure virtual]

Get the name of corresponding evaulator

6.217.3.3 virtual const char* ArcSec::Request::getName () const [pure virtual]

Get the name of this request

6.217.3.4 virtual ReqItemList ArcSec::Request::getRequestItems () const [inline, virtual]

Get all the **RequestItem** (p. 313) inside **RequestItem** (p. 313) container

6.217.3.5 virtual void ArcSec::Request::make_request () [pure virtual]

Create the objects included in **Request** (p. 311) according to the node attached to the **Request** (p. 311) object

6.217.3.6 virtual void ArcSec::Request::setAttributeFactory (AttributeFactory * attributefactory) [pure virtual]

Set the attribute factory for the usage of **Request** (p. 311)

6.217.3.7 `virtual void ArcSec::Request::setRequestItems (ReqItemList) [inline, virtual]`

Set the content of the container

The documentation for this class was generated from the following file:

- Request.h

6.218 ArcSec::RequestAttribute Class Reference

Wrapper which includes **AttributeValue** (p. 61) object which is generated according to date type of one spefic node in Request.xml.

```
#include <RequestAttribute.h>
```

Public Member Functions

- **RequestAttribute** (**Arc::XMLNode** &node, **AttributeFactory** *attrfactory)
- **RequestAttribute** & **duplicate** (**RequestAttribute** &)

6.218.1 Detailed Description

Wrapper which includes **AttributeValue** (p. 61) object which is generated according to date type of one spefic node in Request.xml.

6.218.2 Constructor & Destructor Documentation

6.218.2.1 `ArcSec::RequestAttribute::RequestAttribute (Arc::XMLNode & node, AttributeFactory * attrfactory)`

Constructor - create attribute value object according to the "Type" in the node <Attribute attributeid="urn:arc:subject:voms-attribute" type="string">urn:mace:shibboleth:examples</Attribute>

6.218.3 Member Function Documentation

6.218.3.1 `RequestAttribute& ArcSec::RequestAttribute::duplicate (RequestAttribute &)`

Duplicate the parameter into "this"

The documentation for this class was generated from the following file:

- RequestAttribute.h

6.219 ArcSec::RequestItem Class Reference

Interface for request item container, <subjects, actions, objects, ctxs> tuple.

```
#include <RequestItem.h>
```

Public Member Functions

- **RequestItem** (Arc::XMLNode &, AttributeFactory *)

6.219.1 Detailed Description

Interface for request item container, <subjects, actions, objects, ctxs> tuple.

6.219.2 Constructor & Destructor Documentation

6.219.2.1 ArcSec::RequestItem::RequestItem (Arc::XMLNode &, AttributeFactory *)
[inline]

Constructor

Parameters

<i>node</i>	The XMLNode structure of the request item
<i>attributefactory</i>	The AttributeFactory (p. 56) which will be used to generate RequestAttribute (p. 313)

The documentation for this class was generated from the following file:

- RequestItem.h

6.220 ArcSec::RequestTuple Class Reference

The documentation for this class was generated from the following file:

- EvaluationCtx.h

6.221 Arc::ResourceSlotType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.222 Arc::ResourceType Class Reference

The documentation for this class was generated from the following file:

- JobDescription.h

6.223 ArcSec::Response Class Reference

Container for the evaluation results.

```
#include <Response.h>
```

6.223.1 Detailed Description

Container for the evaluation results.

The documentation for this class was generated from the following file:

- Response.h

6.224 ArcSec::ResponseItem Class Reference

Evaluation result concerning one **RequestTuple** (p. 314).

```
#include <Response.h>
```

6.224.1 Detailed Description

Evaluation result concerning one **RequestTuple** (p. 314). Include the **RequestTuple** (p. 314), related XMLNode, the set of policy objects which give positive evaluation result, and the related XMLNode

The documentation for this class was generated from the following file:

- Response.h

6.225 ArcSec::ResponseList Class Reference

The documentation for this class was generated from the following file:

- Response.h

6.226 Arc::Run Class Reference

```
#include <Run.h>
```

Public Member Functions

- **Run** (const std::string &cmdline)
- **Run** (const std::list< std::string > &argv)
- **~Run** (void)
- **operator bool** (void)
- bool **operator!** (void)
- bool **Start** (void)
- bool **Wait** (int timeout)
- bool **Wait** (void)
- int **Result** (void)
- bool **Running** (void)
- int **ReadStdout** (int timeout, char *buf, int size)
- int **ReadStderr** (int timeout, char *buf, int size)
- int **WriteStdin** (int timeout, const char *buf, int size)
- void **AssignStdout** (std::string &str)
- void **AssignStderr** (std::string &str)
- void **AssignStdin** (std::string &str)
- void **KeepStdout** (bool keep=true)
- void **KeepStderr** (bool keep=true)
- void **KeepStdin** (bool keep=true)
- void **CloseStdout** (void)
- void **CloseStderr** (void)
- void **CloseStdin** (void)
- void **AssignWorkingDirectory** (std::string &wd)
- void **Kill** (int timeout)
- void **Abandon** (void)

Static Public Member Functions

- static void **AfterFork** (void)

6.226.1 Detailed Description

This class runs external executable. It is possible to read/write it's standard handles or to redirect them to std::string elements.

6.226.2 Constructor & Destructor Documentation

6.226.2.1 Arc::Run::Run (const std::string & *cmdline*)

Constructor preapres object to run cmdline

6.226.2.2 Arc::Run::Run (const std::list< std::string > & argv)

Constructor prepares object to run executable and arguments specified in argv

6.226.2.3 Arc::Run::~~Run (void)

Destructor kills running executable and releases associated resources

6.226.3 Member Function Documentation**6.226.3.1 void Arc::Run::Abandon (void)**

Detach this object from running process. After calling this method instance is not associated with external process anymore. As result destructor will not kill process.

6.226.3.2 static void Arc::Run::AfterFork (void) [static]

Call this method after fork() in child cporocess. It will reinitialize internal structures for new environment. Do not call it in any other case than defined.

6.226.3.3 void Arc::Run::AssignStderr (std::string & str)

Associate stderr handle of executable with string. This method must be called before **Start()** (p. 319). str object must be valid as long as this object exists.

6.226.3.4 void Arc::Run::AssignStdin (std::string & str)

Associate stdin handle of executable with string. This method must be called before **Start()** (p. 319). str object must be valid as long as this object exists.

6.226.3.5 void Arc::Run::AssignStdout (std::string & str)

Associate stdout handle of executable with string. This method must be called before **Start()** (p. 319). str object must be valid as long as this object exists.

6.226.3.6 void Arc::Run::AssignWorkingDirectory (std::string & wd) [inline]

Assign working directory of the running process

6.226.3.7 void Arc::Run::CloseStderr (void)

Closes pipe associated with stderr handle

6.226.3.8 void Arc::Run::CloseStdin (void)

Closes pipe associated with stdin handle

6.226.3.9 void Arc::Run::CloseStdout (void)

Closes pipe associated with stdout handle

6.226.3.10 void Arc::Run::KeepStderr (bool *keep* = true)

Keep stderr same as parent's if keep = true

6.226.3.11 void Arc::Run::KeepStdin (bool *keep* = true)

Keep stdin same as parent's if keep = true

6.226.3.12 void Arc::Run::KeepStdout (bool *keep* = true)

Keep stdout same as parent's if keep = true

6.226.3.13 void Arc::Run::Kill (int *timeout*)

Kill running executable. First soft kill signal (SIGTERM) is sent to executable. If after timeout seconds executable is still running it's killed completely. Curently this method does not work for Windows OS

6.226.3.14 Arc::Run::operator bool (void) [inline]

Returns true if object is valid

6.226.3.15 bool Arc::Run::operator! (void) [inline]

Returns true if object is invalid

6.226.3.16 int Arc::Run::ReadStderr (int *timeout*, char * *buf*, int *size*)

Read from stderr handle of running executable. Parameter timeout specifies upper limit for which method will block in milliseconds. Negative means infinite. This method may be used while stderr is directed to string. But result is unpredictable. Returns number of read bytes.

6.226.3.17 `int Arc::Run::ReadStdout (int timeout, char * buf, int size)`

Read from stdout handle of running executable. Parameter timeout specifies upper limit for which method will block in milliseconds. Negative means infinite. This method may be used while stdout is directed to string. But result is unpredictable. Returns number of read bytes.

6.226.3.18 `int Arc::Run::Result (void)` `[inline]`

Returns exit code of execution.

6.226.3.19 `bool Arc::Run::Running (void)`

Return true if execution is going on.

6.226.3.20 `bool Arc::Run::Start (void)`

Starts running executable. This method may be called only once.

6.226.3.21 `bool Arc::Run::Wait (int timeout)`

Wait till execution finished or till timeout seconds expires. Returns true if execution is complete.

6.226.3.22 `bool Arc::Run::Wait (void)`

Wait till execution finished

6.226.3.23 `int Arc::Run::WriteStdin (int timeout, const char * buf, int size)`

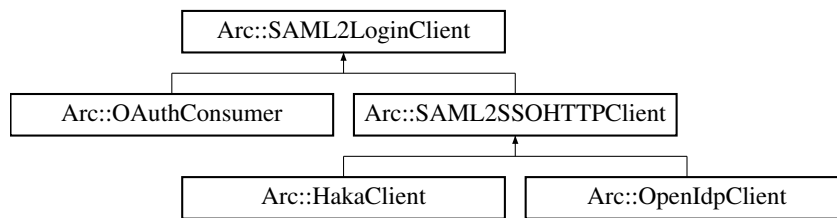
Write to stdin handle of running executable. Parameter timeout specifies upper limit for which method will block in milliseconds. Negative means infinite. This method may be used while stdin is directed to string. But result is unpredictable. Returns number of written bytes.

The documentation for this class was generated from the following file:

- Run.h

6.227 Arc::SAML2LoginClient Class Reference

Inheritance diagram for Arc::SAML2LoginClient:



Public Member Functions

- **SAML2LoginClient** (const **MCCConfig** cfg, const **URL** url, std::list< std::string > idp_stack)
- virtual **MCC_Status processLogin** (const std::string username="", const std::string password="")=0
- **MCC_Status findSimpleSAMLInstallation** ()

6.227.1 Constructor & Destructor Documentation

6.227.1.1 **Arc::SAML2LoginClient::SAML2LoginClient** (const **MCCConfig** *cfg*, const **URL** *url*, std::list< std::string > *idp_stack*)

list with the idp for nested wayf For example, Confusa can use betawayf.wayf.dk as an identity provider, which is itself only a wayf and shares the metadata with concrete service providers or even further nested wayfs. Since due to mutual authentication with metadata, we are obliged to follow the SSO redirects from WAYF to WAYF, the WAYFs are stored in a list.

6.227.2 Member Function Documentation

6.227.2.1 **MCC_Status Arc::SAML2LoginClient::findSimpleSAMLInstallation** ()

find the location of the simplesamlphp installation on the SP side Will be stored in (*sso_pages)[SimpleSAML]

6.227.2.2 **virtual MCC_Status Arc::SAML2LoginClient::processLogin** (const std::string *username* = " ", const std::string *password* = " ") [pure virtual]

Base interface for all login procedures

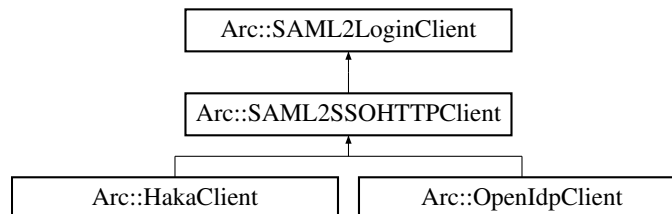
Implemented in **Arc::OAuthConsumer** (p. 270), and **Arc::SAML2SSOHTTPClient** (p. 322).

The documentation for this class was generated from the following file:

- SAML2LoginClient.h

6.228 Arc::SAML2SSOHTTPClient Class Reference

Inheritance diagram for Arc::SAML2SSOHTTPClient:



Public Member Functions

- **MCC_Status processLogin** (const std::string username, const std::string password)
- **MCC_Status parseDN** (std::string *dn)
- **MCC_Status approveCSR** (const std::string approve_page)
- **MCC_Status pushCSR** (const std::string b64_pub_key, const std::string pub_key_hash, std::string *approve_page)
- **MCC_Status storeCert** (const std::string cert_path, const std::string auth_token, const std::string b64_dn)

Protected Member Functions

- virtual **MCC_Status processIdPLogin** (const std::string username, const std::string password)=0
- virtual **MCC_Status processConsent** ()=0
- virtual **MCC_Status processIdP2Confusa** ()=0

6.228.1 Member Function Documentation

6.228.1.1 MCC_Status Arc::SAML2SSOHTTPClient::approveCSR (const std::string approve_page) [virtual]

Simulate click on the approve cert signing request link

Implements **Arc::SAML2LoginClient** (p. 319).

6.228.1.2 MCC_Status Arc::SAML2SSOHTTPClient::parseDN (std::string * dn) [virtual]

Parse the used DN from the Confusa about_you page

Implements **Arc::SAML2LoginClient** (p. 319).

6.228.1.3 `virtual MCC_Status Arc::SAML2SSOHTTPClient::processConsent ()`
`[protected, pure virtual]`

If the IdP has a consent module and the user has not saved her consent, this method will ask the user for consent to transmission of her data to Confusa

Implemented in **Arc::HakaClient** (p. 193), and **Arc::OpenIdpClient** (p. 271).

6.228.1.4 `virtual MCC_Status Arc::SAML2SSOHTTPClient::processIdP2Confusa ()`
`[protected, pure virtual]`

Redirects the user back from identity provider to the Confusa SP

Implemented in **Arc::HakaClient** (p. 193), and **Arc::OpenIdpClient** (p. 271).

6.228.1.5 `virtual MCC_Status Arc::SAML2SSOHTTPClient::processIdPLogin (const std::string username, const std::string password)` `[protected, pure virtual]`

Actual identity provider parsers for next three methods implemented in subdirectory idp/

Parse identity provider login page and submit username and password in the provisioned way

Implemented in **Arc::HakaClient** (p. 193), and **Arc::OpenIdpClient** (p. 271).

6.228.1.6 `MCC_Status Arc::SAML2SSOHTTPClient::processLogin (const std::string username, const std::string password)` `[virtual]`

Models complete SAML2 WebSSO authN flow with start -> WAYF -> Login -> (consent) -> start

Implements **Arc::SAML2LoginClient** (p. 320).

6.228.1.7 `MCC_Status Arc::SAML2SSOHTTPClient::pushCSR (const std::string b64_pub_key, const std::string pub_key_hash, std::string * approve_page)`
`[virtual]`

Send the cert signing request to Confusa for signing

Implements **Arc::SAML2LoginClient** (p. 319).

6.228.1.8 `MCC_Status Arc::SAML2SSOHTTPClient::storeCert (const std::string cert_path, const std::string auth_token, const std::string b64_dn)` `[virtual]`

Download the signed certificate from Confusa and store it locally

Implements **Arc::SAML2LoginClient** (p. 319).

The documentation for this class was generated from the following file:

- SAML2LoginClient.h

6.229 Arc::SAMLToken Class Reference

Class for manipulating SAML Token **Profile** (p. 305).

```
#include <SAMLToken.h>
```

Public Types

- enum **SAMLVersion**

Public Member Functions

- **SAMLToken** (SOAPEnvelope &soap)
- **SAMLToken** (SOAPEnvelope &soap, const std::string &certfile, const std::string &keyfile, **SAMLVersion** saml_version=SAML2, **XMLNode** saml_assertion=**XMLNode**())
- ~**SAMLToken** (void)
- **operator bool** (void)
- bool **Authenticate** (const std::string &cafile, const std::string &capath)
- bool **Authenticate** (void)

6.229.1 Detailed Description

Class for manipulating SAML Token **Profile** (p.305). This class is for generating/-consuming SAML Token profile. See WS-Security SAML Token **Profile** (p. 305) v1.1 (www.oasis-open.org/committees/wss) Currently this class is used by samltoken handler (will appears in src/hed/pdc/samltokensh/) It is not a must to directly called this class. If we need to use SAML Token functionality, we only need to configure the samltoken handler into service and client. Currently, only a minor part of the specification has been implemented.

About how to identify and reference security token for signing message, currently, only the "SAML Assertion Referenced from KeyInfo" (part 3.4.2 of WS-Security SAML Token **Profile** (p. 305) v1.1 specification) is supported, which means the implementation can only process SAML assertion "referenced from KeyInfo", and also can only generate SAML Token with SAML assertion "referenced from KeyInfo". More complete support need to implement.

About subject confirmation method, the implementation can process "hold-of-key" (part 3.5.1 of WS-Security SAML Token **Profile** (p. 305) v1.1 specification) subject confirmation method.

About SAML version, the implementation can process SAML assertion with SAML version 1.1 and 2.0; can only generate SAML assertion with SAML version 2.0.

In the SAML Token profile, for the hold-of-key subject confirmation method, there are three interaction parts: the attesting entity, the relying party and the issuing authority. In the hold-of-key subject confirmation method, it is the attesting entity's subject identity which will be inserted into the SAML assertion.

Firstly the attesting entity authenticates to issuing authority by using some authentication scheme such as WSS x509 Token profile (Alternatively the username/password authentication scheme or other different authentication scheme can also be used, unless the issuing authority can retrieve the key from a trusted certificate server after firmly establishing the subject's identity under the username/password scheme). So then issuing authority is able to make a definitive statement (sign a SAML assertion) about an act of authentication that has already taken place.

The attesting entity gets the SAML assertion and then signs the soap message together with the assertion by using its private key (the relevant certificate has been authenticated by issuing authority, and its relevant public key has been put into SubjectConfirmation element under saml assertion by issuing authority. Only the actual owner of the saml assertion can do this, as only the subject possesses the private key paired with the public key in the assertion. This establishes an irrefutable connection between the author of the SOAP message and the assertion describing an authentication event.)

The relying party is supposed to trust the issuing authority. When it receives a message from the asserting entity, it will check the saml assertion based on its predetermined trust relationship with the SAML issuing authority, and check the signature of the soap message based on the public key in the saml assertion without directly trust relationship with attesting entity (subject owner).

6.229.2 Member Enumeration Documentation

6.229.2.1 enum Arc::SAMLToken::SAMLVersion

Since the specification SAMLVersion is for distinguishing two types of saml version. It is used as the parameter of constructor.

6.229.3 Constructor & Destructor Documentation

6.229.3.1 Arc::SAMLToken::SAMLToken (SOAPEnvelope & soap)

Constructor. Parse SAML Token information from SOAP header. SAML Token related information is extracted from SOAP header and stored in class variables. And then it the **SAMLToken** (p. 322) object will be used for authentication.

Parameters

<i>soap</i>	The SOAP message which contains the SAMLToken (p. 322) in the soap header
-------------	--

6.229.3.2 `Arc::SAMLToken::SAMLToken (SOAPEnvelope & soap, const std::string & certfile, const std::string & keyfile, SAMLVersion saml_version = SAML2, XMLNode saml_assertion = XMLNode ())`

Constructor. Add SAML Token information into the SOAP header. Generated token contains elements SAML token and signature, and is meant to be used for authentication on the consuming side. This constructor is for a specific SAML Token profile usage, in which the attesting entity signs the SAML assertion for itself (self-sign). This usage implicitly requires that the relying party trust the attesting entity. More general (requires issuing authority) usage will be provided by other constructor. And the under-developing SAML service will be used as the issuing authority.

Parameters

<i>soap</i>	The SOAP message to which the SAML Token will be inserted.
<i>certfile</i>	The certificate file.
<i>keyfile</i>	The key file which will be used to create signature.
<i>samlversion</i>	The SAML version, only SAML2 is supported currently.
<i>samlassertion</i>	The SAML assertion got from 3rd party, and used for protecting the SOAP message; If not present, then self-signed assertion will be generated.

6.229.3.3 `Arc::SAMLToken::~~SAMLToken (void)`

Deconstructor. Nothing to be done except finalizing the xmlsec library.

6.229.4 Member Function Documentation

6.229.4.1 `bool Arc::SAMLToken::Authenticate (const std::string & cafile, const std::string & capath)`

Check signature by using the trusted certificates It is used by relying parting after calling **SAMLToken(SOAPEnvelope& soap)** (p. 324) This method will check the SAML assertion based on the trusted certificated specified as parameter cafile or capath; and also check the signature to soap message (the signature is generated by attesting entity by signing soap body together with SAML assertion) by using the public key inside SAML assertion.

Parameters

<i>cafile</i>	ca file
<i>capath</i>	ca directory

6.229.4.2 `bool Arc::SAMLToken::Authenticate (void)`

Check signature by using the cert information in soap message

6.229.4.3 Arc::SAMLToken::operator bool (void)

Returns true of constructor succeeded

The documentation for this class was generated from the following file:

- SAMLToken.h

6.230 Arc::ScalableTime< T > Class Template Reference

```
template<class T> class Arc::ScalableTime< T >
```

The documentation for this class was generated from the following file:

- JobDescription.h

6.231 Arc::ScalableTime< int > Class Template Reference

```
template<> class Arc::ScalableTime< int >
```

The documentation for this class was generated from the following file:

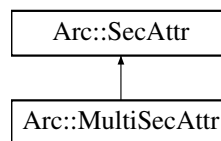
- JobDescription.h

6.232 Arc::SecAttr Class Reference

This is an abstract interface to a security attribute.

```
#include <SecAttr.h>
```

Inheritance diagram for Arc::SecAttr:



Public Member Functions

- **SecAttr** ()
- **bool operator==** (const **SecAttr** &b) const
- **bool operator!=** (const **SecAttr** &b) const
- **virtual operator bool** () const

- virtual bool **Export** (**SecAttrFormat** format, std::string &val) const
- virtual bool **Export** (**SecAttrFormat** format, **XMLNode** &val) const
- virtual bool **Import** (**SecAttrFormat** format, const std::string &val)

Static Public Attributes

- static **SecAttrFormat** **ARCAuth**
- static **SecAttrFormat** **XACML**
- static **SecAttrFormat** **SAML**
- static **SecAttrFormat** **GACL**

6.232.1 Detailed Description

This is an abstract interface to a security attribute. This class is meant to be inherited to implement security attributes. Depending on what data it needs to store inheriting classes may need to implement constructor and destructor. They must however override the equality and the boolean operators. The equality is meant to compare security attributes. The prototype implies that all attributes are comparable to all others. This behaviour should be modified as needed by using `dynamic_cast` operations. The boolean cast operation is meant to embody "nullness" if that is applicable to the particular type.

6.232.2 Member Function Documentation

6.232.2.1 virtual bool **Arc::SecAttr::Export** (**SecAttrFormat** format, std::string & val) const
[virtual]

Convert internal structure into specified format. Returns false if format is not supported/suitable for this attribute.

6.232.2.2 virtual bool **Arc::SecAttr::Export** (**SecAttrFormat** format, **XMLNode** & val)
const [virtual]

Convert internal structure into specified format. Returns false if format is not supported/suitable for this attribute. XML node referenced by is turned into top level element of specified format.

Reimplemented in **Arc::MultiSecAttr** (p. 264).

6.232.2.3 virtual bool **Arc::SecAttr::Import** (**SecAttrFormat** format, const std::string & val)
[virtual]

Fills internal structure from external object of specified format. Returns false if failed to do. The usage pattern for this method is not defined and it is provided only to make class symmetric. Hence it's implementation is not required yet.

6.232.2.4 virtual Arc::SecAttr::operator bool () const [virtual]

This function should return false if the value is to be considered null, e.g. if it hasn't been set or initialized. In other cases it should return true.

Reimplemented in **Arc::MultiSecAttr** (p. 264).

6.232.2.5 bool Arc::SecAttr::operator!= (const SecAttr & b) const [inline]

This is a convenience function to allow the usage of "not equal" conditions and need not be overridden.

6.232.2.6 bool Arc::SecAttr::operator== (const SecAttr & b) const [inline]

This function should (in inheriting classes) return true if this and b are considered to represent same content. Identifying and restricting the type of b should be done using dynamic_cast operations. Currently it is not defined how comparison methods to be used. Hence their implementation is not required.

The documentation for this class was generated from the following file:

- SecAttr.h

6.233 Arc::SecAttrFormat Class Reference

Export/import format.

```
#include <SecAttr.h>
```

6.233.1 Detailed Description

Export/import format. Format is identified by textual identity string. Class description includes basic formats only. That list may be extended.

The documentation for this class was generated from the following file:

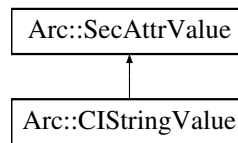
- SecAttr.h

6.234 Arc::SecAttrValue Class Reference

This is an abstract interface to a security attribute.

```
#include <SecAttrValue.h>
```

Inheritance diagram for Arc::SecAttrValue:



Public Member Functions

- **bool operator== (SecAttrValue &b)**
- **bool operator!= (SecAttrValue &b)**
- **virtual operator bool ()**

6.234.1 Detailed Description

This is an abstract interface to a security attribute. This class is meant to be inherited to implement security attributes. Depending on what data it needs to store inheriting classes may need to implement constructor and destructor. They must however override the equality and the boolean operators. The equality is meant to compare security attributes. The prototype implies that all attributes are comparable to all others. This behaviour should be modified as needed by using `dynamic_cast` operations. The boolean cast operation is meant to embody "nullness" if that is applicable to the particular type.

6.234.2 Member Function Documentation

6.234.2.1 **virtual Arc::SecAttrValue::operator bool () [virtual]**

This function should return false if the value is to be considered null, e g if it hasn't been set or initialized. In other cases it should return true.

Reimplemented in **Arc::CIStrngValue** (p. 74).

6.234.2.2 **bool Arc::SecAttrValue::operator!= (SecAttrValue & b)**

This is a convenience function to allow the usage of "not equal" conditions and need not be overridden.

6.234.2.3 **bool Arc::SecAttrValue::operator== (SecAttrValue & b)**

This function should (in inheriting classes) return true if this and b are considered to be the same. Identifying and restricting the type of b should be done using `dynamic_cast` operations.

The documentation for this class was generated from the following file:

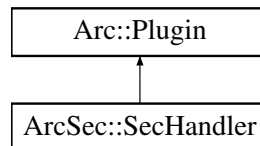
- SecAttrValue.h

6.235 ArcSec::SecHandler Class Reference

Base class for simple security handling plugins.

```
#include <SecHandler.h>
```

Inheritance diagram for ArcSec::SecHandler:



6.235.1 Detailed Description

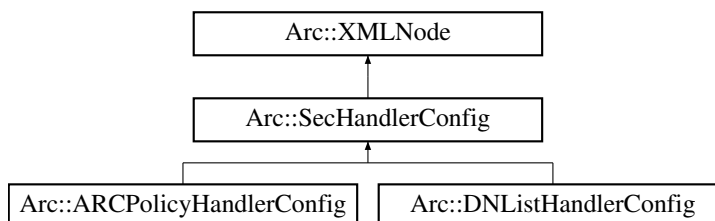
Base class for simple security handling plugins. This virtual class defines method Handle() which processes security related information/attributes in Message and optionally makes security decision. Instances of such classes are normally arranged in chains and are called on incoming and outgoing messages in various MCC and Service plugins. Return value of Handle() defines either processing should continue (true) or stop with error (false). Configuration of **SecHandler** (p. 329) is consumed during creation of instance through XML subtree fed to constructor.

The documentation for this class was generated from the following file:

- SecHandler.h

6.236 Arc::SecHandlerConfig Class Reference

Inheritance diagram for Arc::SecHandlerConfig:



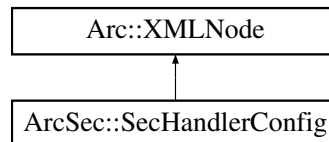
The documentation for this class was generated from the following file:

- ClientInterface.h

6.237 ArcSec::SecHandlerConfig Class Reference

```
#include <SecHandler.h>
```

Inheritance diagram for ArcSec::SecHandlerConfig:



6.237.1 Detailed Description

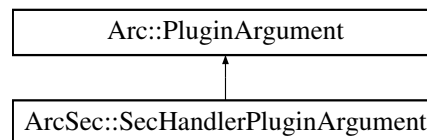
Helper class to create **Security** (p. 331) Handler configuration

The documentation for this class was generated from the following file:

- SecHandler.h

6.238 ArcSec::SecHandlerPluginArgument Class Reference

Inheritance diagram for ArcSec::SecHandlerPluginArgument:



The documentation for this class was generated from the following file:

- SecHandler.h

6.239 ArcSec::Security Class Reference

Common stuff used by security related classes.

```
#include <Security.h>
```

6.239.1 Detailed Description

Common stuff used by security related classes. This class is just a place where to put common stuff that is used by security related classes. So far it only contains a logger.

The documentation for this class was generated from the following file:

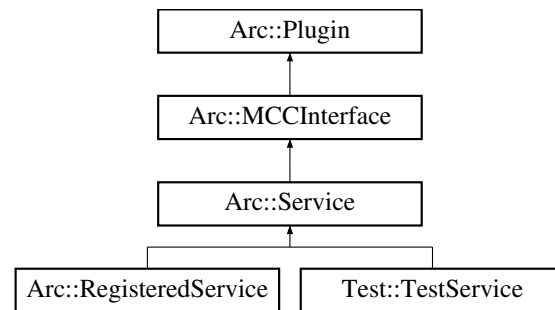
- Security.h

6.240 Arc::Service Class Reference

Service (p. 331) - last component in a **Message** (p. 252) Chain.

```
#include <Service.h>
```

Inheritance diagram for Arc::Service:



Public Member Functions

- **Service** (**Config** *)
- virtual void **AddSecHandler** (**Config** *cfg, **ArcSec::SecHandler** *sechandler, const std::string &label="")
- virtual bool **RegistrationCollector** (**XMLNode** &doc)
- virtual std::string **getID** ()

Protected Member Functions

- bool **ProcessSecHandlers** (**Message** &message, const std::string &label="") const

Protected Attributes

- std::map< std::string, std::list< **ArcSec::SecHandler** * > > **sechandlers_**

Static Protected Attributes

- static **Logger** **logger**

6.240.1 Detailed Description

Service (p. 331) - last component in a **Message** (p. 252) Chain. This class which defines interface and common functionality for every **Service** (p. 331) plugin. Interface is made of method **process()** (p. 249) which is called by **Plexer** (p. 293) or **MCC** (p. 242) class. There is one **Service** (p. 331) object created for every service description processed by **Loader** (p. 228) class objects. Classes derived from **Service** (p. 331) class must implement **process()** (p. 249) method of **MCCInterface** (p. 248). It is up to developer how internal state of service is stored and communicated to other services and external utilities. **Service** (p. 331) is free to expect any type of payload passed to it and generate any payload as well. Useful types depend on MCCs in chain which leads to that service. For example if service is expected to be linked to SOAP **MCC** (p. 242) it must accept and generate messages with **PayloadSOAP** (p. 279) payload. Method **process()** (p. 249) of class derived from **Service** (p. 331) class may be called concurrently in multiple threads. Developers must take that into account and write thread-safe implementation. Simple example of service is provided in `/src/tests/echo/echo.cpp` of source tree. The way to write client counterpart of corresponding service is undefined yet. For example see `/src/tests/echo/test.cpp`.

6.240.2 Constructor & Destructor Documentation

6.240.2.1 `Arc::Service::Service (Config *)`

Example constructor - Server takes at least it's configuration subtree

6.240.3 Member Function Documentation

6.240.3.1 `virtual void Arc::Service::AddSecHandler (Config * cfg, ArcSec::SecHandler * sechandler, const std::string & label = " ") [virtual]`

Add security components/handlers to this **MCC** (p. 242). For more information please see description of **MCC::AddSecHandler** (p. 244)

6.240.3.2 `virtual std::string Arc::Service::getID () [inline, virtual]`

Service (p. 331) may implement own service identifier gathering method. This method return identifier of service which is used for registering it Information Services.

6.240.3.3 `bool Arc::Service::ProcessSecHandlers (Message & message, const std::string & label = " ") const [protected]`

Executes security handlers of specified queue. For more information please see description of **MCC::ProcessSecHandlers** (p. 244)

6.240.3.4 `virtual bool Arc::Service::RegistrationCollector (XMLNode & doc)`
`[virtual]`

Service (p. 331) specific registration collector, used for generate service registrations. In implemented service this method should generate GLUE2 document with part of service description which service wishes to advertise to Information Services.

6.240.4 Field Documentation

6.240.4.1 `Logger Arc::Service::logger` `[static, protected]`

Logger (p. 233) object used to print messages generated by this class.

6.240.4.2 `std::map<std::string,std::list<ArcSec::SecHandler*> >`
`Arc::Service::sechandlers_` `[protected]`

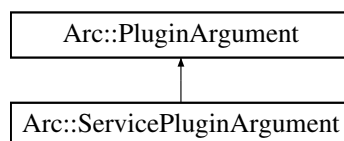
Set of labeled authentication and authorization handlers. **MCC** (p. 242) calls sequence of handlers at specific point depending on associated identifier. in most cases those are "in" and "out" for incoming and outgoing messages correspondingly.

The documentation for this class was generated from the following file:

- Service.h

6.241 Arc::ServicePluginArgument Class Reference

Inheritance diagram for Arc::ServicePluginArgument:



The documentation for this class was generated from the following file:

- Service.h

6.242 Arc::SimpleCondition Class Reference

Simple triggered condition.

```
#include <Thread.h>
```

Public Member Functions

- void **lock** (void)
- void **unlock** (void)
- void **signal** (void)
- void **signal_nonblock** (void)
- void **broadcast** (void)
- void **wait** (void)
- void **wait_nonblock** (void)
- bool **wait** (int t)
- void **reset** (void)

6.242.1 Detailed Description

Simple triggered condition. Provides condition and semaphor objects in one element.

6.242.2 Member Function Documentation

6.242.2.1 void Arc::SimpleCondition::broadcast (void) [inline]

Signal about condition to all waiting threads

6.242.2.2 void Arc::SimpleCondition::lock (void) [inline]

Acquire semaphor

6.242.2.3 void Arc::SimpleCondition::reset (void) [inline]

Reset object to initial state

6.242.2.4 void Arc::SimpleCondition::signal (void) [inline]

Signal about condition

6.242.2.5 void Arc::SimpleCondition::signal_nonblock (void) [inline]

Signal about condition without using semaphor

6.242.2.6 void Arc::SimpleCondition::unlock (void) [inline]

Release semaphor

6.242.2.7 `bool Arc::SimpleCondition::wait (int t)` `[inline]`

Wait for condition no longer than t milliseconds

6.242.2.8 `void Arc::SimpleCondition::wait (void)` `[inline]`

Wait for condition

6.242.2.9 `void Arc::SimpleCondition::wait_nonblock (void)` `[inline]`

Wait for condition without using semaphor

The documentation for this class was generated from the following file:

- Thread.h

6.243 Arc::SimpleCounter Class Reference

Public Member Functions

- `bool wait (int t)`

6.243.1 Member Function Documentation

6.243.1.1 `bool Arc::SimpleCounter::wait (int t)` `[inline]`

Wait for condition no longer than t milliseconds

The documentation for this class was generated from the following file:

- Thread.h

6.244 Arc::SOAPMessage Class Reference

Message (p. 252) restricted to SOAP payload.

```
#include <SOAPMessage.h>
```

Public Member Functions

- `SOAPMessage (void)`
- `SOAPMessage (long msg_ptr_addr)`
- `SOAPMessage (Message &msg)`
- `~SOAPMessage (void)`

- SOAPEnvelope * **Payload** (void)
- void **Payload** (SOAPEnvelope *new_payload)
- MessageAttributes * **Attributes** (void)

6.244.1 Detailed Description

Message (p. 252) restricted to SOAP payload. This is a special **Message** (p. 252) intended to be used in language bindings for programming languages which are not flexible enough to support all kinds of Payloads. It is passed through chain of MCCs and works like the **Message** (p. 252) but can carry only SOAP content.

6.244.2 Constructor & Destructor Documentation

6.244.2.1 Arc::SOAPMessage::SOAPMessage (void) [inline]

Dummy constructor

6.244.2.2 Arc::SOAPMessage::SOAPMessage (long msg_ptr_addr)

Copy constructor. Used by language bindings

6.244.2.3 Arc::SOAPMessage::SOAPMessage (Message & msg)

Copy constructor. Ensures shallow copy.

6.244.2.4 Arc::SOAPMessage::~~SOAPMessage (void)

Destructor does not affect referred objects

6.244.3 Member Function Documentation

6.244.3.1 MessageAttributes* Arc::SOAPMessage::Attributes (void) [inline]

Returns a pointer to the current attributes object or NULL if no attributes object has been assigned.

6.244.3.2 SOAPEnvelope* Arc::SOAPMessage::Payload (void)

Returns pointer to current payload or NULL if no payload assigned.

6.244.3.3 void Arc::SOAPMessage::Payload (SOAPEnvelope * *new_payload*)

Replace payload with a COPY of new one

The documentation for this class was generated from the following file:

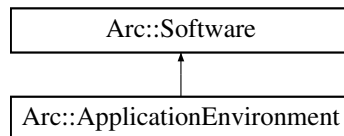
- SOAPMessage.h

6.245 Arc::Software Class Reference

Used to represent software (names and version) and comparison.

```
#include <Software.h>
```

Inheritance diagram for Arc::Software:



Public Types

- enum **ComparisonOperatorEnum** {
NOTEQUAL = 0, **EQUAL** = 1, **GREATERTHAN** = 2, **LESSTHAN** = 3,
GREATERTHANOREQUAL = 4, **LESSTHANOREQUAL** = 5 }
- typedef bool(Software::* **ComparisonOperator**)(const **Software** &) const

Public Member Functions

- **Software** ()
- **Software** (const std::string &name_version)
- **Software** (const std::string &name, const std::string &version)
- **Software** (const std::string &family, const std::string &name, const std::string &version)
- bool **empty** () const
- bool **operator==** (const **Software** &sw) const
- bool **operator!=** (const **Software** &sw) const
- bool **operator>** (const **Software** &sw) const
- bool **operator<** (const **Software** &sw) const
- bool **operator>=** (const **Software** &sw) const
- bool **operator<=** (const **Software** &sw) const
- std::string **operator()** () const
- **operator std::string** (void) const

- `const std::string & getFamily () const`
- `const std::string & getName () const`
- `const std::string & getVersion () const`

Static Public Member Functions

- `static ComparisonOperator convert (const ComparisonOperatorEnum &co)`
- `static std::string toString (ComparisonOperator co)`

Static Public Attributes

- `static const std::string VERSIONTOKENS`

Friends

- `std::ostream & operator<< (std::ostream &out, const Software &sw)`

6.245.1 Detailed Description

Used to represent software (names and version) and comparison. The **Software** (p. 337) class is used to represent the name of a piece of software internally. Generally software are identified by a name and possibly a version number. Some software can also be categorized by type or family (compilers, operating system, etc.). A software object can be compared to other software objects using the comparison operators contained in this class. The basic usage of this class is to test if some specified software requirement (**SoftwareRequirement** (p. 346)) are fulfilled, by using the comparability of the class.

Internally the **Software** (p. 337) object is represented by a family and name identifier, and the software version is tokenized at the characters defined in **VERSIONTOKENS**, and stored as a list of tokens.

6.245.2 Member Typedef Documentation

6.245.2.1 `typedef bool (Software::* Arc::Software::ComparisonOperator)(const Software &) const`

Definition of a comparison operator method pointer.

This `typedef` defines a comparison operator method pointer.

See also

operator== (p. 343),
operator!= (p. 342),
operator> (p. 344),
operator< (p. 343),
operator>= (p. 344),

operator<= (p. 343),
ComparisonOperatorEnum (p. 339).

6.245.3 Member Enumeration Documentation

6.245.3.1 enum Arc::Software::ComparisonOperatorEnum

Comparison operator enum.

The **ComparisonOperatorEnum** (p. 339) enumeration is a 1-1 correspondance between the defined comparison method operators (**Software::ComparisonOperator** (p. 339)), and can be used in circumstances where method pointers are not supported.

Enumerator:

NOTEQUAL see **operator!=** (p. 342)
EQUAL see **operator==** (p. 343)
GREATERTHAN see **operator>** (p. 344)
LESSTHAN see **operator<** (p. 343)
GREATERTHANOREQUAL see **operator>=** (p. 344)
LESSTHANOREQUAL see **operator<=** (p. 343)

6.245.4 Constructor & Destructor Documentation

6.245.4.1 Arc::Software::Software () [inline]

Dummy constructor.

This constructor creates a empty object.

6.245.4.2 Arc::Software::Software (const std::string & name_version)

Create a **Software** (p. 337) object.

Create a **Software** (p. 337) object from a single string composed of a name and a version part. The created object will contain a empty family part. The name and version part of the string will be split at the first occurrence of a dash (-) which is followed by a digit (0-9). If the string does not contain such a pattern, the passed string will be taken to be the name and version will be empty.

Parameters

<i>name_version</i>	should be a string composed of the name and version of the software to represent.
---------------------	---

6.245.4.3 `Arc::Software::Software (const std::string & name, const std::string & version)`

Create a **Software** (p. 337) object.

Create a **Software** (p. 337) object with the specified name and version. The family part will be left empty.

Parameters

<i>name</i>	the software name to represent.
<i>version</i>	the software version to represent.

6.245.4.4 `Arc::Software::Software (const std::string & family, const std::string & name, const std::string & version)`

Create a **Software** (p. 337) object.

Create a **Software** (p. 337) object with the specified family, name and version.

Parameters

<i>family</i>	the software family to represent.
<i>name</i>	the software name to represent.
<i>version</i>	the software version to represent.

6.245.5 Member Function Documentation

6.245.5.1 `static ComparisonOperator Arc::Software::convert (const ComparisonOperatorEnum & co) [static]`

Convert a **ComparisonOperatorEnum** (p. 339) value to a comparison method pointer.

The passed **ComparisonOperatorEnum** (p. 339) will be converted to a comparison method pointer defined by the **Software::ComparisonOperator** (p. 339) typedef.

