

VOMS CC API Reference Manual

1.5.0

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Chapter 1

VOMS CC API Hierarchical Index

1.1 VOMS CC API Class Hierarchy

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

attribute	7
attributelist	9
contactdata	10
data	12
voms	13
vomsdata	17

Chapter 2

VOMS CC API Data Structure Index

2.1 VOMS CC API Data Structures

Here are the data structures with brief descriptions:

attribute	7
attributelist	9
contactdata	10
data (User's characteristics: can be repeated)	12
voms	13
vomsdata	17

Chapter 3

VOMS CC API File Index

3.1 VOMS CC API File List

Here is a list of all files with brief descriptions:

voms_api.h	25
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Chapter 4

VOMS CC API Data Structure Documentation

4.1 attribute Struct Reference

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

Data Fields

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

4.1.1 Detailed Description

Definition at line 45 of file voms_api.h.

4.1.2 Field Documentation

4.1.2.1 std::string [attribute::name](#)

attribute's group

Definition at line 46 of file voms_api.h.

4.1.2.2 std::string [attribute::qualifier](#)

attribute's qualifier

Definition at line 47 of file voms_api.h.

4.1.2.3 std::string [attribute::value](#)

attribute's value

Definition at line 48 of file voms_api.h.

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

- [voms_api.h](#)

4.2 attributelist Struct Reference

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

Data Fields

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

4.2.1 Detailed Description

Definition at line 51 of file voms_api.h.

4.2.2 Field Documentation

4.2.2.1 std::vector<[attribute](#)> [attributelist::attributes](#)

The attributes themselves.

Definition at line 53 of file voms_api.h.

4.2.2.2 std::string [attributelist::grantor](#)

Who granted these attributes.

Definition at line 52 of file voms_api.h.

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

- [voms_api.h](#)

4.3 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](#)

4.3.1 Detailed Description

Definition at line 65 of file voms_api.h.

4.3.2 Field Documentation

4.3.2.1 std::string [contactdata::contact](#)

The subject of the server's certificate

Definition at line 71 of file voms_api.h.

4.3.2.2 std::string [contactdata::host](#)

The hostname of the server

Definition at line 70 of file voms_api.h.

4.3.2.3 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 69 of file voms_api.h.

4.3.2.4 int [contactdata::port](#)

The port on which the server is listening

Definition at line 73 of file voms_api.h.

4.3.2.5 int [contactdata::version](#)

The version of globus under which the server is running

Definition at line 75 of file voms_api.h.

4.3.2.6 std::string [contactdata::vo](#)

The VO served by this server

Definition at line 72 of file voms_api.h.

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

- [voms_api.h](#)

4.4 data Struct Reference

User's characteristics: can be repeated.

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

Data Fields

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

4.4.1 Detailed Description

User's characteristics: can be repeated.

Definition at line 37 of file `voms_api.h`.

4.4.2 Field Documentation

4.4.2.1 `std::string` [data::cap](#)

user's capability

Definition at line 40 of file `voms_api.h`.

4.4.2.2 `std::string` [data::group](#)

user's group

Definition at line 38 of file `voms_api.h`.

4.4.2.3 `std::string` [data::role](#)

user's role

Definition at line 39 of file `voms_api.h`.

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

- [voms_api.h](#)

4.5 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 vomsdata *vd, std::vector< [voms](#) > &v, int *error)

4.5.1 Detailed Description

Definition at line 78 of file voms_api.h.

4.5.2 Constructor & Destructor Documentation

4.5.2.1 `voms::voms (const voms &)`

4.5.2.2 `voms::voms ()`

4.5.2.3 `voms::~~voms ()`

4.5.3 Member Function Documentation

4.5.3.1 `AC* voms::GetAC ()`

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

Generic attributes

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

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

4.5.4 Friends And Related Function Documentation

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

4.5.4.2 `friend class vomsdata` [friend]

Definition at line 79 of file voms_api.h.

4.5.5 Field Documentation

4.5.5.1 `std::string voms::custom`

The data returned by an S command

Definition at line 93 of file voms_api.h.

