33.2 winreg — Windows registry access

These functions expose the Windows registry API to Python. Instead of using an integer as the registry handle, a *handle object* is used to ensure that the handles are closed correctly, even if the programmer neglects to explicitly close them.

Changed in version 3.3: Several functions in this module used to raise a `WindowsError`, which is now an alias of `OSError`.

33.2.1 Functions

This module offers the following functions:

`winreg.CloseKey`(*hkey*)

Closes a previously opened registry key. The *hkey* argument specifies a previously opened key.

Note: If *hkey* is not closed using this method (or via `hkey.Close()`), it is closed when the *hkey* object is destroyed by Python.

`winreg.ConnectRegistry`(*computer_name*, *key*)

Establishes a connection to a predefined registry handle on another computer, and returns a *handle object*.

computer_name is the name of the remote computer, of the form `r"\\computername"`. If `None`, the local computer is used.

key is the predefined handle to connect to.

The return value is the handle of the opened key. If the function fails, an `OSError` exception is raised.

Raises an *auditing event* `winreg.ConnectRegistry` with arguments `computer_name`, `key`.

Changed in version 3.3: See *above*.

`winreg.CreateKey`(*key*, *sub_key*)

Creates or opens the specified key, returning a *handle object*.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that names the key this method opens or creates.

If *key* is one of the predefined keys, *sub_key* may be `None`. In that case, the handle returned is the same key handle passed in to the function.

If the key already exists, this function opens the existing key.

The return value is the handle of the opened key. If the function fails, an `OSError` exception is raised.

Raises an *auditing event* `winreg.CreateKey` with arguments `key`, `sub_key`, `access`.

Raises an *auditing event* `winreg.OpenKey/result` with argument `key`.

Changed in version 3.3: See *above*.

`winreg.CreateKeyEx`(*key*, *sub_key*, *reserved=0*, *access=KEY_WRITE*)

Creates or opens the specified key, returning a *handle object*.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that names the key this method opens or creates.

reserved is a reserved integer, and must be zero. The default is zero.

access is an integer that specifies an access mask that describes the desired security access for the key. Default is *KEY_WRITE*. See *Access Rights* for other allowed values.

If *key* is one of the predefined keys, *sub_key* may be `None`. In that case, the handle returned is the same key handle passed in to the function.

If the key already exists, this function opens the existing key.

The return value is the handle of the opened key. If the function fails, an *OSError* exception is raised.

Raises an *auditing event* `winreg.CreateKey` with arguments `key`, `sub_key`, `access`.

Raises an *auditing event* `winreg.OpenKey/result` with argument `key`.

New in version 3.2.

Changed in version 3.3: See *above*.

`winreg.`**`DeleteKey`**(*key*, *sub_key*)

Deletes the specified key.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that must be a subkey of the key identified by the *key* parameter. This value must not be `None`, and the key may not have subkeys.

This method can not delete keys with subkeys.

If the method succeeds, the entire key, including all of its values, is removed. If the method fails, an *OSError* exception is raised.

Raises an *auditing event* `winreg.DeleteKey` with arguments `key`, `sub_key`, `access`.

Changed in version 3.3: See *above*.

`winreg.`**`DeleteKeyEx`**(*key*, *sub_key*, *access=KEY_WOW64_64KEY*, *reserved=0*)

Deletes the specified key.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that must be a subkey of the key identified by the *key* parameter. This value must not be `None`, and the key may not have subkeys.

reserved is a reserved integer, and must be zero. The default is zero.

access is an integer that specifies an access mask that describes the desired security access for the key. Default is *KEY_WOW64_64KEY*. On 32-bit Windows, the WOW64 constants are ignored. See *Access Rights* for other allowed values.

This method can not delete keys with subkeys.

If the method succeeds, the entire key, including all of its values, is removed. If the method fails, an *OSError* exception is raised.

On unsupported Windows versions, *NotImplementedError* is raised.

Raises an *auditing event* `winreg.DeleteKey` with arguments `key`, `sub_key`, `access`.

New in version 3.2.

Changed in version 3.3: See *above*.

`winreg.`**`DeleteValue`**(*key*, *value*)

Removes a named value from a registry key.

key is an already open key, or one of the predefined *HKEY_* constants*.

value is a string that identifies the value to remove.

