

globus gsi callback Reference Manual

2.7

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1 Globus GSI Callback

The Globus GSI Callback library. This library contains functions that extend OpenSSL path validation.

- [Activation](#)
- [Callback Functions](#)
- [Callback Data Functions](#)

2 globus gsi callback Module Index

2.1 globus gsi callback Modules

Here is a list of all modules:

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3.1 globus gsi callback Related Pages

Here is a list of all related documentation pages:

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4 globus gsi callback Module Documentation

4.1 Activation

Globus GSI Callback uses standard Globus module activation and deactivation.

Defines

- `#define` [GLOBUS_GSI_CALLBACK_MODULE](#)

4.1.1 Detailed Description

Globus GSI Callback uses standard Globus module activation and deactivation.

Before any Globus GSI Callback functions are called, the following function must be called:

```
globus_module_activate(GLOBUS_GSI_CALLBACK_MODULE)
```

This function returns `GLOBUS_SUCCESS` if Globus GSI Callback was successfully initialized, and you are therefore allowed to subsequently call Globus GSI Callback functions. Otherwise, an error code is returned, and Globus GSI Credential functions should not be subsequently called. This function may be called multiple times.

To deactivate Globus GSI Callback, the following function must be called:

```
globus_module_deactivate(GLOBUS_GSI_CALLBACK_MODULE)
```

This function should be called once for each time Globus GSI Callback was activated.

4.1.2 Define Documentation

4.1.2.1 `#define` [GLOBUS_GSI_CALLBACK_MODULE](#)

Module descriptor.

4.2 Callback Functions

Functions that plug into various plug points in the OpenSSL path validation mechanism.

Get callback data index from `X509_STORE`

- `globus_result_t` [globus_gsi_callback_get_X509_STORE_callback_data_index](#) (`int *index`)

Get callback data index from SSL structure

- `globus_result_t` [globus_gsi_callback_get_SSL_callback_data_index](#) (`int *index`)

Certificate verify wrapper

- `int` [globus_gsi_callback_X509_verify_cert](#) (`X509_STORE_CTX *context`, `void *arg`)

Independent path validation callback.

- `int` [globus_gsi_callback_create_proxy_callback](#) (`int preverify_ok`, `X509_STORE_CTX *x509_context`)

SSL path validation callback.

- `int` [globus_gsi_callback_handshake_callback](#) (`int preverify_ok`, `X509_STORE_CTX *x509_context`)

OpenSSL X509_check_issued() wrapper

- int [globus_gsi_callback_check_issued](#) (X509_STORE_CTX *context, X509 *cert, X509 *issuer)

Typedefs

- typedef int(*) [globus_gsi_extension_callback_t](#) ([globus_gsi_callback_data_t](#) callback_data, X509_EXTENSION *extension)

4.2.1 Detailed Description

Functions that plug into various plug points in the OpenSSL path validation mechanism.

These functions add CRL checking, X509 Extension handling and proxy validation.

4.2.2 Typedef Documentation

4.2.2.1 typedef int(*) [globus_gsi_extension_callback_t](#)([globus_gsi_callback_data_t](#) callback_data, X509_EXTENSION *extension)

Typedef for a callback that may be registered for dealing with unhandled X.509 extension.

4.2.3 Function Documentation

4.2.3.1 [globus_result_t](#) [globus_gsi_callback_get_X509_STORE_callback_data_index](#) (int * *index*)

Retrieve or create the index for our callback data structure in the X509_STORE.

Parameters:

index Will contain the index upon return

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.2.3.2 [globus_result_t](#) [globus_gsi_callback_get_SSL_callback_data_index](#) (int * *index*)

Retrieve or create the index for our callback data structure in the SSL structure.

Parameters:

index Will contain the index upon return

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.2.3.3 int [globus_gsi_callback_X509_verify_cert](#) (X509_STORE_CTX * *context*, void * *arg*)

This function wraps the OpenSSL certificate verification callback for the purpose of replacing the standard issuer check with one that deals with proxy certificates.

Should be used with [SSL_CTX_set_cert_verify_callback\(\)](#)

Parameters:

context The X509_STORE_CTX for which to register the callback.

arg Arguments to the callback. Currently ignored.

Returns:

1 on success 0 on failure

4.2.3.4 int globus_gsi_callback_create_proxy_callback (int preverify_ok, X509_STORE_CTX * x509_context)

This function provides a path validation callback for validation outside of a SSL session.

