

VOMS CC API

1.5.0

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Contents

1	Data Structure Index	1
1.1	Data Structures	1
2	File Index	3
2.1	File List	3
3	Data Structure Documentation	5
3.1	attribute Struct Reference	5
3.1.1	Detailed Description	5
3.1.2	Field Documentation	5
3.1.2.1	name	5
3.1.2.2	qualifier	5
3.1.2.3	value	5
3.2	attributelist Struct Reference	6
3.2.1	Detailed Description	6
3.2.2	Field Documentation	6
3.2.2.1	attributes	6
3.2.2.2	grantor	6
3.3	contactdata Struct Reference	6
3.3.1	Detailed Description	6
3.3.2	Field Documentation	7
3.3.2.1	contact	7
3.3.2.2	host	7
3.3.2.3	nick	7
3.3.2.4	port	7
3.3.2.5	version	7
3.3.2.6	vo	7
3.4	data Struct Reference	7
3.4.1	Detailed Description	8
3.4.2	Field Documentation	8
3.4.2.1	cap	8
3.4.2.2	group	8

3.4.2.3	role	8
3.5	voms Struct Reference	8
3.5.1	Detailed Description	9
3.5.2	Constructor & Destructor Documentation	9
3.5.2.1	voms	9
3.5.2.2	voms	9
3.5.2.3	~voms	9
3.5.3	Member Function Documentation	9
3.5.3.1	GetAC	9
3.5.3.2	GetAttributes	9
3.5.3.3	GetTargets	9
3.5.3.4	operator=	9
3.5.4	Friends And Related Function Documentation	9
3.5.4.1	TranslateVOMS	9
3.5.4.2	vomsdata	9
3.5.5	Field Documentation	9
3.5.5.1	custom	9
3.5.5.2	date1	10
3.5.5.3	date2	10
3.5.5.4	fqn	10
3.5.5.5	serial	10
3.5.5.6	server	10
3.5.5.7	serverca	10
3.5.5.8	siglen	10
3.5.5.9	signature	10
3.5.5.10	std	10
3.5.5.11	type	11
3.5.5.12	uri	11
3.5.5.13	user	11
3.5.5.14	userca	11
3.5.5.15	version	11
3.5.5.16	voname	11
3.6	vomsdata Struct Reference	11
3.6.1	Detailed Description	12
3.6.2	Constructor & Destructor Documentation	12
3.6.2.1	vomsdata	12
3.6.2.2	~vomsdata	13
3.6.2.3	vomsdata	13
3.6.3	Member Function Documentation	13
3.6.3.1	AddTarget	13

3.6.3.2	Contact	13
3.6.3.3	Contact	13
3.6.3.4	ContactRaw	14
3.6.3.5	ContactRaw	14
3.6.3.6	ContactRESTRaw	14
3.6.3.7	DefaultData	14
3.6.3.8	ErrorMessage	14
3.6.3.9	Export	15
3.6.3.10	FindByAlias	15
3.6.3.11	FindByVO	15
3.6.3.12	Import	15
3.6.3.13	ListTargets	16
3.6.3.14	LoadCredentials	16
3.6.3.15	LoadSystemContacts	16
3.6.3.16	LoadUserContacts	16
3.6.3.17	Order	16
3.6.3.18	ResetOrder	17
3.6.3.19	ResetTargets	17
3.6.3.20	Retrieve	17
3.6.3.21	Retrieve	17
3.6.3.22	Retrieve	17
3.6.3.23	Retrieve	17
3.6.3.24	RetrieveFromCred	18
3.6.3.25	RetrieveFromCtx	18
3.6.3.26	RetrieveFromProxy	18
3.6.3.27	ServerErrors	18
3.6.3.28	SetLifetime	19
3.6.3.29	SetRetryCount	19
3.6.3.30	SetVerificationTime	19
3.6.3.31	SetVerificationType	19
3.6.4	Field Documentation	19
3.6.4.1	data	19
3.6.4.2	error	19
3.6.4.3	extra_data	19
3.6.4.4	workvo	19
4	File Documentation	21
4.1	voms_api.h File Reference	21
4.1.1	Macro Definition Documentation	22
4.1.1.1	NOGLOBUS	22

4.1.2	Typedef Documentation	22
4.1.2.1	check_sig	22
4.1.2.2	gss_cred_id_t	22
4.1.2.3	gss_ctx_id_t	22
4.1.3	Enumeration Type Documentation	22
4.1.3.1	data_type	22
4.1.3.2	recurse_type	23
4.1.3.3	verify_type	23
4.1.3.4	verror_type	23
4.1.4	Function Documentation	24
4.1.4.1	getVOMSMajorVersionNumber	24
4.1.4.2	getVOMSMinorVersionNumber	24
4.1.4.3	getVOMSPatchVersionNumber	24

Index	24
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Chapter 1

Data Structure Index

1.1 Data Structures

Here are the data structures with brief descriptions:

attribute	5
attributelist	6
contactdata	6
data	
User's characteristics: can be repeated. Generic name-value attribute : can be repeated	7
voms	8
vomldata	11

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

voms_api.h	21
--------------------------------------	----

Chapter 3

Data Structure Documentation

3.1 attribute Struct Reference

```
#include <voms_api.h>
```

Data Fields

- `std::string` [name](#)
- `std::string` [qualifier](#)
- `std::string` [value](#)

3.1.1 Detailed Description

Definition at line 63 of file `voms_api.h`.