Raises an *auditing event* `winreg.DeleteValue` with arguments `key`, `value`.

winreg.**EnumKey**(*key*, *index*)

Enumerates subkeys of an open registry key, returning a string.

key is an already open key, or one of the predefined *HKEY_* constants*.

index is an integer that identifies the index of the key to retrieve.

The function retrieves the name of one subkey each time it is called. It is typically called repeatedly until an `OSError` exception is raised, indicating, no more values are available.

Raises an *auditing event* `winreg.EnumKey` with arguments `key`, `index`.

Changed in version 3.3: See *above*.

winreg.**EnumValue**(*key*, *index*)

Enumerates values of an open registry key, returning a tuple.

key is an already open key, or one of the predefined *HKEY_* constants*.

index is an integer that identifies the index of the value to retrieve.

The function retrieves the name of one subkey each time it is called. It is typically called repeatedly, until an `OSError` exception is raised, indicating no more values.

The result is a tuple of 3 items:

Index	Meaning
0	A string that identifies the value name
1	An object that holds the value data, and whose type depends on the underlying registry type
2	An integer that identifies the type of the value data (see table in docs for `SetValueEx()`)

Raises an *auditing event* `winreg.EnumValue` with arguments `key`, `index`.

Changed in version 3.3: See *above*.

winreg.**ExpandEnvironmentStrings**(*str*)

Expands environment variable placeholders `%NAME%` in strings like *REG_EXPAND_SZ*:

```
>>> ExpandEnvironmentStrings('%windir%')
'C:\\Windows'
```

Raises an *auditing event* `winreg.ExpandEnvironmentStrings` with argument `str`.

winreg.**FlushKey**(*key*)

Writes all the attributes of a key to the registry.

key is an already open key, or one of the predefined *HKEY_* constants*.

It is not necessary to call `FlushKey()` to change a key. Registry changes are flushed to disk by the registry using its lazy flusher. Registry changes are also flushed to disk at system shutdown. Unlike `CloseKey()`, the `FlushKey()` method returns only when all the data has been written to the registry. An application should only call `FlushKey()` if it requires absolute certainty that registry changes are on disk.

Note: If you don't know whether a `FlushKey()` call is required, it probably isn't.

winreg.**LoadKey**(*key*, *sub_key*, *file_name*)

Creates a subkey under the specified key and stores registration information from a specified file into that subkey.

key is a handle returned by `ConnectRegistry()` or one of the constants *HKEY_USERS* or *HKEY_LOCAL_MACHINE*.

sub_key is a string that identifies the subkey to load.

file_name is the name of the file to load registry data from. This file must have been created with the *SaveKey()* function. Under the file allocation table (FAT) file system, the filename may not have an extension.

A call to *LoadKey()* fails if the calling process does not have the SE_RESTORE_PRIVILEGE privilege. Note that privileges are different from permissions – see the RegLoadKey documentation for more details.

If *key* is a handle returned by *ConnectRegistry()*, then the path specified in *file_name* is relative to the remote computer.

Raises an *auditing event* winreg.LoadKey with arguments key, sub_key, file_name.

winreg.**OpenKey**(*key*, *sub_key*, *reserved=0*, *access=KEY_READ*)

winreg.**OpenKeyEx**(*key*, *sub_key*, *reserved=0*, *access=KEY_READ*)

Opens the specified key, returning a *handle object*.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that identifies the sub_key to open.

reserved is a reserved integer, and must be zero. The default is zero.

access is an integer that specifies an access mask that describes the desired security access for the key. Default is *KEY_READ*. See *Access Rights* for other allowed values.

The result is a new handle to the specified key.

If the function fails, *OSError* is raised.

Raises an *auditing event* winreg.OpenKey with arguments key, sub_key, access.

Raises an *auditing event* winreg.OpenKey/result with argument key.

Changed in version 3.2: Allow the use of named arguments.

Changed in version 3.3: See *above*.

winreg.**QueryInfoKey**(*key*)

Returns information about a key, as a tuple.

key is an already open key, or one of the predefined *HKEY_* constants*.

The result is a tuple of 3 items:

Index	Meaning
0	An integer giving the number of sub keys this key has.
1	An integer giving the number of values this key has.
2	An integer giving when the key was last modified (if available) as 100's of nanoseconds since Jan 1, 1601.

