

# VOMS CC API

## 1.5.0

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# Contents

<b>1</b>	<b>Data Structure Index</b>	<b>1</b>
1.1	Data Structures . . . . .	1
<b>2</b>	<b>File Index</b>	<b>3</b>
2.1	File List . . . . .	3
<b>3</b>	<b>Data Structure Documentation</b>	<b>5</b>
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 . . . . .	7
3.2.1	Detailed Description . . . . .	7
3.2.2	Field Documentation . . . . .	7
3.2.2.1	attributes . . . . .	7
3.2.2.2	grantor . . . . .	7
3.3	contactdata Struct Reference . . . . .	8
3.3.1	Detailed Description . . . . .	8
3.3.2	Field Documentation . . . . .	8
3.3.2.1	contact . . . . .	8
3.3.2.2	host . . . . .	8
3.3.2.3	nick . . . . .	8
3.3.2.4	port . . . . .	8
3.3.2.5	version . . . . .	8
3.3.2.6	vo . . . . .	9
3.4	data Struct Reference . . . . .	10
3.4.1	Detailed Description . . . . .	10

3.4.2	Field Documentation	10
3.4.2.1	cap	10
3.4.2.2	group	10
3.4.2.3	role	10
3.5	voms Struct Reference	11
3.5.1	Detailed Description	11
3.5.2	Constructor & Destructor Documentation	12
3.5.2.1	voms	12
3.5.2.2	voms	12
3.5.2.3	~voms	12
3.5.3	Member Function Documentation	12
3.5.3.1	GetAC	12
3.5.3.2	GetAttributes	12
3.5.3.3	GetTargets	12
3.5.3.4	operator=	12
3.5.4	Friends And Related Function Documentation	12
3.5.4.1	TranslateVOMS	12
3.5.4.2	vomsdata	12
3.5.5	Field Documentation	12
3.5.5.1	custom	12
3.5.5.2	date1	12
3.5.5.3	date2	12
3.5.5.4	fqn	13
3.5.5.5	serial	13
3.5.5.6	server	13
3.5.5.7	serverca	13
3.5.5.8	siglen	13
3.5.5.9	signature	13
3.5.5.10	std	13
3.5.5.11	type	13
3.5.5.12	uri	13
3.5.5.13	user	14
3.5.5.14	userca	14
3.5.5.15	version	14
3.5.5.16	voname	14
3.6	vomsdata Struct Reference	15

3.6.1	Detailed Description	16
3.6.2	Constructor & Destructor Documentation	16
3.6.2.1	vomsdata	16
3.6.2.2	~vomsdata	16
3.6.2.3	vomsdata	16
3.6.3	Member Function Documentation	16
3.6.3.1	AddTarget	16
3.6.3.2	Contact	16
3.6.3.3	Contact	17
3.6.3.4	ContactRaw	17
3.6.3.5	ContactRaw	17
3.6.3.6	DefaultData	18
3.6.3.7	ErrorMessage	18
3.6.3.8	Export	18
3.6.3.9	FindByAlias	18
3.6.3.10	FindByVO	19
3.6.3.11	Import	19
3.6.3.12	ListTargets	19
3.6.3.13	LoadCredentials	19
3.6.3.14	LoadSystemContacts	19
3.6.3.15	LoadUserContacts	19
3.6.3.16	Order	20
3.6.3.17	ResetOrder	20
3.6.3.18	ResetTargets	20
3.6.3.19	Retrieve	20
3.6.3.20	Retrieve	20
3.6.3.21	Retrieve	21
3.6.3.22	RetrieveFromCred	21
3.6.3.23	RetrieveFromCred	21
3.6.3.24	RetrieveFromCtx	21
3.6.3.25	RetrieveFromCtx	22
3.6.3.26	RetrieveFromProxy	22
3.6.3.27	ServerErrors	22
3.6.3.28	SetLifetime	22
3.6.3.29	SetRetryCount	22
3.6.3.30	SetVerificationTime	22

3.6.3.31	SetVerificationType	22
3.6.4	Field Documentation	23
3.6.4.1	data	23
3.6.4.2	error	23
3.6.4.3	extra_data	23
3.6.4.4	workvo	23
<b>4</b>	<b>File Documentation</b>	<b>25</b>
4.1	voms_api.h File Reference	25
4.1.1	Typedef Documentation	26
4.1.1.1	check_sig	26
4.1.2	Enumeration Type Documentation	26
4.1.2.1	data_type	26
4.1.2.2	recurse_type	27
4.1.2.3	verify_type	27
4.1.2.4	verror_type	27
4.1.3	Function Documentation	28
4.1.3.1	getMajorVersionNumber	28
4.1.3.2	getMinorVersionNumber	28
4.1.3.3	getPatchVersionNumber	28

# Chapter 1

## Data Structure Index

### 1.1 Data Structures

Here are the data structures with brief descriptions:

<a href="#">attribute</a>	5
<a href="#">attributelist</a>	7
<a href="#">contactdata</a>	8
<a href="#">data</a> (User's characteristics: can be repeated )	10
<a href="#">voms</a>	11
<a href="#">vomsdata</a>	15





# Chapter 2

## File Index

### 2.1 File List

Here is a list of all files with brief descriptions:

<a href="#">voms_api.h</a>	.....	25
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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> vomldata::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 vomldata::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> vomldata::ListTargets (void)`

Returns the list of targets.