3.1.2 Field Documentation

3.1.2.1 `std::string attribute::name`

attribute's group

Definition at line 64 of file `voms_api.h`.

3.1.2.2 `std::string attribute::qualifier`

attribute's qualifier

Definition at line 65 of file `voms_api.h`.

3.1.2.3 `std::string attribute::value`

attribute's value

Definition at line 66 of file `voms_api.h`.

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

- [voms_api.h](#)

3.2 attributelist Struct Reference

```
#include <voms_api.h>
```

Data Fields

- std::string [grantor](#)
- std::vector< [attribute](#) > [attributes](#)

3.2.1 Detailed Description

Definition at line 69 of file voms_api.h.

3.2.2 Field Documentation

3.2.2.1 std::vector<attribute> attributelist::attributes

The attributes themselves.

Definition at line 71 of file voms_api.h.

3.2.2.2 std::string attributelist::grantor

Who granted these attributes.

Definition at line 70 of file voms_api.h.

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

- [voms_api.h](#)

3.3 contactdata Struct Reference

```
#include <voms_api.h>
```

Data Fields

- std::string [nick](#)
- std::string [host](#)
- std::string [contact](#)
- std::string [vo](#)
- int [port](#)
- int [version](#)

3.3.1 Detailed Description

Definition at line 83 of file voms_api.h.

3.3.2 Field Documentation

3.3.2.1 `std::string contactdata::contact`

The subject of the server's certificate

Definition at line 89 of file `voms_api.h`.

3.3.2.2 `std::string contactdata::host`

The hostname of the server

Definition at line 88 of file `voms_api.h`.

3.3.2.3 `std::string contactdata::nick`

< You must never allocate directly this structure. Its `sizeof()` is subject to change without notice. The only supported way to obtain it is via the `FindBy*` functions. The alias of the server

Definition at line 87 of file `voms_api.h`.

3.3.2.4 `int contactdata::port`

The port on which the server is listening

Definition at line 91 of file `voms_api.h`.

3.3.2.5 `int contactdata::version`

The version of globus under which the server is running

Definition at line 93 of file `voms_api.h`.

3.3.2.6 `std::string contactdata::vo`

The VO served by this server

Definition at line 90 of file `voms_api.h`.

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

- [voms_api.h](#)

3.4 data Struct Reference

User's characteristics: can be repeated. Generic name-value attribute : can be repeated.

```
#include <voms_api.h>
```

Data Fields

- `std::string` [group](#)
- `std::string` [role](#)
- `std::string` [cap](#)

3.4.1 Detailed Description

User's characteristics: can be repeated. Generic name-value attribute : can be repeated.

Definition at line 55 of file voms_api.h.

3.4.2 Field Documentation

3.4.2.1 `std::string data::cap`

user's capability

Definition at line 58 of file voms_api.h.

3.4.2.2 `std::string data::group`

user's group

Definition at line 56 of file voms_api.h.

3.4.2.3 `std::string data::role`

user's role

Definition at line 57 of file voms_api.h.

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

- [voms_api.h](#)

3.5 voms Struct Reference

```
#include <voms_api.h>
```

Public Member Functions

- [voms](#) (const [voms](#) &)
- [voms](#) ()
- [voms](#) & [operator=](#) (const [voms](#) &)
- [~voms](#) ()
- AC * [GetAC](#) ()
- std::vector< [attributelist](#) > & [GetAttributes](#) ()
- std::vector< std::string > [GetTargets](#) ()

Data Fields

- int [version](#)
- int [siglen](#)
- std::string [signature](#)
- std::string [user](#)
- std::string [userca](#)
- std::string [server](#)
- std::string [serverca](#)
- std::string [voname](#)

- std::string [uri](#)
- std::string [date1](#)
- std::string [date2](#)
- [data_type](#) type
- std::vector< [data](#) > [std](#)
- std::string [custom](#)
- std::vector< std::string > [fqan](#)
- std::string [serial](#)

Friends

- class [vomsdata](#)
- int [TranslateVOMS](#) (struct vomsdatar *vd, std::vector< [voms](#) > &v, int *error)

3.5.1 Detailed Description

Definition at line 98 of file voms_api.h.

3.5.2 Constructor & Destructor Documentation

3.5.2.1 `voms::voms (const voms &)`

3.5.2.2 `voms::voms ()`

3.5.2.3 `voms::~~voms ()`

3.5.3 Member Function Documentation

3.5.3.1 `AC* voms::GetAC ()`

3.5.3.2 `std::vector<attributelist>& voms::GetAttributes ()`

Generic attributes

3.5.3.3 `std::vector<std::string> voms::GetTargets ()`

3.5.3.4 `voms& voms::operator= (const voms &)`

3.5.4 Friends And Related Function Documentation

3.5.4.1 `int TranslateVOMS (struct vomsdatar * vd, std::vector< voms > & v, int * error)` [[friend](#)]

3.5.4.2 `friend class vomsdata` [[friend](#)]

Definition at line 99 of file voms_api.h.