It should be used in X509_STORE_set_verify_cb_func().

Parameters:

preverify_ok Communicates the result of default validation steps performed by OpenSSL

x509_context The validation state object

Returns:

1 on success 0 on failure

4.2.3.5 int globus_gsi_callback_handshake_callback (int preverify_ok, X509_STORE_CTX * x509_context)

This function provides a path validation callback for the validation part of establishing a SSL session.

It handles proxy certificates, X509 Extensions and CRL checking. It should be used in SSL_CTX_set_verify().

Parameters:

preverify_ok Communicates the result of default validation steps performed by OpenSSL

x509_context The validation state object.

Returns:

1 on success 0 on failure

4.2.3.6 int globus_gsi_callback_check_issued (X509_STORE_CTX * context, X509 * cert, X509 * issuer)

This function wraps the OpenSSL X509_check_issued() call and catches the error caused by the fact that a proxy certificate issuer may not have to have the correct KeyUsage fields set.

Parameters:

context The validation state object.

cert The certificate to check

issuer The issuer certificate to check

Returns:

1 on success 0 on failure

4.3 Callback Data Functions

Functions that deal with the data structure that contains state associated with the path validation callback.

Initializing and destroying a callback data structure

- globus_result_t [globus_gsi_callback_data_init](#) (globus_gsi_callback_data_t *callback_data)
- globus_result_t [globus_gsi_callback_data_destroy](#) (globus_gsi_callback_data_t callback_data)

Copying a callback data structure

- globus_result_t [globus_gsi_callback_data_copy](#) (globus_gsi_callback_data_t source, globus_gsi_callback_data_t *dest)

Getting and setting the certificate chain depth

- globus_result_t [globus_gsi_callback_get_cert_depth](#) (globus_gsi_callback_data_t callback_data, int *cert_depth)
- globus_result_t [globus_gsi_callback_set_cert_depth](#) (globus_gsi_callback_data_t callback_data, int cert_depth)

Getting and setting the "proxy chain" depth

- globus_result_t [globus_gsi_callback_get_proxy_depth](#) (globus_gsi_callback_data_t callback_data, int *proxy_depth)
- globus_result_t [globus_gsi_callback_set_proxy_depth](#) (globus_gsi_callback_data_t callback_data, int proxy_depth)

Getting and setting the certificate type

- globus_result_t [globus_gsi_callback_get_cert_type](#) (globus_gsi_callback_data_t callback_data, globus_gsi_cert_utils_cert_type_t *cert_type)
- globus_result_t [globus_gsi_callback_set_cert_type](#) (globus_gsi_callback_data_t callback_data, globus_gsi_cert_utils_cert_type_t cert_type)

Getting and setting the certificate chain

- globus_result_t [globus_gsi_callback_get_cert_chain](#) (globus_gsi_callback_data_t callback_data, STACK_OF(X509)**cert_chain)
- globus_result_t [globus_gsi_callback_set_cert_chain](#) (globus_gsi_callback_data_t callback_data, STACK_OF(X509)*cert_chain)

Getting and setting the limited proxy handling setting

- globus_result_t [globus_gsi_callback_get_multiple_limited_proxy_ok](#) (globus_gsi_callback_data_t callback_data, int *multiple_limited_proxy_ok)
- globus_result_t [globus_gsi_callback_set_multiple_limited_proxy_ok](#) (globus_gsi_callback_data_t callback_data, int multiple_limited_proxy_ok)

Getting and setting a set of X.509 extension OIDs.

- globus_result_t [globus_gsi_callback_get_extension_oids](#) (globus_gsi_callback_data_t callback_data, void **extension_oids)
- globus_result_t [globus_gsi_callback_set_extension_oids](#) (globus_gsi_callback_data_t callback_data, void *extension_oids)

Getting and setting the trusted certificate directory

- globus_result_t [globus_gsi_callback_get_cert_dir](#) (globus_gsi_callback_data_t callback_data, char **cert_dir)
- globus_result_t [globus_gsi_callback_set_cert_dir](#) (globus_gsi_callback_data_t callback_data, char *cert_dir)

Getting and setting the callback to be called for unknown X.509 extensions

- globus_result_t [globus_gsi_callback_get_extension_cb](#) (globus_gsi_callback_data_t callback_data, [globus_gsi_extension_callback_t](#) *extension_cb)
- globus_result_t [globus_gsi_callback_set_extension_cb](#) (globus_gsi_callback_data_t callback_data, [globus_gsi_extension_callback_t](#) extension_cb)