This static method is not defined in language bindings created with Swig, since method pointers are not supported by Swig.

Parameters

<i>co</i>	a ComparisonOperatorEnum (p. 339) value.
-----------	---

Returns

A method pointer to a comparison method is returned.

6.245.5.2 `bool Arc::Software::empty () const [inline]`

Indicates whether the object is empty.

Returns

`true` if the name of this object is empty, otherwise `false`.

6.245.5.3 `const std::string& Arc::Software::getFamily () const` [inline]

Get family.

Returns

The family the represented software belongs to is returned.

6.245.5.4 `const std::string& Arc::Software::getName () const` [inline]

Get name.

Returns

The name of the represented software is returned.

6.245.5.5 `const std::string& Arc::Software::getVersion () const` [inline]

Get version.

Returns

The version of the represented software is returned.

6.245.5.6 `Arc::Software::operator std::string (void) const` [inline]

Cast to string.

This casting operator behaves exactly as `operator()()` (p. 342) does. The cast is used like `(std::string) <software-object>`.

See also

`operator()()` (p. 342).

References `operator()()`.

6.245.5.7 `bool Arc::Software::operator!= (const Software & sw) const` [inline]

Inequality operator (non-trivial behaviour).

The inequality operator should be used to test if two **Software** (p. 337) objects are of different versions but share the same name and family. So it should not be used to test

if two **Software** (p. 337) objects differ in either name, version or family. Two **Software** (p. 337) objects are unequal if they share the same name and family but have different versions and the versions are non-empty.

Parameters

<i>sw</i>	is the RHS Software (p. 337) object.
-----------	---

Returns

`true` when the two objects are unequal, otherwise `false`.

6.245.5.8 `std::string Arc::Software::operator() () const`

Get string representation.

Returns the string representation of this object, which is 'family'-'name'-'version'.

Returns

The string representation of this object is returned.

See also

`operator std::string()`.

Referenced by `operator std::string()`.

6.245.5.9 `bool Arc::Software::operator< (const Software & sw) const [inline]`

Less-than operator.

The behaviour of this less-than operator is equivalent to the greater-than operator (`operator>()` (p. 344)) with the LHS and RHS swapped.

Parameters

<i>sw</i>	is the RHS object.
-----------	--------------------

Returns

`true` if the LHS is less than the RHS, otherwise `false`.

See also

`operator>()` (p. 344).

6.245.5.10 `bool Arc::Software::operator<= (const Software & sw) const [inline]`

Less-than or equal operator.

The LHS object is greater than or equal to the RHS object if the LHS equal the RHS (**operator==()** (p. 343)) or if the LHS is greater than the RHS (**operator>()** (p. 344)).

Parameters

<i>sw</i>	is the RHS object.
-----------	--------------------

Returns

`true` if the LHS is less than or equal the RHS, otherwise `false`.

See also

operator==() (p. 343),
operator<() (p. 343).

6.245.5.11 `bool Arc::Software::operator==(const Software & sw) const [inline]`

Equality operator.

Two **Software** (p. 337) objects are equal if they are of the same family, and if they have the same name. If BOTH objects specifies a version they must also equal, for the objects to be equal. Otherwise the two objects does not equal. This operator can also be represented by the **Software::EQUAL** (p. 340) **ComparisonOperatorEnum** (p. 339) value.

Parameters

<i>sw</i>	is the RHS Software (p. 337) object.
-----------	---

Returns

`true` when the two objects equals, otherwise `false`.

6.245.5.12 `bool Arc::Software::operator> (const Software & sw) const`

Greater-than operator.

For the LHS object to be greater than the RHS object they must first share the same family and name and have non-empty versions. Then, the first version token of each object is compared and if they are identical, the two next version tokens will be compared. If not identical, the two tokens will be parsed as integers, and if parsing fails the LHS is not greater than the RHS. If parsing succeeds and the integers equals, the two next tokens will be compared, otherwise the comparison is resolved by the integer comparison.

If the LHS contains more version tokens than the RHS, and the comparison have not been resolved at the point of equal number of tokens, then if the additional tokens contains a token which cannot be parsed to a integer the LHS is not greater than the RHS. If the parsed integer is not 0 then the LHS is greater than the RHS. If the rest of the additional tokens are 0, the LHS is not greater than the RHS.

If the RHS contains more version tokens than the LHS and comparison have not been resolved at the point of equal number of tokens, or simply if comparison have not been resolved at the point of equal number of tokens, then the LHS is not greater than the RHS.

Parameters

<i>sw</i>	is the RHS object.
-----------	--------------------

Returns

`true` if the LHS is greater than the RHS, otherwise `false`.

6.245.5.13 `bool Arc::Software::operator>= (const Software & sw) const` `[inline]`

Greater-than or equal operator.

The LHS object is greater than or equal to the RHS object if the LHS equal the RHS (`operator==()` (p. 343)) or if the LHS is greater than the RHS (`operator>()` (p. 344)).

Parameters

<i>sw</i>	is the RHS object.
-----------	--------------------

Returns

`true` if the LHS is greater than or equal the RHS, otherwise `false`.

See also

`operator==()` (p. 343),
`operator>()` (p. 344).

6.245.5.14 `static std::string Arc::Software::toString (ComparisonOperator co)`
`[static]`

Convert `Software::ComparisonOperator` (p. 339) to a string.

This method is not available in language bindings created by Swig, since method pointers are not supported by Swig.

Parameters

<i>co</i>	is a <code>Software::ComparisonOperator</code> (p. 339).
-----------	--

Returns

The string representation of the passed `Software::ComparisonOperator` (p. 339) is returned.

6.245.6 Friends And Related Function Documentation

6.245.6.1 `std::ostream& operator<< (std::ostream & out, const Software & sw)`
`[friend]`

Write **Software** (p. 337) string representation to a `std::ostream`.

Write the string representation of a **Software** (p. 337) object to a `std::ostream`.

Parameters

<i>out</i>	is a <code>std::ostream</code> to write the string representation of the Software (p. 337) object to.
<i>sw</i>	is the Software (p. 337) object to write to the <code>std::ostream</code> .

Returns

The passed `std::ostream` *out* is returned.

6.245.7 Field Documentation

6.245.7.1 `const std::string Arc::Software::VERSIONTOKENS` `[static]`

Tokens used to split version string.

This string constant specifies which tokens will be used to split the version string.

The documentation for this class was generated from the following file:

- Software.h

6.246 Arc::SoftwareRequirement Class Reference

Class used to express and resolve version requirements on software.

```
#include <Software.h>
```

Public Member Functions

- **SoftwareRequirement** (bool requiresAll=false)
- **SoftwareRequirement** (const **Software** &sw, **Software::ComparisonOperator** swComOp=&Software::operator==, bool requiresAll=false)
- **SoftwareRequirement** (const **Software** &sw, **Software::ComparisonOperatorEnum** co, bool requiresAll=false)
- **SoftwareRequirement & operator=** (const **SoftwareRequirement** &sr)
- **SoftwareRequirement** (const **SoftwareRequirement** &sr)
- void **add** (const **Software** &sw, **Software::ComparisonOperator** swComOp=&Software::operator==)
- void **add** (const **Software** &sw, **Software::ComparisonOperatorEnum** co)
- bool **isRequiringAll** () const

- void **setRequirement** (bool all)
- bool **isSatisfied** (const **Software** &sw) const
- bool **isSatisfied** (const std::list< **Software** > &swList) const
- bool **isSatisfied** (const std::list< **ApplicationEnvironment** > &swList) const
- bool **selectSoftware** (const **Software** &sw)
- bool **selectSoftware** (const std::list< **Software** > &swList)
- bool **selectSoftware** (const std::list< **ApplicationEnvironment** > &swList)
- bool **isResolved** () const
- bool **empty** () const
- void **clear** ()
- const std::list< **Software** > & **getSoftwareList** () const
- const std::list< **Software::ComparisonOperator** > & **getComparisonOperatorList** () const

6.246.1 Detailed Description

Class used to express and resolve version requirements on software. A requirement in this class is defined as a pair composed of a **Software** (p. 337) object and either a **Software::ComparisonOperator** (p. 339) method pointer or equally a **Software::ComparisonOperatorEnum** (p. 339) enum value. A **SoftwareRequirement** (p. 346) object can contain multiple of such requirements, and then it can specified if all these requirements should be satisfied, or if it is enough to satisfy only one of them. The requirements can be satisfied by a single **Software** (p. 337) object or a list of either **Software** (p. 337) or **ApplicationEnvironment** (p. 54) objects, by using the method **isSatisfied()** (p. 351). This class also contain a number of methods (**selectSoftware()** (p. 353)) to select **Software** (p. 337) objects which are satisfying the requirements, and in this way resolving requirements.

6.246.2 Constructor & Destructor Documentation

6.246.2.1 Arc::SoftwareRequirement::SoftwareRequirement (bool *requiresAll* = false) [inline]

Create a empty **SoftwareRequirement** (p. 346) object.

The created **SoftwareRequirement** (p. 346) object will contain no requirements.

Parameters

<i>requiresAll</i>	indicates whether the all requirements have to be satisfied (<code>true</code>) or if only a single one (<code>false</code>), the default is that only a single requirement need to be satisfied.
--------------------	---

6.246.2.2 Arc::SoftwareRequirement::SoftwareRequirement (const **Software** & sw, **Software::ComparisonOperator** swComOp = &Software::operator==, bool *requiresAll* = false)

Create a **SoftwareRequirement** (p. 346) object.

The created **SoftwareRequirement** (p. 346) object will contain one requirement specified by the **Software** (p. 337) object *sw*, and the **Software::ComparisonOperator** (p. 339) *swComOp*.

This constructor is not available in language bindings created by Swig, since method pointers are not supported by Swig, see **SoftwareRequirement(const Software&, Software::ComparisonOperatorEnum, bool)** (p. 348) instead.

Parameters

<i>sw</i>	is the Software (p. 337) object of the requirement to add.
<i>swComOp</i>	is the Software::ComparisonOperator (p. 339) of the requirement to add.
<i>requiresAll</i>	indicates whether the all requirements have to be satisfied (<code>true</code>) or if only a single one (<code>false</code>), the default is that only a single requirement need to be satisfied.

6.246.2.3 Arc::SoftwareRequirement::SoftwareRequirement (const Software & *sw*, Software::ComparisonOperatorEnum *co*, bool *requiresAll* = false)

Create a **SoftwareRequirement** (p. 346) object.

The created **SoftwareRequirement** (p. 346) object will contain one requirement specified by the **Software** (p. 337) object *sw*, and the **Software::ComparisonOperatorEnum** (p. 339) *co*.

Parameters

<i>sw</i>	is the Software (p. 337) object of the requirement to add.
<i>co</i>	is the Software::ComparisonOperatorEnum (p. 339) of the requirement to add.
<i>requiresAll</i>	indicates whether the all requirements have to be satisfied (<code>true</code>) or if only a single one (<code>false</code>), the default is that only a single requirement need to be satisfied.

6.246.2.4 Arc::SoftwareRequirement::SoftwareRequirement (const SoftwareRequirement & *sr*) [inline]

Copy constructor.

Create a **SoftwareRequirement** (p. 346) object from another **SoftwareRequirement** (p. 346) object.

Parameters

<i>sr</i>	is the SoftwareRequirement (p. 346) object to make a copy of.
-----------	--

6.246.3 Member Function Documentation

6.246.3.1 `void Arc::SoftwareRequirement::add (const Software & sw, Software::ComparisonOperator swComOp = &Software::operator==)`

Add a **Software** (p. 337) object a corresponding comparion operator to this object.

Adds software name and version to list of requirements and associates the comparison operator with it (equality by default).

This method is not available in language bindings created by Swig, since method pointers are not supported by Swig, see `add(const Software&, Software::ComparisonOperatorEnum)` (p. 349) instead.

Parameters

<i>sw</i>	is the Software (p. 337) object to add as part of a requirement.
<i>swComOp</i>	is the Software::ComparisonOperator (p. 339) method pointer to add as part of a requirement, the default operator will be Software::operator==() (p. 343).

6.246.3.2 `void Arc::SoftwareRequirement::add (const Software & sw, Software::ComparisonOperatorEnum co)`

Add a **Software** (p. 337) object a corresponding comparion operator to this object.

Adds software name and version to list of requirements and associates the comparison operator with it (equality by default).

Parameters

<i>sw</i>	is the Software (p. 337) object to add as part of a requirement.
<i>co</i>	is the Software::ComparisonOperatorEnum (p. 339) value to add as part of a requirement, the default enum will be Software::EQUAL (p. 340).

6.246.3.3 `void Arc::SoftwareRequirement::clear () [inline]`

Clear the object.

The requirements in this object will be cleared when invoking this method.

6.246.3.4 `bool Arc::SoftwareRequirement::empty () const [inline]`

Test if the object is empty.

Returns

`true` if this object do no contain any requirements, otherwise `false`.

6.246.3.5 `const std::list<Software::ComparisonOperator>&
Arc::SoftwareRequirement::getComparisonOperatorList () const [inline]`

Get list of comparison operators.

Returns

The list of internally stored comparison operators is returned.

See also

Software::ComparisonOperator (p. 339),
getSoftwareList (p. 349).

6.246.3.6 `const std::list<Software>& Arc::SoftwareRequirement::getSoftwareList () const
[inline]`

Get list of **Software** (p. 337) objects.

Returns

The list of internally stored **Software** (p. 337) objects is returned.

See also

Software (p. 337),
getComparisonOperatorList (p. 349).

6.246.3.7 `bool Arc::SoftwareRequirement::isRequiringAll () const [inline]`

Indicates whether all requirements has to be satisfied.

This method returns `true` if all requirements has to be satisfied. If only one requirement has to be satisfied, `false` is returned.

Returns

`true` if all requirements has to be satisfied, otherwise `false`.

See also

setRequirement (p. 354).

6.246.3.8 `bool Arc::SoftwareRequirement::isResolved () const`

Indicates whether requirements have been resolved or not.

If specified that only one requirement has to be satisfied, then for this object to be resolved it can only contain one requirement and it has use the equal operator (**Software::operator==** (p. 343)).

If specified that all requirements has to be satisfied, then for this object to be resolved each requirement must have a **Software** (p. 337) object with a unique family/name composition, i.e. no other requirements have a **Software** (p. 337) object with the same family/name composition, and each requirement must use the equal operator (**Software::operator==** (p. 343)).

If this object has been resolved then `true` is returned when invoking this method, otherwise `false` is returned.

Returns

`true` if this object have been resolved, otherwise `false`.

6.246.3.9 `bool Arc::SoftwareRequirement::isSatisfied (const std::list< ApplicationEnvironment > & swList) const`

Test if requirements are satisfied.

This method behaves in exactly the same way as the **isSatisfied(const Software& const** (p. 351) method does.

Parameters

<i>swList</i>	is the list of ApplicationEnvironment (p. 54) objects which should be used to try satisfy the requirements.
---------------	--

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

isSatisfied(const Software&) const (p. 351),
isSatisfied(const std::list<Software>&) const (p. 351),
selectSoftware(const std::list<ApplicationEnvironment>&) (p. 353),
isResolved() const (p. 350).

6.246.3.10 `bool Arc::SoftwareRequirement::isSatisfied (const Software & sw) const`
`[inline]`

Test if requirements are satisfied.

Returns `true` if the requirements are satisfied by the specified **Software** (p. 337) *sw*, otherwise `false` is returned.

Parameters

<i>sw</i>	is the Software (p. 337) which should satisfy the requirements.
-----------	--

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

`isSatisfied(const std::list<Software>&) const` (p. 351),
`isSatisfied(const std::list<ApplicationEnvironment>&) const` (p. 350),
`selectSoftware(const Software&) (p. 353),`
`isResolved() const` (p. 350).

References `isSatisfied()`.

Referenced by `isSatisfied()`.

6.246.3.11 `bool Arc::SoftwareRequirement::isSatisfied (const std::list< Software > & swList) const`

Test if requirements are satisfied.

Returns `true` if stored requirements are satisfied by software specified in *swList*, otherwise `false` is returned.

Note that if all requirements must be satisfied and multiple requirements exist having identical name and family all these requirements should be satisfied by a single **Software** (p. 337) object.

Parameters

<i>swList</i>	is the list of Software (p. 337) objects which should be used to try satisfy the requirements.
---------------	---

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

`isSatisfied(const Software&) const` (p. 351),
`isSatisfied(const std::list<ApplicationEnvironment>&) const` (p. 350),
`selectSoftware(const std::list<Software>&) (p. 352),`
`isResolved() const` (p. 350).

6.246.3.12 `SoftwareRequirement& Arc::SoftwareRequirement::operator= (const SoftwareRequirement & sr)`

Assignment operator.

Set this object equal to that of the passed **SoftwareRequirement** (p. 346) object *sr*.

Parameters

<i>sr</i>	is the SoftwareRequirement (p. 346) object to set object equal to.
-----------	---

6.246.3.13 `bool Arc::SoftwareRequirement::selectSoftware (const std::list< Software > & swList)`

Select software.

If the passed list of **Software** (p. 337) objects *swList* do not satisfy the requirements `false` is returned and this object is not modified. If however the list of **Software** (p. 337) objects *swList* do satisfy the requirements `true` is returned and the **Software** (p. 337) objects satisfying the requirements will replace these with the equality operator (**Software::operator==** (p. 343)) used as the comparator for the new requirements.

Note that if all requirements must be satisfied and multiple requirements exist having identical name and family all these requirements should be satisfied by a single **Software** (p. 337) object and it will replace all these requirements.

Parameters

<i>swList</i>	is a list of Software (p. 337) objects used to satisfy requirements.
---------------	---

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

`selectSoftware(const Software&)` (p. 353),
`selectSoftware(const std::list<ApplicationEnvironment>&)` (p. 353),
`isSatisfied(const std::list<Software>&) const` (p. 351),
`isResolved() const` (p. 350).

6.246.3.14 `bool Arc::SoftwareRequirement::selectSoftware (const Software & sw) [inline]`

Select software.

If the passed **Software** (p. 337) *sw* do not satisfy the requirements `false` is returned and this object is not modified. If however the **Software** (p. 337) object *sw* do satisfy the requirements `true` is returned and the requirements are set to equal the *sw* **Software** (p. 337) object.

Parameters

<i>sw</i>	is the Software (p. 337) object used to satisfy requirements.
-----------	--

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

`selectSoftware(const std::list<Software>&)` (p. 352),
`selectSoftware(const std::list<ApplicationEnvironment>&)` (p. 353),
`isSatisfied(const Software&) const` (p. 351),

isResolved() const (p. 350).

References selectSoftware().

Referenced by selectSoftware().

6.246.3.15 **bool Arc::SoftwareRequirement::selectSoftware (const std::list<ApplicationEnvironment> & swList)**

Select software.

This method behaves exactly as the **selectSoftware(const std::list<Software>&)** (p. 352) method does.

Parameters

<i>swList</i>	is a list of ApplicationEnvironment (p. 54) objects used to satisfy requirements.
---------------	--

Returns

`true` if requirements are satisfied, otherwise `false`.

See also

selectSoftware(const Software&) (p. 353),
selectSoftware(const std::list<Software>&) (p. 352),
isSatisfied(const std::list<ApplicationEnvironment>&) const (p. 350),
isResolved() const (p. 350).

6.246.3.16 **void Arc::SoftwareRequirement::setRequirement (bool all) [inline]**

Set relation between requirements.

Specifies if all requirements stored need to be satisfied or if it is enough to satisfy only one of them.

Parameters

<i>all</i>	is a boolean specifying if all requirements has to be satisfied.
------------	--

See also

isRequiringAll() (p. 350).

The documentation for this class was generated from the following file:

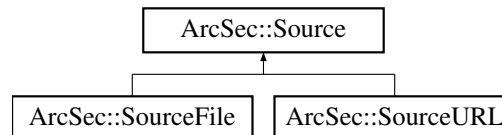
- Software.h

6.247 ArcSec::Source Class Reference

Acquires and parses XML document from specified source.

```
#include <Source.h>
```

Inheritance diagram for ArcSec::Source:



Public Member Functions

- **Source** (const **Source** &s)
- **Source** (**Arc::XMLNode** &xml)
- **Source** (std::istream &stream)
- **Source** (**Arc::URL** &url)
- **Source** (const std::string &str)
- **Arc::XMLNode Get** (void) const
- **operator bool** (void)

6.247.1 Detailed Description

Acquires and parses XML document from specified source. This class is to be used to provide easy way to specify different sources for XML Authorization Policies and Requests.

6.247.2 Constructor & Destructor Documentation

6.247.2.1 ArcSec::Source::Source (const Source & s) [inline]

Copy constructor.

Use this constructor only for temporary objects. Parsed XML document is still owned by copied source and hence lifetime of create object should not exceed that of copied one.

6.247.2.2 ArcSec::Source::Source (Arc::URL & url)

Fetch XML document from specified url and parse it.

This constructor is not implemented yet.

The documentation for this class was generated from the following file:

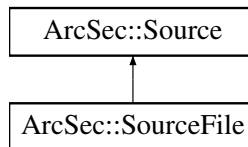
- Source.h

6.248 ArcSec::SourceFile Class Reference

Convenience class for obtaining XML document from file.

```
#include <Source.h>
```

Inheritance diagram for ArcSec::SourceFile:



Public Member Functions

- **SourceFile** (const **SourceFile** &s)
- **SourceFile** (const char *name)
- **SourceFile** (const std::string &name)

6.248.1 Detailed Description

Convenience class for obtaining XML document from file.

The documentation for this class was generated from the following file:

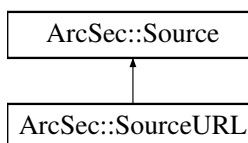
- Source.h

6.249 ArcSec::SourceURL Class Reference

Convenience class for obtaining XML document from remote URL.

```
#include <Source.h>
```

Inheritance diagram for ArcSec::SourceURL:



Public Member Functions

- **SourceURL** (const **SourceURL** &s)
- **SourceURL** (const char *url)
- **SourceURL** (const std::string &url)

6.249.1 Detailed Description

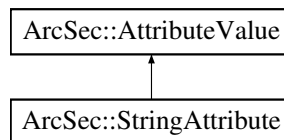
Convenience class for obtaining XML document from remote URL.

The documentation for this class was generated from the following file:

- Source.h

6.250 ArcSec::StringAttribute Class Reference

Inheritance diagram for ArcSec::StringAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.250.1 Member Function Documentation

6.250.1.1 virtual std::string ArcSec::StringAttribute::encode () [inline, virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.250.1.2 virtual bool ArcSec::StringAttribute::equal (**AttributeValue** * value, bool check_id =true) [virtual]

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.250.1.3 `virtual std::string ArcSec::StringAttribute::getId () [inline, virtual]`

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.250.1.4 `virtual std::string ArcSec::StringAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

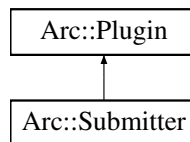
- StringAttribute.h

6.251 Arc::Submitter Class Reference

Base class for the Submitters.

```
#include <Submitter.h>
```

Inheritance diagram for Arc::Submitter:



Public Member Functions

- **URL Submit** (const **JobDescription** &jobdesc, const **ExecutionTarget** &et)
- **URL Migrate** (const **URL** &jobid, const **JobDescription** &jobdesc, const **ExecutionTarget** &et, bool forcemigration)

Protected Attributes

- const **ExecutionTarget** * target

6.251.1 Detailed Description

Base class for the Submitters. **Submitter** (p. 357) is the base class for Grid middleware specialized **Submitter** (p. 357) objects. The class submits job(s) to the computing resource it represents and uploads (needed by the job) local input files.

6.251.2 Member Function Documentation

6.251.2.1 `URL Arc::Submitter::Migrate (const URL & jobid, const JobDescription & jobdesc, const ExecutionTarget & et, bool forcemigration)`

This virtual method should be overridden by plugins which should be capable of migrating jobs. The active job which should be migrated is pointed to by the **URL** (p. 379) *jobid*, and is represented by the **JobDescription** (p. 222) *jobdesc*. The *forcemigration* boolean specifies if the migration should succeed if the active job cannot be terminated. The protected method `AddJob` can be used to save job information. This method should return the **URL** (p. 379) of the migrated job. In case migration fails an empty **URL** (p. 379) should be returned.

6.251.2.2 `URL Arc::Submitter::Submit (const JobDescription & jobdesc, const ExecutionTarget & et)`

This virtual method should be overridden by plugins which should be capable of submitting jobs, defined in the **JobDescription** (p. 222) *jobdesc*, to the **ExecutionTarget** (p. 175) *et*. The protected convenience method `AddJob` can be used to save job information. This method should return the **URL** (p. 379) of the submitted job. In case submission fails an empty **URL** (p. 379) should be returned.

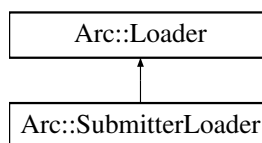
The documentation for this class was generated from the following file:

- `Submitter.h`

6.252 `Arc::SubmitterLoader` Class Reference

```
#include <Submitter.h>
```

Inheritance diagram for `Arc::SubmitterLoader`:



Public Member Functions

- `SubmitterLoader ()`
- `~SubmitterLoader ()`
- `Submitter * load (const std::string &name, const UserConfig &usercfg)`
- `const std::list< Submitter * > & GetSubmitters () const`

6.252.1 Detailed Description

Class responsible for loading **Submitter** (p. 357) plugins The **Submitter** (p. 357) objects returned by a **SubmitterLoader** (p. 359) must not be used after the **SubmitterLoader** (p. 359) goes out of scope.

6.252.2 Constructor & Destructor Documentation

6.252.2.1 Arc::SubmitterLoader::SubmitterLoader ()

Constructor Creates a new **SubmitterLoader** (p. 359).

6.252.2.2 Arc::SubmitterLoader::~~SubmitterLoader ()

Destructor Calling the destructor destroys all Submitters loaded by the **SubmitterLoader** (p. 359) instance.

6.252.3 Member Function Documentation

6.252.3.1 const std::list<Submitter*>& Arc::SubmitterLoader::GetSubmitters () const [inline]

Retrieve the list of loaded Submitters.

Returns

A reference to the list of Submitters.

6.252.3.2 Submitter* Arc::SubmitterLoader::load (const std::string & name, const UserConfig & usercfg)

Load a new **Submitter** (p. 357)

Parameters

<i>name</i>	The name of the Submitter (p. 357) to load.
<i>usercfg</i>	The UserConfig (p. 390) object for the new Submitter (p. 357).

Returns

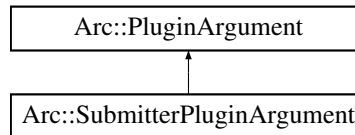
A pointer to the new **Submitter** (p. 357) (NULL on error).

The documentation for this class was generated from the following file:

- Submitter.h

6.253 Arc::SubmitterPluginArgument Class Reference

Inheritance diagram for Arc::SubmitterPluginArgument:



The documentation for this class was generated from the following file:

- Submitter.h

6.254 Arc::TargetGenerator Class Reference

Target generation class

```
#include <TargetGenerator.h>
```

Public Member Functions

- **TargetGenerator** (const **UserConfig** &usercfg, unsigned int startRetrieval=0)
- void **GetTargets** (int targetType, int detailLevel)
- void **RetrieveExecutionTargets** ()
- void **RetrieveJobs** ()
- const std::list< **ExecutionTarget** > & **GetExecutionTargets** () const
- std::list< **ExecutionTarget** > & **ModifyFoundTargets** ()
- const std::list< **ExecutionTarget** > & **FoundTargets** () const
- const std::list< **XMLNode** * > & **FoundJobs** () const
- const std::list< **Job** > & **GetJobs** () const
- bool **AddService** (const std::string Flavour, const **URL** &url)
- bool **AddIndexServer** (const std::string Flavour, const **URL** &url)
- void **AddTarget** (const **ExecutionTarget** &target)
- void **AddJob** (const **XMLNode** &job)
- void **AddJob** (const **Job** &job)
- void **PrintTargetInfo** (bool longlist) const
- void **SaveTargetInfoToStream** (std::ostream &out, bool longlist) const
- **SimpleCounter** & **ServiceCounter** (void)

6.254.1 Detailed Description

Target generation class The **TargetGenerator** (p. 360) class is the umbrella class for resource discovery and information retrieval (index servers and execution services). It can also be used to discover user Grid jobs and detailed information. The **TargetGenerator** (p. 360) loads **TargetRetriever** (p. 366) plugins (which implements the actual information retrieval) from **URL** (p. 379) objects found in the **UserConfig** (p. 390) object passed to its constructor using the custom **TargetRetrieverLoader** (p. 368).

6.254.2 Constructor & Destructor Documentation

6.254.2.1 `Arc::TargetGenerator::TargetGenerator (const UserConfig & usercfg, unsigned int startRetrieval = 0)`

Create a **TargetGenerator** (p. 360) object.

Default constructor to create a TargetGenerator. The constructor reads the computing and index service **URL** (p. 379) objects from the passed **UserConfig** (p. 390) object using the **UserConfig** (p. 390):GetSelectedServices method. From each **URL** (p. 379) a matching specialized **TargetRetriever** (p. 366) plugin is loaded using the **TargetRetrieverLoader** (p. 368). If the second parameter, startRetrieval, is specified, and matches bitwise either a value of 1, 2 or both, retrieval of execution services, jobs or both will be initiated.

Parameters

<i>usercfg</i>	is a reference to a UserConfig (p. 390) object from which endpoints to execution and/or index services will be used. The object also hold information about user credentials.
<i>startRetrival</i>	specifies whether retrival should be started directly. It will be parsed bitwise. A value of 1 will start execution service retrieval (RetrieveExecutionTargets), 2 jobs (RetrieveJobs), and 3 both, while 0 will not start retrieval at all. If not specified, default is 0.

6.254.3 Member Function Documentation

6.254.3.1 `bool Arc::TargetGenerator::AddIndexServer (const std::string Flavour, const URL & url)`

Add a new index server to the foundIndexServers list.

Method to add a new index server to the list of foundIndexServers in a thread secure way. Compares the argument **URL** (p. 379) against the servers returned by **UserConfig::GetRejectedServices** (p. 404) and only allows to add the service if not specifically rejected.

Parameters

<i>flavour</i>	The flavour if the the index server.
<i>url</i>	URL (p. 379) pointing to the index server.

6.254.3.2 void Arc::TargetGenerator::AddJob (const XMLNode & job)

DEPRECATED: Add a new **Job** (p. 210) to this object.

This method is DEPRECATED, use the **AddJob(const Job&)** (p. 362) method instead. Method to add a new **Job** (p. 210) (usually discovered by a **TargetRetriever** (p. 366)) to the internal list of jobs in a thread secure way.

Parameters

<i>job</i>	XMLNode (p. 455) describing the job.
------------	---

6.254.3.3 void Arc::TargetGenerator::AddJob (const Job & job)

Add a new **Job** (p. 210) to this object.

Method to add a new **Job** (p. 210) (usually discovered by a **TargetRetriever** (p. 366)) to the internal list of jobs in a thread secure way.

Parameters

<i>job</i>	Job (p. 210) describing the job.
------------	---

See also

AddJob(const Job&) (p. 362)

6.254.3.4 bool Arc::TargetGenerator::AddService (const std::string Flavour, const URL & url)

Add a new computing service to the foundServices list.

Method to add a new service to the list of foundServices in a thread secure way. Compares the argument **URL** (p. 379) against the services returned by **UserConfig::GetRejectedServices** (p. 404) and only allows to add the service if not specifically rejected.

Parameters

<i>flavour</i>	The flavour if the the computing service.
<i>url</i>	URL (p. 379) pointing to the information system of the computing service.

6.254.3.5 void Arc::TargetGenerator::AddTarget (const ExecutionTarget & target)

Add a new **ExecutionTarget** (p. 175) to the foundTargets list.

Method to add a new **ExecutionTarget** (p. 175) (usually discovered by a **TargetRetriever** (p. 366)) to the list of foundTargets in a thread secure way.

Parameters

<i>target</i>	ExecutionTarget (p. 175) to be added.
---------------	--

6.254.3.6 `const std::list<XMLNode*>& Arc::TargetGenerator::FoundJobs () const`

DEPRECATED: Return jobs found by GetTargets.

This method is DEPRECATED, use the GetFoundJobs method instead. Method to return the list of jobs found by a call to the GetJobs method.

Returns

A list of jobs in XML format is returned.

6.254.3.7 `const std::list<ExecutionTarget>& Arc::TargetGenerator::FoundTargets ()
const [inline]`

DEPRECATED: Return targets found by GetTargets.

This method is DEPRECATED, use the **FoundTargets()** (p. 363) instead. Method to return the list of **ExecutionTarget** (p. 175) objects (currently only supported Target type) found by the GetTarget method.

6.254.3.8 `const std::list<ExecutionTarget>& Arc::TargetGenerator::GetExecutionTargets () const [inline]`

Return targets fetched by RetrieveExecutionTargets method.

Method to return a const list of **ExecutionTarget** (p. 175) objects retrieved by the RetrieveExecutionTargets method.

See also

RetrieveExecutionTargets (p. 365)
GetExecutionTargets (p. 363)

6.254.3.9 `const std::list<Job>& Arc::TargetGenerator::GetJobs () const [inline]`

Return jobs retrieved by RetrieveJobs method.

Method to return the list of jobs found by a call to the GetJobs method.

Returns

A list of the discovered jobs as **Job** (p. 210) objects is returned

See also

RetrieveJobs (p. 365)

6.254.3.10 void Arc::TargetGenerator::GetTargets (int *targetType*, int *detailLevel*)

DEPRECATED: Find available targets.

This method is DEPRECATED, use the **RetrieveExecutionTargets()** (p. 365) or **RetrieveJobs()** (p. 365) method instead. Method to prepare a list of chosen Targets with a specified detail level. Current implementation supports finding computing elements (**ExecutionTarget** (p. 175)) with full detail level and jobs with limited detail level.

Parameters

<i>targetType</i>	0 = ExecutionTarget (p. 175), 1 = Grid jobs
<i>detailLevel</i>	

See also

RetrieveExecutionsTargets()
RetrieveJobs() (p. 365)

6.254.3.11 std::list<ExecutionTarget>& Arc::TargetGenerator::ModifyFoundTargets ()

DEPRECATED: Return targets found by GetTargets.

This method is DEPRECATED, use the **FoundTargets()** (p. 363) instead. Method to return the list of **ExecutionTarget** (p. 175) objects (currently only supported Target type) found by the GetTarget method.

6.254.3.12 void Arc::TargetGenerator::PrintTargetInfo (bool *longlist*) const

DEPRECATED: Prints target information.

This method is DEPRECATED, use the SaveTargetInfoToStream method instead. Method to print information of the found targets to std::cout.

Parameters

<i>longlist</i>	false for minimal information, true for detailed information
-----------------	--

See also

SaveTargetInfoToStream (p. 365)

6.254.3.13 void Arc::TargetGenerator::RetrieveExecutionTargets ()

Retrieve available execution services.

The endpoints specified in the **UserConfig** (p. 390) object passed to this object will be used to retrieve information about execution services (**ExecutionTarget** (p. 175) objects). The discovery and information retrieval of targets is carried out in parallel

threads to speed up the process. If a endpoint is a index service each execution service registered will be queried.

See also

RetrieveJobs (p. 365)

GetExecutionTargets (p. 363)

6.254.3.14 void Arc::TargetGenerator::RetrieveJobs ()

Retrieve job information from execution services.

The endpoints specified in the **UserConfig** (p. 390) object passed to this object will be used to retrieve job information from these endpoints. Only jobs owned by the user which is identified by the credentials specified in the passed **UserConfig** (p. 390) object will be considered (exception being services which has no user authentication). If a endpoint is a index service, each execution service registered will be queried, and searched for job information.

See also

RetrieveExecutionTargets (p. 365)

6.254.3.15 void Arc::TargetGenerator::SaveTargetInfoToStream (std::ostream & out, bool longlist) const

Prints target information.

Method to print information of the found targets to std::cout.

Parameters

<i>out</i>	is a std::ostream object which to direct target information to.
<i>longlist</i>	false for minimal information, true for detailed information

6.254.3.16 SimpleCounter& Arc::TargetGenerator::ServiceCounter (void)

Returns reference to worker counter.

This method returns reference to counter which keeps amount of started worker threads communicating with services asynchronously. The counter must be incremented for every thread started and decremented when thread exits. Main thread will then wait till counters drops to zero.

The documentation for this class was generated from the following file:

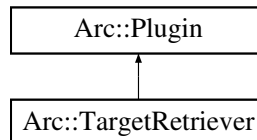
- TargetGenerator.h

6.255 Arc::TargetRetriever Class Reference

TargetRetriever base class

```
#include <TargetRetriever.h>
```

Inheritance diagram for Arc::TargetRetriever:



Public Member Functions

- virtual void **GetTargets** (**TargetGenerator** &mom, int targetType, int detailLevel)=0

Protected Member Functions

- **TargetRetriever** (const **UserConfig** &usercfg, const **URL** &url, ServiceType st, const std::string &flavour)
- virtual void **GetExecutionTargets** (**TargetGenerator** &mom)=0
- virtual void **GetJobs** (**TargetGenerator** &mom)=0

6.255.1 Detailed Description

TargetRetriever base class The **TargetRetriever** (p. 366) class is a pure virtual base class to be used for grid flavour specializations. It is designed to work in conjunction with the **TargetGenerator** (p. 360).

6.255.2 Constructor & Destructor Documentation

6.255.2.1 Arc::TargetRetriever::TargetRetriever (const UserConfig & usercfg, const URL & url, ServiceType st, const std::string & flavour) [protected]

TargetRetriever (p. 366) constructor.

Default constructor to create a TargeGenerator. The constructor reads the computing and index service **URL** (p. 379) objects from the

Parameters

<i>usercfg</i>	
<i>url</i>	
<i>st</i>	
<i>flavour</i>	

6.255.3 Member Function Documentation

6.255.3.1 `virtual void Arc::TargetRetriever::GetExecutionTargets (TargetGenerator & mom)`
`[protected, pure virtual]`

Method for collecting targets.

Pure virtual method for collecting targets. Implementation depends on the Grid middleware in question and is thus left to the specialized class.

Parameters

<i>mom</i>	is the reference to the TargetGenerator (p. 360) which has loaded the TargetRetriever (p. 366)
<i>detailLevel</i>	is the required level of details (1 = All details, 2 = Limited details)

6.255.3.2 `virtual void Arc::TargetRetriever::GetJobs (TargetGenerator & mom)`
`[protected, pure virtual]`

Method for collecting targets.

Pure virtual method for collecting targets. Implementation depends on the Grid middleware in question and is thus left to the specialized class.

Parameters

<i>mom</i>	is the reference to the TargetGenerator (p. 360) which has loaded the TargetRetriever (p. 366)
<i>detailLevel</i>	is the required level of details (1 = All details, 2 = Limited details)

6.255.3.3 `virtual void Arc::TargetRetriever::GetTargets (TargetGenerator & mom, int targetType, int detailLevel)` `[pure virtual]`

DEPRECATED: Method for collecting targets.

This method is DEPRECATED, the GetExecutionTargets and GetJobs methods replaces it.

Pure virtual method for collecting targets. Implementation depends on the Grid middleware in question and is thus left to the specialized class.

Parameters

<i>mom</i>	is the reference to the TargetGenerator (p. 360) which has loaded the TargetRetriever (p. 366)
<i>targetType</i>	is the identificaion of targets to find (0 = ExecutionTargets, 1 = Grid Jobs)
<i>detailLevel</i>	is the required level of details (1 = All details, 2 = Limited details)

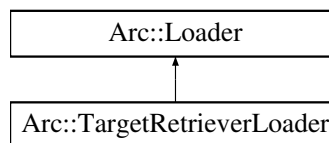
The documentation for this class was generated from the following file:

- TargetRetriever.h

6.256 Arc::TargetRetrieverLoader Class Reference

```
#include <TargetRetriever.h>
```

Inheritance diagram for Arc::TargetRetrieverLoader:



Public Member Functions

- **TargetRetrieverLoader** ()
- **~TargetRetrieverLoader** ()
- **TargetRetriever * load** (const std::string &name, const **UserConfig** &usercfg, const std::string &service, const ServiceType &st)
- const std::list< **TargetRetriever** * > & **GetTargetRetrievers** () const

6.256.1 Detailed Description

Class responsible for loading **TargetRetriever** (p. 366) plugins The **TargetRetriever** (p. 366) objects returned by a **TargetRetrieverLoader** (p. 368) must not be used after the **TargetRetrieverLoader** (p. 368) goes out of scope.

6.256.2 Constructor & Destructor Documentation

6.256.2.1 Arc::TargetRetrieverLoader::TargetRetrieverLoader ()

Constructor Creates a new **TargetRetrieverLoader** (p. 368).

6.256.2.2 Arc::TargetRetrieverLoader::~~TargetRetrieverLoader ()

Destructor Calling the destructor destroys all TargetRetrievers loaded by the **TargetRetrieverLoader** (p. 368) instance.

6.256.3 Member Function Documentation

6.256.3.1 `const std::list<TargetRetriever*>&
Arc::TargetRetrieverLoader::GetTargetRetrievers () const
[inline]`

Retrieve the list of loaded TargetRetrievers.

Returns

A reference to the list of TargetRetrievers.

6.256.3.2 `TargetRetriever* Arc::TargetRetrieverLoader::load (const std::string & name,
const UserConfig & usercfg, const std::string & service, const ServiceType & st)`

Load a new **TargetRetriever** (p. 366)

Parameters

<i>name</i>	The name of the TargetRetriever (p. 366) to load.
<i>usercfg</i>	The UserConfig (p. 390) object for the new TargetRetriever (p. 366).
<i>service</i>	The URL (p. 379) used to contact the target.
<i>st</i>	specifies service type of the target.

Returns

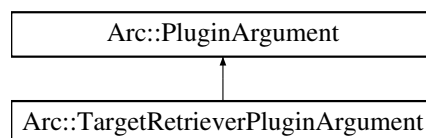
A pointer to the new **TargetRetriever** (p. 366) (NULL on error).