3.5.5 Field Documentation

3.5.5.1 `std::string voms::custom`

The data returned by an S command

Definition at line 113 of file voms_api.h.

3.5.5.2 std::string voms::date1

Beginning of validity of the user info

Definition at line 109 of file voms_api.h.

3.5.5.3 std::string voms::date2

End of validity of the user info

Definition at line 110 of file voms_api.h.

3.5.5.4 std::vector<std::string> voms::fqan

Keeps the data in the compact format

Definition at line 115 of file voms_api.h.

3.5.5.5 std::string voms::serial

Serial number. "0" if coming from non-ac

Definition at line 116 of file voms_api.h.

3.5.5.6 std::string voms::server

The VOMS server DN, as from its certificate

Definition at line 105 of file voms_api.h.

3.5.5.7 std::string voms::serverca

The CA which signed the VOMS certificate

Definition at line 106 of file voms_api.h.

3.5.5.8 int voms::siglen

The length of the VOMS server signature

Definition at line 101 of file voms_api.h.

3.5.5.9 std::string voms::signature

The VOMS server signature

Definition at line 102 of file voms_api.h.

3.5.5.10 std::vector<data> voms::std

User's characteristics

Definition at line 112 of file voms_api.h.

3.5.5.11 data_type voms::type

The type of data returned

Definition at line 111 of file voms_api.h.

3.5.5.12 std::string voms::uri

The URI of the VOMS server

Definition at line 108 of file voms_api.h.

3.5.5.13 std::string voms::user

The user's DN, as from his certificate

Definition at line 103 of file voms_api.h.

3.5.5.14 std::string voms::userca

The CA which signed the user's certificate

Definition at line 104 of file voms_api.h.

3.5.5.15 int voms::version

0 means data didn't originate from an AC

Definition at line 100 of file voms_api.h.

3.5.5.16 std::string voms::voname

The name of the VO to which the VOMS belongs

Definition at line 107 of file voms_api.h.

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

- [voms_api.h](#)

3.6 vomsdata Struct Reference

```
#include <voms_api.h>
```

Public Member Functions

- [vomsdata](#) (std::string voms_dir="", std::string cert_dir="")
- bool [LoadSystemContacts](#) (std::string dir="")
- bool [LoadUserContacts](#) (std::string dir="")
- std::vector< [contactdata](#) > [FindByAlias](#) (std::string alias)
- std::vector< [contactdata](#) > [FindByVO](#) (std::string vo)
- void [Order](#) (std::string att)
- void [ResetOrder](#) (void)
- void [AddTarget](#) (std::string target)
- std::vector< std::string > [ListTargets](#) (void)

- void [ResetTargets](#) (void)
- std::string [ServerErrors](#) (void)
- bool [Retrieve](#) (X509 *cert, STACK_OF(X509)*chain, [recurse_type](#) how=[RECURSE_CHAIN](#))
- bool [Contact](#) (std::string hostname, int port, std::string servsubject, std::string command)
- bool [Contact](#) (std::string hostname, int port, std::string servsubject, std::string command, int timeout)
- bool [ContactRaw](#) (std::string hostname, int port, std::string servsubject, std::string command, std::string &raw, int &version)
- bool [ContactRaw](#) (std::string hostname, int port, std::string servsubject, std::string command, std::string &raw, int &version, int timeout)
- void [SetVerificationType](#) ([verify_type](#) how)
- void [SetLifetime](#) (int lifetime)
- bool [Import](#) (std::string buffer)
- bool [Export](#) (std::string &data)
- bool [DefaultData](#) ([voms](#) &)
- std::string [ErrorMessage](#) (void)
- bool [RetrieveFromCtx](#) ([gss_ctx_id_t](#) context, [recurse_type](#) how)
- bool [RetrieveFromCred](#) ([gss_cred_id_t](#) credential, [recurse_type](#) how)
- bool [Retrieve](#) (X509_EXTENSION *ext)
- bool [RetrieveFromProxy](#) ([recurse_type](#) how)
- bool [Retrieve](#) (FILE *file, [recurse_type](#) how)
- bool [Retrieve](#) (AC *ac)
- [~vomsdata](#) ()
- [vomsdata](#) (const [vomsdata](#) &)
- void [SetRetryCount](#) (int retryCount)
- void [SetVerificationTime](#) (time_t)
- bool [LoadCredentials](#) (X509 *, EVP_PKEY *, STACK_OF(X509)*)
- bool [ContactRESTRaw](#) (const std::string &, int, const std::string &, std::string &, int, int)

Data Fields

- [verror_type](#) error
- std::vector< [voms](#) > [data](#)
- std::string [workvo](#)
- std::string [extra_data](#)

3.6.1 Detailed Description

Definition at line 194 of file voms_api.h.

3.6.2 Constructor & Destructor Documentation

3.6.2.1 vomsdata::vomsdata (std::string *voms_dir* = " ", std::string *cert_dir* = " ")

Parameters

<i>voms_dir</i>	The directory which contains the certificate of the VOMS server
<i>cert_dir</i>	The directory which contains the certificate of the CA If <i>voms_dir</i> is empty, the value of the environment variable X509_VOMS_DIR is taken. If <i>cert_dir</i> is empty, the value of the environment variable X509_CERT_DIR is taken.