Getting and setting the error status

- globus_result_t [globus_gsi_callback_get_error](#) (globus_gsi_callback_data_t callback_data, globus_result_t *error)
- globus_result_t [globus_gsi_callback_set_error](#) (globus_gsi_callback_data_t callback_data, globus_result_t error)

Getting and setting the check self-signed policy flag

- globus_result_t [globus_gsi_callback_get_check_policy_for_self_signed_certs](#) (globus_gsi_callback_data_t callback_data, globus_bool_t *check)
- globus_result_t [globus_gsi_callback_set_check_policy_for_self_signed_certs](#) (globus_gsi_callback_data_t callback_data, globus_bool_t check)

Typedefs

- typedef globus_l_gsi_callback_data_s * [globus_gsi_callback_data_t](#)

4.3.1 Detailed Description

Functions that deal with the data structure that contains state associated with the path validation callback.

4.3.2 Typedef Documentation

4.3.2.1 typedef struct globus_l_gsi_callback_data_s* [globus_gsi_callback_data_t](#)

Callback data typedef.

4.3.3 Function Documentation

4.3.3.1 `globus_result_t globus_gsi_callback_data_init (globus_gsi_callback_data_t * callback_data)`

This function initializes a `globus_gsi_callback_data_t`.

Parameters:

callback_data Reference to the structure to be initialized

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.2 `globus_result_t globus_gsi_callback_data_destroy (globus_gsi_callback_data_t callback_data)`

This function destroys a `globus_gsi_callback_data_t`.

Parameters:

callback_data The structure to be destroyed

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.3 `globus_result_t globus_gsi_callback_data_copy (globus_gsi_callback_data_t source, globus_gsi_callback_data_t * dest)`

This function copies a `globus_gsi_callback_data_t`.

Parameters:

source The structure to be copied

dest The destination of the copy

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.4 `globus_result_t globus_gsi_callback_get_cert_depth (globus_gsi_callback_data_t callback_data, int * cert_depth)`

This function returns the certificate chain depth.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the depth from

cert_depth The returned certificate chain depth

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.5 `globus_result_t globus_gsi_callback_set_cert_depth (globus_gsi_callback_data_t callback_data, int cert_depth)`

This function sets the certificate chain depth.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the depth from

cert_depth The certificate chain depth

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.6 `globus_result_t globus_gsi_callback_get_proxy_depth (globus_gsi_callback_data_t callback_data, int * proxy_depth)`

This function returns the number of proxies in the certificate chain.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the depth from

proxy_depth The returned "proxy chain" depth

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.7 `globus_result_t globus_gsi_callback_set_proxy_depth (globus_gsi_callback_data_t callback_data, int proxy_depth)`

This function sets the number of proxies in the certificate chain.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the depth from

proxy_depth The "proxy chain" depth

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.8 `globus_result_t globus_gsi_callback_get_cert_type (globus_gsi_callback_data_t callback_data, globus_gsi_cert_utils_cert_type_t * cert_type)`

This function returns the certificate type of the certificate currently being processed.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the certificate type from

cert_type Variable containing the certificate type on return

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.9 `globus_result_t globus_gsi_callback_set_cert_type (globus_gsi_callback_data_t callback_data, globus_gsi_cert_utils_cert_type_t cert_type)`

This function sets the certificate type of the certificate currently being processed.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the certificate type on
cert_type The certificate type

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.10 `globus_result_t globus_gsi_callback_get_cert_chain (globus_gsi_callback_data_t callback_data, STACK_OF(X509)** cert_chain)`

This function returns the certificate chain associated with the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to retrieve the certificate chain from.
cert_chain Contains the certificate chain upon successful return

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.11 `globus_result_t globus_gsi_callback_set_cert_chain (globus_gsi_callback_data_t callback_data, STACK_OF(X509)* cert_chain)`

This function sets the certificate chain associated with the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the certificate chain on
cert_chain The certificate chain

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.12 `globus_result_t globus_gsi_callback_get_multiple_limited_proxy_ok (globus_gsi_callback_data_t callback_data, int * multiple_limited_proxy_ok)`

This function gets the value of the limited proxy handling setting.

This setting determines whether path validation will accept limited proxies that have been further delegated, ie certificate chains with a limited proxy followed by further proxies.

