

**NAME**

OSSL\_STORE\_LOADER, OSSL\_STORE\_LOADER\_fetch, OSSL\_STORE\_LOADER\_up\_ref, OSSL\_STORE\_LOADER\_free, OSSL\_STORE\_LOADER\_get0\_provider, OSSL\_STORE\_LOADER\_get0\_properties, OSSL\_STORE\_LOADER\_is\_a, OSSL\_STORE\_LOADER\_get0\_description, OSSL\_STORE\_LOADER\_do\_all\_provided, OSSL\_STORE\_LOADER\_names\_do\_all, OSSL\_STORE\_LOADER\_CTX, OSSL\_STORE\_LOADER\_new, OSSL\_STORE\_LOADER\_get0\_engine, OSSL\_STORE\_LOADER\_get0\_scheme, OSSL\_STORE\_LOADER\_set\_open, OSSL\_STORE\_LOADER\_set\_open\_ex, OSSL\_STORE\_LOADER\_set\_attach, OSSL\_STORE\_LOADER\_set\_ctrl, OSSL\_STORE\_LOADER\_set\_expect, OSSL\_STORE\_LOADER\_set\_find, OSSL\_STORE\_LOADER\_set\_load, OSSL\_STORE\_LOADER\_set\_eof, OSSL\_STORE\_LOADER\_set\_error, OSSL\_STORE\_LOADER\_set\_close, OSSL\_STORE\_register\_loader, OSSL\_STORE\_unregister\_loader, OSSL\_STORE\_open\_fn, OSSL\_STORE\_open\_ex\_fn, OSSL\_STORE\_attach\_fn, OSSL\_STORE\_ctrl\_fn, OSSL\_STORE\_expect\_fn, OSSL\_STORE\_find\_fn, OSSL\_STORE\_load\_fn, OSSL\_STORE\_eof\_fn, OSSL\_STORE\_error\_fn, OSSL\_STORE\_close\_fn - Types and functions to manipulate, register and unregister STORE loaders for different URI schemes

**SYNOPSIS**

```
#include <openssl/store.h>
```

```
typedef struct ossl_store_loader_st OSSL_STORE_LOADER;
```

```
OSSL_STORE_LOADER *OSSL_STORE_LOADER_fetch(OSSL_LIB_CTX *libctx,
      const char *scheme,
      const char *properties);
int OSSL_STORE_LOADER_up_ref(OSSL_STORE_LOADER *loader);
void OSSL_STORE_LOADER_free(OSSL_STORE_LOADER *loader);
const OSSL_PROVIDER *OSSL_STORE_LOADER_get0_provider(const OSSL_STORE_LOADER *
      loader);
const char *OSSL_STORE_LOADER_get0_properties(const OSSL_STORE_LOADER *loader);
const char *OSSL_STORE_LOADER_get0_description(const OSSL_STORE_LOADER *loader);
int OSSL_STORE_LOADER_is_a(const OSSL_STORE_LOADER *loader,
      const char *scheme);
void OSSL_STORE_LOADER_do_all_provided(OSSL_LIB_CTX *libctx,
      void (*user_fn)(OSSL_STORE_LOADER *loader,
      void *arg),
      void *user_arg);
int OSSL_STORE_LOADER_names_do_all(const OSSL_STORE_LOADER *loader,
      void (*fn)(const char *name, void *data),
```

```
void *data);
```