3.6.2.2 vomsdata::~vomsdata ()

3.6.2.3 vomsdata::vomsdata (const vomsdata &)

3.6.3 Member Function Documentation

3.6.3.1 void vomsdata::AddTarget (std::string *target*)

Adds a target to the AC.

Parameters

<i>target</i>	The target to be added. it should be a FQDN.
---------------	--

3.6.3.2 bool vomsdata::Contact (std::string *hostname*, int *port*, std::string *servsubject*, std::string *command*)

Contacts a VOMS server to get a certificate

It is the equivalent of the voms_proxy_init command, but without the --include functionality.

Parameters

<i>hostname</i>	FQDN of the VOMS server
<i>port</i>	the port on which the VOMS server is listening
<i>servsubject</i>	the subject of the server's certificate
<i>command</i>	the command sent to the server

Returns

failure (F) or success (T)

3.6.3.3 bool vomsdata::Contact (std::string *hostname*, int *port*, std::string *servsubject*, std::string *command*, int *timeout*)

Contacts a VOMS server to get a certificate

It is the equivalent of the voms_proxy_init command, but without the --include functionality.

Parameters

<i>hostname</i>	FQDN of the VOMS server
<i>port</i>	the port on which the VOMS server is listening
<i>servsubject</i>	the subject of the server's certificate
<i>command</i>	the command sent to the server

Returns

failure (F) or success (T)

3.6.3.4 `bool vomsdata::ContactRaw (std::string hostname, int port, std::string servsubject, std::string command, std::string & raw, int & version)`

Same as Contact, however it does not start the verification process, and the message received from the server is not parsed.

Parameters

<i>hostname</i>	FQDN of the VOMS server
<i>port</i>	the port on which the VOMS server is listening
<i>servsubject</i>	the subject of the server's certificate
<i>command</i>	the command sent to the server
<i>raw</i>	OUTPUT PARAMETER the answer from the server
<i>version</i>	OUTPUT PARAMETER the version of the answer

Returns

failure (F) or success (T)

3.6.3.5 `bool vomsdata::ContactRaw (std::string hostname, int port, std::string servsubject, std::string command, std::string & raw, int & version, int timeout)`

Same as Contact, however it does not start the verification process, and the message received from the server is not parsed.

Parameters

<i>hostname</i>	FQDN of the VOMS server
<i>port</i>	the port on which the VOMS server is listening
<i>servsubject</i>	the subject of the server's certificate
<i>command</i>	the command sent to the server
<i>raw</i>	OUTPUT PARAMETER the answer from the server
<i>version</i>	OUTPUT PARAMETER the version of the answer

Returns

failure (F) or success (T)

3.6.3.6 `bool vomsdata::ContactRESTRaw (const std::string &, int, const std::string &, std::string &, int, int)`

3.6.3.7 `bool vomsdata::DefaultData (voms &)`

Get the default data extension from those present in the pseudo certificate

3.6.3.8 `std::string vomsdata::ErrorMessage (void)`

Gets a textual description of the error.

Returns

A string containing the error message.

3.6.3.9 bool vomsdata::Export (std::string & data)

Exports data from [vomsdata::data](#) to the format used for inclusion into a certificate.

The function doesn't verify the data

Parameters

<i>data</i>	The certificate extension
-------------	---------------------------

Returns

Failure (F) or Success (T)

3.6.3.10 std::vector<contactdata> vomsdata::FindByAlias (std::string alias)

Finds servers which share a common alias.

Parameters

<i>alias</i>	The alias to look for.
--------------	------------------------

Returns

The servers found. The order in which they are returned is unspecified.

3.6.3.11 std::vector<contactdata> vomsdata::FindByVO (std::string vo)

Finds servers which serve a common VO

Parameters

<i>vo</i>	The VO name to look for.
-----------	--------------------------

Returns

The servers found. The order in which they are returned is unspecified.

3.6.3.12 bool vomsdata::Import (std::string buffer)

Converts data from the format used for inclusion into a certificate to the internal format

The function does verify the data.

Parameters

<i>buffer</i>	contains the data to be converted
---------------	-----------------------------------

Returns

Failure (F) or Success (T)

3.6.3.13 `std::vector<std::string> vomldata::ListTargets (void)`

Returns the list of targets.

3.6.3.14 `bool vomldata::LoadCredentials (X509 *, EVP_PKEY *, STACK_OF(X509)*)`

3.6.3.15 `bool vomldata::LoadSystemContacts (std::string dir = " ")`

Loads the system wide configuration files.

Parameters

<i>dir</i>	The directory in which the files are stored. If dir is empty, defaults to /opt/edg/etc/vomses.
------------	---

Returns

True if all went OK, false otherwise.

3.6.3.16 `bool vomldata::LoadUserContacts (std::string dir = " ")`

Loads the user-specific configuration files.

