

VOMS CC API

1.5.0

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Chapter 1

Data Structure Index

1.1 Data Structures

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Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

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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 60 of file voms_api.h.

3.1.2 Field Documentation

3.1.2.1 std::string attribute::name

attribute's group

Definition at line 61 of file voms_api.h.

3.1.2.2 std::string attribute::qualifier

attribute's qualifier

Definition at line 62 of file voms_api.h.

3.1.2.3 std::string attribute::value

attribute's value

Definition at line 63 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 66 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 68 of file voms_api.h.

3.2.2.2 std::string attributelist::grantor

Who granted these attributes.

Definition at line 67 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 80 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 86 of file voms_api.h.

3.3.2.2 std::string contactdata::host

The hostname of the server

Definition at line 85 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 84 of file voms_api.h.

3.3.2.4 int contactdata::port

The port on which the server is listening

Definition at line 88 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 90 of file voms_api.h.

3.3.2.6 std::string contactdata::vo

The VO served by this server

Definition at line 87 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.

```
#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.

Definition at line 52 of file `voms_api.h`.

3.4.2 Field Documentation

3.4.2.1 `std::string data::cap`

user's capability

Definition at line 55 of file `voms_api.h`.

3.4.2.2 `std::string data::group`

user's group

Definition at line 53 of file `voms_api.h`.

3.4.2.3 `std::string data::role`

user's role

Definition at line 54 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 vomsdata *vd, std::vector< [voms](#) > &v, int *error)

3.5.1 Detailed Description

Definition at line 93 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 94 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 108 of file voms_api.h.

3.5.5.2 `std::string voms::date1`

Beginning of validity of the user info

Definition at line 104 of file voms_api.h.

3.5.5.3 `std::string voms::date2`

End of validity of the user info

Definition at line 105 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 110 of file voms_api.h.

3.5.5.5 std::string voms::serial

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

Definition at line 111 of file voms_api.h.

3.5.5.6 std::string voms::server

The VOMS server DN, as from its certificate

Definition at line 100 of file voms_api.h.

3.5.5.7 std::string voms::serverca

The CA which signed the VOMS certificate

Definition at line 101 of file voms_api.h.

3.5.5.8 int voms::siglen

The length of the VOMS server signature

Definition at line 96 of file voms_api.h.

3.5.5.9 std::string voms::signature

The VOMS server signature

Definition at line 97 of file voms_api.h.

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

User's characteristics

Definition at line 107 of file voms_api.h.

3.5.5.11 data_type voms::type

The type of [data](#) returned

Definition at line 106 of file voms_api.h.

3.5.5.12 std::string voms::uri

The URI of the VOMS server

Definition at line 103 of file voms_api.h.

3.5.5.13 std::string voms::user

The user's DN, as from his certificate

Definition at line 98 of file voms_api.h.

3.5.5.14 std::string voms::userca

The CA which signed the user's certificate

Definition at line 99 of file voms_api.h.

3.5.5.15 int voms::version

0 means [data](#) didn't originate from an AC

Definition at line 95 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 102 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>
```

Data Structures

- class **Initializer**

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** (void *context, **recurse_type** how)
- bool **RetrieveFromCred** (void *credential, **recurse_type** how)
- 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 *, EVP_PKEY *, STACK_OF(X509)*)

Data Fields

- `verror_type` `error`
- `std::vector< voms >` `data`
- `std::string` `workvo`
- `std::string` `extra_data`

3.6.1 Detailed Description

Definition at line 184 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:

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.

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:

target 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, 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:

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)

3.6.3.3 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)

3.6.3.4 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:

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)

3.6.3.5 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)

3.6.3.6 bool vomsdata::DefaultData (voms &)

Get the default [data](#) extension from those present in the pseudo certificate

3.6.3.7 std::string vomsdata::ErrorMessage (void)

Gets a textual description of the error.

Returns:

A string containing the error message.

3.6.3.8 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)

3.6.3.9 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.

3.6.3.10 `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.

3.6.3.11 `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)

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

Returns the list of targets.

3.6.3.13 `bool vomsdata::LoadCredentials (X509 *, EVP_PKEY *, STACK_OF(X509)*)`**3.6.3.14** `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.

3.6.3.15 `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.

3.6.3.16 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.

3.6.3.17 void vomsdata::ResetOrder (void)

Resets the ordering.

3.6.3.18 void vomsdata::ResetTargets (void)

Resets the target list.

3.6.3.19 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.

3.6.3.20 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)

3.6.3.21 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)

3.6.3.22 bool vomsdata::RetrieveFromCred (gss_cred_id_t *credential*, recurse_type *how*) [inline]

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)

Definition at line 439 of file voms_api.h.

3.6.3.23 bool vomsdata::RetrieveFromCred (void * *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)

3.6.3.24 bool vomsdata::RetrieveFromCtx (gss_ctx_id_t *context*, recurse_type *how*) [inline]

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)

Definition at line 432 of file voms_api.h.

3.6.3.25 bool vomsdata::RetrieveFromCtx (void * *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)

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

Gets VOMS information from an existing globus proxy

Parameters:

how 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:

lifetime 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:

how 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 358 of file voms_api.h.

3.6.4.2 `error_type vomsdata::error`

Error code

Definition at line 203 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 362 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 361 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 "gssapi.h"
#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 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)

4.1.1 Typedef Documentation

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

Definition at line 182 of file `voms_api.h`.

4.1.2 Enumeration Type Documentation

4.1.2.1 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 74 of file `voms_api.h`.

4.1.2.2 enum recurse_type

Enumerator:

RECURSE_CHAIN
RECURSE_NONE
RECURSE_DEEP

Definition at line 135 of file voms_api.h.

4.1.2.3 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 141 of file voms_api.h.

4.1.2.4 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 155 of file voms_api.h.

4.1.3 Function Documentation

4.1.3.1 `int getMajorVersionNumber (void)`

4.1.3.2 `int getMinorVersionNumber (void)`

4.1.3.3 `int getPatchVersionNumber (void)`

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