The documentation for this class was generated from the following file:

- TargetRetriever.h

6.257 Arc::TargetRetrieverPluginArgument Class Reference

Inheritance diagram for Arc::TargetRetrieverPluginArgument:

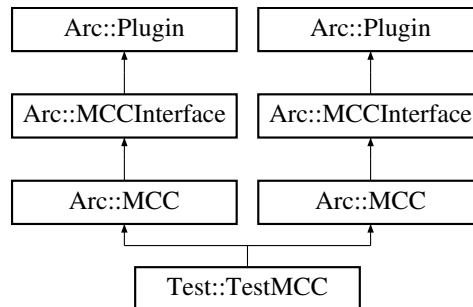


The documentation for this class was generated from the following file:

- TargetRetriever.h

6.258 Test::TestMCC Class Reference

Inheritance diagram for Test::TestMCC:

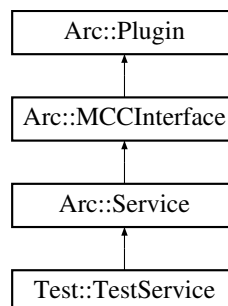


The documentation for this class was generated from the following files:

- loader/TestMCC.h
- message/TestMCC.h

6.259 Test::TestService Class Reference

Inheritance diagram for Test::TestService:



Public Member Functions

- virtual **Arc::MCC_Status** process (**Arc::Message** &request, **Arc::Message** &response)

6.259.1 Member Function Documentation

6.259.1.1 **virtual Arc::MCC_Status Test::TestService::process (Arc::Message & *request*, Arc::Message & *response*)** [virtual]

Method for processing of requests and responses. This method is called by preceeding MCC in chain when a request needs to be processed. This method must call similar method of next MCC in chain unless any failure happens. Result returned by call to next MCC should be processed and passed back to previous MCC. In case of failure this method is expected to generate valid error response and return it back to previous MCC without calling the next one.

Parameters

<i>request</i>	The request that needs to be processed.
<i>response</i>	A Message object that will contain the response of the request when the method returns.

Returns

An object representing the status of the call.

Implements **Arc::MCCInterface** (p. 249).

The documentation for this class was generated from the following file:

- TestService.h

6.260 Arc::ThreadDataItem Class Reference

Base class for per-thread object.

```
#include <Thread.h>
```

Public Member Functions

- **ThreadDataItem** (void)
- **ThreadDataItem** (std::string &key)
- **ThreadDataItem** (const std::string &key)
- void **Attach** (std::string &key)
- void **Attach** (const std::string &key)
- virtual void **Dup** (void)

Static Public Member Functions

- static **ThreadDataItem * Get** (const std::string &key)

6.260.1 Detailed Description

Base class for per-thread object. Classes inherited from this one are attached to current thread under specified key and destroyed only when thread ends or object is replaced by another one with same key.

6.260.2 Constructor & Destructor Documentation

6.260.2.1 `Arc::ThreadDataItem::ThreadDataItem (void)`

Dummy constructor which does nothing. To make object usable one of `Attach(...)` methods must be used.

6.260.2.2 `Arc::ThreadDataItem::ThreadDataItem (std::string & key)`

Creates instance and attaches it to current thread under key. If supplied key is empty random one is generated and stored in key variable.

6.260.2.3 `Arc::ThreadDataItem::ThreadDataItem (const std::string & key)`

Creates instance and attaches it to current thread under key.

6.260.3 Member Function Documentation

6.260.3.1 `void Arc::ThreadDataItem::Attach (std::string & key)`

Attaches object to current thread under key. If supplied key is empty random one is generated and stored in key variable. This method must be used only if object was created using dummy constructor.

6.260.3.2 `void Arc::ThreadDataItem::Attach (const std::string & key)`

Attaches object to current thread under key. This method must be used only if object was created using dummy constructor.

6.260.3.3 `virtual void Arc::ThreadDataItem::Dup (void) [virtual]`

Creates copy of object. This method is called when new thread is created from current thread. It is called in new thread, so new object - if created - gets attached to new thread. If object is not meant to be inherited by new threads then this method should do nothing.

6.260.3.4 `static ThreadDataItem* Arc::ThreadDataItem::Get (const std::string & key)`
[static]

Retrieves object attached to thread under key. Returns if no such object.

The documentation for this class was generated from the following file:

- Thread.h

6.261 Arc::ThreadInitializer Class Reference

The documentation for this class was generated from the following file:

- Thread.h

6.262 Arc::ThreadRegistry Class Reference

```
#include <Thread.h>
```

Public Member Functions

- void **RegisterThread** (void)
- void **UnregisterThread** (void)
- bool **WaitOrCancel** (int timeout)
- bool **WaitForExit** (int timeout=-1)

6.262.1 Detailed Description

This class is a set of conditions, mutexes, etc. conveniently exposed to monitor running child threads and to wait till they exit. There are no protections against race conditions. So use it carefully.

6.262.2 Member Function Documentation

6.262.2.1 `bool Arc::ThreadRegistry::WaitForExit (int timeout = -1)`

Wait for registered threads to exit. Leave after timeout milliseconds if failed. Returns true if all registered threads reported their exit.

6.262.2.2 `bool Arc::ThreadRegistry::WaitOrCancel (int timeout)`

Wait for timeout milliseconds or cancel request. Returns true if cancel request received.

The documentation for this class was generated from the following file:

- Thread.h

6.263 Arc::Time Class Reference

A class for storing and manipulating times.

```
#include <DateTime.h>
```

Public Member Functions

- **Time** ()
- **Time** (time_t)
- **Time** (time_t time, uint32_t nanosec)
- **Time** (const std::string &)
- **Time & operator=** (time_t)
- **Time & operator=** (const **Time** &)
- **Time & operator=** (const char *)
- **Time & operator=** (const std::string &)
- void **SetTime** (time_t)
- void **SetTime** (time_t time, uint32_t nanosec)
- time_t **GetTime** () const
- **operator std::string** () const
- std::string **str** (const **TimeFormat** &=time_format) const
- bool **operator<** (const **Time** &) const
- bool **operator>** (const **Time** &) const
- bool **operator<=** (const **Time** &) const
- bool **operator>=** (const **Time** &) const
- bool **operator==** (const **Time** &) const
- bool **operator!=** (const **Time** &) const
- **Time operator+** (const **Period** &) const
- **Time operator-** (const **Period** &) const
- **Period operator-** (const **Time** &) const

Static Public Member Functions

- static void **SetFormat** (const **TimeFormat** &)
- static **TimeFormat GetFormat** ()

6.263.1 Detailed Description

A class for storing and manipulating times.

6.263.2 Constructor & Destructor Documentation

6.263.2.1 Arc::Time::Time ()

Default constructor. The time is put equal the current time.

6.263.2.2 Arc::Time::Time (time_t)

Constructor that takes a time_t variable and stores it.

6.263.2.3 Arc::Time::Time (time_t time, uint32_t nanosec)

Constructor that takes a fine grained time variables and stores them.

6.263.2.4 Arc::Time::Time (const std::string &)

Constructor that tries to convert a string into a time_t.

6.263.3 Member Function Documentation

6.263.3.1 static TimeFormat Arc::Time::GetFormat () [static]

Gets the default format for time strings.

6.263.3.2 time_t Arc::Time::GetTime () const

gets the time

6.263.3.3 Arc::Time::operator std::string () const

Returns a string representation of the time, using the default format.

6.263.3.4 bool Arc::Time::operator!=(const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.5 Time Arc::Time::operator+ (const Period &) const

Adding **Time** (p. 374) object with **Period** (p. 288) object.

6.263.3.6 Time Arc::Time::operator- (const Period &) const

Subtracting **Period** (p. 288) object from **Time** (p. 374) object.

6.263.3.7 Period Arc::Time::operator- (const Time &) const

Subtracting **Time** (p. 374) object from the other **Time** (p. 374) object.

6.263.3.8 bool Arc::Time::operator< (const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.9 bool Arc::Time::operator<= (const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.10 Time& Arc::Time::operator= (const char *)

Assignment operator from a char pointer.

6.263.3.11 Time& Arc::Time::operator= (const std::string &)

Assignment operator from a string.

6.263.3.12 Time& Arc::Time::operator= (const Time &)

Assignment operator from a **Time** (p. 374).

6.263.3.13 Time& Arc::Time::operator= (time_t)

Assignment operator from a time_t.

6.263.3.14 bool Arc::Time::operator== (const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.15 bool Arc::Time::operator> (const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.16 bool Arc::Time::operator>= (const Time &) const

Comparing two **Time** (p. 374) objects.

6.263.3.17 static void Arc::Time::SetFormat (const TimeFormat &) [static]

Sets the default format for time strings.

6.263.3.18 void Arc::Time::SetTime (time_t)

sets the time

6.263.3.19 void Arc::Time::SetTime (time_t time, uint32_t nanosec)

sets the fine grained time

6.263.3.20 std::string Arc::Time::str (const TimeFormat & =time_format) const

Returns a string representation of the time, using the specified format.

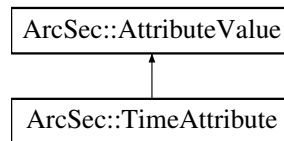
The documentation for this class was generated from the following file:

- DateTime.h

6.264 ArcSec::TimeAttribute Class Reference

```
#include <DateTimeAttribute.h>
```

Inheritance diagram for ArcSec::TimeAttribute:



Public Member Functions

- virtual bool **equal** (AttributeValue *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.264.1 Detailed Description

Format: HHMMSSZ HH:MM:SS HH:MM:SS+HH:MM HH:MM:SSZ

6.264.2 Member Function Documentation

6.264.2.1 virtual std::string ArcSec::TimeAttribute::encode () [virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.264.2.2 `virtual bool ArcSec::TimeAttribute::equal (AttributeValue * value, bool check_id = true) [virtual]`

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.264.2.3 `virtual std::string ArcSec::TimeAttribute::getId () [inline, virtual]`

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.264.2.4 `virtual std::string ArcSec::TimeAttribute::getType () [inline, virtual]`

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

- DateTimeAttribute.h

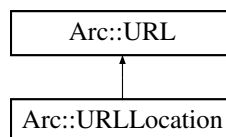
6.265 Arc::TimedMutex Class Reference

The documentation for this class was generated from the following file:

- Thread.h

6.266 Arc::URL Class Reference

Inheritance diagram for Arc::URL:



Public Types

- enum **Scope**

Public Member Functions

- **URL** ()
- **URL** (const std::string &url)
- virtual ~**URL** ()
- const std::string & **Protocol** () const
- void **ChangeProtocol** (const std::string &newprot)
- bool **IsSecureProtocol** () const
- const std::string & **Username** () const
- const std::string & **Passwd** () const
- const std::string & **Host** () const
- void **ChangeHost** (const std::string &newhost)
- int **Port** () const
- void **ChangePort** (int newport)
- const std::string & **Path** () const
- std::string **FullPath** () const
- void **ChangePath** (const std::string &newpath)
- const std::map< std::string, std::string > & **HTTPOptions** () const
- const std::string & **HTTPOption** (const std::string &option, const std::string &undefined="") const
- const std::list< std::string > & **LDAPAttributes** () const
- void **AddLDAPAttribute** (const std::string &attribute)
- **Scope** **LDAPScope** () const
- void **ChangeLDAPScope** (const **Scope** newscope)
- const std::string & **LDAPFilter** () const
- void **ChangeLDAPFilter** (const std::string &newfilter)
- const std::map< std::string, std::string > & **Options** () const
- const std::string & **Option** (const std::string &option, const std::string &undefined="") const
- const std::map< std::string, std::string > & **MetaDataOptions** () const
- const std::string & **MetaDataOption** (const std::string &option, const std::string &undefined="") const
- void **AddOption** (const std::string &option, const std::string &value, bool overwrite=true)
- void **AddMetaDataOption** (const std::string &option, const std::string &value, bool overwrite=true)
- const std::list< **URLLocation** > & **Locations** () const
- const std::map< std::string, std::string > & **CommonLocOptions** () const
- const std::string & **CommonLocOption** (const std::string &option, const std::string &undefined="") const
- virtual std::string **str** () const
- virtual std::string **plainstr** () const
- virtual std::string **fullstr** () const
- virtual std::string **ConnectionURL** () const
- bool **operator**< (const **URL** &url) const
- bool **operator**== (const **URL** &url) const
- **operator** bool () const
- std::map< std::string, std::string > **ParseOptions** (const std::string &optstring, char separator)

Static Public Member Functions

- static std::string **OptionString** (const std::map< std::string, std::string > &options, char separator)

Static Protected Member Functions

- static std::string **BaseDN2Path** (const std::string &)
- static std::string **Path2BaseDN** (const std::string &)

Protected Attributes

- std::string **protocol**
- std::string **username**
- std::string **passwd**
- std::string **host**
- bool **ip6addr**
- int **port**
- std::string **path**
- std::map< std::string, std::string > **httpoptions**
- std::map< std::string, std::string > **metadataoptions**
- std::list< std::string > **ldapattributes**
- **Scope** **ldapscope**
- std::string **ldapfilter**
- std::map< std::string, std::string > **urloptions**
- std::list< **URLLocation** > **locations**
- std::map< std::string, std::string > **commonlocoptions**
- bool **valid**

Friends

- std::ostream & **operator**<< (std::ostream &out, const **URL** &u)

6.266.1 Member Enumeration Documentation

6.266.1.1 enum Arc::URL::Scope

Scope for LDAP URLs

6.266.2 Constructor & Destructor Documentation

6.266.2.1 Arc::URL::URL ()

Empty constructor. Necessary when the class is part of another class and the like.

6.266.2.2 Arc::URL::URL (const std::string & url)

Constructs a new **URL** (p. 379) from a string representation.

6.266.2.3 virtual Arc::URL::~~URL () [virtual]

URL (p. 379) Destructor

6.266.3 Member Function Documentation**6.266.3.1 void Arc::URL::AddLDAPAttribute (const std::string & attribute)**

Adds an LDAP attribute.

6.266.3.2 void Arc::URL::AddMetaDataOption (const std::string & option, const std::string & value, bool overwrite = true)

Adds a metadata option

6.266.3.3 void Arc::URL::AddOption (const std::string & option, const std::string & value, bool overwrite = true)

Adds a **URL** (p. 379) option.

6.266.3.4 static std::string Arc::URL::BaseDN2Path (const std::string &) [static, protected]

a private method that converts an ldap basedn to a path.

6.266.3.5 void Arc::URL::ChangeHost (const std::string & newhost)

Changes the hostname of the **URL** (p. 379).

6.266.3.6 void Arc::URL::ChangeLDAPFilter (const std::string & newfilter)

Changes the LDAP filter.

6.266.3.7 void Arc::URL::ChangeLDAPScope (const Scope newscope)

Changes the LDAP scope.

6.266.3.8 `void Arc::URL::ChangePath (const std::string & newpath)`

Changes the path of the **URL** (p. 379).

6.266.3.9 `void Arc::URL::ChangePort (int newport)`

Changes the port of the **URL** (p. 379).

6.266.3.10 `void Arc::URL::ChangeProtocol (const std::string & newprot)`

Changes the protocol of the **URL** (p. 379).

6.266.3.11 `const std::string& Arc::URL::CommonLocOption (const std::string & option, const std::string & undefined = " ") const`

Returns the value of a common location option.

Parameters

<i>option</i>	The option whose value is returned.
<i>undefined</i>	This value is returned if the common location option is not defined.

6.266.3.12 `const std::map<std::string, std::string>& Arc::URL::CommonLocOptions () const`

Returns the common location options if any.

6.266.3.13 `virtual std::string Arc::URL::ConnectionURL () const` [virtual]

Returns a string representation with protocol, host and port only

6.266.3.14 `std::string Arc::URL::FullPath () const`

Returns the path of the **URL** (p. 379) with all options attached.

6.266.3.15 `virtual std::string Arc::URL::fullstr () const` [virtual]

Returns a string representation including options and locations

Reimplemented in **Arc::URLLocation** (p. 389).

6.266.3.16 `const std::string& Arc::URL::Host () const`

Returns the hostname of the **URL** (p. 379).

6.266.3.17 `const std::string& Arc::URL::HTTPOption (const std::string & option, const std::string & undefined = " ") const`

Returns the value of an HTTP option.

Parameters

<i>option</i>	The option whose value is returned.
<i>undefined</i>	This value is returned if the HTTP option is not defined.

6.266.3.18 `const std::map<std::string, std::string>& Arc::URL::HTTPOptions () const`

Returns HTTP options if any.

6.266.3.19 `bool Arc::URL::IsSecureProtocol () const`

Indicates whether the protocol is secure or not.

6.266.3.20 `const std::list<std::string>& Arc::URL::LDAPAttributes () const`

Returns the LDAP attributes if any.

6.266.3.21 `const std::string& Arc::URL::LDAPFilter () const`

Returns the LDAP filter.

6.266.3.22 `Scope Arc::URL::LDAPScope () const`

Returns the LDAP scope.

6.266.3.23 `const std::list<URLLocation>& Arc::URL::Locations () const`

Returns the locations if any.

6.266.3.24 `const std::string& Arc::URL::MetaDataOption (const std::string & option, const std::string & undefined = " ") const`

Returns the value of a metadata option.

Parameters

<i>option</i>	The option whose value is returned.
<i>undefined</i>	This value is returned if the metadata option is not defined.

6.266.3.25 `const std::map<std::string, std::string>& Arc::URL::MetaDataOptions () const`

Returns metadata options if any.

6.266.3.26 `Arc::URL::operator bool () const`

Check if instance holds valid **URL** (p. 379)

6.266.3.27 `bool Arc::URL::operator< (const URL & url) const`

Compares one **URL** (p. 379) to another

6.266.3.28 `bool Arc::URL::operator== (const URL & url) const`

Is one **URL** (p. 379) equal to another?

6.266.3.29 `const std::string& Arc::URL::Option (const std::string & option, const std::string & undefined = " ") const`

Returns the value of a **URL** (p. 379) option.

Parameters

<i>option</i>	The option whose value is returned.
<i>undefined</i>	This value is returned if the URL (p. 379) option is not defined.

6.266.3.30 `const std::map<std::string, std::string>& Arc::URL::Options () const`

Returns **URL** (p. 379) options if any.

6.266.3.31 `static std::string Arc::URL::OptionString (const std::map< std::string, std::string > & options, char separator) [static]`

Returns a string representation of the options given in the options map

6.266.3.32 `std::map<std::string, std::string> Arc::URL::ParseOptions (const std::string & optstring, char separator)`

Parse a string of options separated by separator into an attribute->value map

6.266.3.33 `const std::string& Arc::URL::Passwd () const`

Returns the password of the **URL** (p. 379).

6.266.3.34 `const std::string& Arc::URL::Path () const`

Returns the path of the **URL** (p. 379).

6.266.3.35 `static std::string Arc::URL::Path2BaseDN (const std::string &) [static, protected]`

a private method that converts an ldap path to a basedn.

6.266.3.36 `virtual std::string Arc::URL::plainstr () const [virtual]`

Returns a string representation of the **URL** (p. 379) without any options

6.266.3.37 `int Arc::URL::Port () const`

Returns the port of the **URL** (p. 379).

6.266.3.38 `const std::string& Arc::URL::Protocol () const`

Returns the protocol of the **URL** (p. 379).

6.266.3.39 `virtual std::string Arc::URL::str () const [virtual]`

Returns a string representation of the **URL** (p. 379) including meta-options.

Reimplemented in **Arc::URLLocation** (p. 389).

6.266.3.40 `const std::string& Arc::URL::Username () const`

Returns the username of the **URL** (p. 379).

6.266.4 Friends And Related Function Documentation**6.266.4.1** `std::ostream& operator<< (std::ostream & out, const URL & u) [friend]`

Overloaded operator << to print a **URL** (p. 379).

6.266.5 Field Documentation**6.266.5.1** `std::map<std::string, std::string> Arc::URL::commonlocoptions [protected]`

common location options for index server URLs.

6.266.5.2 `std::string Arc::URL::host` [protected]

hostname of the url.

6.266.5.3 `std::map<std::string, std::string> Arc::URL::httpoptions` [protected]

HTTP options of the url.

6.266.5.4 `bool Arc::URL::ip6addr` [protected]

if host is IPv6 numerical address notation.

6.266.5.5 `std::list<std::string> Arc::URL::ldapattributes` [protected]

LDAP attributes of the url.

6.266.5.6 `std::string Arc::URL::ldapfilter` [protected]

LDAP filter of the url.

6.266.5.7 `Scope Arc::URL::ldapscope` [protected]

LDAP scope of the url.

6.266.5.8 `std::list<URLLocation> Arc::URL::locations` [protected]

locations for index server URLs.

6.266.5.9 `std::map<std::string, std::string> Arc::URL::metadataoptions`
[protected]

Meta data options

6.266.5.10 `std::string Arc::URL::passwd` [protected]

password of the url.

6.266.5.11 `std::string Arc::URL::path` [protected]

the url path.

6.266.5.12 `int Arc::URL::port` [protected]

portnumber of the url.

6.266.5.13 `std::string Arc::URL::protocol` [protected]

the url protocol.

6.266.5.14 `std::map<std::string, std::string> Arc::URL::urloptions` [protected]

options of the url.

6.266.5.15 `std::string Arc::URL::username` [protected]

username of the url.

6.266.5.16 `bool Arc::URL::valid` [protected]

flag to describe validity of **URL** (p. 379)

The documentation for this class was generated from the following file:

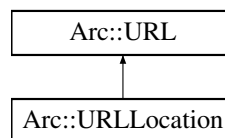
- **URL.h**

6.267 Arc::URLLocation Class Reference

Class to hold a resolved **URL** (p. 379) location.

```
#include <URL.h>
```

Inheritance diagram for Arc::URLLocation:



Public Member Functions

- **URLLocation** (const std::string &url="")
- **URLLocation** (const std::string &url, const std::string &name)
- **URLLocation** (const **URL** &url)
- **URLLocation** (const **URL** &url, const std::string &name)

- **URLLocation** (const std::map< std::string, std::string > &options, const std::string &name)
- virtual ~**URLLocation** ()
- const std::string & **Name** () const
- virtual std::string **str** () const
- virtual std::string **fullstr** () const

Protected Attributes

- std::string **name**

6.267.1 Detailed Description

Class to hold a resolved **URL** (p. 379) location. It is specific to file indexing service registrations.

6.267.2 Constructor & Destructor Documentation

6.267.2.1 Arc::URLLocation::URLLocation (const std::string & url = " ")

Creates a **URLLocation** (p. 387) from a string representaion.

6.267.2.2 Arc::URLLocation::URLLocation (const std::string & url, const std::string & name)

Creates a **URLLocation** (p. 387) from a string representaion and a name.

6.267.2.3 Arc::URLLocation::URLLocation (const **URL** & url)

Creates a **URLLocation** (p. 387) from a **URL** (p. 379).

6.267.2.4 Arc::URLLocation::URLLocation (const **URL** & url, const std::string & name)

Creates a **URLLocation** (p. 387) from a **URL** (p. 379) and a name.

6.267.2.5 Arc::URLLocation::URLLocation (const std::map< std::string, std::string > & options, const std::string & name)

Creates a **URLLocation** (p. 387) from options and a name.

6.267.2.6 virtual Arc::URLLocation::~~URLLocation () [virtual]

URLLocation (p. 387) destructor.

6.267.3 Member Function Documentation

6.267.3.1 `virtual std::string Arc::URLLocation::fullstr () const` `[virtual]`

Returns a string representation including options and locations

Reimplemented from **Arc::URL** (p. 383).

6.267.3.2 `const std::string& Arc::URLLocation::Name () const`

Returns the **URLLocation** (p. 387) name.

6.267.3.3 `virtual std::string Arc::URLLocation::str () const` `[virtual]`

Returns a string representation of the **URLLocation** (p. 387).

Reimplemented from **Arc::URL** (p. 385).

6.267.4 Field Documentation

6.267.4.1 `std::string Arc::URLLocation::name` `[protected]`

the **URLLocation** (p. 387) name as registered in the indexing service.

The documentation for this class was generated from the following file:

- **URL.h**

6.268 Arc::URLMap Class Reference

Data Structures

- class **map_entry**

The documentation for this class was generated from the following file:

- **URLMap.h**

6.269 Arc::User Class Reference

The documentation for this class was generated from the following file:

- **User.h**

6.270 Arc::UserConfig Class Reference

User configuration class

```
#include <UserConfig.h>
```

Public Member Functions

- **UserConfig** (**initializeCredentialsType** initializeCredentials=**initializeCredentialsType**())
- **UserConfig** (const std::string &conffile, **initializeCredentialsType** initializeCredentials=**initializeCredentialsType**(), bool loadSysConfig=true)
- **UserConfig** (const std::string &conffile, const std::string &jfile, **initializeCredentialsType** initializeCredentials=**initializeCredentialsType**(), bool loadSysConfig=true)
- **UserConfig** (const long int &ptraddr)
- void **InitializeCredentials** ()
- bool **CredentialsFound** () const
- bool **LoadConfigurationFile** (const std::string &conffile, bool ignoreJobListFile=true)
- bool **SaveToFile** (const std::string &filename) const
- void **ApplyToConfig** (**BaseConfig** &ccfg) const
- **operator bool** () const
- bool **operator!** () const
- bool **JobListFile** (const std::string &path)
- const std::string & **JobListFile** () const
- bool **AddServices** (const std::list< std::string > &services, ServiceType st)
- bool **AddServices** (const std::list< std::string > &selected, const std::list< std::string > &rejected, ServiceType st)
- const std::list< std::string > & **GetSelectedServices** (ServiceType st) const
- const std::list< std::string > & **GetRejectedServices** (ServiceType st) const
- void **ClearSelectedServices** ()
- void **ClearSelectedServices** (ServiceType st)
- void **ClearRejectedServices** ()
- void **ClearRejectedServices** (ServiceType st)
- bool **Timeout** (int newTimeout)
- int **Timeout** () const
- bool **Verbosity** (const std::string &newVerbosity)
- const std::string & **Verbosity** () const
- bool **Broker** (const std::string &name)
- bool **Broker** (const std::string &name, const std::string &argument)
- const std::pair< std::string, std::string > & **Broker** () const
- bool **Bartender** (const std::vector< **URL** > &urls)
- void **AddBartender** (const **URL** &url)
- const std::vector< **URL** > & **Bartender** () const
- bool **VOMSServerPath** (const std::string &path)
- const std::string & **VOMSServerPath** () const
- bool **UserName** (const std::string &name)

- const std::string & **UserName** () const
- bool **Password** (const std::string &newPassword)
- const std::string & **Password** () const
- bool **ProxyPath** (const std::string &newProxyPath)
- const std::string & **ProxyPath** () const
- bool **CertificatePath** (const std::string &newCertificatePath)
- const std::string & **CertificatePath** () const
- bool **KeyPath** (const std::string &newKeyPath)
- const std::string & **KeyPath** () const
- bool **KeyPassword** (const std::string &newKeyPassword)
- const std::string & **KeyPassword** () const
- bool **KeySize** (int newKeySize)
- int **KeySize** () const
- bool **CACertificatePath** (const std::string &newCACertificatePath)
- const std::string & **CACertificatePath** () const
- bool **CACertificatesDirectory** (const std::string &newCACertificatesDirectory)
- const std::string & **CACertificatesDirectory** () const
- bool **CertificateLifeTime** (const **Period** &newCertificateLifeTime)
- const **Period** & **CertificateLifeTime** () const
- bool **SLCS** (const **URL** &newSLCS)
- const **URL** & **SLCS** () const
- bool **StoreDirectory** (const std::string &newStoreDirectory)
- const std::string & **StoreDirectory** () const
- bool **IdPName** (const std::string &name)
- const std::string & **IdPName** () const
- bool **OverlayFile** (const std::string &path)
- const std::string & **OverlayFile** () const
- bool **UtilsDirPath** (const std::string &dir)
- const std::string & **UtilsDirPath** () const

Static Public Attributes

- static const std::string **ARCUSERDIRECTORY**
- static const std::string **SYSCONFIG**
- static const std::string **SYSCONFIGARCLOC**
- static const std::string **DEFAULTCONFIG**
- static const std::string **EXAMPLECONFIG**
- static const int **DEFAULT_TIMEOUT** = 20
- static const std::string **DEFAULT_BROKER**

6.270.1 Detailed Description

User configuration class This class provides a container for a selection of various attributes/parameters which can be configured to needs of the user, and can be read by implementing instances or programs. The class can be used in two ways. One can create a object from a configuration file, or simply set the desired attributes by using the setter method, associated with every setable attribute. The list of attributes which can be configured in this class are:

- certificatepath / **CertificatePath(const std::string&)** (p. 402)
- keypath / **KeyPath(const std::string&)** (p. 409)
- proxypath / **ProxyPath(const std::string&)** (p. 414)
- cacertificatesdirectory / **CACertificatesDirectory(const std::string&)** (p. 400)
- cacertificatepath / **CACertificatePath(const std::string&)** (p. 399)
- timeout / **Timeout(int)** (p. 417)
- joblist / **JobListFile(const std::string&)** (p. 407)
- defaultservices / **AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType)** (p. 395)
- rejectservices / **AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType)** (p. 395)
- verbosity / **Verbosity(const std::string&)** (p. 419)
- brokername / **Broker(const std::string&)** (p. 398) or **Broker(const std::string&, const std::string&)** (p. 399)
- brokerarguments / **Broker(const std::string&)** (p. 398) or **Broker(const std::string&, const std::string&)** (p. 399)
- bartender / **Bartender(const std::list<URL>&)**
- vomsserverpath / **VOMSServerPath(const std::string&)** (p. 419)
- username / **UserName(const std::string&)** (p. 418)
- password / **Password(const std::string&)** (p. 413)
- keypassword / **KeyPassword(const std::string&)** (p. 408)
- keysize / **KeySize(int)** (p. 410)
- certificatelifetime / **CertificateLifeTime(const Period&)** (p. 401)
- slcs / **SLCS(const URL&)** (p. 415)
- storedirectory / **StoreDirectory(const std::string&)** (p. 416)
- idpname / **IdPName(const std::string&)** (p. 405)

where the first term is the name of the attribute used in the configuration file, and the second term is the associated setter method (for more information about a given attribute see the description of the setter method).

The configuration file should have a INI-style format and the **IniConfig** (p. 204) class will thus be used to parse the file. The above mentioned attributes should be placed in the common section. Another section is also valid in the configuration file, which is the alias section. Here it is possible to define aliases representing one or multiple services. These aliases can be used in the **AddServices(const std::list<std::string>&, ServiceType)** (p. 396) and **AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType)** (p. 395) methods.

The **UserConfig** (p. 390) class also provides a method **InitializeCredentials()** (p. 406) for locating user credentials by searching in different standard locations. The **CredentialsFound()** (p. 404) method can be used to test if locating the credentials succeeded.

6.270.2 Constructor & Destructor Documentation

6.270.2.1 Arc::UserConfig::UserConfig (initializeCredentialsType initializeCredentials = initializeCredentialsType ())

Create a **UserConfig** (p. 390) object.

The **UserConfig** (p. 390) object created by this constructor initializes only default values, and if specified by the *initializeCredentials* boolean credentials will be tried initialized using the **InitializeCredentials()** (p. 406) method. The object is only non-valid if initialization of credentials fails which can be checked with the **operator bool()** (p. 412) method.

Parameters

<i>initializeCredentials</i>	is a optional boolean indicating if the InitializeCredentials() (p. 406) method should be invoked, the default is <code>true</code> .
------------------------------	--

See also

InitializeCredentials() (p. 406)
operator bool() (p. 412)

6.270.2.2 Arc::UserConfig::UserConfig (const std::string & conffile, initializeCredentialsType initializeCredentials = initializeCredentialsType (), bool loadSysConfig = true)

Create a **UserConfig** (p. 390) object.

The **UserConfig** (p. 390) object created by this constructor will, if specified by the *loadSysConfig* boolean, first try to load the system configuration file by invoking the **LoadConfigurationFile()** (p. 410) method, and if this fails a `::WARNING` is reported. Then the configuration file passed will be tried loaded using the before mentioned method, and if this fails an `::ERROR` is reported, and the created object will be non-valid. Note that if the passed file path is empty the example configuration will be tried

copied to the default configuration file path specified by `DEFAULTCONFIG`. If the example file cannot be copied one or more `::WARNING` messages will be reported and no configuration will be loaded. If loading the configurations file succeeded and if `initializeCredentials` is `true` then credentials will be initialized using the **InitializeCredentials()** (p. 406) method, and if no valid credentials are found the created object will be non-valid.

Parameters

<i>conffile</i>	is the path to a INI-configuration file.
<i>initialize-Credentials</i>	is a boolean indicating if credentials should be initialized, the default is <code>true</code> .
<i>loadSysConfig</i>	is a boolean indicating if the system configuration file should be loaded aswell, the default is <code>true</code> .

See also

LoadConfigurationFile(const std::string&, bool) (p. 410)
InitializeCredentials() (p. 406)
operator bool() (p. 412)
SYSCONFIG (p. 421)
EXAMPLECONFIG (p. 421)

6.270.2.3 Arc::UserConfig::UserConfig (const std::string & conffile, const std::string & jfile, initializeCredentialsType initializeCredentials = initializeCredentialsType(), bool loadSysConfig = true)

Create a **UserConfig** (p. 390) object.

The **UserConfig** (p. 390) object created by this constructor does only differ from the **UserConfig(const std::string&, bool, bool)** constructor in that it is possible to pass the path of the job list file directly to this constructor. If the job list file *joblistfile* is empty, the behaviour of this constructor is exactly the same as the before mentioned, otherwise the job list file will be initilized by invoking the setter method **JobListFile(const std::string&)** (p. 407). If it fails the created object will be non-valid, otherwise the specified configuration file *conffile* will be loaded with the *ignoreJobListFile* argument set to `true`.

Parameters

<i>conffile</i>	is the path to a INI-configuration file
<i>jfile</i>	is the path to a (non-)existing job list file.
<i>initialize-Credentials</i>	is a boolean indicating if credentials should be initialized, the default is <code>true</code> .
<i>loadSysConfig</i>	is a boolean indicating if the system configuration file should be loaded aswell, the default is <code>true</code> .

See also

JobListFile(const std::string&) (p. 407)
LoadConfigurationFile(const std::string&, bool) (p. 410)

InitializeCredentials() (p. 406)

operator bool() (p. 412)

6.270.2.4 Arc::UserConfig::UserConfig (const long int & ptraddr)

Language binding constructor.

The passed long int should be a pointer address to a **UserConfig** (p. 390) object, and this address is then casted into this **UserConfig** (p. 390) object.

Parameters

<i>ptraddr</i>	is an memory address to a UserConfig (p. 390) object.
----------------	--

6.270.3 Member Function Documentation

6.270.3.1 void Arc::UserConfig::AddBartender (const URL & url) [inline]

Set bartenders, used to contact Chelonia.

Takes as input a Bartender **URL** (p. 379) and adds this to the list of bartenders.

Parameters

<i>url</i>	is a URL (p. 379) to be added to the list of bartenders.
------------	---

See also

Bartender(const std::list<URL>&)

Bartender() const (p. 398)

6.270.3.2 bool Arc::UserConfig::AddServices (const std::list< std::string > & selected, const std::list< std::string > & rejected, ServiceType st)

Add selected and rejected services.

The only difference in behaviour of this method compared to the **AddServices(const std::list<std::string>&, ServiceType)** (p. 396) method is the input parameters and the format these parameters should follow. Instead of having an optional '-' in front of the string selected and rejected services should be specified in the two different arguments.

Two attributes are indirectly associated with this setter method 'defaultservices' and 'rejectservices'. The values specified with the 'defaultservices' attribute will be added to the list of selected services, and like-wise with the 'rejectservices' attribute.

Parameters

<i>selected</i>	is a list of services which will be added to the selected services of this object.
<i>rejected</i>	is a list of services which will be added to the rejected services of this object.
<i>st</i>	specifies the ServiceType of the services to add.

Returns

This method return `false` in case an alias cannot be resolved. In any other case `true` is returned.

See also

AddServices(const std::list<std::string> &, ServiceType) (p. 396)
GetSelectedServices() (p. 405)
GetRejectedServices() (p. 404)
ClearSelectedServices() (p. 403)
ClearRejectedServices() (p. 403)
LoadConfigurationFile() (p. 410)

6.270.3.3 bool Arc::UserConfig::AddServices (const std::list< std::string > & services, ServiceType st)

Add selected and rejected services.

This method adds selected services and adds services to reject from the specified list *services*, which contains string objects. The syntax of a single element in the list must be expressed in the following two formats:

[*-*] < *flavour* > : < *service_url* > |[*-*] < *alias* >

where the optional '*-*' indicate that the service should be added to the private list of services to reject. In the first format the <*flavour*> part indicates the type of ACC plugin to use when contacting the service, which is specified by the **URL** (p. 379) <*service_url*>, and in the second format the <*alias*> part specifies a alias defined in a parsed configuration file, note that the alias must not contain any of the charaters ':', ',', ' ' or '\t'. If a alias cannot be resolved an ::ERROR will be reported to the logger and the method will return false. If a element in the list *services* cannot be parsed an ::ERROR will be reported, and the element is skipped.

Two attributes are indirectly associated with this setter method 'defaultservices' and 'rejectservices'. The values specified with the 'defaultservices' attribute will be added to the list of selected services, and like-wise with the 'rejectservices' attribute.

Parameters

<i>services</i>	is a list of services to either select or reject.
<i>st</i>	indicates the type of the specfied services.

Returns

This method returns `false` in case an alias cannot be resolved. In any other case `true` is returned.

See also

AddServices(const std::string&, const std::string&, ServiceType)
GetSelectedServices() (p. 405)
GetRejectedServices() (p. 404)

ClearSelectedServices() (p. 403)
ClearRejectedServices() (p. 403)
LoadConfigurationFile() (p. 410)

6.270.3.4 void Arc::UserConfig::ApplyToConfig (BaseConfig & ccfg) const

Apply credentials to **BaseConfig** (p. 65).

This methods sets the **BaseConfig** (p. 65) credentials to the credentials contained in this object. It also passes user defined configuration overlay if any.

See also

InitializeCredentials() (p. 406)
CredentialsFound() (p. 404)
BaseConfig (p. 65)

Parameters

<i>ccfg</i>	a BaseConfig (p. 65) object which will configured with the credentials of this object.
-------------	---

6.270.3.5 bool Arc::UserConfig::Bartender (const std::vector< URL > & urls) [inline]

Set bartenders, used to contact Chelonia.

Takes as input a vector of Bartender URLs.

The attribute associated with this setter method is 'bartender'.

Parameters

<i>urls</i>	is a list of URL (p. 379) object to be set as bartenders.
-------------	--

Returns

This method always returns `true`.

See also

AddBartender(const URL&) (p. 395)
Bartender() const (p. 398)

6.270.3.6 const std::vector<URL>& Arc::UserConfig::Bartender () const [inline]

Get bartenders.

Returns a list of Bartender URLs

Returns

The list of bartender **URL** (p. 379) objects is returned.

See also

Bartender(const std::list<URL>&)
AddBartender(const URL&) (p. 395)

6.270.3.7 bool Arc::UserConfig::Broker (const std::string & name)

Set broker to use in target matching.

The string passed to this method should be in the format:

`< name > [:< argument >]`

where the <name> is the name of the broker and cannot contain any ':', and the optional <argument> should contain arguments which should be passed to the broker.

Two attributes are associated with this setter method 'brokername' and 'brokerarguments'.

Parameters

<i>name</i>	the broker name and argument specified in the format given above.
-------------	---

Returns

This method allways returns `true`.

See also

Broker (p. 67)
Broker(const std::string&, const std::string&) (p. 399)
Broker() const (p. 399)
DEFAULT_BROKER (p. 420)

6.270.3.8 bool Arc::UserConfig::Broker (const std::string & name, const std::string & argument) [inline]

Set broker to use in target matching.

As opposed to the **Broker**(const std::string&) (p. 398) method this method sets broker name and arguments directly from the passed two arguments.

Two attributes are associated with this setter method 'brokername' and 'brokerarguments'.

Parameters

<i>name</i>	is the name of the broker.
<i>argument</i>	is the arguments of the broker.

Returns

This method always returns `true`.

See also

Broker (p. 67)
Broker(const std::string&) (p. 398)
Broker() const (p. 399)
DEFAULT_BROKER (p. 420)

6.270.3.9 `const std::pair<std::string, std::string>& Arc::UserConfig::Broker () const`
`[inline]`

Get the broker and corresponding arguments.

The returned pair contains the broker name as the first component and the argument as the second.

See also

Broker(const std::string&) (p. 398)
Broker(const std::string&, const std::string&) (p. 399)
DEFAULT_BROKER (p. 420)

6.270.3.10 `bool Arc::UserConfig::CACertificatePath (const std::string & newCACertificatePath)`
`[inline]`

Set CA-certificate path.

The path to the file containing CA-certificate will be set when calling this method. This configuration parameter is deprecated - use `CACertificatesDirectory` instead. Only `arcslcs` uses it.

The attribute associated with this setter method is `'cacertificatepath'`.

Parameters

<i>newCACertificatePath</i>	is the path to the CA-certificate.
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Returns

This method always returns `true`.

See also

CACertificatePath() const (p. 400)

6.270.3.11 `const std::string& Arc::UserConfig::CACertificatePath () const` `[inline]`

Get path to CA-certificate.

Retrieve the path to the file containing CA-certificate. This configuration parameter is deprecated.

Returns

The path to the CA-certificate is returned.

See also

CACertificatePath(const std::string&) (p. 399)

6.270.3.12 `bool Arc::UserConfig::CACertificatesDirectory (const std::string & newCACertificatesDirectory)` `[inline]`

Set path to CA-certificate directory.

The path to the directory containing CA-certificates will be set when calling this method. Note that the **InitializeCredentials()** (p. 406) method will also try to set this path, by searching in different locations.

The attribute associated with this setter method is 'cacertificatesdirectory'.