Parameters

<i>dir</i>	The directory in which the files are stored. If dir is empty, defaults to \$VOMS_USERCONF. If this is empty too, defaults to \$HOME/.edg/vomses, or to ~/.edg/vomses as a last resort.
------------	---

Returns

True if all went OK, false otherwise.

3.6.3.17 `void vomldata::Order (std::string att)`

Sets up the ordering of the results.

Defines the ordering of the data returned by [Contact\(\)](#). Results are ordered in the same order as the calls to this function.

Parameters

<i>att</i>	The attribute to be ordered.
------------	------------------------------

3.6.3.18 void vomsdata::ResetOrder (void)

Resets the ordering.

3.6.3.19 void vomsdata::ResetTargets (void)

Resets the target list.

3.6.3.20 bool vomsdata::Retrieve (X509 * *cert*, STACK_OF(X509)* *chain*, recurse_type *how* = RECURSE_CHAIN)

Extracts the VOMS extension from an X.509 certificate. The function doesn't check the validity of the certificates, but it does check the content of the user data.

Parameters

<i>cert</i>	The certificate with the VOMS extensions
<i>chain</i>	The chain of the validation certificates (only the intermediate ones)
<i>how</i>	Recursion type

Returns

failure (F) or success (T)

3.6.3.21 bool vomsdata::Retrieve (X509_EXTENSION * *ext*)

Gets VOMS information from the given extension

Parameters

<i>ext</i>	The extension to parse.
------------	-------------------------

Returns

failure (F) or success (T)

3.6.3.22 bool vomsdata::Retrieve (FILE * *file*, recurse_type *how*)

Gets VOMS information from a proxy saved as a file.

Parameters

<i>file</i>	the file name
<i>how</i>	Recursion type

Returns

failure (F) or success (T)

Note: Does NOT verify that the proxy is valid. Such verification must be obtained through other means.

3.6.3.23 bool vomsdata::Retrieve (AC * *ac*)

Gets VOMS information from the AC

Parameters

<i>ext</i>	The extension to parse.
------------	-------------------------

Returns

failure (F) or success (T)

3.6.3.24 `bool vomsdata::RetrieveFromCred (gss_cred_id_t credential, recurse_type how)`

Gets VOMS information from the given globus credential

Parameters

<i>credential</i>	The credential from which to retrieve the certificate.
<i>how</i>	Recursion type

Returns

failure (F) or success (T)

3.6.3.25 `bool vomsdata::RetrieveFromCtx (gss_ctx_id_t context, recurse_type how)`

Gets VOMS information from the given globus context

Parameters

<i>context</i>	The context from which to retrieve the certificate.
<i>how</i>	Recursion type

Returns

failure (F) or success (T)

3.6.3.26 `bool vomsdata::RetrieveFromProxy (recurse_type how)`

Gets VOMS information from an existing globus proxy

Parameters

<i>how</i>	Recursion type
------------	----------------

Returns

failure (F) or success (T)

3.6.3.27 `std::string vomsdata::ServerErrors (void)`

Gets the error message returned by the server

3.6.3.28 void vomsdata::SetLifetime (int *lifetime*)

Set requested lifetime for the [Contact\(\)](#) call.

Parameters

<i>lifetime</i>	Requested lifetime, in seconds
-----------------	--------------------------------

3.6.3.29 void vomsdata::SetRetryCount (int *retryCount*)**3.6.3.30 void vomsdata::SetVerificationTime (time_t)****3.6.3.31 void vomsdata::SetVerificationType (verify_type *how*)**

Sets the type of verification done on the data.

Parameters

<i>how</i>	The type of verification.
------------	---------------------------

3.6.4 Field Documentation**3.6.4.1 std::vector<voms> vomsdata::data**

User's info, as in the certificate extension.

It may contain data gathered from more than one VOMS server,
Definition at line 368 of file voms_api.h.

3.6.4.2 verror_type vomsdata::error

Error code

Definition at line 213 of file voms_api.h.

3.6.4.3 std::string vomsdata::extra_data

The data specified by the user with the --include switch.

Note that this field doesn't contain the result of a request to the VOMS server, but instead data specified by the user.

The reason for the introduction of this extension is to let a user include important data into his proxy certificate, like, for example, a kerberos ticket

Definition at line 372 of file voms_api.h.

3.6.4.4 std::string vomsdata::workvo

The value of the -vo option of the voms-proxy-init command

Definition at line 371 of file voms_api.h.

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

- [voms_api.h](#)

Chapter 4

File Documentation

4.1 voms_api.h File Reference

```
#include <fstream>
#include <string>
#include <vector>
#include <openssl/x509.h>
#include <openssl/bio.h>
#include <sys/types.h>
#include "newformat.h"
```

Data Structures

- struct [data](#)
User's characteristics: can be repeated. Generic name-value attribute : can be repeated.
- struct [attribute](#)
- struct [attributelist](#)
- struct [contactdata](#)
- struct [voms](#)
- struct [vomsdata](#)

Macros

- #define [NOGLOBUS](#)

Typedefs

- typedef void * [gss_cred_id_t](#)
- typedef void * [gss_ctx_id_t](#)
- typedef bool(* [check_sig](#))(X509 *, void *, [verror_type](#) &)