4.5.5.2 `std::string voms::date1`

Beginning of validity of the user info

Definition at line 89 of file voms_api.h.

4.5.5.3 `std::string voms::date2`

End of validity of the user info

Definition at line 90 of file voms_api.h.

4.5.5.4 `std::vector<std::string> voms::fqan`

Keeps the data in the compact format

Definition at line 95 of file voms_api.h.

4.5.5.5 `std::string voms::serial`

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

Definition at line 96 of file voms_api.h.

4.5.5.6 `std::string voms::server`

The VOMS server DN, as from its certificate

Definition at line 85 of file voms_api.h.

4.5.5.7 `std::string voms::serverca`

The CA which signed the VOMS certificate

Definition at line 86 of file voms_api.h.

4.5.5.8 `int voms::siglen`

The length of the VOMS server signature

Definition at line 81 of file voms_api.h.

4.5.5.9 `std::string voms::signature`

The VOMS server signature

Definition at line 82 of file voms_api.h.

4.5.5.10 `std::vector<data> voms::std`

User's characteristics

Definition at line 92 of file voms_api.h.

4.5.5.11 `data_type voms::type`

The type of data returned

Definition at line 91 of file voms_api.h.

4.5.5.12 `std::string voms::uri`

The URI of the VOMS server

Definition at line 88 of file voms_api.h.

4.5.5.13 `std::string voms::user`

The user's DN, as from his certificate

Definition at line 83 of file voms_api.h.

4.5.5.14 `std::string voms::userca`

The CA which signed the user's certificate

Definition at line 84 of file voms_api.h.

4.5.5.15 `int voms::version`

0 means data didn't originate from an AC

Definition at line 80 of file voms_api.h.

4.5.5.16 `std::string voms::voname`

The name of the VO to which the VOMS belongs

Definition at line 87 of file voms_api.h.

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

- [voms_api.h](#)

4.6 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 [ContactRaw](#) (std::string hostname, int port, std::string servsubject, std::string command, std::string &raw, int &version)
- 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)
- [~vomsdata](#) ()
- [vomsdata](#) (const [vomsdata](#) &)
- void [SetRetryCount](#) (int retryCount)
- void [SetVerificationTime](#) (time_t)
- bool [LoadCredentials](#) (X509 *cert, STACK_OF(X509)*chain, EVP_PKEY *key)

Data Fields

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

Data Structures

- class [Initializer](#)

4.6.1 Detailed Description

Definition at line 169 of file voms_api.h.

4.6.2 Constructor & Destructor Documentation

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

Parameters:

voms_dir The directory which contains the certificate of the VOMS server

cert_dir The directory which contains the certificate of the CA

If *voms_dir* is empty, the value of the environment variable X509_VOMS_DIR is taken.

If *cert_dir* is empty, the value of the environment variable X509_CERT_DIR is taken.

4.6.2.2 vomsdata::~vomsdata ()

4.6.2.3 vomsdata::vomsdata (const vomsdata &)

4.6.3 Member Function Documentation

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

Adds a target to the AC.

Parameters:

target The target to be added. it should be a FQDN.

4.6.3.2 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:

hostname FQDN of the VOMS server

port the port on which the VOMS server is listening

servsubject the subject of the server's certificate

command the command sent to the server

Returns:

failure (F) or success (T)

4.6.3.3 `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:

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

Returns:

failure (F) or success (T)

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

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

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

Gets a textual description of the error.

Returns:

A string containing the error message.

4.6.3.6 `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:

data The certificate extension

Returns:

Failure (F) or Success (T)

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

Finds servers which share a common alias.

Parameters:

alias The alias to look for.

Returns:

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

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

Finds servers which serve a common VO

Parameters:

vo The VO name to look for.

Returns:

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

4.6.3.9 `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:

buffer contains the data to be converted

Returns:

Failure (F) or Success (T)

4.6.3.10 `std::vector<std::string> vomsdata::ListTargets (void)`

Returns the list of targets.

4.6.3.11 `bool vomsdata::LoadCredentials (X509 * cert, STACK_OF(X509)* chain, EVP_PKEY * key)`

4.6.3.12 `bool vomsdata::LoadSystemContacts (std::string dir = " ")`

Loads the system wide configuration files.