Parameters

<i>newCACertificatesDirectory</i>	is the path to the CA-certificate directory.
-----------------------------------	--

Returns

This method always returns `true`.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
CACertificatesDirectory() const (p. 401)

6.270.3.13 `const std::string& Arc::UserConfig::CACertificatesDirectory () const` `[inline]`

Get path to CA-certificate directory.

Retrieve the path to the CA-certificate directory.

Returns

The path to the CA-certificate directory is returned.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
CACertificatesDirectory(const std::string&) (p. 400)

6.270.3.14 `bool Arc::UserConfig::CertificateLifeTime (const Period & newCertificateLifeTime)`
`[inline]`

Set certificate life time.

Sets lifetime of user certificate which will be obtained from Short Lived Credentials **Service** (p. 331).

The attribute associated with this setter method is 'certificatelifetime'.

Parameters

<i>newCertificateLifeTime</i>	is the life time of a certificate, as a Period (p. 288) object.
-------------------------------	--

Returns

This method always returns `true`.

See also

CertificateLifeTime() const (p. 401)

6.270.3.15 `const Period& Arc::UserConfig::CertificateLifeTime () const` `[inline]`

Get certificate life time.

Gets lifetime of user certificate which will be obtained from Short Lived Credentials **Service** (p. 331).

Returns

The certificate life time is returned as a **Period** (p. 288) object.

See also

CertificateLifeTime(const Period&) (p. 401)

6.270.3.16 `bool Arc::UserConfig::CertificatePath (const std::string & newCertificatePath)`
`[inline]`

Set path to certificate.

The path to user certificate will be set by this method. The path to the corresponding key can be set with the **KeyPath(const std::string&)** (p. 409) method. Note that the

InitializeCredentials() (p. 406) method will also try to set this path, by searching in different locations.

The attribute associated with this setter method is 'certificatepath'.

Parameters

<i>newCertificatePath</i>	is the path to the new certificate.
---------------------------	-------------------------------------

Returns

This method always returns `true`.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
CertificatePath() const (p. 402)
KeyPath(const std::string&) (p. 409)

6.270.3.17 `const std::string& Arc::UserConfig::CertificatePath () const` [inline]

Get path to certificate.

The path to the cerficate is returned when invoking this method.

Returns

The certificate path is returned.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
CertificatePath(const std::string&) (p. 402)
KeyPath() const (p. 409)

6.270.3.18 `void Arc::UserConfig::ClearRejectedServices (ServiceType st)`

Clear rejected services with specified ServiceType.

Calling this method will cause the internally stored rejected services with the ServiceType *st* to be cleared.

See also

ClearRejectedServices() (p. 403)
ClearSelectedServices(ServiceType) (p. 404)
AddServices(const std::list<std::string>&, ServiceType) (p. 396)
AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)
GetRejectedServices() (p. 404)

6.270.3.19 void Arc::UserConfig::ClearRejectedServices ()

Clear selected services.

Calling this method will cause the internally stored rejected services to be cleared.

See also

ClearRejectedServices(ServiceType) (p. 403)

ClearSelectedServices() (p. 403)

AddServices(const std::list<std::string>&, ServiceType) (p. 396)

AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)

GetRejectedServices() (p. 404)

6.270.3.20 void Arc::UserConfig::ClearSelectedServices ()

Clear selected services.

Calling this method will cause the internally stored selected services to be cleared.

See also

ClearSelectedServices(ServiceType) (p. 404)

ClearRejectedServices() (p. 403)

AddServices(const std::list<std::string>&, ServiceType) (p. 396)

AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)

GetSelectedServices() (p. 405)

6.270.3.21 void Arc::UserConfig::ClearSelectedServices (ServiceType st)

Clear selected services with specified ServiceType.

Calling this method will cause the internally stored selected services with the Service-Type *st* to be cleared.

See also

ClearSelectedServices() (p. 403)

ClearRejectedServices(ServiceType) (p. 403)

AddServices(const std::list<std::string>&, ServiceType) (p. 396)

AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)

GetSelectedServices() (p. 405)

6.270.3.22 `bool Arc::UserConfig::CredentialsFound () const` `[inline]`

Validate credential location.

Valid credentials consists of a combination of a path to existing CA-certificate directory and either a path to existing proxy or a path to existing user key/certificate pair. If valid credentials are found this method returns `true`, otherwise `false` is returned.

Returns

`true` if valid credentials are found, otherwise `false`.

See also

InitializeCredentials() (p. 406)

6.270.3.23 `const std::list<std::string>& Arc::UserConfig::GetRejectedServices (ServiceType st) const`

Get rejected services.

Get the rejected services with the `ServiceType` specified by `st`.

Parameters

<code>st</code>	specifies which <code>ServiceType</code> should be returned by the method.
-----------------	--

Returns

The rejected services is returned.

See also

AddServices(const std::list<std::string>&, ServiceType) (p. 396)

AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)

GetSelectedServices(ServiceType)

ClearRejectedServices() (p. 403)

6.270.3.24 `const std::list<std::string>& Arc::UserConfig::GetSelectedServices (ServiceType st) const`

Get selected services.

Get the selected services with the `ServiceType` specified by `st`.

Parameters

<code>st</code>	specifies which <code>ServiceType</code> should be returned by the method.
-----------------	--

Returns

The selected services is returned.

See also

AddServices(const std::list<std::string>&, ServiceType) (p. 396)

AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType) (p. 395)

GetRejectedServices(ServiceType) const (p. 404)

ClearSelectedServices() (p. 403)

6.270.3.25 `bool Arc::UserConfig::IdPName (const std::string & name) [inline]`

Set IdP name.

Sets Identity Provider name (Shibboleth) to which user belongs. It is used for contacting Short Lived Certificate **Service** (p. 331).

The attribute associated with this setter method is 'idpname'.

Parameters

<i>name</i>	is the new IdP name.
-------------	----------------------

Returns

This method always returns `true`.

See also**6.270.3.26** `const std::string& Arc::UserConfig::IdPName () const [inline]`

Get IdP name.

Gets Identity Provider name (Shibboleth) to which user belongs.

Returns

The IdP name

See also

IdPName(const std::string&) (p. 405)

6.270.3.27 `void Arc::UserConfig::InitializeCredentials ()`

Initialize user credentials.

The location of the user credentials will be tried located when calling this method and stored internally when found. The method searches in different locations. First the user proxy or the user key/certificate pair is tried located in the following order:

- Proxy path specified by the environment variable `X509_USER_PROXY`
- Key/certificate path specified by the environment `X509_USER_KEY` and `X509_USER_CERT`
- Proxy path specified in either configuration file passed to the constructor or explicitly set using the setter method **ProxyPath(const std::string&)** (p. 414)
- Key/certificate path specified in either configuration file passed to the constructor or explicitly set using the setter methods **KeyPath(const std::string&)** (p. 409) and **CertificatePath(const std::string&)** (p. 402)
- ProxyPath with file name `x509up_u` concatenated with the user ID located in the OS temporary directory.

If the proxy or key/certificate pair have been explicitly specified only the specified path(s) will be tried, and if not found a `::ERROR` is reported. If the proxy or key/certificate have not been specified and it is not located in the temporary directory a `::WARNING` will be reported and the host key/certificate pair is tried and then the Globus key/certificate pair and a `::ERROR` will be reported if not found in any of these locations.

Together with the proxy and key/certificate pair, the path to the directory containing CA certificates is also tried located when invoking this method. The directory will be tried located in the following order:

- Path specified by the `X509_CERT_DIR` environment variable.
- Path explicitly specified either in a parsed configuration file using the `cacertificatedirectory` or by using the setter method **CACertificatesDirectory()** (p. 400).
- Path created by concatenating the output of `User::Home()` with `'.globus'` and `'certificates'` separated by the directory delimiter.
- Path created by concatenating the output of `Glib::get_home_dir()` with `'.globus'` and `'certificates'` separated by the directory delimiter.
- Path created by concatenating the output of **ArcLocation::Get()** (p. 55), with `'etc'` and `'certificates'` separated by the directory delimiter.
- Path created by concatenating the output of **ArcLocation::Get()** (p. 55), with `'etc'`, `'grid-security'` and `'certificates'` separated by the directory delimiter.
- Path created by concatenating the output of **ArcLocation::Get()** (p. 55), with `'share'` and `'certificates'` separated by the directory delimiter.
- Path created by concatenating `'etc'`, `'grid-security'` and `'certificates'` separated by the directory delimiter.

If the CA certificate directory have explicitly been specified and the directory does not exist a `::ERROR` is reported. If none of the directories above does not exist a `::ERROR` is reported.

See also

CredentialsFound() (p. 404)
ProxyPath(const std::string&) (p. 414)
KeyPath(const std::string&) (p. 409)
CertificatePath(const std::string&) (p. 402)
CACertificatesDirectory(const std::string&) (p. 400)

6.270.3.28 bool Arc::UserConfig::JobListFile (const std::string & path)

Set path to job list file.

The method takes a path to a file which will be used as the job list file for storing and reading job information. If the specified path *path* does not exist a empty job list file will be tried created. If creating the job list file in any way fails *false* will be returned and a `::ERROR` message will be reported. Otherwise *true* is returned. If the directory containing the file does not exist, it will be tried created. The method will also return *false* if the file is not a regular file.

The attribute associated with this setter method is 'joblist'.

Parameters

<i>path</i>	the path to the job list file.
-------------	--------------------------------

Returns

If the job list file is a regular file or if it can be created *true* is returned, otherwise *false* is returned.

See also

JobListFile() const (p. 408)

6.270.3.29 const std::string& Arc::UserConfig::JobListFile () const [inline]

Get a reference to the path of the job list file.

The job list file is used to store and fetch information about submitted computing jobs to computing services. This method will return the path to the specified job list file.

Returns

The path to the job list file is returned.

See also

JobListFile(const std::string&) (p. 407)

6.270.3.30 `bool Arc::UserConfig::KeyPassword (const std::string & newKeyPassword)`
`[inline]`

Set password for generated key.

Set password to be used to encode private key of credentials obtained from Short Lived Credentials **Service** (p. 331).

The attribute associated with this setter method is 'keypassword'.

Parameters

<i>newKeyPassword</i>	is the new password to the key.
-----------------------	---------------------------------

Returns

This method always returns `true`.

See also

KeyPassword() `const` (p. 408)
KeyPath(const std::string&) (p. 409)
KeySize(int) (p. 410)

6.270.3.31 `const std::string& Arc::UserConfig::KeyPassword () const` `[inline]`

Get password for generated key.

Get password to be used to encode private key of credentials obtained from Short Lived Credentials **Service** (p. 331).

Returns

The key password is returned.

See also

KeyPassword(const std::string&) (p. 408)
KeyPath() `const` (p. 409)
KeySize() `const` (p. 410)

6.270.3.32 `bool Arc::UserConfig::KeyPath (const std::string & newKeyPath)` `[inline]`

Set path to key.

The path to user key will be set by this method. The path to the corresponding certificate can be set with the **CertificatePath(const std::string&)** (p. 402) method. Note that the **InitializeCredentials()** (p. 406) method will also try to set this path, by searching in different locations.

The attribute associated with this setter method is 'keypath'.

Parameters

<i>newKeyPath</i>	is the path to the new key.
-------------------	-----------------------------

Returns

This method always returns `true`.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
KeyPath() const (p. 409)
CertificatePath(const std::string&) (p. 402)
KeyPassword(const std::string&) (p. 408)
KeySize(int) (p. 410)

6.270.3.33 `const std::string& Arc::UserConfig::KeyPath () const` `[inline]`

Get path to key.

The path to the key is returned when invoking this method.

Returns

The path to the user key is returned.

See also

InitializeCredentials() (p. 406)
CredentialsFound() const (p. 404)
KeyPath(const std::string&) (p. 409)
CertificatePath() const (p. 402)
KeyPassword() const (p. 408)
KeySize() const (p. 410)

6.270.3.34 `int Arc::UserConfig::KeySize () const` `[inline]`

Get key size.

Get size/strengt of private key of credentials obtained from Short Lived Credentials Service (p. 331).

Returns

The key size, as an integer, is returned.

See also

KeySize(int) (p. 410)
KeyPath() const (p. 409)
KeyPassword() const (p. 408)

6.270.3.35 `bool Arc::UserConfig::KeySize (int newKeySize)` `[inline]`

Set key size.

Set size/strengt of private key of credentials obtained from Short Lived Credentials **Service** (p. 331).

The attribute associated with this setter method is 'keysize'.

Parameters

<i>newKeySize</i>	is the size, an integer, of the key.
-------------------	--------------------------------------

Returns

This method always returns `true`.

See also

KeySize() `const` (p. 410)
KeyPath(const std::string&) (p. 409)
KeyPassword(const std::string&) (p. 408)

6.270.3.36 `bool Arc::UserConfig::LoadConfigurationFile (const std::string & confFile, bool ignoreJobListFile = true)`

Load specified configuration file.

The configuration file passed is parsed by this method by using the **IniConfig** (p. 204) class. If the parsing is unsuccessful a `::WARNING` is reported.

The format of the configuration file should follow that of INI, and every attribute present in the file is only allowed once, if otherwise a `::WARNING` will be reported. The file can contain at most two sections, one named common and the other name alias. If other sections exist a `::WARNING` will be reported. Only the following attributes is allowed in the common section of the configuration `file`:

- `certificatepath` (**CertificatePath(const std::string&)** (p. 402))
- `keypath` (**KeyPath(const std::string&)** (p. 409))
- `proxypath` (**ProxyPath(const std::string&)** (p. 414))
- `cacertificatesdirectory` (**CACertificatesDirectory(const std::string&)** (p. 400))
- `cacertificatepath` (**CACertificatePath(const std::string&)** (p. 399))
- `timeout` (**Timeout(int)** (p. 417))
- `joblist` (**JobListFile(const std::string&)** (p. 407))
- `defaultservices` (**AddServices(const std::list<std::string>&, const std::list<std::string>&, ServiceType)** (p. 395))

- rejectservices (**AddServices**(const std::list<std::string>&, const std::list<std::string>&, **ServiceType**) (p. 395))
- verbosity (**Verbosity**(const std::string&) (p. 419))
- brokername (**Broker**(const std::string&) (p. 398) or **Broker**(const std::string&, const std::string&) (p. 399))
- brokerarguments (**Broker**(const std::string&) (p. 398) or **Broker**(const std::string&, const std::string&) (p. 399))
- bartender (**Bartender**(const std::list<URL>&))
- vomsserverpath (**VOMSServerPath**(const std::string&) (p. 419))
- username (**UserName**(const std::string&) (p. 418))
- password (**Password**(const std::string&) (p. 413))
- keypassword (**KeyPassword**(const std::string&) (p. 408))
- keysize (**KeySize**(int) (p. 410))
- certificatelifetime (**CertificateLifeTime**(const Period&) (p. 401))
- slcs (**SLCS**(const URL&) (p. 415))
- storedirectory (**StoreDirectory**(const std::string&) (p. 416))
- idpname (**IdPName**(const std::string&) (p. 405))

where the method in parentheses is the associated setter method. If other attributes exist in the common section a ::WARNING will be reported for each of these attributes. In the alias section aliases can be defined, and should represent a selection of services. The alias can then be referred to by input to the **AddServices**(const std::list<std::string>&, **ServiceType**) (p. 396) and **AddServices**(const std::list<std::string>&, const std::list<std::string>&, **ServiceType**) (p. 395) methods. An alias can not contain any of the characters '.', ':', ' ' or '\t' and should be defined as follows:

`< alias_name > = < service_type > : < flavour > : < service_url > | < alias_ref > [...]`

where <alias_name> is the name of the defined alias, <service_type> is the service type in lower case, <flavour> is the type of middleware plugin to use, <service_url> is the **URL** (p. 379) which should be used to contact the service and <alias_ref> is another defined alias. The parsed aliases will be stored internally and resolved when needed. If a alias already exist, and another alias with the same name is parsed then this other alias will overwrite the existing alias.

Parameters

<i>conffile</i>	is the path to the configuration file.
<i>ignoreJob-ListFile</i>	is a optional boolean which indicates whether the joblistfile attribute in the configuration file should be ignored. Default is to ignored it (true).

Returns

If loading the configuration file succeeds `true` is returned, otherwise `false` is returned.

See also

SaveToFile() (p. 415)

6.270.3.37 Arc::UserConfig::operator bool (void) const [inline]

Check for validity.

The validity of an object created from this class can be checked using this casting operator. An object is valid if the constructor did not encounter any errors.

See also

operator!() (p. 412)

6.270.3.38 bool Arc::UserConfig::operator! (void) const [inline]

Check for non-validity.

See **operator bool()** (p. 412) for a description.

See also

operator bool() (p. 412)

6.270.3.39 const std::string& Arc::UserConfig::OverlayFile () const [inline]

Get path to configuration overlay file.

Returns

The overlay file path

See also

OverlayFile(const std::string&) (p. 413)

6.270.3.40 bool Arc::UserConfig::OverlayFile (const std::string & path) [inline]

Set path to configuration overlay file.

Content of specified file is a backdoor to configuration XML generated from information stored in this class. The content of file is passed to **BaseConfig** (p. 65) class

in `ApplyToConfig(BaseConfig&)` then merged with internal configuration XML representation. This feature is meant for quick prototyping/testing/tuning of functionality without rewriting code. It is meant for developers and most users won't need it.

The attribute associated with this setter method is 'overlayfile'.

Parameters

<i>path</i>	is the new overlay file path.
-------------	-------------------------------

Returns

This method always returns `true`.

See also

6.270.3.41 `bool Arc::UserConfig::Password (const std::string & newPassword) [inline]`

Set password.

Set password which is used for requesting credentials from Short Lived Credentials Service (p. 331).

The attribute associated with this setter method is 'password'.

Parameters

<i>newPassword</i>	is the new password to set.
--------------------	-----------------------------

Returns

This method always returns `true`.

See also

Password() const (p. 414)

6.270.3.42 `const std::string& Arc::UserConfig::Password () const [inline]`

Get password.

Get password which is used for requesting credentials from Short Lived Credentials Service (p. 331).

Returns

The password is returned.

See also

Password(const std::string&) (p. 413)

6.270.3.43 `bool Arc::UserConfig::ProxyPath (const std::string & newProxyPath)`
`[inline]`

Set path to user proxy.

This method will set the path of the user proxy. Note that the **InitializeCredentials()** (p. 406) method will also try to set this path, by searching in different locations.

The attribute associated with this setter method is 'proxypath'

Parameters

<i>newProxy-Path</i>	is the path to a user proxy.
----------------------	------------------------------

Returns

This method always returns `true`.

See also

InitializeCredentials() (p. 406)
CredentialsFound() (p. 404)
ProxyPath() const (p. 414)

6.270.3.44 `const std::string& Arc::UserConfig::ProxyPath () const` `[inline]`

Get path to user proxy.

Retrieve path to user proxy.

Returns

Returns the path to the user proxy.

See also

ProxyPath(const std::string&) (p. 414)

6.270.3.45 `bool Arc::UserConfig::SaveToFile (const std::string & filename) const`

Save to INI file.

This method will save the object data as a INI file. The saved file can be loaded with the LoadConfigurationFile method.

Parameters

<i>filename</i>	the name of the file which the data will be saved to.
-----------------	---

Returns

`false` if unable to get handle on file, otherwise `true` is returned.

See also

LoadConfigurationFile() (p. 410)

6.270.3.46 `bool Arc::UserConfig::SLCS (const URL & newSLCS) [inline]`

Set the **URL** (p. 379) to the Short Lived Certificate **Service** (p. 331) (SLCS).

The attribute associated with this setter method is 'slcs'.

Parameters

<i>newSLCS</i>	is the URL (p. 379) to the SLCS
----------------	--

Returns

This method always returns `true`.

See also

SLCS() const (p. 415)

6.270.3.47 `const URL& Arc::UserConfig::SLCS () const [inline]`

Get the **URL** (p. 379) to the Short Lived Certificate **Service** (p. 331) (SLCS).

Returns

The SLCS is returned.

See also

SLCS(const URL&) (p. 415)

6.270.3.48 `bool Arc::UserConfig::StoreDirectory (const std::string & newStoreDirectory) [inline]`

Set store directory.

Sets directory which will be used to store credentials obtained from Short Lived **Credential** (p. 98) Service.

The attribute associated with this setter method is 'storedirectory'.

Parameters

<i>newStoreDirectory</i>	is the path to the store directory.
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Returns

This method always returns `true`.

See also

6.270.3.49 `const std::string& Arc::UserConfig::StoreDirectory () const` `[inline]`

Get store directory.

Sets directory which is used to store credentials obtained from Short Lived **Credential** (p. 98) Service.

Returns

The path to the store directory is returned.

See also

StoreDirectory(const std::string&) (p. 416)

6.270.3.50 `int Arc::UserConfig::Timeout () const` `[inline]`

Get timeout.

Returns the timeout in seconds.

Returns

timeout in seconds.

See also

Timeout(int) (p. 417)

DEFAULT_TIMEOUT (p. 420)

6.270.3.51 `bool Arc::UserConfig::Timeout (int newTimeout)`

Set timeout.

When communicating with a service the timeout specifies how long, in seconds, the communicating instance should wait for a response. If the response have not been recieved before this period in time, the connection is typically dropped, and an error will be reported.

This method will set the timeout to the specified integer. If the passed integer is less than or equal to 0 then `false` is returned and the timeout will not be set, otherwise `true` is returned and the timeout will be set to the new value.

The attribute associated with this setter method is 'timeout'.

Parameters

<i>newTimeout</i>	the new timeout value in seconds.
-------------------	-----------------------------------

Returns

false in case *newTimeout* <= 0, otherwise true.

See also

Timeout() const (p. 416)

DEFAULT_TIMEOUT (p. 420)

6.270.3.52 `const std::string& Arc::UserConfig::UserName () const` [inline]

Get user-name.

Get username which is used for requesting credentials from Short Lived Credentials **Service** (p. 331).

Returns

The username is returned.

See also

UserName(const std::string&) (p. 418)

6.270.3.53 `bool Arc::UserConfig::UserName (const std::string & name)` [inline]

Set user-name for SLCS.

Set username which is used for requesting credentials from Short Lived Credentials **Service** (p. 331).

The attribute associated with this setter method is 'username'.

Parameters

<i>name</i>	is the name of the user.
-------------	--------------------------

Returns

This method always return true.

See also

UserName() const (p. 417)

6.270.3.54 `const std::string& Arc::UserConfig::UtilsDirPath () const` [inline]

Get path to directory storing utility files for DataPoints.

Returns

The utils dir path

See also

UtilsDirPath(const std::string&) (p. 418)

6.270.3.55 bool Arc::UserConfig::UtilsDirPath (const std::string & dir)

Set path to directory storing utility files for DataPoints.

Some DataPoints can store information on remote services in local files. This method sets the path to the directory containing these files. For example arc* tools set it to ARCUSERDIRECTORY and A-REX sets it to the control directory. The directory is created if it does not exist.

Parameters

<i>path</i>	is the new utils dir path.
-------------	----------------------------

Returns

This method always returns `true`.

6.270.3.56 const std::string& Arc::UserConfig::Verbosity () const [inline]

Get the user selected level of verbosity.

The string representation of the verbosity level specified by the user is returned when calling this method. If the user have not specified the verbosity level the empty string will be referenced.

Returns

the verbosity level, or empty if it has not been set.

See also

Verbosity(const std::string&) (p. 419)

6.270.3.57 bool Arc::UserConfig::Verbosity (const std::string & newVerbosity)

Set verbosity.

The verbosity will be set when invoking this method. If the string passed cannot be parsed into a corresponding LogLevel, using the function a `::WARNING` is reported and `false` is returned, otherwise `true` is returned.

The attribute associated with this setter method is 'verbosity'.

Returns

`true` in case the verbosity could be set to a allowed LogLevel, otherwise `false`.

See also

Verbosity() const (p. 419)

6.270.3.58 bool Arc::UserConfig::VOMSServerPath (const std::string & *path*) [inline]

Set path to file containing VOMS configuration.

Set path to file which contains list of VOMS services and associated configuration parameters needed to contact those services. It is used by arcproxy.

The attribute associated with this setter method is 'vomsserverpath'.

Parameters

<i>path</i>	the path to VOMS configuration file
-------------	-------------------------------------

Returns

This method always return true.

See also

VOMSServerPath() const (p. 420)

6.270.3.59 const std::string& Arc::UserConfig::VOMSServerPath () const [inline]

Get path to file containing VOMS configuration.

Get path to file which contains list of VOMS services and associated configuration parameters.

Returns

The path to VOMS configuration file is returned.

See also

VOMSServerPath(const std::string&) (p. 419)

6.270.4 Field Documentation**6.270.4.1 const std::string Arc::UserConfig::ARCUSERDIRECTORY [static]**

Path to ARC user home directory.

The *ARCUSERDIRECTORY* variable is the path to the ARC home directory of the current user. This path is created using the User::Home() method.

See also

User::Home()

6.270.4.2 const std::string Arc::UserConfig::DEFAULT_BROKER [static]

Default broker.

The *DEFAULT_BROKER* specifies the name of the broker which should be used in case no broker is explicitly chosen.

See also

Broker (p. 67)

Broker(const std::string&) (p. 398)

Broker(const std::string&, const std::string&) (p. 399)

Broker() const (p. 399)

6.270.4.3 const int Arc::UserConfig::DEFAULT_TIMEOUT = 20 [static]

Default timeout in seconds.

The *DEFAULT_TIMEOUT* specifies interval which will be used in case no timeout interval have been explicitly specified. For a description about timeout see **Timeout(int)** (p. 417).

See also

Timeout(int) (p. 417)

Timeout() const (p. 416)

6.270.4.4 const std::string Arc::UserConfig::DEFAULTCONFIG [static]

Path to default configuration file.

The *DEFAULTCONFIG* variable is the path to the default configuration file used in case no configuration file have been specified. The path is created from the *ARCUSERDIRECTORY* object.

6.270.4.5 const std::string Arc::UserConfig::EXAMPLECONFIG [static]

Path to example configuration.

The *EXAMPLECONFIG* variable is the path to the example configuration file.

6.270.4.6 const std::string Arc::UserConfig::SYSCONFIG [static]

Path to system configuration.

The *SYSCONFIG* variable is the path to the system configuration file. This variable is only equal to *SYSCONFIGARCLOC* if ARC is installed in the root (highly unlikely).

6.270.4.7 `const std::string Arc::UserConfig::SYSCONFIGARCLOC` [static]

Path to system configuration at ARC location.

The *SYSCONFIGARCLOC* variable is the path to the system configuration file which reside at the ARC installation location.

The documentation for this class was generated from the following file:

- UserConfig.h

6.271 Arc::UsernameToken Class Reference

Interface for manipulation of WS-Security according to Username Token **Profile** (p. 305).

```
#include <UsernameToken.h>
```

Public Types

- enum **PasswordType**

Public Member Functions

- **UsernameToken** (SOAPEnvelope &soap)
- **UsernameToken** (SOAPEnvelope &soap, const std::string &username, const std::string &password, const std::string &uid, **PasswordType** pwdtype)
- **UsernameToken** (SOAPEnvelope &soap, const std::string &username, const std::string &id, bool mac, int iteration)
- **operator bool** (void)
- std::string **Username** (void)
- bool **Authenticate** (const std::string &password, std::string &derived_key)
- bool **Authenticate** (std::istream &password, std::string &derived_key)

6.271.1 Detailed Description

Interface for manipulation of WS-Security according to Username Token **Profile** (p. 305).

6.271.2 Member Enumeration Documentation

6.271.2.1 enum Arc::UsernameToken::PasswordType

SOAP header element

6.271.3 Constructor & Destructor Documentation

6.271.3.1 Arc::UsernameToken::UsernameToken (SOAPEnvelope & *soap*)

Link to existing SOAP header and parse Username Token information. Username Token related information is extracted from SOAP header and stored in class variables.

6.271.3.2 Arc::UsernameToken::UsernameToken (SOAPEnvelope & *soap*, const std::string & *username*, const std::string & *password*, const std::string & *uid*, PasswordType *pwdtype*)

Add Username Token information into the SOAP header. Generated token contains elements Username and Password and is meant to be used for authentication.

Parameters

<i>soap</i>	the SOAP message
<i>username</i>	<wsse:Username>...</wsse:Username> - if empty it is entered interactively from stdin
<i>password</i>	<wsse:Password Type="...">...</wsse:Password> - if empty it is entered interactively from stdin
<i>uid</i>	<wsse:UsernameToken (p. 421) wsu:ID="...">
<i>pwdtype</i>	<wsse:Password Type="...">...</wsse:Password>

6.271.3.3 Arc::UsernameToken::UsernameToken (SOAPEnvelope & *soap*, const std::string & *username*, const std::string & *id*, bool *mac*, int *iteration*)

Add Username Token information into the SOAP header. Generated token contains elements Username and Salt and is meant to be used for deriving Key Derivation.

Parameters

<i>soap</i>	the SOAP message
<i>username</i>	<wsse:Username>...</wsse:Username>
<i>mac</i>	if derived key is meant to be used for Message (p. 252) Authentication Code
<i>iteration</i>	<wsse11:Iteration>...</wsse11:Iteration>

6.271.4 Member Function Documentation

6.271.4.1 bool Arc::UsernameToken::Authenticate (const std::string & *password*, std::string & *derived_key*)

Checks parsed/generated token against specified password. If token is meant to be used for deriving a key then key is returned in *derived_key*. In that case authentication is performed outside of **UsernameToken** (p. 421) class using obtained *derived_key*.

6.271.4.2 `bool Arc::UsernameToken::Authenticate (std::istream & password, std::string & derived_key)`

Checks parsed token against password stored in specified stream. If token is meant to be used for deriving a key then key is returned in `derived_key`

6.271.4.3 `Arc::UsernameToken::operator bool (void)`

Returns true of constructor succeeded

6.271.4.4 `std::string Arc::UsernameToken::Username (void)`

Returns username associated with this instance

The documentation for this class was generated from the following file:

- UsernameToken.h

6.272 Arc::UserSwitch Class Reference

```
#include <User.h>
```

6.272.1 Detailed Description

If this class is created user identity is switched to provided uid and gid. Due to internal lock there will be only one valid instance of this class. Any attempt to create another instance will block till first one is destroyed. If uid and gid are set to 0 then user identity is not switched. But lock is applied anyway. The lock has dual purpose. First and most important is to protect communication with underlying operating system which may depend on user identity. For that it is advisable for code which talks to operating system to acquire valid instance of this class. Care must be taken for not to hold that instance too long cause that may block other code in multithreaded environment. Other purpose of this lock is to provide workaround for glibc bug in `__nptl_setxid`. That bug causes lockup of `seteuid()` function if racing with fork. To avoid this problem the lock mentioned above is used by **Run** (p. 315) class while spawning new process.

The documentation for this class was generated from the following file:

- User.h

6.273 Arc::VOMSACInfo Class Reference

The documentation for this class was generated from the following file:

- VOMSUtil.h

6.274 Arc::VOMSTrustList Class Reference

```
#include <VOMSUtil.h>
```

Public Member Functions

- **VOMSTrustList** (const std::vector< std::string > &encoded_list)
- **VOMSTrustList** (const std::vector< VOMSTrustChain > &chains, const std::vector< VOMSTrustRegex > ®exs)
- VOMSTrustChain & **AddChain** (const VOMSTrustChain &chain)
- VOMSTrustChain & **AddChain** (void)
- **RegularExpression** & **AddRegex** (const VOMSTrustRegex ®)

6.274.1 Detailed Description

Stores definitions for making decision if VOMS server is trusted

6.274.2 Constructor & Destructor Documentation

6.274.2.1 Arc::VOMSTrustList::VOMSTrustList (const std::vector< std::string > & encoded_list)

Creates chain lists and regexps from plain list. List is made of chunks delimited by elements containing pattern "NEXT CHAIN". Each chunk with more than one element is converted into one instance of VOMSTrustChain. Chunks with single element are converted to VOMSTrustChain if element does not have special symbols. Otherwise it is treated as regular expression. Those symbols are '^', '\$' and '*'. Trusted chains can be configured in two ways: one way is: <tls:VOMSCertTrustDNChain> <tls:VOMSCertTrustDN>/O=Grid/O=NorduGrid/CN=host/arthur.hep.lu.se</tls:VOMSCertTrustDN> <tls:VOMSCertTrustDN>/O=Grid/O=NorduGrid/CN=NorduGrid Certification Authority</tls:VOMSCertTrustDN>----NEXT CHAIN---</tls:VOMSCertTrustDN> <tls:VOMSCertTrustDN>/DC=ch</tls:VOMSCertTrustDN>/DC=ch/DC=cern/CN=CERN Trusted Certification Authority</tls:VOMSCertTrustDN> </tls:VOMSCertTrustDNChain> the other way is: <tls:VOMSCertTrustDNChain> <tls:VOMSCertTrustDN>/O=Grid/O=NorduGrid/CN=host/arthur.hep.lu.se</tls:VOMSCertTrustDN> <tls:VOMSCertTrustDN>/O=Grid/O=NorduGrid/CN=NorduGrid Certification Authority</tls:VOMSCertTrustDN> </tls:VOMSCertTrustDNChain> <tls:VOMSCertTrustDNChain> <tls:VOMSCertTrustDN>/DC=ch/DC=cern</tls:VOMSCertTrustDN>/DC=ch/DC=cern/CN=CERN Trusted Certification Authority</tls:VOMSCertTrustDN> </tls:VOMSCertTrustDNChain> each chunk is supposed to contain a suit of DN of trusted certificate chain, in which the first DN is the DN of the certificate (cert0) which is used to sign the Attribute Certificate (AC), the second DN is the DN of the issuer certificate(cert1) which is used to sign cert0. So if there are one or more intermediate issuers, then there should be 3 or more than 3 DNs in this chunk (considering cert0 and the root certificate, plus the intermediate certificate) .

6.274.2.2 Arc::VOMSTrustList::VOMSTrustList (const std::vector< VOMSTrustChain > & chains, const std::vector< VOMSTrustRegex > & regexs)

Creates chain lists and regexps from those specified in arguments. See **AddChain()** (p. 426) and **AddRegex()** (p. 426) for more information.

6.274.3 Member Function Documentation

6.274.3.1 VOMSTrustChain& Arc::VOMSTrustList::AddChain (const VOMSTrustChain & chain)

Adds chain of trusted DN's to list. During verification each signature of AC is checked against all stored chains. DN's of chain of certificate used for signing AC are compared against DN's stored in these chains one by one. If needed DN of issuer of last certificate is checked too. Comparison succeeds if DN's in at least one stored chain are same as those in certificate chain. Comparison stops when all DN's in stored chain are compared. If there are more DN's in stored chain than in certificate chain then comparison fails. Empty stored list matches any certificate chain. Taking into account that certificate chains are verified down to trusted CA anyway, having more than one DN in stored chain seems to be useless. But such feature may be found useful by some very strict sysadmins. ??? IMO, DN list here is not only for authentication, it is also kind of ACL, which means the AC consumer only trusts those DN's which issues AC.

6.274.3.2 VOMSTrustChain& Arc::VOMSTrustList::AddChain (void)

Adds empty chain of trusted DN's to list.

6.274.3.3 RegularExpression& Arc::VOMSTrustList::AddRegex (const VOMSTrustRegex & reg)

Adds regular expression to list. During verification each signature of AC is checked against all stored regular expressions. DN of signing certificate must match at least one of stored regular expressions.

The documentation for this class was generated from the following file:

- VOMSUtil.h

6.275 Arc::WSAEndpointReference Class Reference

Interface for manipulation of WS-Addressing Endpoint Reference.

```
#include <WSA.h>
```

Public Member Functions

- **WSAEndpointReference** (XMLNode epr)

- **WSAEndpointReference** (const **WSAEndpointReference** &wsa)
- **WSAEndpointReference** (const std::string &address)
- **WSAEndpointReference** (void)
- **~WSAEndpointReference** (void)
- std::string **Address** (void) const
- void **Address** (const std::string &uri)
- **WSAEndpointReference** & **operator=** (const std::string &address)
- **XMLNode ReferenceParameters** (void)
- **XMLNode MetaData** (void)
- **operator XMLNode** (void)

6.275.1 Detailed Description

Interface for manipulation of WS-Adressing Endpoint Reference. It works on Endpoint Reference stored in XML tree. No information is stored in this object except reference to corresponding XML subtree.

6.275.2 Constructor & Destructor Documentation

6.275.2.1 **Arc::WSAEndpointReference::WSAEndpointReference (XMLNode *epr*)**

Link to top level EPR XML node Linking to existing EPR in XML tree

6.275.2.2 **Arc::WSAEndpointReference::WSAEndpointReference (const WSAEndpointReference & *wsa*)**

Copy constructor

6.275.2.3 **Arc::WSAEndpointReference::WSAEndpointReference (const std::string & *address*)**

Creating independent EPR - not implemented

6.275.2.4 **Arc::WSAEndpointReference::WSAEndpointReference (void)**

Dummy constructor - creates invalid instance

6.275.2.5 **Arc::WSAEndpointReference::~~WSAEndpointReference (void)**

Destructor. All empty elements of EPR XML are destroyed here too

6.275.3 Member Function Documentation

6.275.3.1 `std::string Arc::WSAEndpointReference::Address (void) const`

Returns Address ([URL](#) (p. 379)) encoded in EPR

6.275.3.2 `void Arc::WSAEndpointReference::Address (const std::string & uri)`

Assigns new Address value. If EPR had no Address element it is created.

6.275.3.3 `XMLNode Arc::WSAEndpointReference::MetaData (void)`

Access to MetaData element of EPR. Obtained XML element should be manipulated directly in application-dependent way. If EPR had no MetaData element it is created.

6.275.3.4 `Arc::WSAEndpointReference::operator XMLNode (void)`

Returns reference to EPR top XML node

6.275.3.5 `WSAEndpointReference& Arc::WSAEndpointReference::operator= (const std::string & address)`

Same as Address(uri)

6.275.3.6 `XMLNode Arc::WSAEndpointReference::ReferenceParameters (void)`

Access to ReferenceParameters element of EPR. Obtained XML element should be manipulated directly in application-dependent way. If EPR had no ReferenceParameters element it is created.

The documentation for this class was generated from the following file:

- WSA.h

6.276 Arc::WSAHeader Class Reference

Interface for manipulation WS-Addressing information in SOAP header.

```
#include <WSA.h>
```

Public Member Functions

- **WSAHeader** (SOAPEnvelope &soap)
- **WSAHeader** (const std::string &action)

- `std::string To` (void) const
- `void To` (const `std::string &uri`)
- `WSAEndpointReference From` (void)
- `WSAEndpointReference ReplyTo` (void)
- `WSAEndpointReference FaultTo` (void)
- `std::string Action` (void) const
- `void Action` (const `std::string &uri`)
- `std::string MessageID` (void) const
- `void MessageID` (const `std::string &uri`)
- `std::string RelatesTo` (void) const
- `void RelatesTo` (const `std::string &uri`)
- `std::string RelationshipType` (void) const
- `void RelationshipType` (const `std::string &uri`)
- `XMLNode ReferenceParameter` (int n)
- `XMLNode ReferenceParameter` (const `std::string &name`)
- `XMLNode NewReferenceParameter` (const `std::string &name`)
- `operator XMLNode` (void)

Static Public Member Functions

- static bool `Check` (SOAPEnvelope &soap)

Protected Attributes

- bool `header_allocated_`

6.276.1 Detailed Description

Interface for manipulation WS-Addressing information in SOAP header. It works on Endpoint Reference stored in XML tree. No information is stored in this object except reference to corresponding XML subtree.

6.276.2 Constructor & Destructor Documentation

6.276.2.1 `Arc::WSAHeader::WSAHeader (SOAPEnvelope & soap)`

Linking to a header of existing SOAP message

6.276.2.2 `Arc::WSAHeader::WSAHeader (const std::string & action)`

Creating independent SOAP header - not implemented

6.276.3 Member Function Documentation

6.276.3.1 `std::string Arc::WSAHeader::Action (void) const`

Returns content of Action element of SOAP Header.

6.276.3.2 `void Arc::WSAHeader::Action (const std::string & uri)`

Set content of Action element of SOAP Header. If such element does not exist it's created.

6.276.3.3 `static bool Arc::WSAHeader::Check (SOAPEnvelope & soap) [static]`

Tells if specified SOAP message has WSA header

6.276.3.4 `WSAEndpointReference Arc::WSAHeader::FaultTo (void)`

Returns FaultTo element of SOAP Header. If such element does not exist it's created. Obtained element may be manipulated.

6.276.3.5 `WSAEndpointReference Arc::WSAHeader::From (void)`

Returns From element of SOAP Header. If such element does not exist it's created. Obtained element may be manipulated.

6.276.3.6 `std::string Arc::WSAHeader::MessageID (void) const`

Returns content of MessageID element of SOAP Header.

6.276.3.7 `void Arc::WSAHeader::MessageID (const std::string & uri)`

Set content of MessageID element of SOAP Header. If such element does not exist it's created.

6.276.3.8 `XMLNode Arc::WSAHeader::NewReferenceParameter (const std::string & name)`

Creates new ReferenceParameter element with specified name. Returns reference to created element.

6.276.3.9 `Arc::WSAHeader::operator XMLNode (void)`

Returns reference to SOAP Header - not implemented

6.276.3.10 XMLNode Arc::WSAHeader::ReferenceParameter (const std::string & name)

Returns first ReferenceParameter element with specified name

6.276.3.11 XMLNode Arc::WSAHeader::ReferenceParameter (int n)

Return n-th ReferenceParameter element

6.276.3.12 void Arc::WSAHeader::RelatesTo (const std::string & uri)

Set content of RelatesTo element of SOAP Header. If such element does not exist it's created.

6.276.3.13 std::string Arc::WSAHeader::RelatesTo (void) const

Returns content of RelatesTo element of SOAP Header.

6.276.3.14 void Arc::WSAHeader::RelationshipType (const std::string & uri)

Set content of RelationshipType element of SOAP Header. If such element does not exist it's created.

6.276.3.15 std::string Arc::WSAHeader::RelationshipType (void) const

Returns content of RelationshipType element of SOAP Header.