The following functions have been deprecated since OpenSSL 3.0, and can be hidden entirely by defining **OPENSSL\_API\_COMPAT** with a suitable version value, see **openssl\_user\_macros(7)**:

```
OSSL_STORE_LOADER *OSSL_STORE_LOADER_new(ENGINE *e, const char *scheme);
const ENGINE *OSSL_STORE_LOADER_get0_engine(const OSSL_STORE_LOADER
      *store_loader);
const char *OSSL_STORE_LOADER_get0_scheme(const OSSL_STORE_LOADER
      *store_loader);
```

```
/* struct ossl_store_loader_ctx_st is defined differently by each loader */
typedef struct ossl_store_loader_ctx_st OSSL_STORE_LOADER_CTX;
```

```
typedef OSSL_STORE_LOADER_CTX *(*OSSL_STORE_open_fn)(
    const char *uri, const UI_METHOD *ui_method, void *ui_data);
int OSSL_STORE_LOADER_set_open(OSSL_STORE_LOADER *store_loader,
    OSSL_STORE_open_fn store_open_function);
typedef OSSL_STORE_LOADER_CTX *(*OSSL_STORE_open_ex_fn)(
    const char *uri, const UI_METHOD *ui_method, void *ui_data);
int OSSL_STORE_LOADER_set_open_ex
(OSSL_STORE_LOADER *store_loader,
    OSSL_STORE_open_ex_fn store_open_ex_function);
typedef OSSL_STORE_LOADER_CTX *(*OSSL_STORE_attach_fn)
(const OSSL_STORE_LOADER *loader, BIO *bio,
    OSSL_LIB_CTX *libctx, const char *propq,
    const UI_METHOD *ui_method, void *ui_data);
int OSSL_STORE_LOADER_set_attach(OSSL_STORE_LOADER *loader,
    OSSL_STORE_attach_fn attach_function);
typedef int (*OSSL_STORE_ctrl_fn)(OSSL_STORE_LOADER_CTX *ctx, int cmd,
    va_list args);
int OSSL_STORE_LOADER_set_ctrl(OSSL_STORE_LOADER *store_loader,
    OSSL_STORE_ctrl_fn store_ctrl_function);
typedef int (*OSSL_STORE_expect_fn)(OSSL_STORE_LOADER_CTX *ctx, int expected);
int OSSL_STORE_LOADER_set_expect(OSSL_STORE_LOADER *loader,
    OSSL_STORE_expect_fn expect_function);
typedef int (*OSSL_STORE_find_fn)(OSSL_STORE_LOADER_CTX *ctx,
    OSSL_STORE_SEARCH *criteria);
int OSSL_STORE_LOADER_set_find(OSSL_STORE_LOADER *loader,
    OSSL_STORE_find_fn find_function);
```

```

typedef OSSL_STORE_INFO *(*OSSL_STORE_load_fn)(OSSL_STORE_LOADER_CTX *ctx,
        UI_METHOD *ui_method,
        void *ui_data);
int OSSL_STORE_LOADER_set_load(OSSL_STORE_LOADER *store_loader,
        OSSL_STORE_load_fn store_load_function);
typedef int (*OSSL_STORE_eof_fn)(OSSL_STORE_LOADER_CTX *ctx);
int OSSL_STORE_LOADER_set_eof(OSSL_STORE_LOADER *store_loader,
        OSSL_STORE_eof_fn store_eof_function);
typedef int (*OSSL_STORE_error_fn)(OSSL_STORE_LOADER_CTX *ctx);
int OSSL_STORE_LOADER_set_error(OSSL_STORE_LOADER *store_loader,
        OSSL_STORE_error_fn store_error_function);
typedef int (*OSSL_STORE_close_fn)(OSSL_STORE_LOADER_CTX *ctx);
int OSSL_STORE_LOADER_set_close(OSSL_STORE_LOADER *store_loader,
        OSSL_STORE_close_fn store_close_function);
void OSSL_STORE_LOADER_free(OSSL_STORE_LOADER *store_loader);

int OSSL_STORE_register_loader(OSSL_STORE_LOADER *loader);
OSSL_STORE_LOADER *OSSL_STORE_unregister_loader(const char *scheme);

```

## DESCRIPTION

**OSSL\_STORE\_LOADER** is a method for OSSL\_STORE loaders, which implement **OSSL\_STORE\_open()**, **OSSL\_STORE\_open\_ex()**, **OSSL\_STORE\_load()**, **OSSL\_STORE\_eof()**, **OSSL\_STORE\_error()** and **OSSL\_STORE\_close()** for specific storage schemes.

**OSSL\_STORE\_LOADER\_fetch()** looks for an implementation for a storage *scheme* within the providers that has been loaded into the **OSSL\_LIB\_CTX** given by *libctx*, and with the properties given by *properties*.

**OSSL\_STORE\_LOADER\_up\_ref()** increments the reference count for the given *loader*.

**OSSL\_STORE\_LOADER\_free()** decrements the reference count for the given *loader*, and when the count reaches zero, frees it.

**OSSL\_STORE\_LOADER\_get0\_provider()** returns the provider of the given *loader*.

**OSSL\_STORE\_LOADER\_get0\_properties()** returns the property definition associated with the given *loader*.

**OSSL\_STORE\_LOADER\_is\_a()** checks if *loader* is an implementation of an algorithm that's identifiable with *scheme*.

**OSSL\_STORE\_LOADER\_get0\_description()** returns a description of the *loader*, meant for display and human consumption. The description is at the discretion of the *loader* implementation.

**OSSL\_STORE\_LOADER\_do\_all\_provided()** traverses all store implementations by all activated providers in the library context *libctx*, and for each of the implementations, calls *user\_fn* with the implementation method and *user\_arg* as arguments.

**OSSL\_STORE\_LOADER\_names\_do\_all()** traverses all names for the given *loader*, and calls *fn* with each name and *data*.

### Legacy Types and Functions (deprecated)

These functions help applications and engines to create loaders for schemes they support. These are all deprecated and discouraged in favour of provider implementations, see **provider-storemgmt(7)**.

**OSSL\_STORE\_LOADER\_CTX** is a type template, to be defined by each loader using "struct `ossl_store_loader_ctx_st { ... }`".