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

# Index

- ~voms
  - voms, [12](#)
- ~vomsgdata
  - vomsgdata, [16](#)
- AddTarget
  - vomsgdata, [16](#)
- attribute, [5](#)
  - name, [5](#)
  - qualifier, [5](#)
  - value, [5](#)
- attributelist, [7](#)
  - attributes, [7](#)
  - grantor, [7](#)
- attributes
  - attributelist, [7](#)
- cap
  - data, [10](#)
- check\_sig
  - voms\_api.h, [26](#)
- Contact
  - vomsgdata, [16](#), [17](#)
- contact
  - contactdata, [8](#)
- contactdata, [8](#)
  - contact, [8](#)
  - host, [8](#)
  - nick, [8](#)
  - port, [8](#)
  - version, [8](#)
  - vo, [8](#)
- ContactRaw
  - vomsgdata, [17](#)
- custom
  - voms, [12](#)
- data, [10](#)
  - cap, [10](#)
  - group, [10](#)
  - role, [10](#)
  - vomsgdata, [23](#)
- data\_type
  - voms\_api.h, [26](#)
- date1
  - voms, [12](#)
- date2
  - voms, [12](#)
- DefaultData
  - vomsgdata, [18](#)
- error
  - vomsgdata, [23](#)
- ErrorMessage
  - vomsgdata, [18](#)
- Export
  - vomsgdata, [18](#)
- extra\_data
  - vomsgdata, [23](#)
- FindByAlias
  - vomsgdata, [18](#)
- FindByVO
  - vomsgdata, [18](#)
- fqan
  - voms, [12](#)
- GetAC
  - voms, [12](#)
- GetAttributes
  - voms, [12](#)
- getMajorVersionNumber
  - voms\_api.h, [28](#)
- getMinorVersionNumber
  - voms\_api.h, [28](#)
- getPatchVersionNumber
  - voms\_api.h, [28](#)
- GetTargets
  - voms, [12](#)
- grantor
  - attributelist, [7](#)
- group
  - data, [10](#)
- host
  - contactdata, [8](#)
- Import
  - vomsgdata, [19](#)
- ListTargets

- vomsdata, 19
- LoadCredentials
  - vomsdata, 19
- LoadSystemContacts
  - vomsdata, 19
- LoadUserContacts
  - vomsdata, 19
- name
  - attribute, 5
- nick
  - contactdata, 8
- operator=
  - voms, 12
- Order
  - vomsdata, 20
- port
  - contactdata, 8
- qualifier
  - attribute, 5
- RECURSE\_CHAIN
  - voms\_api.h, 27
- RECURSE\_DEEP
  - voms\_api.h, 27
- RECURSE\_NONE
  - voms\_api.h, 27
- recurse\_type
  - voms\_api.h, 26
- ResetOrder
  - vomsdata, 20
- ResetTargets
  - vomsdata, 20
- Retrieve
  - vomsdata, 20
- RetrieveFromCred
  - vomsdata, 21
- RetrieveFromCtx
  - vomsdata, 21, 22
- RetrieveFromProxy
  - vomsdata, 22
- role
  - data, 10
- serial
  - voms, 13
- server
  - voms, 13
- serverca
  - voms, 13
- ServerErrors
  - vomsdata, 22
- SetLifetime
  - vomsdata, 22
- SetRetryCount
  - vomsdata, 22
- SetVerificationTime
  - vomsdata, 22
- SetVerificationType
  - vomsdata, 22
- siglen
  - voms, 13
- signature
  - voms, 13
- std
  - voms, 13
- TranslateVOMS
  - voms, 12
- type
  - voms, 13
- TYPE\_CUSTOM
  - voms\_api.h, 26
- TYPE\_NODATA
  - voms\_api.h, 26
- TYPE\_STD
  - voms\_api.h, 26
- uri
  - voms, 13
- user
  - voms, 13
- userca
  - voms, 14
- value
  - attribute, 5
- VERIFY\_CERTLIST
  - voms\_api.h, 27
- VERIFY\_DATE
  - voms\_api.h, 27
- VERIFY\_FULL
  - voms\_api.h, 27
- VERIFY\_ID
  - voms\_api.h, 27
- VERIFY\_KEY
  - voms\_api.h, 27
- VERIFY\_NONE
  - voms\_api.h, 27
- VERIFY\_ORDER
  - voms\_api.h, 27
- VERIFY\_SIGN
  - voms\_api.h, 27
- VERIFY\_TARGET
  - voms\_api.h, 27
- verify\_type