6.276.3.16 WSAEndpointReference Arc::WSAHeader::ReplyTo (void)

Returns ReplyTo element of SOAP Header. If such element does not exist it's created. Obtained element may be manipulated.

6.276.3.17 std::string Arc::WSAHeader::To (void) const

Returns content of To element of SOAP Header.

6.276.3.18 void Arc::WSAHeader::To (const std::string & uri)

Set content of To element of SOAP Header. If such element does not exist it's created.

6.276.4 Field Documentation

6.276.4.1 bool Arc::WSAHeader::header_allocated_ [protected]

SOAP header element

The documentation for this class was generated from the following file:

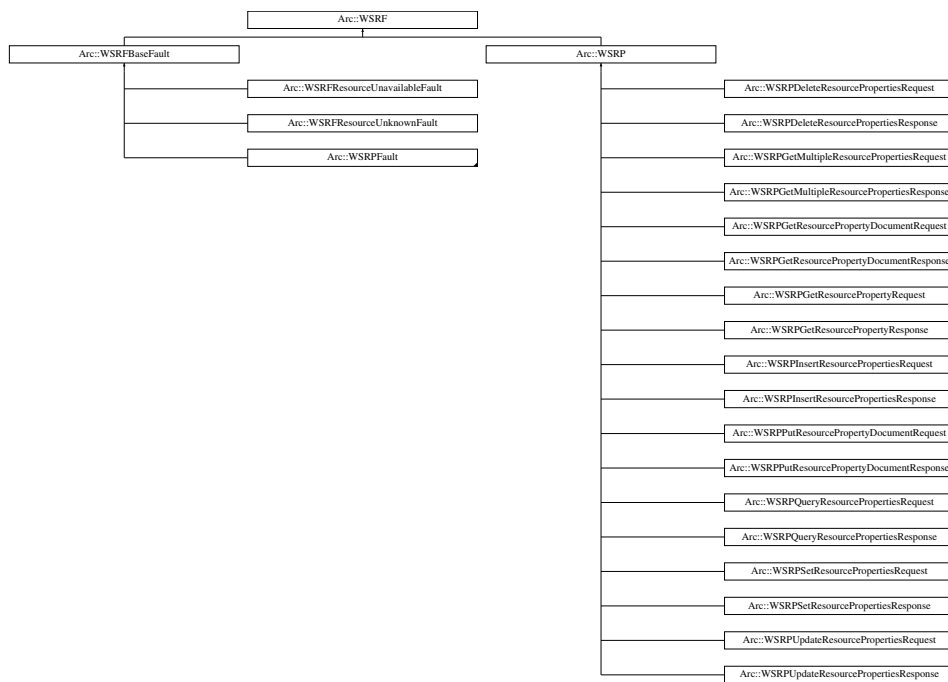
- WSA.h

6.277 Arc::WSRF Class Reference

Base class for every **WSRF** (p. 431) message.

```
#include <WSRF.h>
```

Inheritance diagram for Arc::WSRF:



Public Member Functions

- **WSRF** (SOAPEnvelope &soap, const std::string &action="")
- **WSRF** (bool fault=false, const std::string &action="")
- virtual SOAPEnvelope & **SOAP** (void)
- virtual **operator bool** (void)

Protected Member Functions

- void **set_namespaces** (void)

Protected Attributes

- bool **allocated_**
- bool **valid_**

6.277.1 Detailed Description

Base class for every **WSRF** (p.431) message. This class is not intended to be used directly. Use it like reference while passing through unknown **WSRF** (p.431) message or use classes derived from it.

6.277.2 Constructor & Destructor Documentation

6.277.2.1 **Arc::WSRF::WSRF** (**SOAPEnvelope** & *soap*, const std::string & *action* = " ")

Constructor - creates object out of supplied SOAP tree.

6.277.2.2 **Arc::WSRF::WSRF** (bool *fault* = *false*, const std::string & *action* = " ")

Constructor - creates new **WSRF** (p.431) object

6.277.3 Member Function Documentation

6.277.3.1 **virtual Arc::WSRF::operator bool** (void) [*inline*, *virtual*]

Returns true if instance is valid

References `valid_`.

6.277.3.2 **void Arc::WSRF::set_namespaces** (void) [*protected*]

true if object represents valid **WSRF** (p.431) message set WS Resource namespaces and default prefixes in SOAP message

Reimplemented in **Arc::WSRP** (p.437), and **Arc::WSRFBaseFault** (p.434).

6.277.3.3 **virtual SOAPEnvelope& Arc::WSRF::SOAP** (void) [*inline*, *virtual*]

Direct access to underlying SOAP element

6.277.4 Field Documentation

6.277.4.1 bool Arc::WSRF::allocated_ [protected]

Associated SOAP message - it's SOAP message after all

6.277.4.2 bool Arc::WSRF::valid_ [protected]

true if soap_ needs to be deleted in destructor

Referenced by operator `bool()`.

The documentation for this class was generated from the following file:

- WSRF.h

6.278 Arc::WSRFBBaseFault Class Reference

Base class for **WSRF** (p. 431) fault messages.

```
#include <WSRFBaseFault.h>
```

Inheritance diagram for Arc::WSRFBBaseFault:



Public Member Functions

- **WSRFBaseFault** (SOAPEnvelope &soap)
- **WSRFBaseFault** (const std::string &type)

Protected Member Functions

- **void set_namespaces (void)**

6.278.1 Detailed Description

Base class for **WSRF** (p.431) fault messages. Use classes inherited from it for specific faults.

6.278.2 Constructor & Destructor Documentation

6.278.2.1 Arc::WSRFBaseFault::WSRFBaseFault (SOAPEnvelope & soap)

Constructor - creates object out of supplied SOAP tree.

6.278.2.2 Arc::WSRFBaseFault::WSRFBaseFault (const std::string & type)

Constructor - creates new **WSRF** (p. 431) fault

6.278.3 Member Function Documentation

6.278.3.1 void Arc::WSRFBaseFault::set_namespaces (void) [protected]

set WS-ResourceProperties namespaces and default prefixes in SOAP message

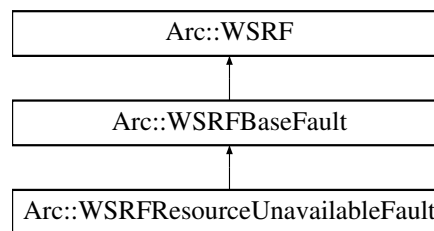
Reimplemented from **Arc::WSRF** (p. 432).

The documentation for this class was generated from the following file:

- WSRFBaseFault.h

6.279 Arc::WSRFResourceUnavailableFault Class Reference

Inheritance diagram for Arc::WSRFResourceUnavailableFault:

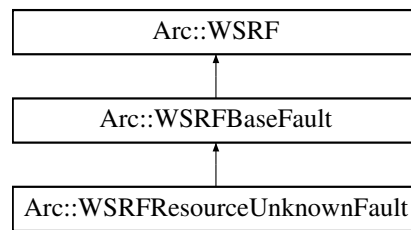


The documentation for this class was generated from the following file:

- WSRFBaseFault.h

6.280 Arc::WSRFResourceUnknownFault Class Reference

Inheritance diagram for Arc::WSRFResourceUnknownFault:



The documentation for this class was generated from the following file:

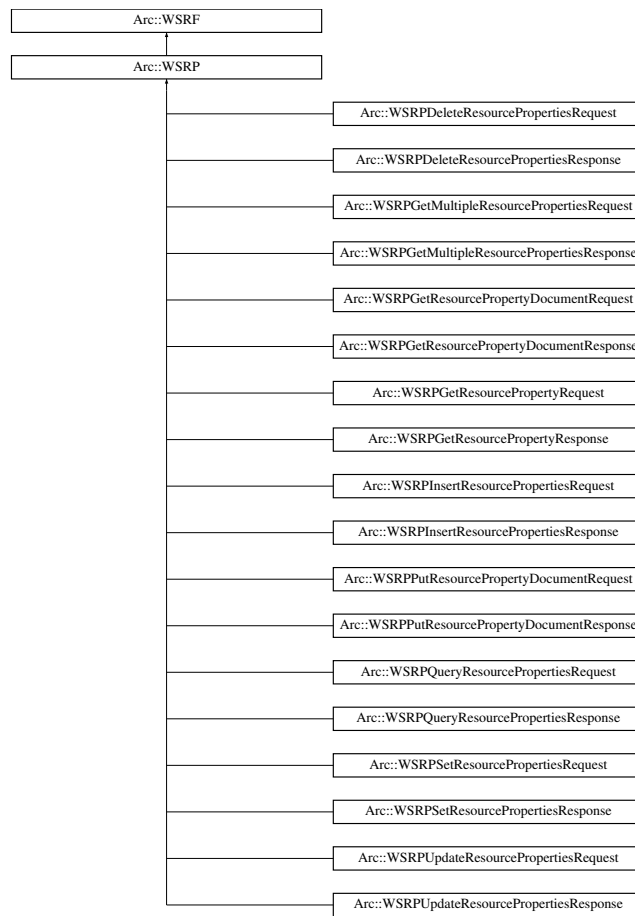
- WSRFBaseFault.h

6.281 Arc::WSRP Class Reference

Base class for WS-ResourceProperties structures.

```
#include <WSResourceProperties.h>
```

Inheritance diagram for Arc::WSRP:



Public Member Functions

- **WSRP** (bool fault=false, const std::string &action="")
- **WSRP** (SOAPEnvelope &soap, const std::string &action="")

Protected Member Functions

- void **set_namespaces** (void)

6.281.1 Detailed Description

Base class for WS-ResourceProperties structures. Inheriting classes implement specific WS-ResourceProperties messages and their properties/elements. Refer to WS-ResourceProperties specifications for things specific to every message.

6.281.2 Constructor & Destructor Documentation

6.281.2.1 Arc::WSRP::WSRP (bool *fault* = false, const std::string & *action* = " ")

Constructor - prepares object for creation of new **WSRP** (p. 435) request/response/fault

6.281.2.2 Arc::WSRP::WSRP (SOAPEnvelope & *soap*, const std::string & *action* = " ")

Constructor - creates object out of supplied SOAP tree. It does not check if 'soap' represents valid WS-ResourceProperties structure. Actual check for validity of structure has to be done by derived class.

6.281.3 Member Function Documentation

6.281.3.1 void Arc::WSRP::set_namespaces (void) [protected]

set WS-ResourceProperties namespaces and default prefixes in SOAP message

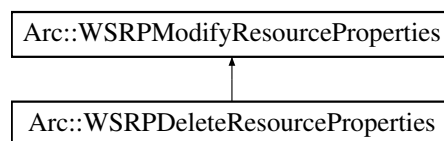
Reimplemented from **Arc::WSRF** (p. 432).

The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.282 Arc::WSRPDeleteResourceProperties Class Reference

Inheritance diagram for Arc::WSRPDeleteResourceProperties:

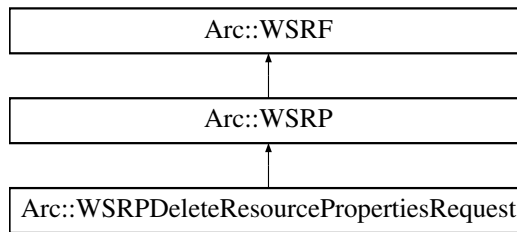


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.283 Arc::WSRPDeleteResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPDeleteResourcePropertiesRequest:

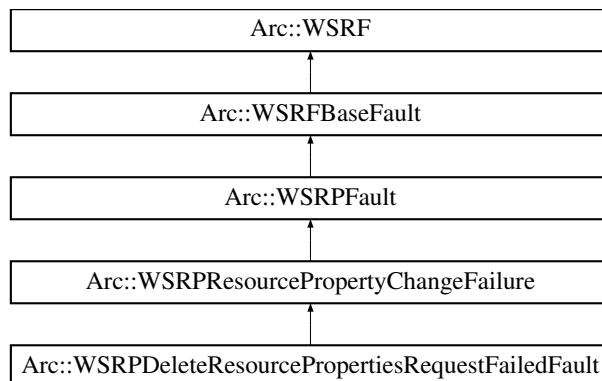


The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

6.284 Arc::WSRPDeleteResourcePropertiesRequestFailedFault Class Reference

Inheritance diagram for `Arc::WSRPDeleteResourcePropertiesRequestFailedFault`:



The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

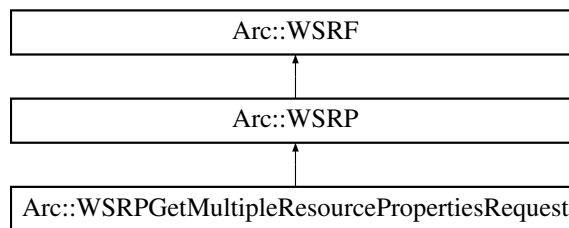
6.285 Arc::WSRPDeleteResourcePropertiesResponse Class Reference

Inheritance diagram for `Arc::WSRPDeleteResourcePropertiesResponse`:

- WSResourceProperties.h

6.287 Arc::WSRPGetMultipleResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPGetMultipleResourcePropertiesRequest:

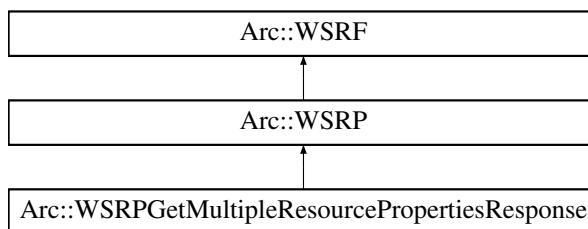


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.288 Arc::WSRPGetMultipleResourcePropertiesResponse Class Reference

Inheritance diagram for Arc::WSRPGetMultipleResourcePropertiesResponse:



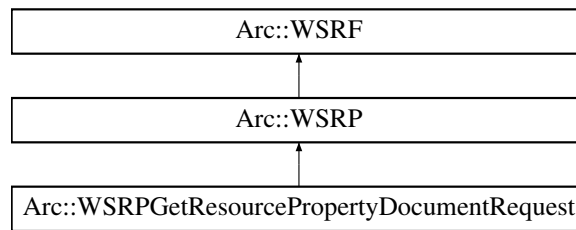
The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.289 Arc::WSRPGetResourcePropertyDocumentRequest Class Reference

Inheritance diagram for Arc::WSRPGetResourcePropertyDocumentRequest:

6.290 Arc::WSRPGetResourcePropertyDocumentResponse Class Reference 443

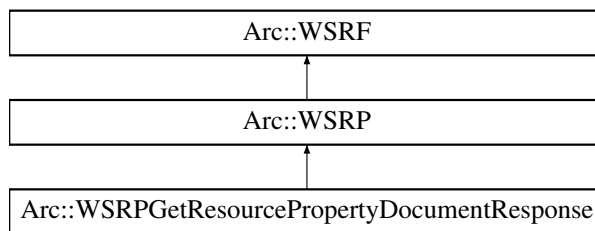


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.290 Arc::WSRPGetResourcePropertyDocumentResponse Class Reference

Inheritance diagram for Arc::WSRPGetResourcePropertyDocumentResponse:

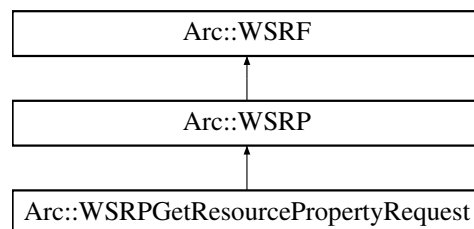


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.291 Arc::WSRPGetResourcePropertyRequest Class Reference

Inheritance diagram for Arc::WSRPGetResourcePropertyRequest:

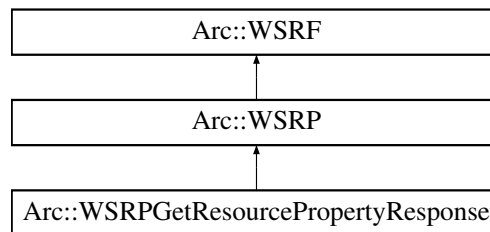


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.292 Arc::WSRPGetResourcePropertyResponse Class Reference

Inheritance diagram for Arc::WSRPGetResourcePropertyResponse:

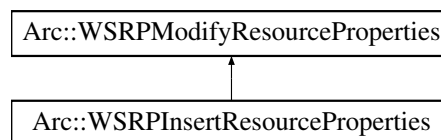


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.293 Arc::WSRPInsertResourceProperties Class Reference

Inheritance diagram for Arc::WSRPInsertResourceProperties:



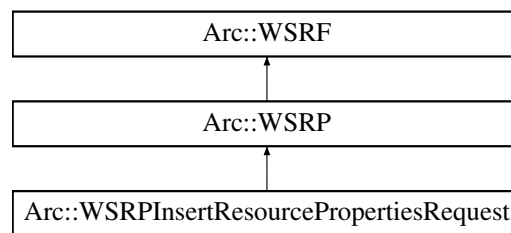
The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.294 Arc::WSRPInsertResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPInsertResourcePropertiesRequest:

6.295 Arc::WSRPInsertResourcePropertiesRequestFailedFault Class Reference

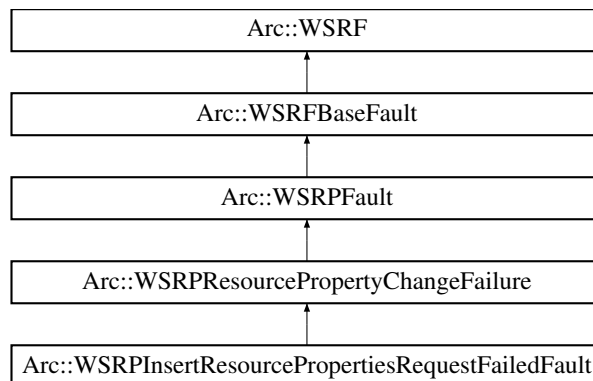


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.295 Arc::WSRPInsertResourcePropertiesRequestFailedFault Class Reference

Inheritance diagram for Arc::WSRPInsertResourcePropertiesRequestFailedFault:

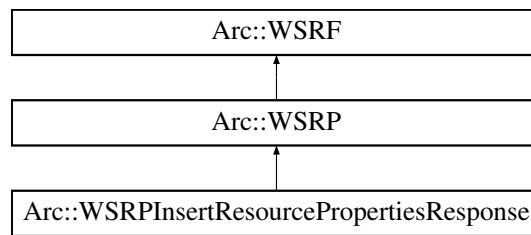


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.296 Arc::WSRPInsertResourcePropertiesResponse Class Reference

Inheritance diagram for Arc::WSRPInsertResourcePropertiesResponse:

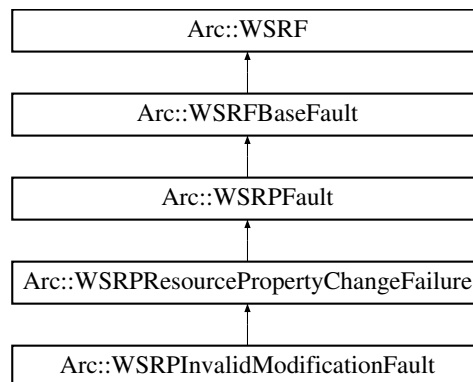


The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

6.297 `Arc::WSRPInvalidModificationFault` Class Reference

Inheritance diagram for `Arc::WSRPInvalidModificationFault`:

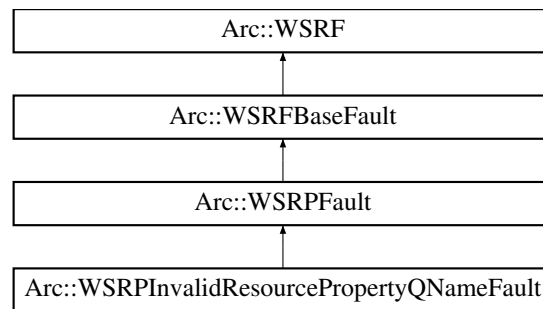


The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

6.298 `Arc::WSRPInvalidResourcePropertyQNameFault` Class Reference

Inheritance diagram for `Arc::WSRPInvalidResourcePropertyQNameFault`:

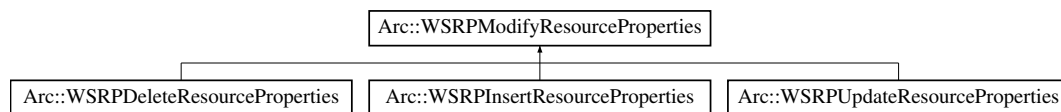


The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

6.299 Arc::WSRPMModifyResourceProperties Class Reference

Inheritance diagram for `Arc::WSRPMModifyResourceProperties`:

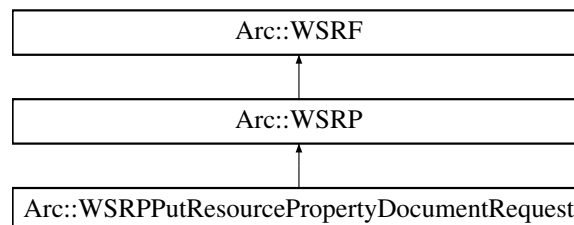


The documentation for this class was generated from the following file:

- `WSResourceProperties.h`

6.300 Arc::WSRPPutResourcePropertyDocumentRequest Class Reference

Inheritance diagram for `Arc::WSRPPutResourcePropertyDocumentRequest`:

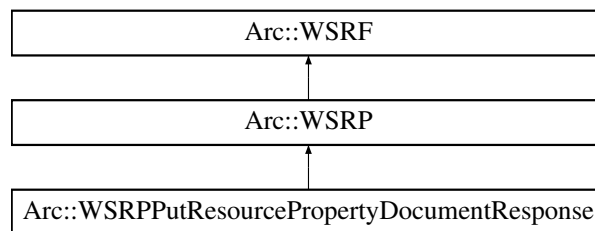


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.301 Arc::WSRPPutResourcePropertyDocumentResponse Class Reference

Inheritance diagram for Arc::WSRPPutResourcePropertyDocumentResponse:

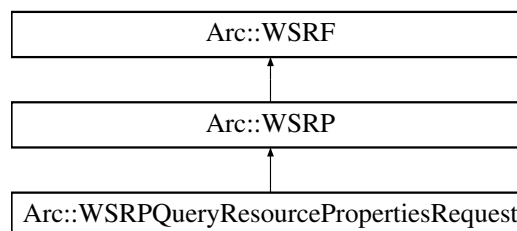


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.302 Arc::WSRPQueryResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPQueryResourcePropertiesRequest:

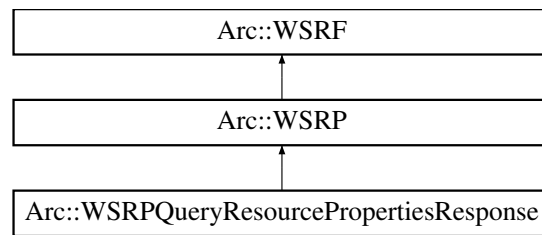


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.303 Arc::WSRPQueryResourcePropertiesResponse Class Reference

Inheritance diagram for Arc::WSRPQueryResourcePropertiesResponse:



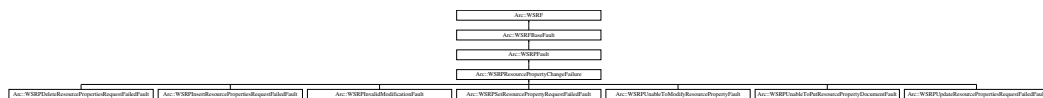
The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.304 Arc::WSRPResourcePropertyChangeFailure Class Reference

```
#include <WSResourceProperties.h>
```

Inheritance diagram for Arc::WSRPResourcePropertyChangeFailure:



Public Member Functions

- **WSRPResourcePropertyChangeFailure** (SOAPEnvelope &soap)
- **WSRPResourcePropertyChangeFailure** (const std::string &type)

6.304.1 Detailed Description

Base class for WS-ResourceProperties faults which contain ResourcePropertyChange-Failure

6.304.2 Constructor & Destructor Documentation

6.304.2.1 Arc::WSRPResourcePropertyChangeFailure::WSRPResourcePropertyChangeFailure (SOAPEnvelope & soap) [inline]

Constructor - creates object out of supplied SOAP tree.

6.304.2.2 Arc::WSRPResourcePropertyChangeFailure::WSRPResourcePropertyChangeFailure (const std::string & type) [inline]

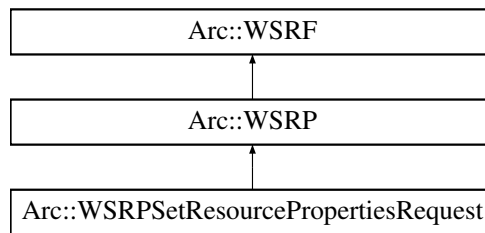
Constructor - creates new **WSRP** (p. 435) fault

The documentation for this class was generated from the following file:

- WSRResourceProperties.h

6.305 Arc::WSRPSetResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPSetResourcePropertiesRequest:

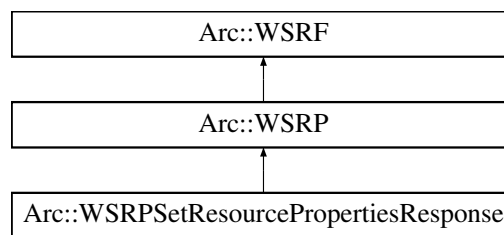


The documentation for this class was generated from the following file:

- WSRResourceProperties.h

6.306 Arc::WSRPSetResourcePropertiesResponse Class Reference

Inheritance diagram for Arc::WSRPSetResourcePropertiesResponse:



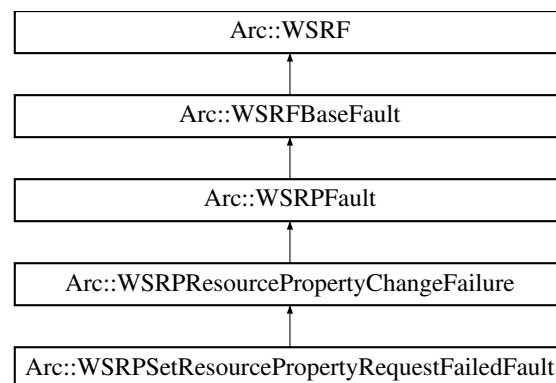
The documentation for this class was generated from the following file:

- WSRResourceProperties.h

6.307 Arc::WSRPSetResourcePropertyRequestFailedFault Class Reference

Inheritance diagram for Arc::WSRPSetResourcePropertyRequestFailedFault:

6.308 Arc::WSRPUUnableToModifyResourcePropertyFault Class Reference 451

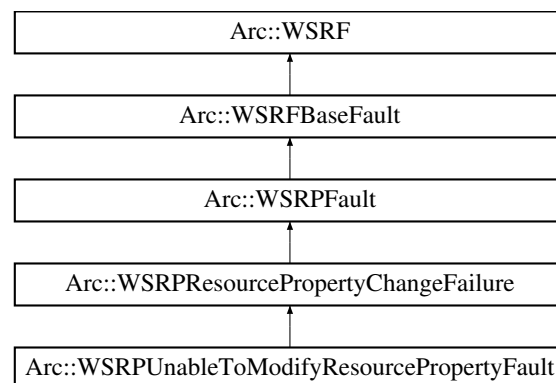


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.308 Arc::WSRPUUnableToModifyResourcePropertyFault Class Reference

Inheritance diagram for Arc::WSRPUUnableToModifyResourcePropertyFault:

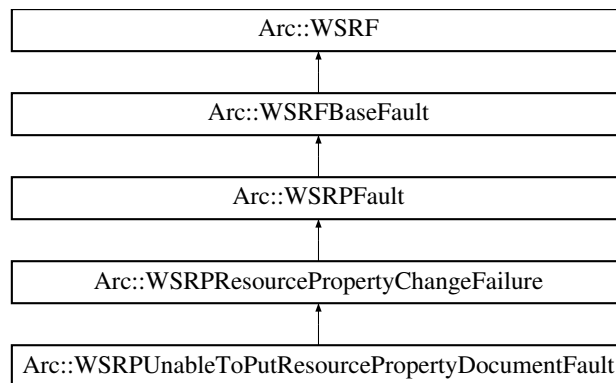


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.309 Arc::WSRPUUnableToPutResourcePropertyDocumentFault Class Reference

Inheritance diagram for Arc::WSRPUUnableToPutResourcePropertyDocumentFault:

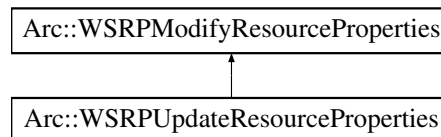


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.310 Arc::WSRPUpdateResourceProperties Class Reference

Inheritance diagram for Arc::WSRPUpdateResourceProperties:

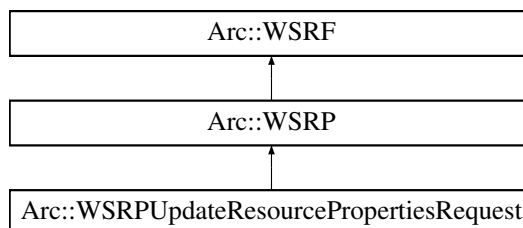


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.311 Arc::WSRPUpdateResourcePropertiesRequest Class Reference

Inheritance diagram for Arc::WSRPUpdateResourcePropertiesRequest:



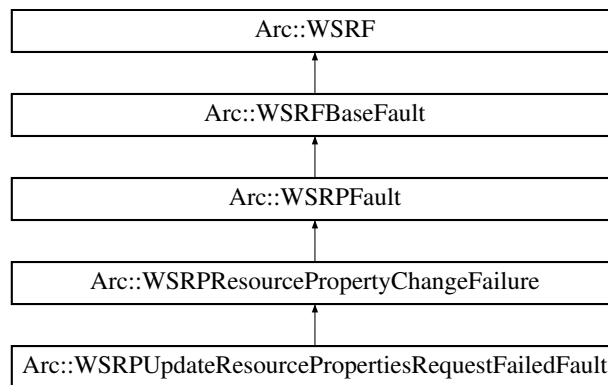
6.312 Arc::WSRPUUpdateResourcePropertiesRequestFailedFault Class Reference 153

The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.312 Arc::WSRPUUpdateResourcePropertiesRequestFailedFault Class Reference

Inheritance diagram for Arc::WSRPUUpdateResourcePropertiesRequestFailedFault:

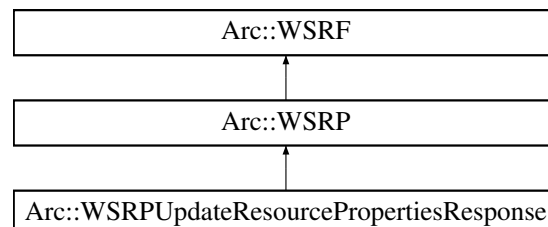


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.313 Arc::WSRPUUpdateResourcePropertiesResponse Class Reference

Inheritance diagram for Arc::WSRPUUpdateResourcePropertiesResponse:

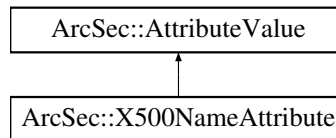


The documentation for this class was generated from the following file:

- WSResourceProperties.h

6.314 ArcSec::X500NameAttribute Class Reference

Inheritance diagram for ArcSec::X500NameAttribute:



Public Member Functions

- virtual bool **equal** (**AttributeValue** *other, bool check_id=true)
- virtual std::string **encode** ()
- virtual std::string **getType** ()
- virtual std::string **getId** ()

6.314.1 Member Function Documentation

6.314.1.1 virtual std::string ArcSec::X500NameAttribute::encode () [inline, virtual]

encode the value in a string format

Implements **ArcSec::AttributeValue** (p. 62).

6.314.1.2 virtual bool ArcSec::X500NameAttribute::equal (**AttributeValue** * value, bool *check_id* =true) [virtual]

Evaluate whether "this" equals to the parameter value

Implements **ArcSec::AttributeValue** (p. 62).

6.314.1.3 virtual std::string ArcSec::X500NameAttribute::getId () [inline, virtual]

Get the AttributeId of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 62).

6.314.1.4 virtual std::string ArcSec::X500NameAttribute::getType () [inline, virtual]

Get the DataType of the <Attribute>

Implements **ArcSec::AttributeValue** (p. 63).

The documentation for this class was generated from the following file:

- X500NameAttribute.h

6.315 Arc::X509Token Class Reference

Class for manipulating X.509 Token **Profile** (p. 305).

```
#include <X509Token.h>
```

Public Types

- enum **X509TokenType**

Public Member Functions

- **X509Token** (SOAPEnvelope &soap, const std::string &keyfile="")
- **X509Token** (SOAPEnvelope &soap, const std::string &certfile, const std::string &keyfile, **X509TokenType** token_type=Signature)
- **~X509Token** (void)
- **operator bool** (void)
- bool **Authenticate** (const std::string &cafile, const std::string &capath)
- bool **Authenticate** (void)

6.315.1 Detailed Description

Class for manipulating X.509 Token **Profile** (p. 305). This class is for generating/consuming X.509 Token profile. Currently it is used by x509token handler (src/hed/pdc/x509tokensh/) It is not necessary to directly called this class. If we need to use X.509 Token functionality, we only need to configure the x509token handler into service and client.

6.315.2 Member Enumeration Documentation

6.315.2.1 enum Arc::X509Token::X509TokenType

X509TokenType is for distinguishing two types of operation. It is used as the parameter of constructor.

6.315.3 Constructor & Destructor Documentation

6.315.3.1 Arc::X509Token::X509Token (SOAPEnvelope & soap, const std::string & keyfile = " ")

Constructor.Parse X509 Token information from SOAP header. X509 Token related information is extracted from SOAP header and stored in class variables. And then it the

X509Token (p. 453) object will be used for authentication if the tokentype is Signature; otherwise if the tokentype is Encryption, the encrypted soap body will be decrypted and replaced by decrypted message. keyfile is only needed when the **X509Token** (p. 453) is encryption token

6.315.3.2 Arc::X509Token::X509Token (SOAPEnvelope & soap, const std::string & certfile, const std::string & keyfile, X509TokenType token_type = Signature)

Constructor. Add X509 Token information into the SOAP header. Generated token contains elements X509 token and signature, and is meant to be used for authentication on the consuming side.

Parameters

<i>soap</i>	The SOAP message to which the X509 Token will be inserted
<i>certfile</i>	The certificate file which will be used to encrypt the SOAP body (if parameter tokentype is Encryption), or be used as <wsse:BinarySecurityToken/> (if parameter tokentype is Signature).
<i>keyfile</i>	The key file which will be used to create signature. Not needed when create encryption.
<i>tokentype</i>	Token type: Signature or Encryption.

6.315.3.3 Arc::X509Token::~~X509Token (void)

Deconstructor. Nothing to be done except finalizing the xmlsec library.

6.315.4 Member Function Documentation

6.315.4.1 bool Arc::X509Token::Authenticate (const std::string & cafile, const std::string & capath)

Check signature by using the certificare information in **X509Token** (p. 453) which is parsed by the constructor, and the trusted certificates specified as one of the two parameters. Not only the signature (in the **X509Token** (p. 453)) itself is checked, but also the certificate which is supposed to check the signature needs to be trused (which means the certificate is issued by the ca certificate from CA file or CA directory). At least one the the two parameters should be set.

Parameters

<i>cafile</i>	The CA file
<i>capath</i>	The CA directory

Returns

true if authentication passes; otherwise false

6.315.4.2 bool Arc::X509Token::Authenticate (void)

Check signature by using the cert information in soap message. Only the signature itself is checked, and it is not guranteed that the certificate which is supposed to check the signature is trusted.

6.315.4.3 Arc::X509Token::operator bool (void)

Returns true of constructor succeeded

The documentation for this class was generated from the following file:

- X509Token.h

6.316 Arc::XmlContainer Class Reference

The documentation for this class was generated from the following file:

- XmlContainer.h

6.317 Arc::XmlDatabase Class Reference

The documentation for this class was generated from the following file:

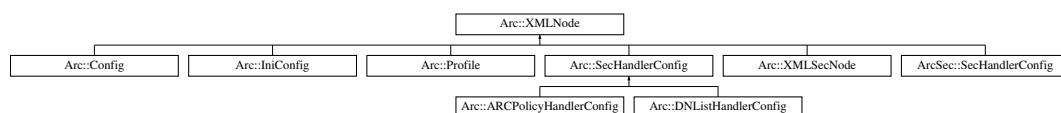
- XmlDatabase.h

6.318 Arc::XMLNode Class Reference

Wrapper for LibXML library Tree interface.

```
#include <XMLNode.h>
```

Inheritance diagram for Arc::XMLNode:

**Public Member Functions**

- **XMLNode** (void)
- **XMLNode** (const **XMLNode** &node)
- **XMLNode** (const std::string &xml)

- **XMLNode** (const char *xml, int len=-1)
- **XMLNode** (long ptr_addr)
- **XMLNode** (const **NS** &ns, const char *name)
- **~XMLNode** (void)
- void **New** (**XMLNode** &node) const
- void **Exchange** (**XMLNode** &node)
- void **Move** (**XMLNode** &node)
- void **Swap** (**XMLNode** &node)
- **operator bool** (void) const
- bool **operator!** (void) const
- bool **operator==** (const **XMLNode** &node)
- bool **operator!=** (const **XMLNode** &node)
- bool **Same** (const **XMLNode** &node)
- bool **operator==** (bool val)
- bool **operator!=** (bool val)
- bool **operator==** (const std::string &str)
- bool **operator!=** (const std::string &str)
- bool **operator==** (const char *str)
- bool **operator!=** (const char *str)
- **XMLNode Child** (int n=0)
- **XMLNode operator[]** (const char *name) const
- **XMLNode operator[]** (const std::string &name) const
- **XMLNode operator[]** (int n) const
- void **operator++** (void)
- void **operator--** (void)
- int **Size** (void) const
- **XMLNode Get** (const std::string &name) const
- std::string **Name** (void) const
- std::string **Prefix** (void) const
- std::string **FullName** (void) const
- std::string **Namespace** (void) const
- void **Name** (const char *name)
- void **Name** (const std::string &name)
- void **GetXML** (std::string &out_xml_str, bool user_friendly=false) const
- void **GetXML** (std::string &out_xml_str, const std::string &encoding, bool user_friendly=false) const
- void **GetDoc** (std::string &out_xml_str, bool user_friendly=false) const
- **operator std::string** (void) const
- **XMLNode & operator=** (const char *content)
- **XMLNode & operator=** (const std::string &content)
- void **Set** (const std::string &content)
- **XMLNode & operator=** (const **XMLNode** &node)
- **XMLNode Attribute** (int n=0)
- **XMLNode Attribute** (const char *name)
- **XMLNode Attribute** (const std::string &name)
- **XMLNode NewAttribute** (const char *name)

- **XMLNode NewAttribute** (const std::string &name)
- int **AttributesSize** (void) const
- void **Namespaces** (const **NS** &namespaces, bool keep=false, int recursion=-1)
- **NS Namespaces** (void)
- std::string **NamespacePrefix** (const char *urn)
- **XMLNode NewChild** (const char *name, int n=-1, bool global_order=false)
- **XMLNode NewChild** (const std::string &name, int n=-1, bool global_order=false)
- **XMLNode NewChild** (const char *name, const **NS** &namespaces, int n=-1, bool global_order=false)
- **XMLNode NewChild** (const std::string &name, const **NS** &namespaces, int n=-1, bool global_order=false)
- **XMLNode NewChild** (const **XMLNode** &node, int n=-1, bool global_order=false)
- void **Replace** (const **XMLNode** &node)
- void **Destroy** (void)
- XMLNodeList **Path** (const std::string &path)
- XMLNodeList **XPathLookup** (const std::string &xpathExpr, const **NS** &nsList)
- **XMLNode GetRoot** (void)
- **XMLNode Parent** (void)
- bool **SaveToFile** (const std::string &file_name) const
- bool **SaveToStream** (std::ostream &out) const
- bool **ReadFromFile** (const std::string &file_name)
- bool **ReadFromStream** (std::istream &in)
- bool **Validate** (const std::string &schema_file, std::string &err_msg)

Protected Member Functions

- **XMLNode** (xmlNodePtr node)

Protected Attributes

- bool **is_owner_**
- bool **is_temporary_**

Friends

- bool **MatchXMLName** (const **XMLNode** &node1, const **XMLNode** &node2)
- bool **MatchXMLName** (const **XMLNode** &node, const char *name)
- bool **MatchXMLName** (const **XMLNode** &node, const std::string &name)
- bool **MatchXMLNamespace** (const **XMLNode** &node1, const **XMLNode** &node2)
- bool **MatchXMLNamespace** (const **XMLNode** &node, const char *uri)
- bool **MatchXMLNamespace** (const **XMLNode** &node, const std::string &uri)

6.318.1 Detailed Description

Wrapper for LibXML library Tree interface. This class wraps XML Node, Document and Property/Attribute structures. Each instance serves as pointer to actual LibXML element and provides convenient (for chosen purpose) methods for manipulating it. This class has no special ties to LibXML library and may be easily rewritten for any XML parser which provides interface similar to LibXML Tree. It implements only small subset of XML capabilities, which is probably enough for performing most of useful actions. This class also filters out (usually) useless textual nodes which are often used to make XML documents human-readable.

6.318.2 Constructor & Destructor Documentation

6.318.2.1 `Arc::XMLNode::XMLNode (xmlNodePtr node) [inline, protected]`

Private constructor for inherited classes Creates instance and links to existing LibXML structure. Acquired structure is not owned by class instance. If there is need to completely pass control of LibXML document to then instance's `is_owner_` variable has to be set to true.

6.318.2.2 `Arc::XMLNode::XMLNode (void) [inline]`

Constructor of invalid node Created instance does not point to XML element. All methods are still allowed for such instance but produce no results.

6.318.2.3 `Arc::XMLNode::XMLNode (const XMLNode & node) [inline]`

Copies existing instance. Underlying XML element is NOT copied. Ownership is NOT inherited. Strictly speaking it should be no const here - but that conflicts with C++.