**OSSL\_STORE\_open\_fn**, **OSSL\_STORE\_open\_ex\_fn**, **OSSL\_STORE\_ctrl\_fn**, **OSSL\_STORE\_expect\_fn**, **OSSL\_STORE\_find\_fn**, **OSSL\_STORE\_load\_fn**, **OSSL\_STORE\_eof\_fn**, and **OSSL\_STORE\_close\_fn** are the function pointer types used within a STORE loader. The functions pointed at define the functionality of the given loader.

### **OSSL\_STORE\_open\_fn** and **OSSL\_STORE\_open\_ex\_fn**

**OSSL\_STORE\_open\_ex\_fn** takes a URI and is expected to interpret it in the best manner possible according to the scheme the loader implements. It also takes a **UI\_METHOD** and associated data, to be used any time something needs to be prompted for, as well as a library context *libctx* with an associated property query *propq*, to be used when fetching necessary algorithms to perform the loads. Furthermore, this function is expected to initialize what needs to be initialized, to create a private data store (**OSSL\_STORE\_LOADER\_CTX**, see above), and to return it. If something goes wrong, this function is expected to return NULL.

**OSSL\_STORE\_open\_fn** does the same thing as **OSSL\_STORE\_open\_ex\_fn** but uses NULL for the library context *libctx* and property query *propq*.

### **OSSL\_STORE\_attach\_fn**

This function takes a **BIO**, otherwise works like **OSSL\_STORE\_open\_ex\_fn**.

### **OSSL\_STORE\_ctrl\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer, a command number *cmd* and a **va\_list** *args* and is used to manipulate loader specific parameters.

Loader specific command numbers must begin at **OSSL\_STORE\_C\_CUSTOM\_START**. Any number below that is reserved for future globally known command numbers.

This function is expected to return 1 on success, 0 on error.

### **OSSL\_STORE\_expect\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and a **OSSL\_STORE\_INFO** identity *expected*, and is used to tell the loader what object type is expected. *expected* may be zero to signify that no specific object type is expected.

This function is expected to return 1 on success, 0 on error.

### **OSSL\_STORE\_find\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and a **OSSL\_STORE\_SEARCH** search criterion, and is used to tell the loader what to search for.

When called with the loader context being NULL, this function is expected to return 1 if the loader supports the criterion, otherwise 0.

When called with the loader context being something other than NULL, this function is expected to return 1 on success, 0 on error.

### **OSSL\_STORE\_load\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and a **UI\_METHOD** with associated data. It's expected to load the next available data, mold it into a data structure that can be wrapped in a **OSSL\_STORE\_INFO** using one of the **OSSL\_STORE\_INFO(3)** functions. If no more data is available or an error occurs, this function is expected to return NULL. The **OSSL\_STORE\_eof\_fn** and **OSSL\_STORE\_error\_fn** functions must indicate if it was in fact the end of data or if an error occurred.

Note that this function retrieves *one* data item only.

### **OSSL\_STORE\_eof\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and is expected to return 1 to indicate that the end of available data has been reached. It is otherwise expected to return 0.

### **OSSL\_STORE\_error\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and is expected to return 1 to indicate that an error occurred in a previous call to the **OSSL\_STORE\_load\_fn** function. It is otherwise expected to return 0.

**OSSL\_STORE\_close\_fn**

This function takes a **OSSL\_STORE\_LOADER\_CTX** pointer and is expected to close or shut down what needs to be closed, and finally free the contents of the **OSSL\_STORE\_LOADER\_CTX** pointer. It returns 1 on success and 0 on error.

**OSSL\_STORE\_LOADER\_new()** creates a new **OSSL\_STORE\_LOADER**. It takes an **ENGINE** *e* and a string *scheme*. *scheme* must *always* be set. Both *e* and *scheme* are used as is and must therefore be alive as long as the created loader is.

**OSSL\_STORE\_LOADER\_get0\_engine()** returns the engine of the *store\_loader*.

**OSSL\_STORE\_LOADER\_get0\_scheme()** returns the scheme of the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_opener()** sets the opener function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_opener\_ex()** sets the opener with library context function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_attach()** sets the attacher function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_ctrl()** sets the control function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_expect()** sets the expect function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_load()** sets the loader function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_eof()** sets the end of file checker function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_set\_close()** sets the closing function for the *store\_loader*.

**OSSL\_STORE\_LOADER\_free()** frees the given *store\_loader*.

**OSSL\_STORE\_register\_loader()** register the given *store\_loader* and thereby makes it available for use with **OSSL\_STORE\_open()**, **OSSL\_STORE\_open\_ex()**, **OSSL\_STORE\_load()**, **OSSL\_STORE\_eof()** and **OSSL\_STORE\_close()**.

