

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

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 vomldata::Export (std::string & data)

Exports data from [vomldata::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> vomldata::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> vomldata::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 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

<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 <i>dir</i> is empty, defaults to <code>/opt/edg/etc/vomses</code> .
------------	--

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 <i>dir</i> is empty, defaults to <code>\$VOMS_USERCONF</code> . If this is empty too, defaults to <code>\$HOME/.edg/vomses</code> , or to <code>~/.edg/vomses</code> 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)

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