- voms\_api.h, 27
- VERR\_COMM
  - voms\_api.h, 27
- VERR\_DIR
  - voms\_api.h, 27
- VERR\_EXTRINFO
  - voms\_api.h, 27
- VERR\_FILE
  - voms\_api.h, 28
- VERR\_FORMAT
  - voms\_api.h, 27
- VERR\_IDCHECK
  - voms\_api.h, 27
- VERR\_MEM
  - voms\_api.h, 28
- VERR\_NODATA
  - voms\_api.h, 27
- VERR\_NOEXT
  - voms\_api.h, 27
- VERR\_NOIDENT
  - voms\_api.h, 27
- VERR\_NOINIT
  - voms\_api.h, 27
- VERR\_NONE
  - voms\_api.h, 27
- VERR\_NOSOCKET
  - voms\_api.h, 27
- VERR\_NOTAVAIL
  - voms\_api.h, 28
- VERR\_ORDER
  - voms\_api.h, 28
- VERR\_PARAM
  - voms\_api.h, 27
- VERR\_PARSE
  - voms\_api.h, 27
- VERR\_SERVER
  - voms\_api.h, 28
- VERR\_SERVERCODE
  - voms\_api.h, 28
- VERR\_SIGN
  - voms\_api.h, 27
- VERR\_TIME
  - voms\_api.h, 27
- VERR\_TYPE
  - voms\_api.h, 28
- VERR\_VERIFY
  - voms\_api.h, 28
- verror\_type
  - voms\_api.h, 27
- version
  - contactdata, 8
  - voms, 14
- vo
  - contactdata, 8
- voms, 11
  - ~voms, 12
  - custom, 12
  - date1, 12
  - date2, 12
  - fqan, 12
  - GetAC, 12
  - GetAttributes, 12
  - GetTargets, 12
  - operator=, 12
  - serial, 13
  - server, 13
  - serverca, 13
  - siglen, 13
  - signature, 13
  - std, 13
  - TranslateVOMS, 12
  - type, 13
  - uri, 13
  - user, 13
  - userca, 14
  - version, 14
  - voms, 12
  - vomsdata, 12
  - voname, 14
- voms\_api.h
  - RECURSE\_CHAIN, 27
  - RECURSE\_DEEP, 27
  - RECURSE\_NONE, 27
  - TYPE\_CUSTOM, 26
  - TYPE\_NODATA, 26
  - TYPE\_STD, 26
  - VERIFY\_CERTLIST, 27
  - VERIFY\_DATE, 27
  - VERIFY\_FULL, 27
  - VERIFY\_ID, 27
  - VERIFY\_KEY, 27
  - VERIFY\_NONE, 27
  - VERIFY\_ORDER, 27
  - VERIFY\_SIGN, 27
  - VERIFY\_TARGET, 27
  - VERR\_COMM, 27
  - VERR\_DIR, 27
  - VERR\_EXTRINFO, 27
  - VERR\_FILE, 28
  - VERR\_FORMAT, 27
  - VERR\_IDCHECK, 27
  - VERR\_MEM, 28
  - VERR\_NODATA, 27
  - VERR\_NOEXT, 27
  - VERR\_NOIDENT, 27
  - VERR\_NOINIT, 27
  - VERR\_NONE, 27
  - VERR\_NOSOCKET, 27

- VERR\_NOTAVAIL, [28](#)
- VERR\_ORDER, [28](#)
- VERR\_PARAM, [27](#)
- VERR\_PARSE, [27](#)
- VERR\_SERVER, [28](#)
- VERR\_SERVERCODE, [28](#)
- VERR\_SIGN, [27](#)
- VERR\_TIME, [27](#)
- VERR\_TYPE, [28](#)
- VERR\_VERIFY, [28](#)
- voms\_api.h, [25](#)
  - check\_sig, [26](#)
  - data\_type, [26](#)
  - getMajorVersionNumber, [28](#)
  - getMinorVersionNumber, [28](#)
  - getPatchVersionNumber, [28](#)
  - recurse\_type, [26](#)
  - verify\_type, [27](#)
  - verror\_type, [27](#)
- vomsdata, [15](#)
  - ~vomsdata, [16](#)
  - AddTarget, [16](#)
  - Contact, [16](#), [17](#)
  - ContactRaw, [17](#)
  - data, [23](#)
  - DefaultData, [18](#)
  - error, [23](#)
  - ErrorMessage, [18](#)
  - Export, [18](#)
  - extra\_data, [23](#)
  - FindByAlias, [18](#)
  - FindByVO, [18](#)
  - Import, [19](#)
  - ListTargets, [19](#)
  - LoadCredentials, [19](#)
  - LoadSystemContacts, [19](#)
  - LoadUserContacts, [19](#)
  - Order, [20](#)
  - ResetOrder, [20](#)
  - ResetTargets, [20](#)
  - Retrieve, [20](#)
  - RetrieveFromCred, [21](#)
  - RetrieveFromCtx, [21](#), [22](#)
  - RetrieveFromProxy, [22](#)
  - ServerErrors, [22](#)
  - SetLifetime, [22](#)
  - SetRetryCount, [22](#)
  - SetVerificationTime, [22](#)
  - SetVerificationType, [22](#)
  - voms, [12](#)
  - vomsdata, [16](#)
  - workvo, [23](#)
- voname
  - voms, [14](#)
- workvo
  - vomsdata, [23](#)