Enumerations

- enum [data_type](#) { [TYPE_NODATA](#), [TYPE_STD](#), [TYPE_CUSTOM](#) }
The type of data returned.
- enum [recurse_type](#) { [RECURSE_CHAIN](#), [RECURSE_NONE](#), [RECURSE_DEEP](#) }

- enum `verify_type` {
`VERIFY_FULL` = 0xffffffff, `VERIFY_NONE` = 0x00000000, `VERIFY_DATE` = 0x00000001, `VERIFY_TARGET`
= 0x00000002,
`VERIFY_KEY` = 0x00000004, `VERIFY_SIGN` = 0x00000008, `VERIFY_ORDER` = 0x00000010, `VERIFY_ID`
= 0x00000020,
`VERIFY_CERTLIST` = 0x00000040 }
 - enum `verror_type` {
`VERR_NONE`, `VERR_NOCKET`, `VERR_NOIDENT`, `VERR_COMM`,
`VERR_PARAM`, `VERR_NOEXT`, `VERR_NOINIT`, `VERR_TIME`,
`VERR_IDCHECK`, `VERR_EXTRINFO`, `VERR_FORMAT`, `VERR_NODATA`,
`VERR_PARSE`, `VERR_DIR`, `VERR_SIGN`, `VERR_SERVER`,
`VERR_MEM`, `VERR_VERIFY`, `VERR_TYPE`, `VERR_ORDER`,
`VERR_SERVERCODE`, `VERR_NOTAVAIL`, `VERR_FILE` }
- Error codes.*

Functions

- int `getVOMSMajorVersionNumber` (void)
- int `getVOMSMinorVersionNumber` (void)
- int `getVOMSPatchVersionNumber` (void)

4.1.1 Macro Definition Documentation

4.1.1.1 #define NOGLOBUS

Definition at line 33 of file `voms_api.h`.

4.1.2 Typedef Documentation

4.1.2.1 typedef bool(* check_sig)(X509 *, void *, verror_type &)

Definition at line 190 of file `voms_api.h`.

4.1.2.2 typedef void* gss_cred_id_t

Definition at line 42 of file `voms_api.h`.

4.1.2.3 typedef void* gss_ctx_id_t

Definition at line 43 of file `voms_api.h`.

4.1.3 Enumeration Type Documentation

4.1.3.1 enum data_type

The type of data returned.

Enumerator

- `TYPE_NODATA`** no data
- `TYPE_STD`** group, role, capability triplet
- `TYPE_CUSTOM`** result of an S command

Definition at line 77 of file `voms_api.h`.

4.1.3.2 enum recurse_type

Enumerator

RECURSE_CHAIN
RECURSE_NONE
RECURSE_DEEP

Definition at line 143 of file voms_api.h.

4.1.3.3 enum verify_type

Enumerator

VERIFY_FULL
VERIFY_NONE
VERIFY_DATE
VERIFY_TARGET
VERIFY_KEY
VERIFY_SIGN
VERIFY_ORDER
VERIFY_ID
VERIFY_CERTLIST

Definition at line 149 of file voms_api.h.

4.1.3.4 enum verror_type

Error codes.

Enumerator

VERR_NONE
VERR_NOSOCKET Socket problem
VERR_NOIDENT Cannot identify itself (certificate problem)
VERR_COMM Server problem
VERR_PARAM Wrong parameters
VERR_NOEXT VOMS extension missing
VERR_NOINIT Initialization error
VERR_TIME Error in time checking
VERR_IDCHECK User data in extension different from the real ones
VERR_EXTRAINFO VO name and URI missing
VERR_FORMAT Wrong data format
VERR_NODATA Empty extension
VERR_PARSE Parse error
VERR_DIR Directory error
VERR_SIGN Signature error
VERR_SERVER Unidentifiable VOMS server
VERR_MEM Memory problems
VERR_VERIFY Generic verification error

VERR_TYPE Returned data of unknown type

VERR_ORDER Ordering different than required

VERR_SERVERCODE Error message from the server

VERR_NOTAVAIL Method not available

VERR_FILE Error reading data from file

Definition at line 163 of file voms_api.h.

4.1.4 Function Documentation

4.1.4.1 int getVOMSMajorVersionNumber (void)

4.1.4.2 int getVOMSMinorVersionNumber (void)

4.1.4.3 int getVOMSPatchVersionNumber (void)

Index

- ~voms
 - voms, [9](#)
- ~vomsgdata
 - vomsgdata, [12](#)
- AddTarget
 - vomsgdata, [13](#)
- attribute, [5](#)
 - name, [5](#)
 - qualifier, [5](#)
 - value, [5](#)
- attributelist, [6](#)
 - attributes, [6](#)
 - grantor, [6](#)
- attributes
 - attributelist, [6](#)
- cap
 - data, [8](#)
- check_sig
 - voms_api.h, [22](#)
- Contact
 - vomsgdata, [13](#)
- contact
 - contactdata, [7](#)
- ContactRESTRaw
 - vomsgdata, [14](#)
- ContactRaw
 - vomsgdata, [14](#)
- contactdata, [6](#)
 - contact, [7](#)
 - host, [7](#)
 - nick, [7](#)
 - port, [7](#)
 - version, [7](#)
 - vo, [7](#)
- custom
 - voms, [9](#)
- data, [7](#)
 - cap, [8](#)
 - group, [8](#)
 - role, [8](#)
 - vomsgdata, [19](#)
- data_type
 - voms_api.h, [22](#)
- date1
 - voms, [9](#)
- date2
 - voms, [10](#)