6.318.2.4 `Arc::XMLNode::XMLNode (const std::string & xml)`

Creates XML document structure from textual representation of XML document. Created structure is pointed and owned by constructed instance

6.318.2.5 `Arc::XMLNode::XMLNode (const char * xml, int len = -1)`

Same as previous

6.318.2.6 `Arc::XMLNode::XMLNode (long ptr_addr)`

Copy constructor. Used by language bindings

6.318.2.7 Arc::XMLNode::XMLNode (const NS & ns, const char * name)

Creates empty XML document structure with specified namespaces. Created XML contains only root element named 'name'. Created structure is pointed and owned by constructed instance

6.318.2.8 Arc::XMLNode::~~XMLNode (void)

Destructor Also destroys underlying XML document if owned by this instance

6.318.3 Member Function Documentation**6.318.3.1 XMLNode Arc::XMLNode::Attribute (int n = 0)**

Returns list of all attributes of node.

Returns **XMLNode** (p. 455) instance representing n-th attribute of node.

Referenced by Attribute().

6.318.3.2 XMLNode Arc::XMLNode::Attribute (const char * name)

Returns **XMLNode** (p. 455) instance representing first attribute of node with specified by name

6.318.3.3 XMLNode Arc::XMLNode::Attribute (const std::string & name) [inline]

Returns **XMLNode** (p. 455) instance representing first attribute of node with specified by name

References Attribute().

6.318.3.4 int Arc::XMLNode::AttributesSize (void) const

Returns number of attributes of node

6.318.3.5 XMLNode Arc::XMLNode::Child (int n = 0)

Returns **XMLNode** (p. 455) instance representing n-th child of XML element. If such does not exist invalid **XMLNode** (p. 455) instance is returned

6.318.3.6 void Arc::XMLNode::Destroy (void)

Destroys underlying XML element. XML element is unlinked from XML tree and destroyed. After this operation **XMLNode** (p. 455) instance becomes invalid

6.318.3.7 void Arc::XMLNode::Exchange (XMLNode & *node*)

Exchanges XML (sub)trees. Following combinations are possible If either this or node are referring owned XML tree (top level node) then references are simply exchanged. This operation is fast. If both this and node are referring to XML (sub)tree of different documents then (sub)trees are exchanged between documents. If both this and node are referring to XML (sub)tree of same document then (sub)trees are moved inside document. The main reason for this method is to provide effective way to insert one XML document inside another. One should take into account that if any of exchanged nodes is top level it must be also owner of document. Otherwise method will fail. If both nodes are top level owners and/or invalid nodes then this method is identical to `Swap()` (p. 466).

6.318.3.8 std::string Arc::XMLNode::FullName (void) const [inline]

Returns prefix:name of XML node

References `Name()`, and `Prefix()`.

6.318.3.9 XMLNode Arc::XMLNode::Get (const std::string & *name*) const [inline]

Same as `operator[]`

References `operator[]()`.

6.318.3.10 void Arc::XMLNode::GetDoc (std::string & *out_xml_str*, bool *user_friendly* = false) const

Fills argument with whole XML document textual representation

6.318.3.11 XMLNode Arc::XMLNode::GetRoot (void)

Get the root node from any child node of the tree

6.318.3.12 void Arc::XMLNode::GetXML (std::string & *out_xml_str*, bool *user_friendly* = false) const

Fills argument with this instance XML subtree textual representation

6.318.3.13 void Arc::XMLNode::GetXML (std::string & *out_xml_str*, const std::string & *encoding*, bool *user_friendly* = false) const

Fills argument with this instance XML subtree textual representation if the XML subtree is corresponding to the encoding format specified in the argument, e.g. utf-8

6.318.3.14 void Arc::XMLNode::Move (XMLNode & node)

Moves content of this XML (sub)tree to node This operation is similar to New except that XML (sub)tree to referred by this is destroyed. This method is more effective than combination of **New()** (p. 462) and **Destroy()** (p. 459) because internally it is optimized not to copy data if not needed. The main purpose of this is to effectively extract part of XML document.

6.318.3.15 std::string Arc::XMLNode::Name (void) const

Returns name of XML node

Referenced by FullName(), and Name().

6.318.3.16 void Arc::XMLNode::Name (const std::string & name) [inline]

Assigns new name to XML node

References Name().

6.318.3.17 void Arc::XMLNode::Name (const char * name)

Assigns new name to XML node

6.318.3.18 std::string Arc::XMLNode::Namespace (void) const

Returns namespace URI of XML node

6.318.3.19 std::string Arc::XMLNode::NamespacePrefix (const char * urn)

Returns prefix of specified namespace. Empty string if no such namespace.

6.318.3.20 NS Arc::XMLNode::Namespaces (void)

Returns namespaces known at this node

6.318.3.21 void Arc::XMLNode::Namespaces (const NS & namespaces, bool keep = false, int recursion = -1)

Assigns namespaces of XML document at point specified by this instance. If namespace already exists it gets new prefix. New namespaces are added. It is useful to apply this method to XML being processed in order to refer to it's elements by known prefix. If keep is set to false existing namespace definition residing at this instance and below are removed (default behavior). If recursion is set to positive number then depth of prefix replacement is limited by this number (0 limits it to this node only). For unlimited

recursion use -1. If recursion is limited then value of keep is ignored and existing namespaces are always kept.

6.318.3.22 void Arc::XMLNode::New (XMLNode & node) const

Creates a copy of XML (sub)tree. If object does not represent whole document - top level document is created. 'new_node' becomes a pointer owning new XML document.

6.318.3.23 XMLNode Arc::XMLNode::NewAttribute (const char * name)

Creates new attribute with specified name.

Referenced by NewAttribute().

6.318.3.24 XMLNode Arc::XMLNode::NewAttribute (const std::string & name) [inline]

Creates new attribute with specified name.

References NewAttribute().

6.318.3.25 XMLNode Arc::XMLNode::NewChild (const char * name, int n = -1, bool global_order = false)

Creates new child XML element at specified position with specified name. Default is to put it at end of list. If global order is true position applies to whole set of children, otherwise only to children of same name. Returns created node.

Referenced by NewChild().

6.318.3.26 XMLNode Arc::XMLNode::NewChild (const std::string & name, int n = -1, bool global_order = false) [inline]

Same as NewChild(const char*,int,bool) (p. 462)

References NewChild().

6.318.3.27 XMLNode Arc::XMLNode::NewChild (const char * name, const NS & namespaces, int n = -1, bool global_order = false)

Creates new child XML element at specified position with specified name and namespaces. For more information look at NewChild(const char*,int,bool) (p. 462)

6.318.3.28 `XMLNode Arc::XMLNode::NewChild (const std::string & name, const NS & namespaces, int n = -1, bool global_order = false) [inline]`

Same as `NewChild(const char*,const NS&,int,bool)` (p. 462)

References `NewChild()`.

6.318.3.29 `XMLNode Arc::XMLNode::NewChild (const XMLNode & node, int n = -1, bool global_order = false)`

Link a copy of supplied XML node as child. Returns instance referring to new child. XML element is a copy of supplied one but not owned by returned instance

6.318.3.30 `Arc::XMLNode::operator bool (void) const [inline]`

Returns true if instance points to XML element - valid instance

References `is_temporary_`.

6.318.3.31 `Arc::XMLNode::operator std::string (void) const`

Returns textual content of node excluding content of children nodes

6.318.3.32 `bool Arc::XMLNode::operator! (void) const [inline]`

Returns true if instance does not point to XML element - invalid instance

References `is_temporary_`.

6.318.3.33 `bool Arc::XMLNode::operator!= (const XMLNode & node) [inline]`

Returns false if 'node' represents same XML element

6.318.3.34 `bool Arc::XMLNode::operator!= (bool val) [inline]`

This operator is needed to avoid ambiguity

6.318.3.35 `bool Arc::XMLNode::operator!= (const std::string & str) [inline]`

This operator is needed to avoid ambiguity

6.318.3.36 `bool Arc::XMLNode::operator!= (const char * str) [inline]`

This operator is needed to avoid ambiguity

6.318.3.37 void Arc::XMLNode::operator++ (void)

Convenience operator to switch to next element of same name. If there is no such node this object becomes invalid.

6.318.3.38 void Arc::XMLNode::operator-- (void)

Convenience operator to switch to previous element of same name. If there is no such node this object becomes invalid.

6.318.3.39 XMLNode& Arc::XMLNode::operator= (const char * *content*)

Sets textual content of node. All existing children nodes are discarded.

Referenced by operator=(), and Set().

6.318.3.40 XMLNode& Arc::XMLNode::operator= (const XMLNode & *node*)

Make instance refer to another XML node. Ownership is not inherited. Due to nature of **XMLNode** (p. 455) there should be no const here, but that does not fit into C++.

6.318.3.41 XMLNode& Arc::XMLNode::operator= (const std::string & *content*)
[inline]

Sets textual content of node. All existing children nodes are discarded.

References operator=().

6.318.3.42 bool Arc::XMLNode::operator==(bool *val*) [inline]

This operator is needed to avoid ambiguity

6.318.3.43 bool Arc::XMLNode::operator==(const XMLNode & *node*) [inline]

Returns true if 'node' represents same XML element

Referenced by Same().

6.318.3.44 bool Arc::XMLNode::operator==(const char * *str*) [inline]

This operator is needed to avoid ambiguity

6.318.3.45 bool Arc::XMLNode::operator==(const std::string & *str*) [inline]

This operator is needed to avoid ambiguity

6.318.3.46 XMLNode Arc::XMLNode::operator[] (const char * *name*) const

Returns **XMLNode** (p. 455) instance representing first child element with specified name. Name may be "namespace_prefix:name", "namespace_uri:name" or simply "name". In last case namespace is ignored. If such node does not exist invalid **XMLNode** (p. 455) instance is returned. This method should not be marked const because obtaining unrestricted **XMLNode** (p. 455) of child element allows modification of underlying XML tree. But in order to keep const in other places non-const-handling is passed to programmer. Otherwise C++ compiler goes nuts.

Referenced by Get(), and operator[]().

6.318.3.47 XMLNode Arc::XMLNode::operator[] (const std::string & *name*) const
[inline]

Similar to previous method

References operator[]().

6.318.3.48 XMLNode Arc::XMLNode::operator[] (int *n*) const

Returns **XMLNode** (p. 455) instance representing n-th node in sequence of siblings of same name. It's main purpose is to be used to retrieve element in array of children of same name like node["name"][5]. This method should not be marked const because obtaining unrestricted **XMLNode** (p. 455) of child element allows modification of underlying XML tree. But in order to keep const in other places non-const-handling is passed to programmer. Otherwise C++ compiler goes nuts.

6.318.3.49 XMLNode Arc::XMLNode::Parent (void)

Get the parent node from any child node of the tree

6.318.3.50 XMLNodeList Arc::XMLNode::Path (const std::string & *path*)

Collects nodes corresponding to specified path. This is a convenience function to cover common use of XPath but without performance hit. Path is made of node_name[/node_name[...]] and is relative to current node. node_names are treated in same way as in operator[]. Returns all nodes which are represented by path.

6.318.3.51 std::string Arc::XMLNode::Prefix (void) const

Returns namespace prefix of XML node

Referenced by FullName().

6.318.3.52 `bool Arc::XMLNode::ReadFromFile (const std::string & file_name)`

Read XML document from file and associate it with this node

6.318.3.53 `bool Arc::XMLNode::ReadFromStream (std::istream & in)`

Read XML document from stream and associate it with this node

6.318.3.54 `void Arc::XMLNode::Replace (const XMLNode & node)`

Makes a copy of supplied XML node and makes this instance refer to it

6.318.3.55 `bool Arc::XMLNode::Same (const XMLNode & node)` `[inline]`

Returns true if 'node' represents same XML element - for bindings

References operator==().

6.318.3.56 `bool Arc::XMLNode::SaveToFile (const std::string & file_name) const`

Save string representation of node to file

6.318.3.57 `bool Arc::XMLNode::SaveToStream (std::ostream & out) const`

Save string representation of node to stream

6.318.3.58 `void Arc::XMLNode::Set (const std::string & content)` `[inline]`

Same as operator=. Used for bindings.

References operator=().

6.318.3.59 `int Arc::XMLNode::Size (void) const`

Returns number of children nodes

6.318.3.60 `void Arc::XMLNode::Swap (XMLNode & node)`

Swaps XML (sub)trees to this this and node refer. For XML subtrees this method is not anyhow different then using combination `XMLNode` (p. 455) `tmp=*this; *this=node; node=tmp;` But in case of either this or node owning XML document ownership is swapped too. And this is a main purpose of `Swap()` (p. 466) method.

6.318.3.61 `bool Arc::XMLNode::Validate (const std::string & schema_file, std::string & err_msg)`

Remove all eye-candy information leaving only informational parts * void Purify(void);
XML schema validation against the schema file defined as argument

6.318.3.62 `XMLNodeList Arc::XMLNode::XPathLookup (const std::string & xpathExpr, const NS & nsList)`

Uses xPath to look up the whole xml structure, Returns a list of **XMLNode** (p. 455) points. The xpathExpr should be like "//xx:child1/" which indicates the namespace and node that you would like to find; The nsList is the namespace the result should belong to (e.g. xx="uri:test"). **Query** (p. 306) is run on whole XML document but only the elements belonging to this XML subtree are returned.

6.318.4 Friends And Related Function Documentation

6.318.4.1 `bool MatchXMLName (const XMLNode & node1, const XMLNode & node2)`
[friend]

Returns true if underlying XML elements have same names

6.318.4.2 `bool MatchXMLName (const XMLNode & node, const std::string & name)`
[friend]

Returns true if 'name' matches name of 'node'. If name contains prefix it's checked too

6.318.4.3 `bool MatchXMLName (const XMLNode & node, const char * name)`
[friend]

Returns true if 'name' matches name of 'node'. If name contains prefix it's checked too

6.318.4.4 `bool MatchXMLNamespace (const XMLNode & node1, const XMLNode & node2)` [friend]

Returns true if underlying XML elements belong to same namespaces

6.318.4.5 `bool MatchXMLNamespace (const XMLNode & node, const std::string & uri)`
[friend]

Returns true if 'namespace' matches 'node's namespace.

6.318.4.6 `bool MatchXMLNamespace (const XMLNode & node, const char * uri)`
`[friend]`

Returns true if 'namespace' matches 'node's namespace.

6.318.5 Field Documentation

6.318.5.1 `bool Arc::XMLNode::is_owner_` `[protected]`

If true node is owned by this instance - hence released in destructor. Normally that may be true only for top level node of XML document.

6.318.5.2 `bool Arc::XMLNode::is_temporary_` `[protected]`

This variable is for future

Referenced by operator bool(), and operator!().

The documentation for this class was generated from the following file:

- XMLNode.h

6.319 Arc::XMLNodeContainer Class Reference

```
#include <XMLNode.h>
```

Public Member Functions

- **XMLNodeContainer** (void)
- **XMLNodeContainer** (const **XMLNodeContainer** &)
- **XMLNodeContainer & operator=** (const **XMLNodeContainer** &)
- void **Add** (const **XMLNode** &)
- void **Add** (const std::list< **XMLNode** > &)
- void **AddNew** (const **XMLNode** &)
- void **AddNew** (const std::list< **XMLNode** > &)
- int **Size** (void) const
- **XMLNode operator[]** (int)
- std::list< **XMLNode** > **Nodes** (void)

6.319.1 Detailed Description

Container for multiple **XMLNode** (p. 455) elements

6.319.2 Constructor & Destructor Documentation

6.319.2.1 Arc::XMLNodeContainer::XMLNodeContainer (void)

Default constructor

6.319.2.2 Arc::XMLNodeContainer::XMLNodeContainer (const XMLNodeContainer &)

Copy constructor. Add nodes from argument. Nodes owning XML document are copied using **AddNew()** (p. 469). Not owning nodes are linked using **Add()** (p. 469) method.

6.319.3 Member Function Documentation

6.319.3.1 void Arc::XMLNodeContainer::Add (const XMLNode &)

Link XML subtree referred by node to container. XML tree must be available as long as this object is used.

6.319.3.2 void Arc::XMLNodeContainer::Add (const std::list< XMLNode > &)

Link multiple XML subtrees to container.

6.319.3.3 void Arc::XMLNodeContainer::AddNew (const XMLNode &)

Copy XML subtree referenced by node to container. After this operation container refers to independent XML document. This document is deleted when container is destroyed.

6.319.3.4 void Arc::XMLNodeContainer::AddNew (const std::list< XMLNode > &)

Copy multiple XML subtrees to container.

6.319.3.5 std::list<XMLNode> Arc::XMLNodeContainer::Nodes (void)

Returns all stored nodes.

6.319.3.6 XMLNodeContainer& Arc::XMLNodeContainer::operator= (const XMLNodeContainer &)

Same as copy constructor with current nodes being deleted first.

6.319.3.7 XMLNode Arc::XMLNodeContainer::operator[] (int)

Returns n-th node in a store.

6.319.3.8 int Arc::XMLNodeContainer::Size (void) const

Return number of refered/stored nodes.

The documentation for this class was generated from the following file:

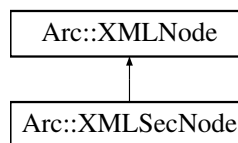
- XMLNode.h

6.320 Arc::XMLSecNode Class Reference

Extends **XMLNode** (p. 455) class to support XML security operation.

```
#include <XMLSecNode.h>
```

Inheritance diagram for Arc::XMLSecNode:



Public Member Functions

- **XMLSecNode** (**XMLNode** &node)
- void **AddSignatureTemplate** (const std::string &id_name, const SignatureMethod sign_method, const std::string &incl_namespaces="")
- bool **SignNode** (const std::string &privkey_file, const std::string &cert_file)
- bool **VerifyNode** (const std::string &id_name, const std::string &ca_file, const std::string &ca_path, bool verify_trusted=true)
- bool **EncryptNode** (const std::string &cert_file, const SymEncryptionType encrypt_type)
- bool **DecryptNode** (const std::string &privkey_file, **XMLNode** &decrypted_node)

6.320.1 Detailed Description

Extends **XMLNode** (p. 455) class to support XML security operation. All **XMLNode** (p. 455) methods are exposed by inheriting from **XMLNode** (p. 455). **XMLSecNode** (p. 470) itself does not own node, instead it uses the node from the base class **XMLNode** (p. 455).

6.320.2 Constructor & Destructor Documentation

6.320.2.1 Arc::XMLSecNode::XMLSecNode (XMLNode & *node*)

Create a object based on an **XMLNode** (p. 455) instance.

6.320.3 Member Function Documentation

6.320.3.1 void Arc::XMLSecNode::AddSignatureTemplate (const std::string & *id_name*, const SignatureMethod *sign_method*, const std::string & *incl_namespaces* = " ")

Add the signature template for later signing.

Parameters

<i>id_name</i>	The identifier name under this node which will be used for the <Signature> to refer to.
<i>sign_method</i>	The sign method for signing. Two options now, RSA_SHA1, DSA_SHA1

6.320.3.2 bool Arc::XMLSecNode::DecryptNode (const std::string & *privkey_file*, XMLNode & *decrypted_node*)

Decrypt the <xenc:EncryptedData/> under this node, the decrypted node will be output in the second argument of DecryptNode method. And the <xenc:EncryptedData/> under this node will be removed after decryption.

Parameters

<i>privkey_file</i>	The private key file, which is used for decrypting
<i>decrypted_node</i>	Output the decrypted node

6.320.3.3 bool Arc::XMLSecNode::EncryptNode (const std::string & *cert_file*, const SymEncryptionType *enrypt_type*)

Encrypt this node, after encryption, this node will be replaced by the encrypted node

Parameters

<i>cert_file</i>	The certificate file, the public key parsed from this certificate is used to encrypted the symmetric key, and then the symmetric key is used to encrypted the node
<i>enrypt_type</i>	The encryption type when encrypting the node, four option in SymEncryptionType
<i>verify_trusted</i>	Verify trusted certificates or not. If set to false, then only the signature will be checked (by using the public key from KeyInfo).

6.320.3.4 `bool Arc::XMLSecNode::SignNode (const std::string & privkey_file, const std::string & cert_file)`

Sign this node (identified by `id_name`).

Parameters

<i>privkey_file</i>	The private key file. The private key is used for signing
<i>cert_file</i>	The certificate file. The certificate is used as the <code><KeyInfo></code> part of the <code><Signature></code> ; <code><KeyInfo></code> will be used for the other end to verify this <code><Signature></code>
<i>incl_namespaces</i>	InclusiveNamespaces for Tranform in Signature

6.320.3.5 `bool Arc::XMLSecNode::VerifyNode (const std::string & id_name, const std::string & ca_file, const std::string & ca_path, bool verify_trusted = true)`

Verify the signature under this node

Parameters

<i>id_name</i>	The id of this node, which is used for identifying the node
<i>ca_file</i>	The CA file which used as trused certificate when verify the certificate in the <code><KeyInfo></code> part of <code><Signature></code>
<i>ca_path</i>	The CA directory; either <code>ca_file</code> or <code>ca_path</code> should be set.

The documentation for this class was generated from the following file:

- XMLSecNode.h

Chapter 7

File Documentation

7.1 URL.h File Reference

Class to hold general URL's.

```
#include <iostream>
#include <list>
#include <map>
#include <string>
```

Data Structures

- class **Arc::URL**
- class **Arc::URLLocation**
*Class to hold a resolved **URL** (p. 379) location.*
- class **Arc::PathIterator**
Class to iterate through elements of path.

Namespaces

- namespace **Arc**

Defines

- #define **RC_DEFAULT_PORT** 389

Functions

- `std::list< URL > Arc::ReadURLList (const URL &urllist)`

7.1.1 Detailed Description

Class to hold general URL's. The URL is split into protocol, hostname, port and path. This class tries to follow RFC 3986 for splitting URLs at least for protocol + host part. It also accepts local file paths which are converted to `file:path`. Usual system dependant file paths are supported. Relative paths are converted to absolute ones by prepending them with current working directory path. File path can't start from # symbol (why?). If string representation of URL starts from '@' then it is treated as path to file containing list of URLs. Simple URL is parsed in following way: `[protocol:][//[username:passwd@][host][:port]][;urloptions[;...]][/path[?httpoption[&...]][:metadataoption[...]]]` The 'protocol' and 'host' parts are treated as case-insensitive and to avoid confusion are converted to lowercase in constructor. Note that 'path' is always converted to absolute path in constructor. Meaning of 'absolute' may depend upon URL type. For generic URL and local POSIX file paths that means path starts from / like `/path/to/file` For Windows paths absolute path may look like `C:` It is important to note that path still can be empty. For referencing local file using absolute path on POSIX filesystem one may use either `file:///path/to/file` or `file:/path/to/file` Relative path will look like `file:to/file` For local Windows files possible URLs are `file:C:` `file:to` URLs representing LDAP resources have different structure of options following 'path' part `ldap://host[:port][;urloptions[;...]][/path[?attributes[?scope[?filter]]]` For LDAP URLs paths are converted from `/key1=value1/.../keyN=valueN` notation to `keyN=valueN,...,key1=value1` and hence path does not contain leading /. If LDAP URL initially had path in second notation leading / is treated as separator only and is stripped. URLs of indexing services optionally may have locations specified before 'host' part `protocol://[location[:location[;...]]@][host][:port]...` The structure of 'location' element is protocol specific.

7.1.2 Define Documentation

7.1.2.1 `#define RC_DEFAULT_PORT 389`

Default ports for different protocols

Index

- ~BrokerLoader
 - Arc::BrokerLoader, 70
- ~Counter
 - Arc::Counter, 91
- ~Database
 - Arc::Database, 109
- ~IntraProcessCounter
 - Arc::IntraProcessCounter, 206
- ~JobControllerLoader
 - Arc::JobControllerLoader, 220
- ~JobDescriptionParserLoader
 - Arc::JobDescriptionParserLoader, 226
- ~Loader
 - Arc::Loader, 229
- ~Logger
 - Arc::Logger, 234
- ~MCCLoader
 - Arc::MCCLoader, 250
- ~Message
 - Arc::Message, 253
- ~PayloadRaw
 - Arc::PayloadRaw, 274
- ~PayloadStream
 - Arc::PayloadStream, 281
- ~Plexer
 - Arc::Plexer, 294
- ~Query
 - Arc::Query, 307
- ~Run
 - Arc::Run, 316
- ~SAMLToken
 - Arc::SAMLToken, 325
- ~SOAPMessage
 - Arc::SOAPMessage, 337
- ~SubmitterLoader
 - Arc::SubmitterLoader, 359
- ~TargetRetrieverLoader
 - Arc::TargetRetrieverLoader, 369
- ~URL
 - Arc::URL, 381
- ~URLLocation
 - Arc::URLLocation, 389
- ~WSAEndpointReference
 - Arc::WSAEndpointReference, 427
- ~X509Token
 - Arc::X509Token, 454
- ~XMLNode
 - Arc::XMLNode, 459
- Abandon
 - Arc::Run, 317
- ACCESS_LATENCY_LARGE
 - Arc::DataPoint, 123
- ACCESS_LATENCY_SMALL
 - Arc::DataPoint, 123
- ACCESS_LATENCY_ZERO
 - Arc::DataPoint, 123
- Acquire
 - Arc::DelegationConsumer, 156
 - Arc::InformationContainer, 200
- acquire
 - Arc::FileLock, 188
- acquireDelegation
 - Arc::ClientX509Delegation, 81
- Action
 - Arc::WSAHeader, 429
- Add
 - Arc::MessageContext, 260
 - Arc::XMLNodeContainer, 469
- add
 - Arc::DataBuffer, 113
 - Arc::MessageAttributes, 255
 - Arc::SoftwareRequirement, 348, 349
- AddBartender
 - Arc::UserConfig, 395
- AddCAdir
 - Arc::BaseConfig, 65
- AddCAFile
 - Arc::BaseConfig, 65
- AddCertExtObj
 - Arc::Credential, 102
- AddCertificate

- Arc::BaseConfig, 65
- AddChain
 - Arc::VOMSTrustList, 425
- AddChecksumObject
 - Arc::DataPoint, 124
 - Arc::DataPointDirect, 134
 - Arc::DataPointIndex, 140
- addDestination
 - Arc::Logger, 234
- addDestinations
 - Arc::Logger, 235
- AddDN
 - Arc::FileCache, 182
- AddExtension
 - Arc::Credential, 102
- AddIndexServer
 - Arc::TargetGenerator, 362
- AddJob
 - Arc::TargetGenerator, 362
- AddLDAPAttribute
 - Arc::URL, 381
- AddLocation
 - Arc::DataPoint, 124
 - Arc::DataPointDirect, 134
 - Arc::DataPointIndex, 140
- AddMetaDataOption
 - Arc::URL, 381
- AddNew
 - Arc::XMLNodeContainer, 469
- AddOption
 - Arc::URL, 381
- AddOverlay
 - Arc::BaseConfig, 65
- AddPluginsPath
 - Arc::BaseConfig, 66
- addPolicy
 - ArcSec::Evaluator, 170
 - ArcSec::Policy, 302
- AddPrivateKey
 - Arc::BaseConfig, 66
- AddProxy
 - Arc::BaseConfig, 66
- AddRegex
 - Arc::VOMSTrustList, 426
- addRegistrar
 - Arc::InfoRegisterContainer, 197
- addRequestItem
 - ArcSec::Request, 312
- Address
 - Arc::WSAEndpointReference, 427
- AddSecHandler
 - Arc::ClientSOAP, 78
 - Arc::MCC, 244
 - Arc::Service, 333
- AddService
 - Arc::TargetGenerator, 362
- addService
 - Arc::InfoRegisterContainer, 197
 - Arc::InfoRegistrar, 199
- AddServices
 - Arc::UserConfig, 395, 396
- AddSignatureTemplate
 - Arc::XMLSecNode, 471
- AddTarget
 - Arc::TargetGenerator, 363
- addVOMSAC
 - Arc, 38
- AfterFork
 - Arc::Run, 317
- allocated
 - Arc::PayloadRawBuf, 276
- allocated_
 - Arc::WSRF, 433
- ApplicationEnvironments
 - Arc::ExecutionTarget, 177
- ApplyToConfig
 - Arc::UserConfig, 397
- approveCSR
 - Arc::OAuthConsumer, 269
 - Arc::SAML2SSOHTTPClient, 321
- Arc, 23
 - addVOMSAC, 38
 - AttrConstIter, 36
 - AttrIter, 37
 - AttrMap, 37
 - BUSY_ERROR, 38
 - ContentFromPayload, 38
 - CreateThreadFunction, 39
 - createVOMSAC, 39
 - CredentialLogger, 45
 - FileOpen, 39
 - final_xmlsec, 39
 - GENERIC_ERROR, 38
 - get_cert_str, 39
 - get_key_from_certfile, 39
 - get_key_from_certstr, 40
 - get_key_from_keyfile, 40
 - get_key_from_keyst, 40
 - get_node, 40
 - get_plugin_instance, 37

- get_property, 40
- GUID, 40
- init_xmlsec, 40
- istring_to_level, 40
- load_key_from_certfile, 41
- load_key_from_certstr, 41
- load_key_from_keyfile, 41
- load_trusted_cert_file, 41
- load_trusted_cert_str, 41
- load_trusted_certs, 41
- LogFormat, 37
- LogLevel, 37
- MatchXMLName, 41, 42
- MatchXMLNamespace, 42
- OpenSSLInit, 42
- operator<, 42
- parseVOMSAC, 42, 43
- PARSING_ERROR, 38
- passphrase_callback, 44
- plugins_table_name, 45
- PROTOCOL_RECOGNIZED_ERROR, 38
- SESSION_CLOSE, 38
- STATUS_OK, 38
- StatusKind, 38
- string, 44
- thread_stacksize, 45
- TimeStamp, 44
- TmpDirCreate, 44
- UNKNOWN_SERVICE_ERROR, 38
- VOMSDecode, 44
- WSAFault, 38
- WSAFaultAssign, 44
- WSAFaultExtract, 45
- WSAFaultInvalidAddressingHeader, 38
- WSAFaultUnknown, 38
- Arc::Adler32Sum, 51
- Arc::ApplicationEnvironment, 54
- Arc::ApplicationType, 55
- Arc::ArcLocation, 55
 - GetPlugins, 55
 - Init, 55
- Arc::ARCPolicyHandlerConfig, 56
- Arc::AttributeIterator, 57
 - AttributeIterator, 58
 - current_, 60
 - end_, 60
 - hasMore, 58
 - key, 59
 - MessageAttributes, 59
 - operator*, 59
 - operator++, 59
 - operator->, 59
- Arc::AutoPointer, 64
- Arc::Base64, 64
- Arc::BaseConfig, 65
 - AddCADir, 65
 - AddCAFile, 65
 - AddCertificate, 65
 - AddOverlay, 65
 - AddPluginsPath, 66
 - AddPrivateKey, 66
 - AddProxy, 66
 - GetOverlay, 66
 - MakeConfig, 66
- Arc::Broker, 67
 - GetBestTarget, 68
 - PossibleTargets, 69
 - PreFilterTargets, 68
 - SortTargets, 69
- Arc::BrokerLoader, 69
 - ~BrokerLoader, 70
 - BrokerLoader, 70
 - GetBrokers, 70
 - load, 70
- Arc::BrokerPluginArgument, 71
- Arc::ByteArray, 71
- Arc::CacheParameters, 71
- Arc::CertEnvLocker, 71
- Arc::ChainContext, 72
 - operator PluginsFactory *, 72
- Arc::Checksum, 72
- Arc::ChecksumAny, 73
- Arc::CIStrStringValue, 73
 - CIStrStringValue, 74
 - equal, 74
 - operator bool, 74
- Arc::ClassLoader, 75
- Arc::ClassLoaderPluginArgument, 75
- Arc::ClientHTTP, 75
- Arc::ClientHTTPwithSAML2SSO, 76
 - ClientHTTPwithSAML2SSO, 76
 - process, 76
- Arc::ClientInterface, 77
- Arc::ClientSOAP, 77
 - AddSecHandler, 78
 - ClientSOAP, 78
 - GetEntry, 78
 - Load, 79
 - process, 79

- Arc::ClientSOAPwithSAML2SSO, 79
 - ClientSOAPwithSAML2SSO, 79
 - process, 80
- Arc::ClientTCP, 80
- Arc::ClientX509Delegation, 81
 - acquireDelegation, 81
 - ClientX509Delegation, 81
 - createDelegation, 81
- Arc::Config, 83
 - Config, 84, 85
 - getFileName, 85
 - parse, 85
 - print, 85
 - save, 85
 - setFileName, 85
- Arc::ConfusaCertHandler, 85
 - ConfusaCertHandler, 86
 - createCertRequest, 86
 - getCertRequestB64, 86
- Arc::ConfusaParserUtils, 86
 - destroy_doc, 87
 - evaluate_path, 87
 - extract_body_information, 87
 - get_doc, 87
 - handle_redirect_step, 87
 - urlencode, 87
 - urlencode_params, 87
- Arc::CountedPointer, 88
- Arc::Counter, 89
 - ~Counter, 91
 - cancel, 91
 - changeExcess, 92
 - changeLimit, 92
 - Counter, 91
 - extend, 92
 - getCounterTicket, 93
 - getCurrentTime, 93
 - getExcess, 93
 - getExpirationReminder, 94
 - getExpiryTime, 94
 - getLimit, 94
 - getValue, 95
 - IDType, 91
 - reserve, 95
 - setExcess, 95
 - setLimit, 96
- Arc::CounterTicket, 96
 - cancel, 97
 - CounterTicket, 97
 - extend, 97
 - isValid, 98
- Arc::CRC32Sum, 98
- Arc::Credential, 98
 - AddCertExtObj, 102
 - AddExtension, 102
 - Credential, 100, 101
 - GenerateEECRequest, 102
 - GenerateRequest, 103
 - GetCert, 103
 - GetCertNumofChain, 103
 - GetCertReq, 103
 - GetDN, 103
 - GetEndTime, 103
 - getFormat, 103
 - GetIdentityName, 104
 - GetLifeTime, 104
 - GetPrivKey, 104
 - GetProxyPolicy, 104
 - GetPubKey, 104
 - GetStartTime, 104
 - GetType, 104
 - GetVerification, 104
 - InitProxyCertInfo, 104
 - InquireRequest, 104, 105
 - IsCredentialsValid, 105
 - IsValid, 105
 - LogError, 105
 - OutputCertificate, 105
 - OutputCertificateChain, 105
 - OutputPrivatekey, 106
 - OutputPublickey, 106
 - SetLifeTime, 106
 - SetProxyPolicy, 106
 - SetStartTime, 106
 - SignEECRequest, 106, 107
 - SignRequest, 107
 - STACK_OF, 107
- Arc::CredentialError, 108
 - CredentialError, 108
- Arc::CredentialStore, 108
- Arc::Database, 109
 - ~Database, 109
 - close, 110
 - connect, 110
 - Database, 109
 - enable_ssl, 110
 - isconnected, 110
 - shutdown, 110
- Arc::DataBuffer, 111
 - add, 113

- buffer_size, 113
- checksum_object, 113
- checksum_valid, 113
- DataBuffer, 112
- eof_read, 113
- eof_write, 114
- error, 114
- error_read, 114
- error_write, 114
- for_read, 114, 115
- for_write, 115
- is_notwritten, 115
- is_read, 115, 116
- is_written, 116
- set, 116
- wait_any, 116
- Arc::DataCallback, 117
- Arc::DataHandle, 117
- Arc::DataMover, 117
 - checks, 118
 - force_to_meta, 118
 - secure, 119
 - set_default_max_inactivity_time, 119
 - set_default_min_average_speed, 119
 - set_default_min_speed, 119
 - Transfer, 119
 - verbose, 120
- Arc::DataPoint, 120
 - ACCESS_LATENCY_LARGE, 123
 - ACCESS_LATENCY_SMALL, 123
 - ACCESS_LATENCY_ZERO, 123
 - AddChecksumObject, 124
 - AddLocation, 124
 - Check, 124
 - CompareLocationMetadata, 124
 - CompareMeta, 125
 - CurrentLocationMetadata, 125
 - DataPoint, 124
 - DataPointAccessLatency, 123
 - DataPointInfoType, 123
 - FinishReading, 125
 - FinishWriting, 125
 - GetFailureReason, 126
 - INFO_TYPE_ACCESS, 123
 - INFO_TYPE_ALL, 123
 - INFO_TYPE_CONTENT, 123
 - INFO_TYPE_NAME, 123
 - INFO_TYPE_REST, 123
 - INFO_TYPE_STRUCT, 123
 - INFO_TYPE_TIMES, 123
- INFO_TYPE_TYPE, 123
- List, 126
- NextLocation, 126
- Passive, 126
- PostRegister, 126
- PrepareReading, 127
- PrepareWriting, 127
- PreRegister, 128
- PreUnregister, 128
- ProvidesMeta, 128
- Range, 129
- ReadOutOfOrder, 129
- Registered, 129
- Resolve, 129
- SetAdditionalChecks, 129
- SetMeta, 130
- SetSecure, 130
- SetURL, 130
- SortLocations, 130
- StartReading, 130
- StartWriting, 131
- Stat, 131
- StopReading, 131
- StopWriting, 132
- TransferLocations, 132
- Unregister, 132
- valid_url_options, 133
- WriteOutOfOrder, 132
- Arc::DataPointDirect, 133
 - AddChecksumObject, 134
 - AddLocation, 134
 - CompareLocationMetadata, 135
 - CurrentLocationMetadata, 135
 - NextLocation, 135
 - Passive, 135
 - PostRegister, 135
 - PreRegister, 136
 - PreUnregister, 136
 - ProvidesMeta, 136
 - Range, 136
 - ReadOutOfOrder, 137
 - Registered, 137
 - Resolve, 137
 - SetAdditionalChecks, 137
 - SetSecure, 137
 - SortLocations, 138
 - Unregister, 138
 - WriteOutOfOrder, 138
- Arc::DataPointIndex, 138
 - AddChecksumObject, 140

- AddLocation, 140
- Check, 141
- CompareLocationMetadata, 141
- CurrentLocationMetadata, 141
- FinishReading, 141
- FinishWriting, 141
- NextLocation, 142
- Passive, 142
- PrepareReading, 142
- PrepareWriting, 143
- ProvidesMeta, 143
- Range, 143
- ReadOutOfOrder, 144
- Registered, 144
- SetAdditionalChecks, 144
- SetMeta, 144
- SetSecure, 144
- SortLocations, 145
- StartReading, 145
- StartWriting, 145
- StopReading, 145
- StopWriting, 146
- TransferLocations, 146
- WriteOutOfOrder, 146
- Arc::DataPointLoader, 146
- Arc::DataPointPluginArgument, 147
- Arc::DataSpeed, 147
 - DataSpeed, 148
 - hold, 149
 - set_base, 149
 - set_max_data, 149
 - set_max_inactivity_time, 149
 - set_min_average_speed, 149
 - set_min_speed, 150
 - set_progress_indicator, 150
 - transfer, 150
 - verbose, 150
- Arc::DataStatus, 151
 - CacheError, 152
 - CheckError, 152
 - CredentialsExpiredError, 152
 - DataStatusType, 151
 - DeleteError, 152
 - InconsistentMetadataError, 152
 - IsReadingError, 152
 - IsWritingError, 152
 - ListError, 152
 - LocationAlreadyExistsError, 152
 - NoLocationError, 152
 - NotInitializedError, 152
 - NotSupportedForDirectDataPointsError, 152
 - PostRegisterError, 152
 - PreRegisterError, 152
 - ReadAcquireError, 151
 - ReadError, 152
 - ReadFinishError, 152
 - ReadPrepareError, 152
 - ReadPrepareWait, 152
 - ReadResolveError, 151
 - ReadStartError, 152
 - ReadStopError, 152
 - StageError, 152
 - StatError, 152
 - Success, 151
 - SuccessCached, 152
 - SystemError, 152
 - TransferError, 152
 - UnimplementedError, 152
 - UnknownError, 152
 - UnregisterError, 152
 - WriteAcquireError, 151
 - WriteError, 152
 - WriteFinishError, 152
 - WritePrepareError, 152
 - WritePrepareWait, 152
 - WriteResolveError, 152
 - WriteStartError, 152
 - WriteStopError, 152
- Arc::DBranch, 155
- Arc::DelegationConsumer, 155
 - Acquire, 156
 - Backup, 156
 - DelegationConsumer, 156
 - Generate, 156
 - ID, 156
 - LogError, 156
 - Request, 156
 - Restore, 157
- Arc::DelegationConsumerSOAP, 157
 - DelegateCredentialsInit, 158
 - DelegatedToken, 158
 - DelegationConsumerSOAP, 158
 - UpdateCredentials, 158
- Arc::DelegationContainerSOAP, 158
 - context_lock_, 160
 - DelegateCredentialsInit, 159
 - DelegatedToken, 159
 - max_duration_, 160
 - max_size_, 160