Parameters:

dir 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.

4.6.3.13 `bool vomsdata::LoadUserContacts (std::string dir = " ")`

Loads the user-specific configuration files.

Parameters:

dir 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.

4.6.3.14 void vomsdata::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:

att The attribute to be ordered.

4.6.3.15 void vomsdata::ResetOrder (void)

Resets the ordering.

4.6.3.16 void vomsdata::ResetTargets (void)

Resets the target list.

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

Gets VOMS information from a proxy saved as a file.

Parameters:

the file

how 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.

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

Gets VOMS information from the given extension

Parameters:

ext The extension to parse.

Returns:

failure (F) or success (T)

4.6.3.19 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:

cert The certificate with the VOMS extensions

chain The chain of the validation certificates (only the intermediate ones)

how Recursion type

Returns:

failure (F) or success (T)

4.6.3.20 bool vomsdata::RetrieveFromCred (gss_cred_id_t credential, recurse_type how)

Gets VOMS information from the given globus credential

Parameters:

credential The credential from which to retrieve the certificate.

how Recursion type

Returns:

failure (F) or success (T)

4.6.3.21 bool vomsdata::RetrieveFromCtx (gss_ctx_id_t context, recurse_type how)

Gets VOMS information from the given globus context

Parameters:

context The context from which to retrieve the certificate.

how Recursion type

Returns:

failure (F) or success (T)

4.6.3.22 bool vomsdata::RetrieveFromProxy (recurse_type how)

Gets VOMS information from an existing globus proxy

Parameters:

how Recursion type

Returns:

failure (F) or success (T)

4.6.3.23 std::string vomsdata::ServerErrors (void)

Gets the error message returned by the server

4.6.3.24 void vomsdata::SetLifetime (int lifetime)

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

Parameters:

lifetime Requested lifetime, in seconds

4.6.3.25 void vomsdata::SetRetryCount (int *retryCount*)

4.6.3.26 void vomsdata::SetVerificationTime (time_t)

4.6.3.27 void vomsdata::SetVerificationType ([verify_type](#) *how*)

Sets the type of verification done on the data.

Parameters:

how The type of verification.

4.6.4 Field Documentation

4.6.4.1 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 316 of file voms_api.h.

4.6.4.2 [verror_type](#) [vomsdata::error](#)

Error code

Definition at line 188 of file voms_api.h.

4.6.4.3 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 320 of file voms_api.h.

4.6.4.4 std::string [vomsdata::workvo](#)

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

Definition at line 319 of file voms_api.h.

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

- [voms_api.h](#)

Chapter 5

VOMS CC API File Documentation

5.1 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.
- struct [attribute](#)
- struct [attributelist](#)
- struct [contactdata](#)
- struct [voms](#)
- struct [vomsdata](#)
- class [vomsdata::Initializer](#)

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 `getMajorVersionNumber` (void)
- int `getMinorVersionNumber` (void)
- int `getPatchVersionNumber` (void)

5.1.1 Typedef Documentation

5.1.1.1 typedef bool(* `check_sig`)(X509 *, void *, `verror_type` &)

Definition at line 167 of file voms_api.h.

5.1.1.2 typedef void* `gss_cred_id_t`

Definition at line 25 of file voms_api.h.

5.1.1.3 typedef void* `gss_ctx_id_t`

Definition at line 26 of file voms_api.h.

5.1.2 Enumeration Type Documentation

5.1.2.1 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 59 of file voms_api.h.

5.1.2.2 enum [recurse_type](#)

Enumerator:

RECURSE_CHAIN

RECURSE_NONE

RECURSE_DEEP

Definition at line 120 of file voms_api.h.

5.1.2.3 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 126 of file voms_api.h.

5.1.2.4 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 140 of file voms_api.h.

5.1.3 Function Documentation

5.1.3.1 int getMajorVersionNumber (void)

5.1.3.2 int getMinorVersionNumber (void)

5.1.3.3 int getPatchVersionNumber (void)

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