Raises an *auditing event* winreg.QueryInfoKey with argument key.

winreg.**QueryValue**(*key*, *sub_key*)

Retrieves the unnamed value for a key, as a string.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that holds the name of the subkey with which the value is associated. If this parameter is None or empty, the function retrieves the value set by the *SetValue()* method for the key identified by *key*.

Values in the registry have name, type, and data components. This method retrieves the data for a key's first value that has a NULL name. But the underlying API call doesn't return the type, so always use *QueryValueEx()* if possible.

Raises an *auditing event* winreg.QueryValue with arguments key, sub_key, value_name.

winreg.**QueryValueEx**(*key*, *value_name*)

Retrieves the type and data for a specified value name associated with an open registry key.

key is an already open key, or one of the predefined *HKEY_* constants*.

value_name is a string indicating the value to query.

The result is a tuple of 2 items:

Index	Meaning
0	The value of the registry item.
1	An integer giving the registry type for this value (see table in docs for `SetValueEx()`)

Raises an *auditing event* `winreg.QueryValue` with arguments `key`, `sub_key`, `value_name`.

winreg.**SaveKey**(*key*, *file_name*)

Saves the specified key, and all its subkeys to the specified file.

key is an already open key, or one of the predefined *HKEY_* constants*.

file_name is the name of the file to save registry data to. This file cannot already exist. If this filename includes an extension, it cannot be used on file allocation table (FAT) file systems by the `LoadKey()` method.

If *key* represents a key on a remote computer, the path described by *file_name* is relative to the remote computer. The caller of this method must possess the **SeBackupPrivilege** security privilege. Note that privileges are different than permissions – see the Conflicts Between User Rights and Permissions documentation for more details.

This function passes `NULL` for *security_attributes* to the API.

Raises an *auditing event* `winreg.SaveKey` with arguments `key`, `file_name`.

winreg.**SetValue**(*key*, *sub_key*, *type*, *value*)

Associates a value with a specified key.

key is an already open key, or one of the predefined *HKEY_* constants*.

sub_key is a string that names the subkey with which the value is associated.

type is an integer that specifies the type of the data. Currently this must be `REG_SZ`, meaning only strings are supported. Use the `SetValueEx()` function for support for other data types.

value is a string that specifies the new value.

If the key specified by the *sub_key* parameter does not exist, the SetValue function creates it.

Value lengths are limited by available memory. Long values (more than 2048 bytes) should be stored as files with the filenames stored in the configuration registry. This helps the registry perform efficiently.

The key identified by the *key* parameter must have been opened with `KEY_SET_VALUE` access.

Raises an *auditing event* `winreg.SetValue` with arguments `key`, `sub_key`, `type`, `value`.

winreg.**SetValueEx**(*key*, *value_name*, *reserved*, *type*, *value*)

Stores data in the value field of an open registry key.

key is an already open key, or one of the predefined *HKEY_* constants*.

value_name is a string that names the subkey with which the value is associated.

reserved can be anything – zero is always passed to the API.

type is an integer that specifies the type of the data. See *Value Types* for the available types.

value is a string that specifies the new value.

This method can also set additional value and type information for the specified key. The key identified by the key parameter must have been opened with `KEY_SET_VALUE` access.

To open the key, use the `CreateKey()` or `OpenKey()` methods.

Value lengths are limited by available memory. Long values (more than 2048 bytes) should be stored as files with the filenames stored in the configuration registry. This helps the registry perform efficiently.

Raises an *auditing event* `winreg.SetValue` with arguments `key`, `sub_key`, `type`, `value`.

`winreg.`**`DisableReflectionKey`**(*key*)

Disables registry reflection for 32-bit processes running on a 64-bit operating system.

key is an already open key, or one of the predefined *HKEY_* constants*.

Will generally raise `NotImplementedError` if executed on a 32-bit operating system.

If the key is not on the reflection list, the function succeeds but has no effect. Disabling reflection for a key does not affect reflection of any subkeys.

Raises an *auditing event* `winreg.DisableReflectionKey` with argument `key`.

`winreg.`**`EnableReflectionKey`**(*key*)

Restores registry reflection for the specified disabled key.

key is an already open key, or one of the predefined *HKEY_* constants*.

Will generally raise `NotImplementedError` if executed on a 32-bit operating system.

Restoring reflection for a key does not affect reflection of any subkeys.