Parameters:

callback_data The `globus_gsi_callback_data_t` to get the limited proxy setting from
multiple_limited_proxy_ok Contains the value of the setting upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

Deprecated

This function always returns true now. It will be removed in the next release.

4.3.3.13 globus_result_t globus_gsi_callback_set_multiple_limited_proxy_ok (globus_gsi_callback_data_t callback_data, int multiple_limited_proxy_ok)

This function sets the value of the limited proxy handling setting.

This setting determines whether path validation will accept limited proxies that have been further delegated, ie certificate chains with a limited proxy followed by further proxies.

Parameters:

callback_data The globus_gsi_callback_data_t to set the limited proxy setting on
multiple_limited_proxy_ok The value of the setting

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

Deprecated

This function has been turned into a no-op. It will be removed in the next release.

4.3.3.14 globus_result_t globus_gsi_callback_get_extension_oids (globus_gsi_callback_data_t callback_data, void ** extension_oids)

This function gets a list of X.509 extension OIDs that may be used by the extensions callback to allow or disallow certain extensions.

Parameters:

callback_data The globus_gsi_callback_data_t to get the array of extension OIDs from.
extension_oids Contains the list of extension OIDs upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.15 globus_result_t globus_gsi_callback_set_extension_oids (globus_gsi_callback_data_t callback_data, void * extension_oids)

This function sets a list of X.509 extension OIDs that may be used by the extensions callback to allow or disallow certain extensions.

Parameters:

callback_data The globus_gsi_callback_data_t to get the array of extension OIDs from.
extension_oids The list of extension OIDs

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.16 `globus_result_t globus_gsi_callback_get_cert_dir (globus_gsi_callback_data_t callback_data, char ** cert_dir)`

This function gets the trusted certificate directory from the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to get the trusted certificates directory from.

cert_dir Contains the path to the trusted certificate directory upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.17 `globus_result_t globus_gsi_callback_set_cert_dir (globus_gsi_callback_data_t callback_data, char * cert_dir)`

This function sets the trusted certificate directory on the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the trusted certificates directory on.

cert_dir The path to the trusted certificate directory

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.18 `globus_result_t globus_gsi_callback_get_extension_cb (globus_gsi_callback_data_t callback_data, globus_gsi_extension_callback_t * extension_cb)`

This function gets the callback that is called for unknown X.509 extensions.

Parameters:

callback_data The `globus_gsi_callback_data_t` to get the callback information from

extension_cb Contains the extension callback upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.19 `globus_result_t globus_gsi_callback_set_extension_cb (globus_gsi_callback_data_t callback_data, globus_gsi_extension_callback_t extension_cb)`

This function sets the callback that is called for unknown X.509 extensions.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the callback information on

extension_cb The extension callback

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.20 `globus_result_t globus_gsi_callback_get_error (globus_gsi_callback_data_t callback_data, globus_result_t * error)`

This function gets the error status stored in the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to get the error from

error Contains the error upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.21 `globus_result_t globus_gsi_callback_set_error (globus_gsi_callback_data_t callback_data, globus_result_t error)`

This function sets the error status stored in the callback data.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the error on

error The error

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

4.3.3.22 `globus_result_t globus_gsi_callback_get_check_policy_for_self_signed_certs (globus_gsi_callback_data_t callback_data, globus_bool_t * check)`

This function gets the value of the "check policy for self-signed certificates flag" in the callback data.

If this is set then the CA signing policy for a self-signed certificate must include a policy line that allows it to sign itself.

Parameters:

callback_data The `globus_gsi_callback_data_t` to get the error from

check Contains the value of the flag upon successful return.

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

Since:

Globus Toolkit 4.2.1

4.3.3.23 `globus_result_t globus_gsi_callback_set_check_policy_for_self_signed_certs (globus_gsi_callback_data_t callback_data, globus_bool_t check)`

This function sets the value of the "check policy for self-signed certificates flag" in the callback data.

If this is set then the CA signing policy for a self-signed certificate must include a policy line that allows it to sign itself.