**OSSL\_STORE\_unregister\_loader()** unregister the store loader for the given *scheme*.

**RETURN VALUES**

**OSSL\_STORE\_LOADER\_fetch()** returns a pointer to an **OSSL\_STORE\_LOADER** object, or NULL on error.

**OSSL\_STORE\_LOADER\_up\_ref()** returns 1 on success, or 0 on error.

**OSSL\_STORE\_LOADER\_names\_do\_all()** returns 1 if the callback was called for all names. A return value of 0 means that the callback was not called for any names.

**OSSL\_STORE\_LOADER\_free()** doesn't return any value.

**OSSL\_STORE\_LOADER\_get0\_provider()** returns a pointer to a provider object, or NULL on error.

**OSSL\_STORE\_LOADER\_get0\_properties()** returns a pointer to a property definition string, or NULL on error.

**OSSL\_STORE\_LOADER\_is\_a()** returns 1 if *loader* was identifiable, otherwise 0.

**OSSL\_STORE\_LOADER\_get0\_description()** returns a pointer to a description, or NULL if there isn't one.

The functions with the types **OSSL\_STORE\_open\_fn**, **OSSL\_STORE\_open\_ex\_fn**, **OSSL\_STORE\_ctrl\_fn**, **OSSL\_STORE\_expect\_fn**, **OSSL\_STORE\_load\_fn**, **OSSL\_STORE\_eof\_fn** and **OSSL\_STORE\_close\_fn** have the same return values as **OSSL\_STORE\_open()**, **OSSL\_STORE\_open\_ex()**, **OSSL\_STORE\_ctrl()**, **OSSL\_STORE\_expect()**, **OSSL\_STORE\_load()**, **OSSL\_STORE\_eof()** and **OSSL\_STORE\_close()**, respectively.

**OSSL\_STORE\_LOADER\_new()** returns a pointer to a **OSSL\_STORE\_LOADER** on success, or NULL on failure.

**OSSL\_STORE\_LOADER\_set\_open()**, **OSSL\_STORE\_LOADER\_set\_open\_ex()**, **OSSL\_STORE\_LOADER\_set\_ctrl()**, **OSSL\_STORE\_LOADER\_set\_load()**, **OSSL\_STORE\_LOADER\_set\_eof()** and **OSSL\_STORE\_LOADER\_set\_close()** return 1 on success, or 0 on failure.

**OSSL\_STORE\_register\_loader()** returns 1 on success, or 0 on failure.

**OSSL\_STORE\_unregister\_loader()** returns the unregistered loader on success, or NULL on failure.

## SEE ALSO

**ossl\_store(7)**, **OSSL\_STORE\_open(3)**, **OSSL\_LIB\_CTX(3)**, **provider-storemgmt(7)**

## HISTORY

**OSSL\_STORE\_LOADER\_fetch()**, **OSSL\_STORE\_LOADER\_up\_ref()**,

**OSSL\_STORE\_LOADER\_free()**, **OSSL\_STORE\_LOADER\_get0\_provider()**, **OSSL\_STORE\_LOADER\_get0\_properties()**, **OSSL\_STORE\_LOADER\_is\_a()**, **OSSL\_STORE\_LOADER\_do\_all\_provided()** and **OSSL\_STORE\_LOADER\_names\_do\_all()** were added in OpenSSL 3.0.

**OSSL\_STORE\_open\_ex\_fn()** was added in OpenSSL 3.0.

**OSSL\_STORE\_LOADER**, **OSSL\_STORE\_LOADER\_CTX**, **OSSL\_STORE\_LOADER\_new()**, **OSSL\_STORE\_LOADER\_set0\_scheme()**, **OSSL\_STORE\_LOADER\_get0\_scheme()**, **OSSL\_STORE\_LOADER\_get0\_engine()**, **OSSL\_STORE\_LOADER\_set\_expect()**, **OSSL\_STORE\_LOADER\_set\_find()**, **OSSL\_STORE\_LOADER\_set\_attach()**, **OSSL\_STORE\_LOADER\_set\_open\_ex()**, **OSSL\_STORE\_LOADER\_set\_open()**, **OSSL\_STORE\_LOADER\_set\_ctrl()**, **OSSL\_STORE\_LOADER\_set\_load()**, **OSSL\_STORE\_LOADER\_set\_eof()**, **OSSL\_STORE\_LOADER\_set\_close()**, **OSSL\_STORE\_LOADER\_free()**, **OSSL\_STORE\_register\_loader()**, **OSSL\_STORE\_LOADER\_set\_error()**, **OSSL\_STORE\_unregister\_loader()**, **OSSL\_STORE\_open\_fn()**, **OSSL\_STORE\_ctrl\_fn()**, **OSSL\_STORE\_load\_fn()**, **OSSL\_STORE\_eof\_fn()** and **OSSL\_STORE\_close\_fn()** were added in OpenSSL 1.1.1, and became deprecated in OpenSSL 3.0.

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