Raises an *auditing event* `winreg.EnableReflectionKey` with argument `key`.

`winreg.`**`QueryReflectionKey`**(*key*)

Determines the reflection state for the specified key.

key is an already open key, or one of the predefined *HKEY_* constants*.

Returns `True` if reflection is disabled.

Will generally raise `NotImplementedError` if executed on a 32-bit operating system.

Raises an *auditing event* `winreg.QueryReflectionKey` with argument `key`.

33.2.2 Constants

The following constants are defined for use in many `winreg` functions.

HKEY_* Constants

`winreg.`**`HKEY_CLASSES_ROOT`**

Registry entries subordinate to this key define types (or classes) of documents and the properties associated with those types. Shell and COM applications use the information stored under this key.

`winreg.`**`HKEY_CURRENT_USER`**

Registry entries subordinate to this key define the preferences of the current user. These preferences include the settings of environment variables, data about program groups, colors, printers, network connections, and application preferences.

`winreg.`**`HKEY_LOCAL_MACHINE`**

Registry entries subordinate to this key define the physical state of the computer, including data about the bus type, system memory, and installed hardware and software.

`winreg.`**`HKEY_USERS`**

Registry entries subordinate to this key define the default user configuration for new users on the local computer and the user configuration for the current user.

winreg.**HKEY_PERFORMANCE_DATA**

Registry entries subordinate to this key allow you to access performance data. The data is not actually stored in the registry; the registry functions cause the system to collect the data from its source.

winreg.**HKEY_CURRENT_CONFIG**

Contains information about the current hardware profile of the local computer system.

winreg.**HKEY_DYN_DATA**

This key is not used in versions of Windows after 98.

Access Rights

For more information, see Registry Key Security and Access.

winreg.**KEY_ALL_ACCESS**

Combines the STANDARD_RIGHTS_REQUIRED, *KEY_QUERY_VALUE*, *KEY_SET_VALUE*, *KEY_CREATE_SUB_KEY*, *KEY_ENUMERATE_SUB_KEYS*, *KEY_NOTIFY*, and *KEY_CREATE_LINK* access rights.

winreg.**KEY_WRITE**

Combines the STANDARD_RIGHTS_WRITE, *KEY_SET_VALUE*, and *KEY_CREATE_SUB_KEY* access rights.

winreg.**KEY_READ**

Combines the STANDARD_RIGHTS_READ, *KEY_QUERY_VALUE*, *KEY_ENUMERATE_SUB_KEYS*, and *KEY_NOTIFY* values.

winreg.**KEY_EXECUTE**

Equivalent to *KEY_READ*.

winreg.**KEY_QUERY_VALUE**

Required to query the values of a registry key.

winreg.**KEY_SET_VALUE**

Required to create, delete, or set a registry value.

winreg.**KEY_CREATE_SUB_KEY**

Required to create a subkey of a registry key.

winreg.**KEY_ENUMERATE_SUB_KEYS**

Required to enumerate the subkeys of a registry key.

winreg.**KEY_NOTIFY**

Required to request change notifications for a registry key or for subkeys of a registry key.

winreg.**KEY_CREATE_LINK**

Reserved for system use.

64-bit Specific

For more information, see Accessing an Alternate Registry View.

winreg.**KEY_WOW64_64KEY**

Indicates that an application on 64-bit Windows should operate on the 64-bit registry view. On 32-bit Windows, this constant is ignored.

winreg.**KEY_WOW64_32KEY**

Indicates that an application on 64-bit Windows should operate on the 32-bit registry view. On 32-bit Windows, this constant is ignored.

Value Types

For more information, see Registry Value Types.

winreg.**REG_BINARY**
Binary data in any form.

winreg.**REG_DWORD**
32-bit number.

winreg.**REG_DWORD_LITTLE_ENDIAN**
A 32-bit number in little-endian format. Equivalent to *REG_DWORD*.

winreg.**REG_DWORD_BIG_ENDIAN**
A 32-bit number in big-endian format.

winreg.**REG_EXPAND_SZ**
Null-terminated string containing references to environment variables (`%PATH%`).

winreg.**REG_LINK**
A Unicode symbolic link.

winreg.**REG_MULTI_SZ**
A sequence of null-terminated strings, terminated by two null characters. (Python handles this termination automatically.)

winreg.**REG_NONE**
No defined value type.

winreg.**REG_QWORD**
A 64-bit number.