Parameters:

callback_data The `globus_gsi_callback_data_t` to set the error on
check New value of the flag

Returns:

GLOBUS_SUCCESS unless an error occurred, in which case, a globus error object ID is returned

Since:

Globus Toolkit 4.2.1

4.4 GSI Callback Constants

Enumerations

- enum `globus_gsi_callback_error_t` {
`GLOBUS_GSI_CALLBACK_ERROR_SUCCESS` = 0,
`GLOBUS_GSI_CALLBACK_ERROR_VERIFY_CRED` = 1,
`GLOBUS_GSI_CALLBACK_ERROR_CERT_NOT_YET_VALID` = 2,
`GLOBUS_GSI_CALLBACK_ERROR_CANT_GET_LOCAL_CA_CERT` = 3,
`GLOBUS_GSI_CALLBACK_ERROR_CERT_HAS_EXPIRED` = 4,
`GLOBUS_GSI_CALLBACK_ERROR_INVALID_PROXY` = 5,
`GLOBUS_GSI_CALLBACK_ERROR_LIMITED_PROXY` = 6,
`GLOBUS_GSI_CALLBACK_ERROR_INVALID_CRL` = 7,
`GLOBUS_GSI_CALLBACK_ERROR_REVOKED_CERT` = 8,
`GLOBUS_GSI_CALLBACK_ERROR_MIXING_DIFFERENT_PROXY_TYPES` = 9,
`GLOBUS_GSI_CALLBACK_ERROR_WITH_SIGNING_POLICY` = 10,
`GLOBUS_GSI_CALLBACK_ERROR_OLD_GAA` = 11,
`GLOBUS_GSI_CALLBACK_ERROR_CALLBACK_DATA` = 12,
`GLOBUS_GSI_CALLBACK_ERROR_ERRNO` = 13,
`GLOBUS_GSI_CALLBACK_ERROR_CERT_CHAIN` = 14,
`GLOBUS_GSI_CALLBACK_ERROR_WITH_CALLBACK_DATA_INDEX` = 15,
`GLOBUS_GSI_CALLBACK_ERROR_PROXY_PATH_LENGTH_EXCEEDED` = 16,
`GLOBUS_GSI_CALLBACK_ERROR_LAST` = 18 }

4.4.1 Enumeration Type Documentation

4.4.1.1 enum `globus_gsi_callback_error_t`

GSI Callback Error codes.

Enumerator:

GLOBUS_GSI_CALLBACK_ERROR_SUCCESS Success - never used.

GLOBUS_GSI_CALLBACK_ERROR_VERIFY_CRED Error verifying credential.

GLOBUS_GSI_CALLBACK_ERROR_CERT_NOT_YET_VALID The certificate is not yet valid.

GLOBUS_GSI_CALLBACK_ERROR_CANT_GET_LOCAL_CA_CERT Unable to discover a local trusted CA for a given certificate.

GLOBUS_GSI_CALLBACK_ERROR_CERT_HAS_EXPIRED The certificate has expired.

GLOBUS_GSI_CALLBACK_ERROR_INVALID_PROXY The proxy format is invalid.

GLOBUS_GSI_CALLBACK_ERROR_LIMITED_PROXY Limited proxies are not accepted.

GLOBUS_GSI_CALLBACK_ERROR_INVALID_CRL Invalid CRL.

GLOBUS_GSI_CALLBACK_ERROR_REVOKED_CERT The certificate has been revoked.

GLOBUS_GSI_CALLBACK_ERROR_MIXING_DIFFERENT_PROXY_TYPES The cert chain contains both legacy on rfc compliant proxies.

GLOBUS_GSI_CALLBACK_ERROR_WITH_SIGNING_POLICY Could not verify certificate chain against the signing policy for the issuing CA.

GLOBUS_GSI_CALLBACK_ERROR_OLD_GAA OldGAA error.

GLOBUS_GSI_CALLBACK_ERROR_CALLBACK_DATA Error with the callback data structure.

GLOBUS_GSI_CALLBACK_ERROR_ERRNO System error.

GLOBUS_GSI_CALLBACK_ERROR_CERT_CHAIN Error setting or getting the cert chain from callback data.

GLOBUS_GSI_CALLBACK_ERROR_WITH_CALLBACK_DATA_INDEX Error getting callback data index.

GLOBUS_GSI_CALLBACK_ERROR_PROXY_PATH_LENGTH_EXCEEDED Exceeded the path length specified in the proxy cert info extension.

GLOBUS_GSI_CALLBACK_ERROR_LAST Last marker - never used.

5 globus gsi callback Page Documentation

5.1 Deprecated List

Global [`globus_gsi_callback_get_multiple_limited_proxy_ok`](#) This function always returns true now. It will be removed in the next release.

Global [`globus_gsi_callback_set_multiple_limited_proxy_ok`](#) This function has been turned into a no-op. It will be removed in the next release.

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