- max_usage_, 160
- UpdateCredentials, 159
- Arc::DelegationProvider, 160
 - Delegate, 161
 - DelegationProvider, 161
- Arc::DelegationProviderSOAP, 161
 - DelegateCredentialsInit, 162, 163
 - DelegatedToken, 163
 - DelegationProviderSOAP, 162
 - ID, 163
 - UpdateCredentials, 163
- Arc::DiskSpaceRequirementType, 165
- Arc::DItem, 165
- Arc::DItemString, 165
- Arc::DNListHandlerConfig, 165
- Arc::ExecutableType, 174
- Arc::ExecutionTarget, 175
 - ApplicationEnvironments, 177
 - ComputingShareName, 177
 - ExecutionTarget, 175, 176
 - FreeSlotsWithDuration, 177
 - GetSubmitter, 176
 - MaxDiskSpace, 178
 - MaxMainMemory, 178
 - MaxVirtualMemory, 178
 - OperatingSystem, 178
 - operator=, 176
 - Print, 176
 - SaveToStream, 177
 - Update, 177
- Arc::ExpirationReminder, 179
 - getExpiryTime, 179
 - getReservationID, 179
 - operator<, 179
- Arc::FileCache, 180
 - AddDN, 182
 - CheckCreated, 183
 - CheckDN, 183
 - CheckValid, 183
 - Copy, 183
 - File, 183
 - FileCache, 181, 182
 - GetCreated, 184
 - GetValid, 184
 - Link, 184
 - operator bool, 184
 - operator==, 185
 - Release, 185
 - SetValid, 185
 - Start, 185
 - Stop, 185
 - StopAndDelete, 186
- Arc::FileInfo, 187
- Arc::FileLock, 187
 - acquire, 188
 - FileLock, 188
 - release, 189
- Arc::FileType, 189
- Arc::FinderLoader, 189
- Arc::GlobusResult, 192
- Arc::GSSCredential, 192
- Arc::HakaClient, 193
 - processConsent, 193
 - processIdP2Confusa, 193
 - processIdPLogin, 193
- Arc::HTTPClientInfo, 194
- Arc::InfoCache, 194
 - InfoCache, 194
- Arc::InfoCacheInterface, 194
 - Get, 195
- Arc::InfoFilter, 195
 - Filter, 196
 - InfoFilter, 196
- Arc::InfoRegister, 196
- Arc::InfoRegisterContainer, 197
 - addRegistrar, 197
 - addService, 197
 - removeService, 197
- Arc::InfoRegisters, 198
 - InfoRegisters, 198
- Arc::InfoRegistrar, 198
 - addService, 199
 - registration, 199
- Arc::InformationContainer, 199
 - Acquire, 200
 - Assign, 200
 - doc_, 200
 - Get, 200
 - InformationContainer, 200
- Arc::InformationInterface, 201
 - Get, 202
 - InformationInterface, 201
 - lock_, 202
- Arc::InformationRequest, 202
 - InformationRequest, 202, 203
 - SOAP, 203
- Arc::InformationResponse, 203
 - InformationResponse, 204
 - Result, 204
- Arc::IniConfig, 204

- Arc::initializeCredentialsType, 204
- Arc::IntraProcessCounter, 205
 - ~IntraProcessCounter, 206
 - cancel, 207
 - changeExcess, 207
 - changeLimit, 207
 - extend, 207
 - getExcess, 208
 - getLimit, 208
 - getValue, 208
 - IntraProcessCounter, 206
 - reserve, 209
 - setExcess, 209
 - setLimit, 210
- Arc::ISIS_description, 210
- Arc::IString, 210
- Arc::Job, 210
 - Job, 211
 - operator=, 211
 - Print, 212
 - ReadAllJobsFromFile, 212
 - RemoveJobsFromFile, 213
 - SaveToStream, 213
 - ToXML, 214
 - WriteJobsToFile, 214, 215
 - WriteJobsToTruncatedFile, 215
- Arc::JobController, 216
 - Cat, 217
 - FillJobStore, 218
 - Migrate, 218
 - PrintJobStatus, 219
 - SaveJobStatusToStream, 219
- Arc::JobControllerLoader, 220
 - ~JobControllerLoader, 220
 - GetJobControllers, 221
 - JobControllerLoader, 220
 - load, 221
- Arc::JobControllerPluginArgument, 221
- Arc::JobDescription, 222
 - GetSourceLanguage, 222
 - operator bool, 222
 - OtherAttributes, 225
 - Parse, 222, 223
 - Print, 223
 - SaveToStream, 224
 - UnParse, 224
- Arc::JobDescriptionParser, 225
- Arc::JobDescriptionParserLoader, 225
 - ~JobDescriptionParserLoader, 226
 - GetJobDescriptionParsers, 226
 - JobDescriptionParserLoader, 226
 - load, 226
- Arc::JobDescriptionParserLoader::iterator, 210
- Arc::JobIdentificationType, 227
- Arc::JobState, 227
- Arc::JobSupervisor, 227
 - GetJobControllers, 228
 - JobSupervisor, 228
- Arc::LoadableModuleDescription, 228
- Arc::Loader, 228
 - ~Loader, 229
 - factory_, 229
 - Loader, 229
- Arc::LogDestination, 230
 - LogDestination, 230
- Arc::LogFile, 231
 - log, 232
 - LogFile, 231
 - setBackups, 232
 - setMaxSize, 232
 - setReopen, 232
- Arc::Logger, 233
 - ~Logger, 234
 - addDestination, 234
 - addDestinations, 235
 - getDestinations, 235
 - getRootLogger, 235
 - getThreshold, 235
 - Logger, 234
 - msg, 235
 - setThreadContext, 236
 - setThreshold, 236
 - setThresholdForDomain, 236
- Arc::LoggerContext, 237
- Arc::LoggerFormat, 237
- Arc::LogMessage, 237
 - getLevel, 239
 - Logger, 239
 - LogMessage, 238
 - operator<<, 239
 - setIdentifier, 239
- Arc::LogStream, 240
 - log, 241
 - LogStream, 240
- Arc::MCC, 242
 - AddSecHandler, 244
 - logger, 245
 - MCC, 243
 - Next, 244

- next_, 245
- process, 244
- ProcessSecHandlers, 244
- sechandlers_, 245
- Unlink, 244
- Arc::MCC_Status, 245
 - getExplanation, 246
 - getKind, 246
 - getOrigin, 246
 - isOk, 247
 - MCC_Status, 246
 - operator bool, 247
 - operator std::string, 247
- Arc::MCCConfig, 248
 - MakeConfig, 248
- Arc::MCCInterface, 248
 - process, 249
- Arc::MCCLoader, 249
 - ~MCCLoader, 250
 - MCCLoader, 250
 - operator[], 251
- Arc::MCCPluginArgument, 251
- Arc::MD5Sum, 251
- Arc::MemoryAllocationException, 252
- Arc::Message, 252
 - ~Message, 253
 - Attributes, 253
 - Auth, 253
 - AuthContext, 253
 - Context, 254
 - Message, 253
 - operator=, 254
 - Payload, 254
- Arc::MessageAttributes, 254
 - add, 255
 - attributes_, 257
 - count, 256
 - get, 256
 - getAll, 256
 - MessageAttributes, 255
 - remove, 257
 - removeAll, 257
 - set, 257
- Arc::MessageAuth, 258
 - Export, 258
 - Filter, 258
- Arc::MessageAuthContext, 259
- Arc::MessageContext, 259
 - Add, 260
- Arc::MessageContextElement, 260
- Arc::MessagePayload, 260
- Arc::ModuleDesc, 261
- Arc::ModuleManager, 261
 - find, 262
 - findLocation, 262
 - load, 262
 - makePersistent, 262
 - ModuleManager, 262
 - reload, 263
 - setCfg, 263
 - unload, 263
- Arc::MultiSecAttr, 263
 - Export, 264
 - operator bool, 264
- Arc::MySQLDatabase, 264
 - close, 265
 - connect, 265
 - enable_ssl, 265
 - isconnected, 265
 - shutdown, 266
- Arc::MySQLQuery, 266
 - execute, 266
 - get_array, 267
 - get_num_columns, 267
 - get_num_rows, 267
 - get_row, 267
 - get_row_field, 267
- Arc::NotificationType, 268
- Arc::NS, 268
- Arc::OAuthConsumer, 268
 - approveCSR, 269
 - OAuthConsumer, 269
 - parseDN, 269
 - processLogin, 270
 - pushCSR, 270
 - storeCert, 270
- Arc::OpenIdpClient, 270
 - processConsent, 271
 - processIdP2Confusa, 271
 - processIdPLogin, 271
- Arc::OptionParser, 271
- Arc::PathIterator, 272
 - operator bool, 273
 - operator*, 273
 - operator++, 273
 - operator--, 273
 - PathIterator, 273
 - Rest, 273
- Arc::PayloadRaw, 273
 - ~PayloadRaw, 274

- Buffer, 274
- BufferPos, 274
- BufferSize, 275
- Content, 275
- Insert, 275
- operator[], 275
- PayloadRaw, 274
- Size, 275
- Truncate, 275
- Arc::PayloadRawBuf, 276
 - allocated, 276
 - length, 276
 - size, 276
- Arc::PayloadRawInterface, 276
 - Buffer, 277
 - BufferPos, 277
 - BufferSize, 277
 - Content, 278
 - Insert, 278
 - operator[], 278
 - Size, 278
 - Truncate, 278
- Arc::PayloadSOAP, 279
 - PayloadSOAP, 279, 280
- Arc::PayloadStream, 280
 - ~PayloadStream, 281
 - Get, 281
 - handle_, 283
 - Limit, 281
 - operator bool, 282
 - PayloadStream, 281
 - Pos, 282
 - Put, 282
 - seekable_, 283
 - Size, 283
 - Timeout, 283
- Arc::PayloadStreamInterface, 283
 - Get, 284
 - Limit, 285
 - operator bool, 285
 - Pos, 285
 - Put, 285
 - Size, 286
 - Timeout, 286
- Arc::PayloadWSRF, 286
 - PayloadWSRF, 287
- Arc::Period, 288
 - GetPeriod, 289
 - istr, 289
 - operator std::string, 289
 - operator<, 290
 - operator<=, 290
 - operator>, 290
 - operator>=, 290
 - operator=, 290
 - operator==, 290
 - Period, 289
 - SetPeriod, 290
- Arc::Plexer, 293
 - ~Plexer, 294
 - logger, 295
 - Next, 294
 - Plexer, 294
 - process, 294
- Arc::PlexerEntry, 295
- Arc::Plugin, 295
- Arc::PluginArgument, 296
 - get_factory, 297
 - get_module, 297
- Arc::PluginDesc, 298
- Arc::PluginDescriptor, 298
- Arc::PluginsFactory, 298
 - FilterByKind, 299
 - load, 299
 - PluginsFactory, 299
 - report, 300
 - scan, 300
 - TryLoad, 300
- Arc::Printf, 304
- Arc::PrintfBase, 305
- Arc::Profile, 305
- Arc::Query, 306
 - ~Query, 307
 - execute, 307
 - get_array, 307
 - get_num_columns, 307
 - get_num_rows, 307
 - get_row, 308
 - get_row_field, 308
 - Query, 306
- Arc::Range, 309
- Arc::Register_Info_Type, 309
- Arc::RegisteredService, 309
 - RegisteredService, 310
- Arc::RegularExpression, 310
 - match, 310
- Arc::ResourceSlotType, 314
- Arc::ResourcesType, 314
- Arc::Run, 315
 - ~Run, 316

- Abandon, 317
- AfterFork, 317
- AssignStderr, 317
- AssignStdin, 317
- AssignStdout, 317
- AssignWorkingDirectory, 317
- CloseStderr, 317
- CloseStdin, 317
- CloseStdout, 317
- KeepStderr, 317
- KeepStdin, 318
- KeepStdout, 318
- Kill, 318
- operator bool, 318
- ReadStderr, 318
- ReadStdout, 318
- Result, 318
- Run, 316
- Running, 318
- Start, 319
- Wait, 319
- WriteStdin, 319
- Arc::SAML2LoginClient, 319
 - findSimpleSAMLInstallation, 320
 - processLogin, 320
 - SAML2LoginClient, 320
- Arc::SAML2SSOHTTPClient, 320
 - approveCSR, 321
 - parseDN, 321
 - processConsent, 321
 - processIdP2Confusa, 321
 - processIdPLogin, 321
 - processLogin, 322
 - pushCSR, 322
 - storeCert, 322
- Arc::SAMLToken, 322
 - ~SAMLToken, 325
 - Authenticate, 325
 - operator bool, 325
 - SAMLToken, 324
 - SAMLVersion, 324
- Arc::ScalableTime, 325
- Arc::ScalableTime< int >, 326
- Arc::SecAttr, 326
 - Export, 327
 - Import, 327
 - operator bool, 327
 - operator==, 327
- Arc::SecAttrFormat, 328
- Arc::SecAttrValue, 328
 - operator bool, 329
 - operator==, 329
- Arc::SecHandlerConfig, 330
- Arc::Service, 331
 - AddSecHandler, 333
 - getID, 333
 - logger, 333
 - ProcessSecHandlers, 333
 - RegistrationCollector, 333
 - sechandlers_, 333
 - Service, 333
- Arc::ServicePluginArgument, 334
- Arc::SimpleCondition, 334
 - broadcast, 335
 - lock, 335
 - reset, 335
 - signal, 335
 - signal_nonblock, 335
 - unlock, 335
 - wait, 335
 - wait_nonblock, 335
- Arc::SimpleCounter, 336
 - wait, 336
- Arc::SOAPMessage, 336
 - ~SOAPMessage, 337
 - Attributes, 337
 - Payload, 337
 - SOAPMessage, 337
- Arc::Software, 337
 - ComparisonOperator, 339
 - ComparisonOperatorEnum, 339
 - convert, 341
 - empty, 341
 - EQUAL, 339
 - getFamily, 341
 - getName, 341
 - getVersion, 341
 - GREATERTHAN, 340
 - GREATERTHANOREQUAL, 340
 - LESSTHAN, 340
 - LESSTHANOREQUAL, 340
 - NOTEQUAL, 339
 - operator std::string, 342
 - operator<, 343
 - operator<<, 345
 - operator<=, 343
 - operator>, 344
 - operator>=, 344
 - operator(), 342
 - operator==, 343

- Software, 340
- toString, 345
- VERSIONTOKENS, 346
- Arc::SoftwareRequirement, 346
 - add, 348, 349
 - clear, 349
 - empty, 349
 - getComparisonOperatorList, 349
 - getSoftwareList, 349
 - isRequiringAll, 350
 - isResolved, 350
 - isSatisfied, 350, 351
 - operator=, 352
 - selectSoftware, 352, 353
 - setRequirement, 354
 - SoftwareRequirement, 347, 348
- Arc::Submitter, 357
 - Migrate, 358
 - Submit, 358
- Arc::SubmitterLoader, 359
 - ~SubmitterLoader, 359
 - GetSubmitters, 359
 - load, 360
 - SubmitterLoader, 359
- Arc::SubmitterPluginArgument, 360
- Arc::TargetGenerator, 360
 - AddIndexServer, 362
 - AddJob, 362
 - AddService, 362
 - AddTarget, 363
 - FoundJobs, 363
 - FoundTargets, 363
 - GetExecutionTargets, 363
 - GetJobs, 364
 - GetTargets, 364
 - ModifyFoundTargets, 364
 - PrintTargetInfo, 364
 - RetrieveExecutionTargets, 365
 - RetrieveJobs, 365
 - SaveTargetInfoToStream, 365
 - ServiceCounter, 366
 - TargetGenerator, 361
- Arc::TargetRetriever, 366
 - GetExecutionTargets, 367
 - GetJobs, 367
 - GetTargets, 368
 - TargetRetriever, 367
- Arc::TargetRetrieverLoader, 368
 - ~TargetRetrieverLoader, 369
 - GetTargetRetrievers, 369
 - load, 369
 - TargetRetrieverLoader, 369
- Arc::TargetRetrieverPluginArgument, 370
- Arc::ThreadDataItem, 371
 - Attach, 372
 - Dup, 373
 - Get, 373
 - ThreadDataItem, 372
- Arc::ThreadInitializer, 373
- Arc::ThreadRegistry, 373
 - WaitForExit, 374
 - WaitOrCancel, 374
- Arc::Time, 374
 - GetFormat, 375
 - GetTime, 375
 - operator std::string, 375
 - operator<, 376
 - operator<=, 376
 - operator>, 376
 - operator>=, 377
 - operator+, 376
 - operator-, 376
 - operator=, 376
 - operator==, 376
 - SetFormat, 377
 - SetTime, 377
 - str, 377
 - Time, 375
- Arc::TimedMutex, 378
- Arc::URL, 379
 - ~URL, 381
 - AddLDAPAttribute, 381
 - AddMetaDataOption, 381
 - AddOption, 381
 - BaseDN2Path, 381
 - ChangeHost, 381
 - ChangeLDAPFilter, 382
 - ChangeLDAPScope, 382
 - ChangePath, 382
 - ChangePort, 382
 - ChangeProtocol, 382
 - CommonLocOption, 382
 - CommonLocOptions, 382
 - commonlocoptions, 386
 - ConnectionURL, 382
 - FullPath, 382
 - fullstr, 383
 - Host, 383
 - host, 386
 - HTTPOption, 383

- HTTPOptions, 383
- httpoptions, 386
- ip6addr, 386
- IsSecureProtocol, 383
- LDAPAttributes, 383
- ldapattributes, 386
- LDAPFilter, 383
- ldapfilter, 386
- LDAPScope, 383
- ldapscope, 386
- Locations, 383
- locations, 386
- MetaDataOption, 384
- MetaDataOptions, 384
- metadataoptions, 386
- operator bool, 384
- operator<, 384
- operator<=, 386
- operator==, 384
- Option, 384
- Options, 384
- OptionString, 384
- ParseOptions, 385
- Passwd, 385
- passwd, 387
- Path, 385
- path, 387
- Path2BaseDN, 385
- plainstr, 385
- Port, 385
- port, 387
- Protocol, 385
- protocol, 387
- Scope, 381
- str, 385
- URL, 381
- urloptions, 387
- Username, 385
- username, 387
- valid, 387
- Arc::URLLocation, 387
 - ~URLLocation, 389
 - fullstr, 389
 - Name, 389
 - name, 389
 - str, 389
 - URLLocation, 388, 389
- Arc::URLMap, 390
- Arc::User, 390
- Arc::UserConfig, 390
- AddBartender, 395
- AddServices, 395, 396
- ApplyToConfig, 397
- ARCUSERDIRECTORY, 420
- Bartender, 397, 398
- Broker, 398, 399
- CACertificatePath, 399, 400
- CACertificatesDirectory, 400, 401
- CertificateLifeTime, 401
- CertificatePath, 402
- ClearRejectedServices, 402, 403
- ClearSelectedServices, 403
- CredentialsFound, 404
- DEFAULT_BROKER, 420
- DEFAULT_TIMEOUT, 420
- DEFAULTCONFIG, 421
- EXAMPLECONFIG, 421
- GetRejectedServices, 404
- GetSelectedServices, 405
- IdPName, 405
- InitializeCredentials, 406
- JobListFile, 407
- KeyPassword, 408
- KeyPath, 409
- KeySize, 409, 410
- LoadConfigurationFile, 410
- operator bool, 412
- OverlayFile, 412, 413
- Password, 413, 414
- ProxyPath, 414
- SaveToFile, 415
- SLCS, 415
- StoreDirectory, 416
- SYSCONFIG, 421
- SYSCONFIGARCLOC, 421
- Timeout, 416, 417
- UserConfig, 393–395
- UserName, 417
- UtilsDirPath, 418
- Verbosity, 418, 419
- VOMSServerPath, 419, 420
- Arc::UsernameToken, 421
 - Authenticate, 423
 - operator bool, 423
 - PasswordType, 422
 - Username, 423
 - UsernameToken, 422, 423
- Arc::UserSwitch, 424
- Arc::VOMSACInfo, 424
- Arc::VOMSTrustList, 424

- AddChain, 425
- AddRegex, 426
- VOMSTrustList, 425
- Arc::WSAEndpointReference, 426
 - ~WSAEndpointReference, 427
 - Address, 427
 - MetaData, 427
 - operator XMLNode, 427
 - operator=, 427
 - ReferenceParameters, 427
 - WSAEndpointReference, 426, 427
- Arc::WSAHeader, 428
 - Action, 429
 - Check, 429
 - FaultTo, 429
 - From, 429
 - header_allocated_, 431
 - MessageID, 429
 - NewReferenceParameter, 430
 - operator XMLNode, 430
 - ReferenceParameter, 430
 - RelatesTo, 430
 - RelationshipType, 430
 - ReplyTo, 430
 - To, 430, 431
 - WSAHeader, 429
- Arc::WSRF, 431
 - allocated_, 433
 - operator bool, 432
 - set_namespaces, 432
 - SOAP, 432
 - valid_, 433
 - WSRF, 432
- Arc::WSRFBBaseFault, 433
 - set_namespaces, 434
 - WSRFBBaseFault, 434
- Arc::WSRFResourceUnavailableFault, 434
- Arc::WSRFResourceUnknownFault, 434
- Arc::WSRP, 435
 - set_namespaces, 437
 - WSRP, 437
- Arc::WSRPDeleteResourceProperties, 437
- Arc::WSRPDeleteResourcePropertiesRequest, 437
- Arc::WSRPDeleteResourcePropertiesRequestFailedFault, 438
- Arc::WSRPDeleteResourcePropertiesResponse, 438
- Arc::WSRPFault, 439
 - WSRPFault, 439
- Arc::WSRPGetMultipleResourcePropertiesRequest, 440
- Arc::WSRPGetMultipleResourcePropertiesResponse, 440
- Arc::WSRPGetResourcePropertyDocumentRequest, 440
- Arc::WSRPGetResourcePropertyDocumentResponse, 441
- Arc::WSRPGetResourcePropertyRequest, 441
- Arc::WSRPGetResourcePropertyResponse, 442
- Arc::WSRPInsertResourceProperties, 442
- Arc::WSRPInsertResourcePropertiesRequest, 442
- Arc::WSRPInsertResourcePropertiesRequestFailedFault, 443
- Arc::WSRPInsertResourcePropertiesResponse, 443
- Arc::WSRPInvalidModificationFault, 444
- Arc::WSRPInvalidResourcePropertyQNameFault, 444
- Arc::WSRPModifyResourceProperties, 445
- Arc::WSRPPutResourcePropertyDocumentRequest, 445
- Arc::WSRPPutResourcePropertyDocumentResponse, 446
- Arc::WSRPQueryResourcePropertiesRequest, 446
- Arc::WSRPQueryResourcePropertiesResponse, 446
- Arc::WSRPResourcePropertyChangeFailure, 447
 - WSRPResourcePropertyChangeFailure, 447
- Arc::WSRPSetResourcePropertiesRequest, 448
- Arc::WSRPSetResourcePropertiesResponse, 448
- Arc::WSRPSetResourcePropertyRequestFailedFault, 448
- Arc::WSRPUnableToModifyResourcePropertyFault, 449
- Arc::WSRPUnableToPutResourcePropertyDocumentFault, 449
- Arc::WSRPUpdateResourceProperties, 450
- Arc::WSRPUpdateResourcePropertiesRequest, 450
- Arc::WSRPUpdateResourcePropertiesRequestFailedFault, 451

-
- Arc::WSRPUUpdateResourcePropertiesResponse, Set, 466
 - 451
 - Arc::X509Token, 453
 - ~X509Token, 454
 - Authenticate, 454
 - operator bool, 455
 - X509Token, 453, 454
 - X509TokenType, 453
 - Arc::XmlContainer, 455
 - Arc::XmlDatabase, 455
 - Arc::XMLNode, 455
 - ~XMLNode, 459
 - Attribute, 459
 - AttributesSize, 459
 - Child, 459
 - Destroy, 459
 - Exchange, 459
 - FullName, 460
 - Get, 460
 - GetDoc, 460
 - GetRoot, 460
 - GetXML, 460
 - is_owner_, 468
 - is_temporary_, 468
 - MatchXMLName, 467
 - MatchXMLNamespace, 467
 - Move, 460
 - Name, 461
 - Namespace, 461
 - NamespacePrefix, 461
 - Namespaces, 461
 - New, 462
 - NewAttribute, 462
 - NewChild, 462, 463
 - operator bool, 463
 - operator std::string, 463
 - operator++, 463
 - operator--, 464
 - operator=, 464
 - operator==, 464
 - operator[], 464, 465
 - Parent, 465
 - Path, 465
 - Prefix, 465
 - ReadFromFile, 465
 - ReadFromStream, 466
 - Replace, 466
 - Same, 466
 - SaveToFile, 466
 - SaveToStream, 466
 - Size, 466
 - Swap, 466
 - Validate, 466
 - XMLNode, 458
 - XPathLookup, 467
 - Arc::XMLNodeContainer, 468
 - Add, 469
 - AddNew, 469
 - Nodes, 469
 - operator=, 469
 - operator[], 469
 - Size, 470
 - XMLNodeContainer, 469
 - Arc::XMLSecNode, 470
 - AddSignatureTemplate, 471
 - DecryptNode, 471
 - EncryptNode, 471
 - SignNode, 471
 - VerifyNode, 472
 - XMLSecNode, 471
 - ArcCredential, 45
 - CERT_TYPE_CA, 46
 - CERT_TYPE_EEC, 46
 - CERT_TYPE_GSI_2_LIMITED_PROXY, 47
 - CERT_TYPE_GSI_2_PROXY, 47
 - CERT_TYPE_GSI_3_IMPERSONATION_PROXY, 46
 - CERT_TYPE_GSI_3_INDEPENDENT_PROXY, 47
 - CERT_TYPE_GSI_3_LIMITED_PROXY, 47
 - CERT_TYPE_GSI_3_RESTRICTED_PROXY, 47
 - CERT_TYPE_RFC_ANYLANGUAGE_PROXY, 47
 - CERT_TYPE_RFC_IMPERSONATION_PROXY, 47
 - CERT_TYPE_RFC_INDEPENDENT_PROXY, 47
 - CERT_TYPE_RFC_LIMITED_PROXY, 47
 - CERT_TYPE_RFC_RESTRICTED_PROXY, 47
 - certType, 46
 - ArcCredential::ACACI, 49
 - ArcCredential::ACATTHOLDER, 49
 - ArcCredential::ACATTR, 49
 - ArcCredential::ACATTRIBUTE, 49
-

- ArcCredential::ACC, 49
- ArcCredential::ACCERTS, 50
- ArcCredential::ACDIGEST, 50
- ArcCredential::ACFORM, 50
- ArcCredential::ACFULLATTRIBUTES, 50
- ArcCredential::ACHOLDER, 50
- ArcCredential::ACIETFATTR, 50
- ArcCredential::ACINFO, 51
- ArcCredential::ACIS, 51
- ArcCredential::ACSEQ, 51
- ArcCredential::ACTARGET, 51
- ArcCredential::ACTARGETS, 51
- ArcCredential::ACVAL, 51
- ArcCredential::cert_verify_context, 71
- ArcCredential::PROXYCERTINFO_st, 306
- ArcCredential::PROXYPOLICY_st, 306
- ArcSec::AlgFactory, 52
 - createAlg, 53
- ArcSec::AnyURIAttribute, 53
 - encode, 53
 - equal, 53
 - getId, 54
 - getType, 54
- ArcSec::ArcPeriod, 56
- ArcSec::Attr, 56
- ArcSec::AttributeFactory, 56
- ArcSec::AttributeProxy, 60
 - getAttribute, 61
- ArcSec::AttributeValue, 61
 - encode, 62
 - equal, 62
 - getId, 62
 - getType, 62
- ArcSec::Attrs, 63
- ArcSec::AuthzRequest, 63
- ArcSec::AuthzRequestSection, 63
- ArcSec::BooleanAttribute, 66
 - encode, 67
 - equal, 67
 - getId, 67
 - getType, 67
- ArcSec::CombiningAlg, 82
 - combine, 83
 - getalgId, 83
- ArcSec::DateAttribute, 153
 - encode, 153
 - equal, 153
 - getId, 153
 - getType, 153
- ArcSec::DateTimeAttribute, 154
 - encode, 154
 - equal, 154
 - getId, 154
 - getType, 154
- ArcSec::DenyOverridesCombiningAlg, 163
 - combine, 164
 - getalgId, 164
- ArcSec::DurationAttribute, 166
 - encode, 166
 - equal, 166
 - getId, 167
 - getType, 167
- ArcSec::EqualFunction, 167
 - evaluate, 168
 - getFunctionName, 168
- ArcSec::EvalResult, 168
- ArcSec::EvaluationCtx, 169
 - EvaluationCtx, 169
- ArcSec::Evaluator, 169
 - addPolicy, 170
 - evaluate, 170, 171
 - getAlgFactory, 171
 - getAttrFactory, 171
 - getFnFactory, 171
 - getName, 172
 - setCombiningAlg, 172
- ArcSec::EvaluatorContext, 172
 - operator AlgFactory *, 173
 - operator AttributeFactory *, 173
 - operator FnFactory *, 173
- ArcSec::EvaluatorLoader, 173
 - getEvaluator, 174
 - getPolicy, 174
 - getRequest, 174
- ArcSec::FnFactory, 189
 - createFn, 190
- ArcSec::Function, 190
 - evaluate, 191
- ArcSec::GenericAttribute, 191
 - encode, 192
 - equal, 192
 - getId, 192
 - getType, 192
- ArcSec::InRangeFunction, 204
 - evaluate, 205
- ArcSec::MatchFunction, 241
 - evaluate, 242
 - getFunctionName, 242
- ArcSec::OrderedCombiningAlg, 272
- ArcSec::PDP, 287

- ArcSec::PDPConfigContext, 288
- ArcSec::PDPPluginArgument, 288
- ArcSec::PeriodAttribute, 291
 - encode, 291
 - equal, 291
 - getId, 291
 - getType, 291
- ArcSec::PermitOverridesCombiningAlg, 292
 - combine, 292
 - getalgId, 293
- ArcSec::Policy, 300
 - addPolicy, 302
 - eval, 302
 - getEffect, 302
 - getEvalName, 302
 - getEvalResult, 302
 - getName, 302
 - make_policy, 302
 - Policy, 301
 - setEvalResult, 302
 - setEvaluatorContext, 302
- ArcSec::PolicyParser, 303
 - parsePolicy, 303
- ArcSec::PolicyStore, 304
 - PolicyStore, 304
- ArcSec::PolicyStore::PolicyElement, 303
- ArcSec::Request, 311
 - addRequestItem, 312
 - getEvalName, 312
 - getName, 312
 - getRequestItems, 312
 - make_request, 312
 - Request, 311
 - setAttributeFactory, 312
 - setRequestItems, 312
- ArcSec::RequestAttribute, 313
 - duplicate, 313
 - RequestAttribute, 313
- ArcSec::RequestItem, 313
 - RequestItem, 314
- ArcSec::RequestTuple, 314
- ArcSec::Response, 314
- ArcSec::ResponseItem, 315
- ArcSec::ResponseList, 315
- ArcSec::SecHandler, 329
- ArcSec::SecHandlerConfig, 330
- ArcSec::SecHandlerPluginArgument, 331
- ArcSec::Security, 331
- ArcSec::Source, 354
 - Source, 355
- ArcSec::SourceFile, 355
- ArcSec::SourceURL, 356
- ArcSec::StringAttribute, 356
 - encode, 357
 - equal, 357
 - getId, 357
 - getType, 357
- ArcSec::TimeAttribute, 377
 - encode, 378
 - equal, 378
 - getId, 378
 - getType, 378
- ArcSec::X500NameAttribute, 452
 - encode, 452
 - equal, 452
 - getId, 452
 - getType, 452
- ARCUSERDIRECTORY
 - Arc::UserConfig, 420
- Assign
 - Arc::InformationContainer, 200
- AssignStderr
 - Arc::Run, 317
- AssignStdin
 - Arc::Run, 317
- AssignStdout
 - Arc::Run, 317
- AssignWorkingDirectory
 - Arc::Run, 317
- Attach
 - Arc::ThreadDataItem, 372
- AttrConstIter
 - Arc, 36
- Attribute
 - Arc::XMLNode, 459
- AttributeIterator
 - Arc::AttributeIterator, 58
- Attributes
 - Arc::Message, 253
 - Arc::SOAPMessage, 337
- attributes_
 - Arc::MessageAttributes, 257
- AttributesSize
 - Arc::XMLNode, 459
- AttrIter
 - Arc, 37
- AttrMap
 - Arc, 37
- Auth
 - Arc::Message, 253

- AuthContext
 - Arc::Message, 253
- Authenticate
 - Arc::SAMLToken, 325
 - Arc::UsernameToken, 423
 - Arc::X509Token, 454
- Backup
 - Arc::DelegationConsumer, 156
- Bartender
 - Arc::UserConfig, 397, 398
- BaseDN2Path
 - Arc::URL, 381
- broadcast
 - Arc::SimpleCondition, 335
- Broker
 - Arc::UserConfig, 398, 399
- BrokerLoader
 - Arc::BrokerLoader, 70
- Buffer
 - Arc::PayloadRaw, 274
 - Arc::PayloadRawInterface, 277
- buffer_size
 - Arc::DataBuffer, 113
- BufferPos
 - Arc::PayloadRaw, 274
 - Arc::PayloadRawInterface, 277
- BufferSize
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 277
- BUSY_ERROR
 - Arc, 38
- CACertificatePath
 - Arc::UserConfig, 399, 400
- CACertificatesDirectory
 - Arc::UserConfig, 400, 401
- CacheError
 - Arc::DataStatus, 152
- cancel
 - Arc::Counter, 91
 - Arc::CounterTicket, 97
 - Arc::IntraProcessCounter, 207
- Cat
 - Arc::JobController, 217
- CERT_TYPE_CA
 - ArcCredential, 46
- CERT_TYPE_EEC
 - ArcCredential, 46
- CERT_TYPE_GSI_2_LIMITED_PROXY
 - ArcCredential, 47
- CERT_TYPE_GSI_2_PROXY
 - ArcCredential, 47
- CERT_TYPE_GSI_3_IMPERSONATION_PROXY
 - ArcCredential, 46
- CERT_TYPE_GSI_3_INDEPENDENT_PROXY
 - ArcCredential, 47
- CERT_TYPE_GSI_3_LIMITED_PROXY
 - ArcCredential, 47
- CERT_TYPE_GSI_3_RESTRICTED_PROXY
 - ArcCredential, 47
- CERT_TYPE_RFC_ANYLANGUAGE_PROXY
 - ArcCredential, 47
- CERT_TYPE_RFC_IMPERSONATION_PROXY
 - ArcCredential, 47
- CERT_TYPE_RFC_INDEPENDENT_PROXY
 - ArcCredential, 47
- CERT_TYPE_RFC_LIMITED_PROXY
 - ArcCredential, 47
- CERT_TYPE_RFC_RESTRICTED_PROXY
 - ArcCredential, 47
- CertificateLifeTime
 - Arc::UserConfig, 401
- CertificatePath
 - Arc::UserConfig, 402
- certType
 - ArcCredential, 46
- changeExcess
 - Arc::Counter, 92
 - Arc::IntraProcessCounter, 207
- ChangeHost
 - Arc::URL, 381
- ChangeLDAPFilter
 - Arc::URL, 382
- ChangeLDAPScope
 - Arc::URL, 382
- changeLimit
 - Arc::Counter, 92
 - Arc::IntraProcessCounter, 207
- ChangePath
 - Arc::URL, 382
- ChangePort
 - Arc::URL, 382
- ChangeProtocol
 - Arc::URL, 382
- Check

- Arc::DataPoint, 124
- Arc::DataPointIndex, 141
- Arc::WSAHeader, 429
- CheckCreated
 - Arc::FileCache, 183
- CheckDN
 - Arc::FileCache, 183
- CheckError
 - Arc::DataStatus, 152
- checks
 - Arc::DataMover, 118
- checksum_object
 - Arc::DataBuffer, 113
- checksum_valid
 - Arc::DataBuffer, 113
- CheckValid
 - Arc::FileCache, 183
- Child
 - Arc::XMLNode, 459
- CIStrngValue
 - Arc::CIStrngValue, 74
- clear
 - Arc::SoftwareRequirement, 349
- ClearRejectedServices
 - Arc::UserConfig, 402, 403
- ClearSelectedServices
 - Arc::UserConfig, 403
- ClientHTTPwithSAML2SSO
 - Arc::ClientHTTPwithSAML2SSO, 76
- ClientSOAP
 - Arc::ClientSOAP, 78
- ClientSOAPwithSAML2SSO
 - Arc::ClientSOAPwithSAML2SSO, 79
- ClientX509Delegation
 - Arc::ClientX509Delegation, 81
- close
 - Arc::Database, 110
 - Arc::MySQLDatabase, 265
- CloseStderr
 - Arc::Run, 317
- CloseStdin
 - Arc::Run, 317
- CloseStdout
 - Arc::Run, 317
- combine
 - ArcSec::CombiningAlg, 83
 - ArcSec::DenyOverridesCombiningAlg, createAlg
164
 - ArcSec::PermitOverridesCombiningAlg, createCertRequest
292
- CommonLocOption
 - Arc::URL, 382
- CommonLocOptions
 - Arc::URL, 382
- commonlocoptions
 - Arc::URL, 386
- CompareLocationMetadata
 - Arc::DataPoint, 124
 - Arc::DataPointDirect, 135
 - Arc::DataPointIndex, 141
- CompareMeta
 - Arc::DataPoint, 125
- ComparisonOperator
 - Arc::Software, 339
- ComparisonOperatorEnum
 - Arc::Software, 339
- ComputingShareName
 - Arc::ExecutionTarget, 177
- Config
 - Arc::Config, 84, 85
- ConfusaCertHandler
 - Arc::ConfusaCertHandler, 86
- connect
 - Arc::Database, 110
 - Arc::MySQLDatabase, 265
- ConnectionURL
 - Arc::URL, 382
- Content
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 278
- ContentFromPayload
 - Arc, 38
- Context
 - Arc::Message, 254
- context_lock_
 - Arc::DelegationContainerSOAP, 160
- convert
 - Arc::Software, 341
- Copy
 - Arc::FileCache, 183
- count
 - Arc::MessageAttributes, 256
- Counter
 - Arc::Counter, 91
- CounterTicket
 - Arc::CounterTicket, 97
- ArcSec::AlgFactory, 53
- Arc::ConfusaCertHandler, 86

- createDelegation
 - Arc::ClientX509Delegation, 81
- createFn
 - ArcSec::FnFactory, 190
- CreateThreadFunction
 - Arc, 39
- createVOMSAC
 - Arc, 39
- Credential
 - Arc::Credential, 100, 101
- CredentialError
 - Arc::CredentialError, 108
- CredentialLogger
 - Arc, 45
- CredentialsExpiredError
 - Arc::DataStatus, 152
- CredentialsFound
 - Arc::UserConfig, 404
- current_
 - Arc::AttributeIterator, 60
- CurrentLocationMetadata
 - Arc::DataPoint, 125
 - Arc::DataPointDirect, 135
 - Arc::DataPointIndex, 141
- Database
 - Arc::Database, 109
- DataBuffer
 - Arc::DataBuffer, 112
- DataPoint
 - Arc::DataPoint, 124
- DataPointAccessLatency
 - Arc::DataPoint, 123
- DataPointInfoType
 - Arc::DataPoint, 123
- DataSpeed
 - Arc::DataSpeed, 148
- DataStatusType
 - Arc::DataStatus, 151
- DecryptNode
 - Arc::XMLSecNode, 471
- DEFAULT_BROKER
 - Arc::UserConfig, 420
- DEFAULT_TIMEOUT
 - Arc::UserConfig, 420
- DEFAULTCONFIG
 - Arc::UserConfig, 421
- Delegate
 - Arc::DelegationProvider, 161
- DelegateCredentialsInit
 - Arc::DelegationConsumerSOAP, 158
 - Arc::DelegationContainerSOAP, 159
 - Arc::DelegationProviderSOAP, 162, 163
- DelegatedToken
 - Arc::DelegationConsumerSOAP, 158
 - Arc::DelegationContainerSOAP, 159
 - Arc::DelegationProviderSOAP, 163
- DelegationConsumer
 - Arc::DelegationConsumer, 156
- DelegationConsumerSOAP
 - Arc::DelegationConsumerSOAP, 158
- DelegationProvider
 - Arc::DelegationProvider, 161
- DelegationProviderSOAP
 - Arc::DelegationProviderSOAP, 162
- DeleteError
 - Arc::DataStatus, 152
- Destroy
 - Arc::XMLNode, 459
- destroy_doc
 - Arc::ConfusaParserUtils, 87
- doc_
 - Arc::InformationContainer, 200
- Dup
 - Arc::ThreadDataItem, 373
- duplicate
 - ArcSec::RequestAttribute, 313
- empty
 - Arc::Software, 341
 - Arc::SoftwareRequirement, 349
- enable_ssl
 - Arc::Database, 110
 - Arc::MySQLDatabase, 265
- encode
 - ArcSec::AnyURIAttribute, 53
 - ArcSec::AttributeValue, 62
 - ArcSec::BooleanAttribute, 67
 - ArcSec::DateAttribute, 153
 - ArcSec::DateTimeAttribute, 154
 - ArcSec::DurationAttribute, 166
 - ArcSec::GenericAttribute, 192
 - ArcSec::PeriodAttribute, 291
 - ArcSec::StringAttribute, 357
 - ArcSec::TimeAttribute, 378
 - ArcSec::X500NameAttribute, 452
- EncryptNode
 - Arc::XMLSecNode, 471
- end_

- Arc::AttributeIterator, 60
- eof_read
 - Arc::DataBuffer, 113
- eof_write
 - Arc::DataBuffer, 114
- EQUAL
 - Arc::Software, 339
- equal
 - Arc::CStringValue, 74
 - ArcSec::AnyURIAttribute, 53
 - ArcSec::AttributeValue, 62
 - ArcSec::BooleanAttribute, 67
 - ArcSec::DateAttribute, 153
 - ArcSec::DateTimeAttribute, 154
 - ArcSec::DurationAttribute, 166
 - ArcSec::GenericAttribute, 192
 - ArcSec::PeriodAttribute, 291
 - ArcSec::StringAttribute, 357
 - ArcSec::TimeAttribute, 378
 - ArcSec::X500NameAttribute, 452
- error
 - Arc::DataBuffer, 114
- error_read
 - Arc::DataBuffer, 114
- error_write
 - Arc::DataBuffer, 114
- eval
 - ArcSec::Policy, 302
- evaluate
 - ArcSec::EqualFunction, 168
 - ArcSec::Evaluator, 170, 171
 - ArcSec::Function, 191
 - ArcSec::InRangeFunction, 205
 - ArcSec::MatchFunction, 242
- evaluate_path
 - Arc::ConfusaParserUtils, 87
- EvaluationCtx
 - ArcSec::EvaluationCtx, 169
- EXAMPLECONFIG
 - Arc::UserConfig, 421
- Exchange
 - Arc::XMLNode, 459
- execute
 - Arc::MySQLQuery, 266
 - Arc::Query, 307
- ExecutionTarget
 - Arc::ExecutionTarget, 175, 176
- Export
 - Arc::MessageAuth, 258
 - Arc::MultiSecAttr, 264
 - Arc::SecAttr, 327
- extend
 - Arc::Counter, 92
 - Arc::CounterTicket, 97
 - Arc::IntraProcessCounter, 207
- extract_body_information
 - Arc::ConfusaParserUtils, 87
- factory_
 - Arc::Loader, 229
- FaultTo
 - Arc::WSAHeader, 429
- File
 - Arc::FileCache, 183
- FileCache
 - Arc::FileCache, 181, 182
- FileCacheHash, 186
 - getHash, 186
 - maxLength, 186
- FileLock
 - Arc::FileLock, 188
- FileOpen
 - Arc, 39
- FillJobStore
 - Arc::JobController, 218
- Filter
 - Arc::InfoFilter, 196
 - Arc::MessageAuth, 258
- FilterByKind
 - Arc::PluginsFactory, 299
- final_xmlsec
 - Arc, 39
- find
 - Arc::ModuleManager, 262
- findLocation
 - Arc::ModuleManager, 262
- findSimpleSAMLInstallation
 - Arc::SAML2LoginClient, 320
- FinishReading
 - Arc::DataPoint, 125
 - Arc::DataPointIndex, 141
- FinishWriting
 - Arc::DataPoint, 125
 - Arc::DataPointIndex, 141
- for_read
 - Arc::DataBuffer, 114, 115
- for_write
 - Arc::DataBuffer, 115
- force_to_meta
 - Arc::DataMover, 118