- DefaultData
 - vomsgdata, [14](#)
- error
 - vomsgdata, [19](#)
- ErrorMessage
 - vomsgdata, [14](#)
- Export
 - vomsgdata, [15](#)
- extra_data
 - vomsgdata, [19](#)
- FindByAlias
 - vomsgdata, [15](#)
- FindByVO
 - vomsgdata, [15](#)
- fqan
 - voms, [10](#)
- GetAC
 - voms, [9](#)
- GetAttributes
 - voms, [9](#)
- GetTargets
 - voms, [9](#)
- getVOMSMajorVersionNumber
 - voms_api.h, [24](#)
- getVOMSMinorVersionNumber
 - voms_api.h, [24](#)
- getVOMSPatchVersionNumber
 - voms_api.h, [24](#)
- grantor
 - attributelist, [6](#)
- group
 - data, [8](#)
- gss_cred_id_t
 - voms_api.h, [22](#)
- gss_ctx_id_t
 - voms_api.h, [22](#)
- host
 - contactdata, [7](#)
- Import
 - vomsgdata, [15](#)
- ListTargets
 - vomsgdata, [16](#)
- LoadCredentials
 - vomsgdata, [16](#)
- LoadSystemContacts

- vomsdata, [16](#)
- LoadUserContacts
 - vomsdata, [16](#)
- NOGLOBUS
 - voms_api.h, [22](#)
- name
 - attribute, [5](#)
- nick
 - contactdata, [7](#)
- operator=
 - voms, [9](#)
- Order
 - vomsdata, [16](#)
- port
 - contactdata, [7](#)
- qualifier
 - attribute, [5](#)
- RECURSE_CHAIN
 - voms_api.h, [23](#)
- RECURSE_DEEP
 - voms_api.h, [23](#)
- RECURSE_NONE
 - voms_api.h, [23](#)
- recurse_type
 - voms_api.h, [22](#)
- ResetOrder
 - vomsdata, [16](#)
- ResetTargets
 - vomsdata, [17](#)
- Retrieve
 - vomsdata, [17](#)
- RetrieveFromCred
 - vomsdata, [18](#)
- RetrieveFromCtx
 - vomsdata, [18](#)
- RetrieveFromProxy
 - vomsdata, [18](#)
- role
 - data, [8](#)
- serial
 - voms, [10](#)
- server
 - voms, [10](#)
- ServerErrors
 - vomsdata, [18](#)
- serverca
 - voms, [10](#)
- SetLifetime
 - vomsdata, [18](#)
- SetRetryCount
 - vomsdata, [19](#)
- SetVerificationTime
 - vomsdata, [19](#)
- SetVerificationType
 - vomsdata, [19](#)
- siglen
 - voms, [10](#)
- signature
 - voms, [10](#)
- std
 - voms, [10](#)
- TYPE_CUSTOM
 - voms_api.h, [22](#)
- TYPE_NODATA
 - voms_api.h, [22](#)
- TYPE_STD
 - voms_api.h, [22](#)
- TranslateVOMS
 - voms, [9](#)
- type
 - voms, [10](#)
- uri
 - voms, [11](#)
- user
 - voms, [11](#)
- userca
 - voms, [11](#)
- VERIFY_CERTLIST
 - voms_api.h, [23](#)
- VERIFY_DATE
 - voms_api.h, [23](#)
- VERIFY_FULL
 - voms_api.h, [23](#)
- VERIFY_ID
 - voms_api.h, [23](#)
- VERIFY_KEY
 - voms_api.h, [23](#)
- VERIFY_NONE
 - voms_api.h, [23](#)
- VERIFY_ORDER
 - voms_api.h, [23](#)
- VERIFY_SIGN
 - voms_api.h, [23](#)
- VERIFY_TARGET
 - voms_api.h, [23](#)
- VERR_COMM
 - voms_api.h, [23](#)
- VERR_DIR
 - voms_api.h, [23](#)
- VERR_EXTRAINFO
 - voms_api.h, [23](#)
- VERR_FILE
 - voms_api.h, [24](#)
- VERR_FORMAT
 - voms_api.h, [23](#)
- VERR_IDCHECK
 - voms_api.h, [23](#)
- VERR_MEM
 - voms_api.h, [23](#)
- VERR_NODATA