- FoundJobs
 - Arc::TargetGenerator, 363
- FoundTargets
 - Arc::TargetGenerator, 363
- FreeSlotsWithDuration
 - Arc::ExecutionTarget, 177
- From
 - Arc::WSAHeader, 429
- FullName
 - Arc::XMLNode, 460
- FullPath
 - Arc::URL, 382
- fullstr
 - Arc::URL, 383
 - Arc::URLLocation, 389
- Generate
 - Arc::DelegationConsumer, 156
- GenerateEECRequest
 - Arc::Credential, 102
- GenerateRequest
 - Arc::Credential, 103
- GENERIC_ERROR
 - Arc, 38
- Get
 - Arc::InfoCacheInterface, 195
 - Arc::InformationContainer, 200
 - Arc::InformationInterface, 202
 - Arc::PayloadStream, 281
 - Arc::PayloadStreamInterface, 284
 - Arc::ThreadDataItem, 373
 - Arc::XMLNode, 460
- get
 - Arc::MessageAttributes, 256
- get_array
 - Arc::MySQLQuery, 267
 - Arc::Query, 307
- get_cert_str
 - Arc, 39
- get_doc
 - Arc::ConfusaParserUtils, 87
- get_factory
 - Arc::PluginArgument, 297
- get_key_from_certfile
 - Arc, 39
- get_key_from_certstr
 - Arc, 40
- get_key_from_keyfile
 - Arc, 40
- get_key_from_keyst
 - Arc, 40
- get_module
 - Arc::PluginArgument, 297
- get_node
 - Arc, 40
- get_num_columns
 - Arc::MySQLQuery, 267
 - Arc::Query, 307
- get_num_rows
 - Arc::MySQLQuery, 267
 - Arc::Query, 307
- get_plugin_instance
 - Arc, 37
- get_property
 - Arc, 40
- get_row
 - Arc::MySQLQuery, 267
 - Arc::Query, 308
- get_row_field
 - Arc::MySQLQuery, 267
 - Arc::Query, 308
- getAlgFactory
 - ArcSec::Evaluator, 171
- getalgId
 - ArcSec::CombiningAlg, 83
 - ArcSec::DenyOverridesCombiningAlg, 164
 - ArcSec::PermitOverridesCombiningAlg, 293
- getAll
 - Arc::MessageAttributes, 256
- getAttrFactory
 - ArcSec::Evaluator, 171
- getAttribute
 - ArcSec::AttributeProxy, 61
- GetBestTarget
 - Arc::Broker, 68
- GetBrokers
 - Arc::BrokerLoader, 70
- GetCert
 - Arc::Credential, 103
- GetCertNumofChain
 - Arc::Credential, 103
- GetCertReq
 - Arc::Credential, 103
- getCertRequestB64
 - Arc::ConfusaCertHandler, 86
- getComparisonOperatorList
 - Arc::SoftwareRequirement, 349
- getCounterTicket

- Arc::Counter, 93
- GetCreated
 - Arc::FileCache, 184
- getCurrentTime
 - Arc::Counter, 93
- getDestinations
 - Arc::Logger, 235
- GetDN
 - Arc::Credential, 103
- GetDoc
 - Arc::XMLNode, 460
- getEffect
 - ArcSec::Policy, 302
- GetEndTime
 - Arc::Credential, 103
- GetEntry
 - Arc::ClientSOAP, 78
- getEvalName
 - ArcSec::Policy, 302
 - ArcSec::Request, 312
- getEvalResult
 - ArcSec::Policy, 302
- getEvaluator
 - ArcSec::EvaluatorLoader, 174
- getExcess
 - Arc::Counter, 93
 - Arc::IntraProcessCounter, 208
- GetExecutionTargets
 - Arc::TargetGenerator, 363
 - Arc::TargetRetriever, 367
- getExpirationReminder
 - Arc::Counter, 94
- getExpiryTime
 - Arc::Counter, 94
 - Arc::ExpirationReminder, 179
- getExplanation
 - Arc::MCC_Status, 246
- GetFailureReason
 - Arc::DataPoint, 126
- getFamily
 - Arc::Software, 341
- getFileName
 - Arc::Config, 85
- getFnFactory
 - ArcSec::Evaluator, 171
- GetFormat
 - Arc::Time, 375
- getFormat
 - Arc::Credential, 103
- getFunctionName
 - ArcSec::EqualFunction, 168
 - ArcSec::MatchFunction, 242
- getHash
 - FileCacheHash, 186
- getID
 - Arc::Service, 333
- getId
 - ArcSec::AnyURIAttribute, 54
 - ArcSec::AttributeValue, 62
 - ArcSec::BooleanAttribute, 67
 - ArcSec::DateAttribute, 153
 - ArcSec::DateTimeAttribute, 154
 - ArcSec::DurationAttribute, 167
 - ArcSec::GenericAttribute, 192
 - ArcSec::PeriodAttribute, 291
 - ArcSec::StringAttribute, 357
 - ArcSec::TimeAttribute, 378
 - ArcSec::X500NameAttribute, 452
- GetIdentityName
 - Arc::Credential, 104
- GetJobControllers
 - Arc::JobControllerLoader, 221
 - Arc::JobSupervisor, 228
- GetJobDescriptionParsers
 - Arc::JobDescriptionParserLoader, 226
- GetJobs
 - Arc::TargetGenerator, 364
 - Arc::TargetRetriever, 367
- getKind
 - Arc::MCC_Status, 246
- getLevel
 - Arc::LogMessage, 239
- GetLifeTime
 - Arc::Credential, 104
- getLimit
 - Arc::Counter, 94
 - Arc::IntraProcessCounter, 208
- getName
 - Arc::Software, 341
 - ArcSec::Evaluator, 172
 - ArcSec::Policy, 302
 - ArcSec::Request, 312
- getOrigin
 - Arc::MCC_Status, 246
- GetOverlay
 - Arc::BaseConfig, 66
- GetPeriod
 - Arc::Period, 289
- GetPlugins
 - Arc::ArcLocation, 55

- getPolicy
 - ArcSec::EvaluatorLoader, 174
- GetPrivKey
 - Arc::Credential, 104
- GetProxyPolicy
 - Arc::Credential, 104
- GetPubKey
 - Arc::Credential, 104
- GetRejectedServices
 - Arc::UserConfig, 404
- getRequest
 - ArcSec::EvaluatorLoader, 174
- getRequestItems
 - ArcSec::Request, 312
- getReservationID
 - Arc::ExpirationReminder, 179
- GetRoot
 - Arc::XMLNode, 460
- getRootLogger
 - Arc::Logger, 235
- GetSelectedServices
 - Arc::UserConfig, 405
- getSoftwareList
 - Arc::SoftwareRequirement, 349
- GetSourceLanguage
 - Arc::JobDescription, 222
- GetStartTime
 - Arc::Credential, 104
- GetSubmitter
 - Arc::ExecutionTarget, 176
- GetSubmitters
 - Arc::SubmitterLoader, 359
- GetTargetRetrievers
 - Arc::TargetRetrieverLoader, 369
- GetTargets
 - Arc::TargetGenerator, 364
 - Arc::TargetRetriever, 368
- getThreshold
 - Arc::Logger, 235
- GetTime
 - Arc::Time, 375
- GetType
 - Arc::Credential, 104
- getType
 - ArcSec::AnyURIAttribute, 54
 - ArcSec::AttributeValue, 62
 - ArcSec::BooleanAttribute, 67
 - ArcSec::DateAttribute, 153
 - ArcSec::DateTimeAttribute, 154
 - ArcSec::DurationAttribute, 167
 - ArcSec::GenericAttribute, 192
 - ArcSec::PeriodAttribute, 291
 - ArcSec::StringAttribute, 357
 - ArcSec::TimeAttribute, 378
 - ArcSec::X500NameAttribute, 452
- GetValid
 - Arc::FileCache, 184
- getValue
 - Arc::Counter, 95
 - Arc::IntraProcessCounter, 208
- GetVerification
 - Arc::Credential, 104
- getVersion
 - Arc::Software, 341
- GetXML
 - Arc::XMLNode, 460
- GREATERTHAN
 - Arc::Software, 340
- GREATERTHANOEQUAL
 - Arc::Software, 340
- GUID
 - Arc, 40
- handle_
 - Arc::PayloadStream, 283
- handle_redirect_step
 - Arc::ConfusaParserUtils, 87
- hasMore
 - Arc::AttributeIterator, 58
- header_allocated_
 - Arc::WSAHeader, 431
- hold
 - Arc::DataSpeed, 149
- Host
 - Arc::URL, 383
- host
 - Arc::URL, 386
- HTTPOption
 - Arc::URL, 383
- HTTPOptions
 - Arc::URL, 383
- httpoptions
 - Arc::URL, 386
- ID
 - Arc::DelegationConsumer, 156
 - Arc::DelegationProviderSOAP, 163
- IdPName
 - Arc::UserConfig, 405
- IDType

- Arc::Counter, 91
- Import
 - Arc::SecAttr, 327
- InconsistentMetadataError
 - Arc::DataStatus, 152
- INFO_TYPE_ACCESS
 - Arc::DataPoint, 123
- INFO_TYPE_ALL
 - Arc::DataPoint, 123
- INFO_TYPE_CONTENT
 - Arc::DataPoint, 123
- INFO_TYPE_NAME
 - Arc::DataPoint, 123
- INFO_TYPE_REST
 - Arc::DataPoint, 123
- INFO_TYPE_STRUCT
 - Arc::DataPoint, 123
- INFO_TYPE_TIMES
 - Arc::DataPoint, 123
- INFO_TYPE_TYPE
 - Arc::DataPoint, 123
- InfoCache
 - Arc::InfoCache, 194
- InfoFilter
 - Arc::InfoFilter, 196
- InfoRegisters
 - Arc::InfoRegisters, 198
- InformationContainer
 - Arc::InformationContainer, 200
- InformationInterface
 - Arc::InformationInterface, 201
- InformationRequest
 - Arc::InformationRequest, 202, 203
- InformationResponse
 - Arc::InformationResponse, 204
- Init
 - Arc::ArcLocation, 55
- init_xmlsec
 - Arc, 40
- InitializeCredentials
 - Arc::UserConfig, 406
- InitProxyCertInfo
 - Arc::Credential, 104
- InquireRequest
 - Arc::Credential, 104, 105
- Insert
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 278
- IntraProcessCounter
 - Arc::IntraProcessCounter, 206
- ip6addr
 - Arc::URL, 386
- is_notwritten
 - Arc::DataBuffer, 115
- is_owner_
 - Arc::XMLNode, 468
- is_read
 - Arc::DataBuffer, 115, 116
- is_temporary_
 - Arc::XMLNode, 468
- is_written
 - Arc::DataBuffer, 116
- isconnected
 - Arc::Database, 110
 - Arc::MySQLDatabase, 265
- IsCredentialsValid
 - Arc::Credential, 105
- isOk
 - Arc::MCC_Status, 247
- IsReadingError
 - Arc::DataStatus, 152
- isRequiringAll
 - Arc::SoftwareRequirement, 350
- isResolved
 - Arc::SoftwareRequirement, 350
- isSatisfied
 - Arc::SoftwareRequirement, 350, 351
- IsSecureProtocol
 - Arc::URL, 383
- istr
 - Arc::Period, 289
- istring_to_level
 - Arc, 40
- IsValid
 - Arc::Credential, 105
- isValid
 - Arc::CounterTicket, 98
- IsWritingError
 - Arc::DataStatus, 152
- Job
 - Arc::Job, 211
- JobControllerLoader
 - Arc::JobControllerLoader, 220
- JobDescriptionParserLoader
 - Arc::JobDescriptionParserLoader, 226
- JobListFile
 - Arc::UserConfig, 407
- JobSupervisor
 - Arc::JobSupervisor, 228

- KeepStderr
 - Arc::Run, 317
- KeepStdin
 - Arc::Run, 318
- KeepStdout
 - Arc::Run, 318
- key
 - Arc::AttributeIterator, 59
- KeyPassword
 - Arc::UserConfig, 408
- KeyPath
 - Arc::UserConfig, 409
- KeySize
 - Arc::UserConfig, 409, 410
- Kill
 - Arc::Run, 318
- LDAPAttributes
 - Arc::URL, 383
- ldapattributes
 - Arc::URL, 386
- LDAPFilter
 - Arc::URL, 383
- ldapfilter
 - Arc::URL, 386
- LDAPScope
 - Arc::URL, 383
- ldapscope
 - Arc::URL, 386
- length
 - Arc::PayloadRawBuf, 276
- LESSTHAN
 - Arc::Software, 340
- LESSTHANOREQUAL
 - Arc::Software, 340
- Limit
 - Arc::PayloadStream, 281
 - Arc::PayloadStreamInterface, 285
- Link
 - Arc::FileCache, 184
- List
 - Arc::DataPoint, 126
- ListError
 - Arc::DataStatus, 152
- Load
 - Arc::ClientSOAP, 79
- load
 - Arc::BrokerLoader, 70
 - Arc::JobControllerLoader, 221
 - Arc::JobDescriptionParserLoader, 226
 - Arc::ModuleManager, 262
 - Arc::PluginsFactory, 299
 - Arc::SubmitterLoader, 360
 - Arc::TargetRetrieverLoader, 369
- load_key_from_certfile
 - Arc, 41
- load_key_from_certstr
 - Arc, 41
- load_key_from_keyfile
 - Arc, 41
- load_trusted_cert_file
 - Arc, 41
- load_trusted_cert_str
 - Arc, 41
- load_trusted_certs
 - Arc, 41
- LoadConfigurationFile
 - Arc::UserConfig, 410
- Loader
 - Arc::Loader, 229
- LocationAlreadyExistsError
 - Arc::DataStatus, 152
- Locations
 - Arc::URL, 383
- locations
 - Arc::URL, 386
- lock
 - Arc::SimpleCondition, 335
- lock_
 - Arc::InformationInterface, 202
- log
 - Arc::LogFile, 232
 - Arc::LogStream, 241
- LogDestination
 - Arc::LogDestination, 230
- LogError
 - Arc::Credential, 105
 - Arc::DelegationConsumer, 156
- LogFile
 - Arc::LogFile, 231
- LogFormat
 - Arc, 37
- Logger
 - Arc::Logger, 234
 - Arc::LogMessage, 239
- logger
 - Arc::MCC, 245
 - Arc::Plexer, 295
 - Arc::Service, 333
- LogLevel

- Arc, 37
- LogMessage
 - Arc::LogMessage, 238
- LogStream
 - Arc::LogStream, 240
- make_policy
 - ArcSec::Policy, 302
- make_request
 - ArcSec::Request, 312
- MakeConfig
 - Arc::BaseConfig, 66
 - Arc::MCCConfig, 248
- makePersistent
 - Arc::ModuleManager, 262
- match
 - Arc::RegularExpression, 310
- MatchXMLName
 - Arc, 41, 42
 - Arc::XMLNode, 467
- MatchXMLNamespace
 - Arc, 42
 - Arc::XMLNode, 467
- max_duration_
 - Arc::DelegationContainerSOAP, 160
- max_size_
 - Arc::DelegationContainerSOAP, 160
- max_usage_
 - Arc::DelegationContainerSOAP, 160
- MaxDiskSpace
 - Arc::ExecutionTarget, 178
- maxLength
 - FileCacheHash, 186
- MaxMainMemory
 - Arc::ExecutionTarget, 178
- MaxVirtualMemory
 - Arc::ExecutionTarget, 178
- MCC
 - Arc::MCC, 243
- MCC_Status
 - Arc::MCC_Status, 246
- MCCLoader
 - Arc::MCCLoader, 250
- Message
 - Arc::Message, 253
- MessageAttributes
 - Arc::AttributeIterator, 59
 - Arc::MessageAttributes, 255
- MessageID
 - Arc::WSAHeader, 429
- MetaData
 - Arc::WSAEndpointReference, 427
- MetaDataOption
 - Arc::URL, 384
- MetaDataOptions
 - Arc::URL, 384
- metadataoptions
 - Arc::URL, 386
- Migrate
 - Arc::JobController, 218
 - Arc::Submitter, 358
- ModifyFoundTargets
 - Arc::TargetGenerator, 364
- ModuleManager
 - Arc::ModuleManager, 262
- Move
 - Arc::XMLNode, 460
- msg
 - Arc::Logger, 235
- Name
 - Arc::URLLocation, 389
 - Arc::XMLNode, 461
- name
 - Arc::URLLocation, 389
- Namespace
 - Arc::XMLNode, 461
- NamespacePrefix
 - Arc::XMLNode, 461
- Namespaces
 - Arc::XMLNode, 461
- New
 - Arc::XMLNode, 462
- NewAttribute
 - Arc::XMLNode, 462
- NewChild
 - Arc::XMLNode, 462, 463
- NewReferenceParameter
 - Arc::WSAHeader, 430
- Next
 - Arc::MCC, 244
 - Arc::Plexer, 294
- next_
 - Arc::MCC, 245
- NextLocation
 - Arc::DataPoint, 126
 - Arc::DataPointDirect, 135
 - Arc::DataPointIndex, 142
- Nodes
 - Arc::XMLNodeContainer, 469

- NoLocationError
 - Arc::DataStatus, 152
- NOTEQUAL
 - Arc::Software, 339
- NotInitializedError
 - Arc::DataStatus, 152
- NotSupportedForDirectDataPointsError
 - Arc::DataStatus, 152
- OAuthConsumer
 - Arc::OAuthConsumer, 269
- OpenSSLInit
 - Arc, 42
- OperatingSystem
 - Arc::ExecutionTarget, 178
- operator AlgFactory *
 - ArcSec::EvaluatorContext, 173
- operator AttributeFactory *
 - ArcSec::EvaluatorContext, 173
- operator bool
 - Arc::CStringValue, 74
 - Arc::FileCache, 184
 - Arc::JobDescription, 222
 - Arc::MCC_Status, 247
 - Arc::MultiSecAttr, 264
 - Arc::PathIterator, 273
 - Arc::PayloadStream, 282
 - Arc::PayloadStreamInterface, 285
 - Arc::Run, 318
 - Arc::SAMLToken, 325
 - Arc::SecAttr, 327
 - Arc::SecAttrValue, 329
 - Arc::URL, 384
 - Arc::UserConfig, 412
 - Arc::UsernameToken, 423
 - Arc::WSRF, 432
 - Arc::X509Token, 455
 - Arc::XMLNode, 463
- operator FnFactory *
 - ArcSec::EvaluatorContext, 173
- operator PluginsFactory *
 - Arc::ChainContext, 72
- operator std::string
 - Arc::MCC_Status, 247
 - Arc::Period, 289
 - Arc::Software, 342
 - Arc::Time, 375
 - Arc::XMLNode, 463
- operator XMLNode
 - Arc::WSAEndpointReference, 427
- Arc::WSAHeader, 430
- operator<
 - Arc::ExpirationReminder, 179
 - Arc::Period, 290
 - Arc::Software, 343
 - Arc::Time, 376
 - Arc::URL, 384
- operator<<
 - Arc, 42
 - Arc::LogMessage, 239
 - Arc::Software, 345
 - Arc::URL, 386
- operator<=
 - Arc::Period, 290
 - Arc::Software, 343
 - Arc::Time, 376
- operator>
 - Arc::Period, 290
 - Arc::Software, 344
 - Arc::Time, 376
- operator>=
 - Arc::Period, 290
 - Arc::Software, 344
 - Arc::Time, 377
- operator*
 - Arc::AttributeIterator, 59
 - Arc::PathIterator, 273
- operator()
 - Arc::Software, 342
- operator+
 - Arc::Time, 376
- operator++
 - Arc::AttributeIterator, 59
 - Arc::PathIterator, 273
 - Arc::XMLNode, 463
- operator-
 - Arc::Time, 376
- operator->
 - Arc::AttributeIterator, 59
- operator--
 - Arc::PathIterator, 273
 - Arc::XMLNode, 464
- operator=
 - Arc::ExecutionTarget, 176
 - Arc::Job, 211
 - Arc::Message, 254
 - Arc::Period, 290
 - Arc::SoftwareRequirement, 352
 - Arc::Time, 376
 - Arc::WSAEndpointReference, 427

- Arc::XMLNode, 464
- Arc::XMLNodeContainer, 469
- operator==
 - Arc::FileCache, 185
 - Arc::Period, 290
 - Arc::SecAttr, 327
 - Arc::SecAttrValue, 329
 - Arc::Software, 343
 - Arc::Time, 376
 - Arc::URL, 384
 - Arc::XMLNode, 464
- operator[]
 - Arc::MCCLoader, 251
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 278
 - Arc::XMLNode, 464, 465
 - Arc::XMLNodeContainer, 469
- Option
 - Arc::URL, 384
- Options
 - Arc::URL, 384
- OptionString
 - Arc::URL, 384
- OtherAttributes
 - Arc::JobDescription, 225
- OutputCertificate
 - Arc::Credential, 105
- OutputCertificateChain
 - Arc::Credential, 105
- OutputPrivatekey
 - Arc::Credential, 106
- OutputPublickey
 - Arc::Credential, 106
- OverlayFile
 - Arc::UserConfig, 412, 413
- Parent
 - Arc::XMLNode, 465
- Parse
 - Arc::JobDescription, 222, 223
- parse
 - Arc::Config, 85
- parseDN
 - Arc::OAuthConsumer, 269
 - Arc::SAML2SSOHTTPClient, 321
- ParseOptions
 - Arc::URL, 385
- parsePolicy
 - ArcSec::PolicyParser, 303
- parseVOMSAC
 - Arc, 42, 43
- PARSING_ERROR
 - Arc, 38
- Passive
 - Arc::DataPoint, 126
 - Arc::DataPointDirect, 135
 - Arc::DataPointIndex, 142
- passphrase_callback
 - Arc, 44
- Passwd
 - Arc::URL, 385
- passwd, 272
 - Arc::URL, 387
- Password
 - Arc::UserConfig, 413, 414
- PasswordType
 - Arc::UsernameToken, 422
- Path
 - Arc::URL, 385
 - Arc::XMLNode, 465
- path
 - Arc::URL, 387
- Path2BaseDN
 - Arc::URL, 385
- PathIterator
 - Arc::PathIterator, 273
- Payload
 - Arc::Message, 254
 - Arc::SOAPMessage, 337
- PayloadRaw
 - Arc::PayloadRaw, 274
- PayloadSOAP
 - Arc::PayloadSOAP, 279, 280
- PayloadStream
 - Arc::PayloadStream, 281
- PayloadWSRF
 - Arc::PayloadWSRF, 287
- Period
 - Arc::Period, 289
- plainstr
 - Arc::URL, 385
- Plexer
 - Arc::Plexer, 294
- plugins_table_name
 - Arc, 45
- PluginsFactory
 - Arc::PluginsFactory, 299
- Policy
 - ArcSec::Policy, 301
- PolicyStore

- ArcSec::PolicyStore, 304
- Port
 - Arc::URL, 385
- port
 - Arc::URL, 387
- Pos
 - Arc::PayloadStream, 282
 - Arc::PayloadStreamInterface, 285
- PossibleTargets
 - Arc::Broker, 69
- PostRegister
 - Arc::DataPoint, 126
 - Arc::DataPointDirect, 135
- PostRegisterError
 - Arc::DataStatus, 152
- PreFilterTargets
 - Arc::Broker, 68
- Prefix
 - Arc::XMLNode, 465
- PrepareReading
 - Arc::DataPoint, 127
 - Arc::DataPointIndex, 142
- PrepareWriting
 - Arc::DataPoint, 127
 - Arc::DataPointIndex, 143
- PreRegister
 - Arc::DataPoint, 128
 - Arc::DataPointDirect, 136
- PreRegisterError
 - Arc::DataStatus, 152
- PreUnregister
 - Arc::DataPoint, 128
 - Arc::DataPointDirect, 136
- Print
 - Arc::ExecutionTarget, 176
 - Arc::Job, 212
 - Arc::JobDescription, 223
- print
 - Arc::Config, 85
- PrintJobStatus
 - Arc::JobController, 219
- PrintTargetInfo
 - Arc::TargetGenerator, 364
- process
 - Arc::ClientHTTPwithSAML2SSO, 76
 - Arc::ClientSOAP, 79
 - Arc::ClientSOAPwithSAML2SSO, 80
 - Arc::MCC, 244
 - Arc::MCCInterface, 249
 - Arc::Plexer, 294
- Test::TestService, 371
- processConsent
 - Arc::HakaClient, 193
 - Arc::OpenIdpClient, 271
 - Arc::SAML2SSOHTTPClient, 321
- processIdP2Confusa
 - Arc::HakaClient, 193
 - Arc::OpenIdpClient, 271
 - Arc::SAML2SSOHTTPClient, 321
- processIdPLogin
 - Arc::HakaClient, 193
 - Arc::OpenIdpClient, 271
 - Arc::SAML2SSOHTTPClient, 321
- processLogin
 - Arc::OAuthConsumer, 270
 - Arc::SAML2LoginClient, 320
 - Arc::SAML2SSOHTTPClient, 322
- ProcessSecHandlers
 - Arc::MCC, 244
 - Arc::Service, 333
- Protocol
 - Arc::URL, 385
- protocol
 - Arc::URL, 387
- PROTOCOL_RECOGNIZED_ERROR
 - Arc, 38
- ProvidesMeta
 - Arc::DataPoint, 128
 - Arc::DataPointDirect, 136
 - Arc::DataPointIndex, 143
- ProxyPath
 - Arc::UserConfig, 414
- pushCSR
 - Arc::OAuthConsumer, 270
 - Arc::SAML2SSOHTTPClient, 322
- Put
 - Arc::PayloadStream, 282
 - Arc::PayloadStreamInterface, 285
- Query
 - Arc::Query, 306
- Range
 - Arc::DataPoint, 129
 - Arc::DataPointDirect, 136
 - Arc::DataPointIndex, 143
- RC_DEFAULT_PORT
 - URL.h, 474
- ReadAcquireError
 - Arc::DataStatus, 151

- ReadAllJobsFromFile
 - Arc::Job, 212
- ReadError
 - Arc::DataStatus, 152
- ReadFinishError
 - Arc::DataStatus, 152
- ReadFromFile
 - Arc::XMLNode, 465
- ReadFromStream
 - Arc::XMLNode, 466
- ReadOutOfOrder
 - Arc::DataPoint, 129
 - Arc::DataPointDirect, 137
 - Arc::DataPointIndex, 144
- ReadPrepareError
 - Arc::DataStatus, 152
- ReadPrepareWait
 - Arc::DataStatus, 152
- ReadResolveError
 - Arc::DataStatus, 151
- ReadStartError
 - Arc::DataStatus, 152
- ReadStderr
 - Arc::Run, 318
- ReadStdout
 - Arc::Run, 318
- ReadStopError
 - Arc::DataStatus, 152
- ReferenceParameter
 - Arc::WSAHeader, 430
- ReferenceParameters
 - Arc::WSAEndpointReference, 427
- Registered
 - Arc::DataPoint, 129
 - Arc::DataPointDirect, 137
 - Arc::DataPointIndex, 144
- RegisteredService
 - Arc::RegisteredService, 310
- registration
 - Arc::InfoRegistrar, 199
- RegistrationCollector
 - Arc::Service, 333
- RelatesTo
 - Arc::WSAHeader, 430
- RelationshipType
 - Arc::WSAHeader, 430
- Release
 - Arc::FileCache, 185
- release
 - Arc::FileLock, 189
- reload
 - Arc::ModuleManager, 263
- remove
 - Arc::MessageAttributes, 257
- removeAll
 - Arc::MessageAttributes, 257
- RemoveJobsFromFile
 - Arc::Job, 213
- removeService
 - Arc::InfoRegisterContainer, 197
- Replace
 - Arc::XMLNode, 466
- ReplyTo
 - Arc::WSAHeader, 430
- report
 - Arc::PluginsFactory, 300
- Request
 - Arc::DelegationConsumer, 156
 - ArcSec::Request, 311
- RequestAttribute
 - ArcSec::RequestAttribute, 313
- RequestItem
 - ArcSec::RequestItem, 314
- reserve
 - Arc::Counter, 95
 - Arc::IntraProcessCounter, 209
- reset
 - Arc::SimpleCondition, 335
- Resolve
 - Arc::DataPoint, 129
 - Arc::DataPointDirect, 137
- Rest
 - Arc::PathIterator, 273
- Restore
 - Arc::DelegationConsumer, 157
- Result
 - Arc::InformationResponse, 204
 - Arc::Run, 318
- RetrieveExecutionTargets
 - Arc::TargetGenerator, 365
- RetrieveJobs
 - Arc::TargetGenerator, 365
- Run
 - Arc::Run, 316
- Running
 - Arc::Run, 318
- Same
 - Arc::XMLNode, 466
- SAML2LoginClient

- Arc::SAML2LoginClient, 320
- SAMLTOKEN
 - Arc::SAMLTOKEN, 324
- SAMLVersion
 - Arc::SAMLTOKEN, 324
- save
 - Arc::Config, 85
- SaveJobStatusToStream
 - Arc::JobController, 219
- SaveTargetInfoToStream
 - Arc::TargetGenerator, 365
- SaveToFile
 - Arc::UserConfig, 415
 - Arc::XMLNode, 466
- SaveToStream
 - Arc::ExecutionTarget, 177
 - Arc::Job, 213
 - Arc::JobDescription, 224
 - Arc::XMLNode, 466
- scan
 - Arc::PluginsFactory, 300
- Scope
 - Arc::URL, 381
- sechndlers_
 - Arc::MCC, 245
 - Arc::Service, 333
- secure
 - Arc::DataMover, 119
- seekable_
 - Arc::PayloadStream, 283
- selectSoftware
 - Arc::SoftwareRequirement, 352, 353
- Service
 - Arc::Service, 333
- ServiceCounter
 - Arc::TargetGenerator, 366
- SESSION_CLOSE
 - Arc, 38
- Set
 - Arc::XMLNode, 466
- set
 - Arc::DataBuffer, 116
 - Arc::MessageAttributes, 257
- set_base
 - Arc::DataSpeed, 149
- set_default_max_inactivity_time
 - Arc::DataMover, 119
- set_default_min_average_speed
 - Arc::DataMover, 119
- set_default_min_speed
 - Arc::DataMover, 119
- set_max_data
 - Arc::DataSpeed, 149
- set_max_inactivity_time
 - Arc::DataSpeed, 149
- set_min_average_speed
 - Arc::DataSpeed, 149
- set_min_speed
 - Arc::DataSpeed, 150
- set_namespaces
 - Arc::WSRF, 432
 - Arc::WSRFBASEFAULT, 434
 - Arc::WSRP, 437
- set_progress_indicator
 - Arc::DataSpeed, 150
- SetAdditionalChecks
 - Arc::DataPoint, 129
 - Arc::DataPointDirect, 137
 - Arc::DataPointIndex, 144
- setAttributeFactory
 - ArcSec::Request, 312
- setBackups
 - Arc::LogFile, 232
- setCfg
 - Arc::ModuleManager, 263
- setCombiningAlg
 - ArcSec::Evaluator, 172
- setEvalResult
 - ArcSec::Policy, 302
- setEvaluatorContext
 - ArcSec::Policy, 302
- setExcess
 - Arc::Counter, 95
 - Arc::IntraProcessCounter, 209
- setFileName
 - Arc::Config, 85
- SetFormat
 - Arc::Time, 377
- setIdentifier
 - Arc::LogMessage, 239
- SetLifeTime
 - Arc::Credential, 106
- setLimit
 - Arc::Counter, 96
 - Arc::IntraProcessCounter, 210
- setMaxSize
 - Arc::LogFile, 232
- SetMeta
 - Arc::DataPoint, 130
 - Arc::DataPointIndex, 144

- SetPeriod
 - Arc::Period, 290
- SetProxyPolicy
 - Arc::Credential, 106
- setReopen
 - Arc::LogFile, 232
- setRequestItems
 - ArcSec::Request, 312
- setRequirement
 - Arc::SoftwareRequirement, 354
- SetSecure
 - Arc::DataPoint, 130
 - Arc::DataPointDirect, 137
 - Arc::DataPointIndex, 144
- SetStartTime
 - Arc::Credential, 106
- setThreadContext
 - Arc::Logger, 236
- setThreshold
 - Arc::Logger, 236
- setThresholdForDomain
 - Arc::Logger, 236
- SetTime
 - Arc::Time, 377
- SetURL
 - Arc::DataPoint, 130
- SetValid
 - Arc::FileCache, 185
- shutdown
 - Arc::Database, 110
 - Arc::MySQLDatabase, 266
- signal
 - Arc::SimpleCondition, 335
- signal_nonblock
 - Arc::SimpleCondition, 335
- SignEECRequest
 - Arc::Credential, 106, 107
- SignNode
 - Arc::XMLSecNode, 471
- SignRequest
 - Arc::Credential, 107
- Size
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 278
 - Arc::PayloadStream, 283
 - Arc::PayloadStreamInterface, 286
 - Arc::XMLNode, 466
 - Arc::XMLNodeContainer, 470
- size
 - Arc::PayloadRawBuf, 276
- SLCS
 - Arc::UserConfig, 415
- SOAP
 - Arc::InformationRequest, 203
 - Arc::WSRF, 432
- SOAPMessage
 - Arc::SOAPMessage, 337
- Software
 - Arc::Software, 340
- SoftwareRequirement
 - Arc::SoftwareRequirement, 347, 348
- SortLocations
 - Arc::DataPoint, 130
 - Arc::DataPointDirect, 138
 - Arc::DataPointIndex, 145
- SortTargets
 - Arc::Broker, 69
- Source
 - ArcSec::Source, 355
- STACK_OF
 - Arc::Credential, 107
- StageError
 - Arc::DataStatus, 152
- Start
 - Arc::FileCache, 185
 - Arc::Run, 319
- StartReading
 - Arc::DataPoint, 130
 - Arc::DataPointIndex, 145
- StartWriting
 - Arc::DataPoint, 131
 - Arc::DataPointIndex, 145
- Stat
 - Arc::DataPoint, 131
- StatError
 - Arc::DataStatus, 152
- STATUS_OK
 - Arc, 38
- StatusKind
 - Arc, 38
- Stop
 - Arc::FileCache, 185
- StopAndDelete
 - Arc::FileCache, 186
- StopReading
 - Arc::DataPoint, 131
 - Arc::DataPointIndex, 145
- StopWriting
 - Arc::DataPoint, 132
 - Arc::DataPointIndex, 146

- storeCert
 - Arc::OAuthConsumer, 270
 - Arc::SAML2SSOHTTPClient, 322
- StoreDirectory
 - Arc::UserConfig, 416
- str
 - Arc::Time, 377
 - Arc::URL, 385
 - Arc::URLLocation, 389
- string
 - Arc, 44
- Submit
 - Arc::Submitter, 358
- SubmitterLoader
 - Arc::SubmitterLoader, 359
- Success
 - Arc::DataStatus, 151
- SuccessCached
 - Arc::DataStatus, 152
- Swap
 - Arc::XMLNode, 466
- SYSCONFIG
 - Arc::UserConfig, 421
- SYSCONFIGARCLOC
 - Arc::UserConfig, 421
- SystemError
 - Arc::DataStatus, 152
- TargetGenerator
 - Arc::TargetGenerator, 361
- TargetRetriever
 - Arc::TargetRetriever, 367
- TargetRetrieverLoader
 - Arc::TargetRetrieverLoader, 369
- Test::TestMCC, 370
- Test::TestService, 370
 - process, 371
- thread_stacksize
 - Arc, 45
- ThreadDataItem
 - Arc::ThreadDataItem, 372
- Time
 - Arc::Time, 375
- Timeout
 - Arc::PayloadStream, 283
 - Arc::PayloadStreamInterface, 286
 - Arc::UserConfig, 416, 417
- TimeStamp
 - Arc, 44
- TmpDirCreate
 - Arc, 44
- To
 - Arc::WSAHeader, 430, 431
- toString
 - Arc::Software, 345
- ToXML
 - Arc::Job, 214
- Transfer
 - Arc::DataMover, 119
- transfer
 - Arc::DataSpeed, 150
- TransferError
 - Arc::DataStatus, 152
- TransferLocations
 - Arc::DataPoint, 132
 - Arc::DataPointIndex, 146
- Truncate
 - Arc::PayloadRaw, 275
 - Arc::PayloadRawInterface, 278
- TryLoad
 - Arc::PluginsFactory, 300
- UnimplementedError
 - Arc::DataStatus, 152
- UNKNOWN_SERVICE_ERROR
 - Arc, 38
- UnknownError
 - Arc::DataStatus, 152
- Unlink
 - Arc::MCC, 244
- unload
 - Arc::ModuleManager, 263
- unlock
 - Arc::SimpleCondition, 335
- UnParse
 - Arc::JobDescription, 224
- Unregister
 - Arc::DataPoint, 132
 - Arc::DataPointDirect, 138
- UnregisterError
 - Arc::DataStatus, 152
- Update
 - Arc::ExecutionTarget, 177
- UpdateCredentials
 - Arc::DelegationConsumerSOAP, 158
 - Arc::DelegationContainerSOAP, 159
 - Arc::DelegationProviderSOAP, 163
- URL
 - Arc::URL, 381
- URL.h, 473

- RC_DEFAULT_PORT, 474
- urlencode
 - Arc::ConfusaParserUtils, 87
- urlencode_params
 - Arc::ConfusaParserUtils, 87
- URLLocation
 - Arc::URLLocation, 388, 389
- urloptions
 - Arc::URL, 387
- UserConfig
 - Arc::UserConfig, 393–395
- UserName
 - Arc::UserConfig, 417
- Username
 - Arc::URL, 385
 - Arc::UsernameToken, 423
- username
 - Arc::URL, 387
- UsernameToken
 - Arc::UsernameToken, 422, 423
- UtilsDirPath
 - Arc::UserConfig, 418
- valid
 - Arc::URL, 387
- valid_
 - Arc::WSRF, 433
- valid_url_options
 - Arc::DataPoint, 133
- Validate
 - Arc::XMLNode, 466
- verbose
 - Arc::DataMover, 120
 - Arc::DataSpeed, 150
- Verbosity
 - Arc::UserConfig, 418, 419
- VerifyNode
 - Arc::XMLSecNode, 472
- VERSIONTOKENS
 - Arc::Software, 346
- VOMSDecode
 - Arc, 44
- VOMSServerPath
 - Arc::UserConfig, 419, 420
- VOMSTrustList
 - Arc::VOMSTrustList, 425
- Wait
 - Arc::Run, 319
- wait
 - Arc::SimpleCondition, 335
 - Arc::SimpleCounter, 336
- wait_any
 - Arc::DataBuffer, 116
- wait_nonblock
 - Arc::SimpleCondition, 335
- WaitForExit
 - Arc::ThreadRegistry, 374
- WaitOrCancel
 - Arc::ThreadRegistry, 374
- WriteAcquireError
 - Arc::DataStatus, 151
- WriteError
 - Arc::DataStatus, 152
- WriteFinishError
 - Arc::DataStatus, 152
- WriteJobsToFile
 - Arc::Job, 214, 215
- WriteJobsToTruncatedFile
 - Arc::Job, 215
- WriteOutOfOrder
 - Arc::DataPoint, 132
 - Arc::DataPointDirect, 138
 - Arc::DataPointIndex, 146
- WritePrepareError
 - Arc::DataStatus, 152
- WritePrepareWait
 - Arc::DataStatus, 152
- WriteResolveError
 - Arc::DataStatus, 152
- WriteStartError
 - Arc::DataStatus, 152
- WriteStdin
 - Arc::Run, 319
- WriteStopError
 - Arc::DataStatus, 152
- WSAEndpointReference
 - Arc::WSAEndpointReference, 426, 427
- WSAFault
 - Arc, 38
- WSAFaultAssign
 - Arc, 44
- WSAFaultExtract
 - Arc, 45
- WSAFaultInvalidAddressingHeader
 - Arc, 38
- WSAFaultUnknown
 - Arc, 38
- WSAHeader
 - Arc::WSAHeader, 429

WSRF
 Arc::WSRF, 432
WSRFBaseFault
 Arc::WSRFBaseFault, 434
WSRP
 Arc::WSRP, 437
WSRPFault
 Arc::WSRPFault, 439
WSRPResourcePropertyChangeFailure
 Arc::WSRPResourcePropertyChangeFailure,
 447

X509Token
 Arc::X509Token, 453, 454
X509TokenType
 Arc::X509Token, 453
XMLNode
 Arc::XMLNode, 458
XMLNodeContainer
 Arc::XMLNodeContainer, 469
XMLSecNode
 Arc::XMLSecNode, 471
XPathLookup
 Arc::XMLNode, 467