- voms_api.h, [23](#)
- VERR_NOEXT
 - voms_api.h, [23](#)
- VERR_NOIDENT
 - voms_api.h, [23](#)
- VERR_NOINIT
 - voms_api.h, [23](#)
- VERR_NONE
 - voms_api.h, [23](#)
- VERR_NOSOCKET
 - voms_api.h, [23](#)
- VERR_NOTAVAIL
 - voms_api.h, [24](#)
- VERR_ORDER
 - voms_api.h, [24](#)
- VERR_PARAM
 - voms_api.h, [23](#)
- VERR_PARSE
 - voms_api.h, [23](#)
- VERR_SERVER
 - voms_api.h, [23](#)
- VERR_SERVERCODE
 - voms_api.h, [24](#)
- VERR_SIGN
 - voms_api.h, [23](#)
- VERR_TIME
 - voms_api.h, [23](#)
- VERR_TYPE
 - voms_api.h, [23](#)
- VERR_VERIFY
 - voms_api.h, [23](#)
- value
 - attribute, [5](#)
- verify_type
 - voms_api.h, [23](#)
- verror_type
 - voms_api.h, [23](#)
- version
 - contactdata, [7](#)
 - voms, [11](#)
- vo
 - contactdata, [7](#)
- voms, [8](#)
 - ~voms, [9](#)
 - custom, [9](#)
 - date1, [9](#)
 - date2, [10](#)
 - fqan, [10](#)
 - GetAC, [9](#)
 - GetAttributes, [9](#)
 - GetTargets, [9](#)
 - operator=, [9](#)
 - serial, [10](#)
 - server, [10](#)
 - serverca, [10](#)
 - siglen, [10](#)
 - signature, [10](#)
 - std, [10](#)
 - TranslateVOMS, [9](#)
 - type, [10](#)
 - uri, [11](#)
 - user, [11](#)
 - userca, [11](#)
 - version, [11](#)
 - voms, [9](#)
 - vomsdata, [9](#)
 - voname, [11](#)
- voms_api.h
 - RECURSE_CHAIN, [23](#)
 - RECURSE_DEEP, [23](#)
 - RECURSE_NONE, [23](#)
 - TYPE_CUSTOM, [22](#)
 - TYPE_NODATA, [22](#)
 - TYPE_STD, [22](#)
 - VERIFY_CERTLIST, [23](#)
 - VERIFY_DATE, [23](#)
 - VERIFY_FULL, [23](#)
 - VERIFY_ID, [23](#)
 - VERIFY_KEY, [23](#)
 - VERIFY_NONE, [23](#)
 - VERIFY_ORDER, [23](#)
 - VERIFY_SIGN, [23](#)
 - VERIFY_TARGET, [23](#)
 - VERR_COMM, [23](#)
 - VERR_DIR, [23](#)
 - VERR_EXTRAINFO, [23](#)
 - VERR_FILE, [24](#)
 - VERR_FORMAT, [23](#)
 - VERR_IDCHECK, [23](#)
 - VERR_MEM, [23](#)
 - VERR_NODATA, [23](#)
 - VERR_NOEXT, [23](#)
 - VERR_NOIDENT, [23](#)
 - VERR_NOINIT, [23](#)
 - VERR_NONE, [23](#)
 - VERR_NOSOCKET, [23](#)
 - VERR_NOTAVAIL, [24](#)
 - VERR_ORDER, [24](#)
 - VERR_PARAM, [23](#)
 - VERR_PARSE, [23](#)
 - VERR_SERVER, [23](#)
 - VERR_SERVERCODE, [24](#)
 - VERR_SIGN, [23](#)
 - VERR_TIME, [23](#)
 - VERR_TYPE, [23](#)
 - VERR_VERIFY, [23](#)
- voms_api.h, [21](#)
 - check_sig, [22](#)
 - data_type, [22](#)
 - getVOMSMajorVersionNumber, [24](#)
 - getVOMSMinorVersionNumber, [24](#)
 - getVOMSPatchVersionNumber, [24](#)
 - gss_cred_id_t, [22](#)
 - gss_ctx_id_t, [22](#)
 - NOGLOBUS, [22](#)
 - recurse_type, [22](#)

- [verify_type, 23](#)
 - [verror_type, 23](#)
- [vomsdata, 11](#)
 - [~vomsdata, 12](#)
 - [AddTarget, 13](#)
 - [Contact, 13](#)
 - [ContactRESTRaw, 14](#)
 - [ContactRaw, 14](#)
 - [data, 19](#)
 - [DefaultData, 14](#)
 - [error, 19](#)
 - [ErrorMessage, 14](#)
 - [Export, 15](#)
 - [extra_data, 19](#)
 - [FindByAlias, 15](#)
 - [FindByVO, 15](#)
 - [Import, 15](#)
 - [ListTargets, 16](#)
 - [LoadCredentials, 16](#)
 - [LoadSystemContacts, 16](#)
 - [LoadUserContacts, 16](#)
 - [Order, 16](#)
 - [ResetOrder, 16](#)
 - [ResetTargets, 17](#)
 - [Retrieve, 17](#)
 - [RetrieveFromCred, 18](#)
 - [RetrieveFromCtx, 18](#)
 - [RetrieveFromProxy, 18](#)
 - [ServerErrors, 18](#)
 - [SetLifetime, 18](#)
 - [SetRetryCount, 19](#)
 - [SetVerificationTime, 19](#)
 - [SetVerificationType, 19](#)
 - [voms, 9](#)
 - [vomsdata, 12, 13](#)
 - [workvo, 19](#)
- [voname](#)
 - [voms, 11](#)
- [workvo](#)
 - [vomsdata, 19](#)