New in version 3.6.

winreg.**REG_QWORD_LITTLE_ENDIAN**
A 64-bit number in little-endian format. Equivalent to *REG_QWORD*.

New in version 3.6.

winreg.**REG_RESOURCE_LIST**
A device-driver resource list.

winreg.**REG_FULL_RESOURCE_DESCRIPTOR**
A hardware setting.

winreg.**REG_RESOURCE_REQUIREMENTS_LIST**
A hardware resource list.

winreg.**REG_SZ**
A null-terminated string.

33.2.3 Registry Handle Objects

This object wraps a Windows HKEY object, automatically closing it when the object is destroyed. To guarantee cleanup, you can call either the *Close()* method on the object, or the *CloseKey()* function.

All registry functions in this module return one of these objects.

All registry functions in this module which accept a handle object also accept an integer, however, use of the handle object is encouraged.

Handle objects provide semantics for `__bool__()` – thus

```
if handle:
    print("Yes")
```

will print `Yes` if the handle is currently valid (has not been closed or detached).

The object also support comparison semantics, so handle objects will compare true if they both reference the same underlying Windows handle value.

Handle objects can be converted to an integer (e.g., using the built-in *int()* function), in which case the underlying Windows handle value is returned. You can also use the *Detach()* method to return the integer handle, and also disconnect the Windows handle from the handle object.

`PyHKEY.`**`Close`**`()`

Closes the underlying Windows handle.

If the handle is already closed, no error is raised.

`PyHKEY.`**`Detach`**`()`

Detaches the Windows handle from the handle object.

The result is an integer that holds the value of the handle before it is detached. If the handle is already detached or closed, this will return zero.

After calling this function, the handle is effectively invalidated, but the handle is not closed. You would call this function when you need the underlying Win32 handle to exist beyond the lifetime of the handle object.

Raises an *auditing event* `winreg.PyHKEY.Detach` with argument `key`.

`PyHKEY.`**`__enter__`**`()`

`PyHKEY.`**`__exit__`**`(*exc_info)`

The HKEY object implements `__enter__()` and `__exit__()` and thus supports the context protocol for the `with` statement:

```
with OpenKey(HKEY_LOCAL_MACHINE, "foo") as key:
    ...  # work with key
```

will automatically close *key* when control leaves the `with` block.

33.3 `winsound` — Sound-playing interface for Windows

The *winsound* module provides access to the basic sound-playing machinery provided by Windows platforms. It includes functions and several constants.

`winsound.`**`Beep`**`(`*frequency*, *duration*`)`

Beep the PC's speaker. The *frequency* parameter specifies frequency, in hertz, of the sound, and must be in the range 37 through 32,767. The *duration* parameter specifies the number of milliseconds the sound should last. If the system is not able to beep the speaker, *RuntimeError* is raised.

`winsound.`**`PlaySound`**`(`*sound*, *flags*`)`

Call the underlying `PlaySound()` function from the Platform API. The *sound* parameter may be a filename, a system sound alias, audio data as a *bytes-like object*, or `None`. Its interpretation depends on the value of *flags*, which can be a bitwise ORed combination of the constants described below. If the *sound* parameter is `None`, any currently playing waveform sound is stopped. If the system indicates an error, *RuntimeError* is raised.

`winsound.`**`MessageBeep`**`(`*type=MB_OK*`)`

Call the underlying `MessageBeep()` function from the Platform API. This plays a sound as specified in the registry. The *type* argument specifies which sound to play; possible values are `-1`, `MB_ICONASTERISK`, `MB_ICONEXCLAMATION`, `MB_ICONHAND`, `MB_ICONQUESTION`, and `MB_OK`, all described below. The value `-1` produces a "simple beep"; this is the final fallback if a sound cannot be played otherwise. If the system indicates an error, *RuntimeError* is raised.

winsound.**SND_FILENAME**

The *sound* parameter is the name of a WAV file. Do not use with *SND_ALIAS*.

winsound.**SND_ALIAS**

The *sound* parameter is a sound association name from the registry. If the registry contains no such name, play the system default sound unless *SND_NODEFAULT* is also specified. If no default sound is registered, raise *RuntimeError*. Do not use with *SND_FILENAME*.

All Win32 systems support at least the following; most systems support many more:

PlaySound() name	Corresponding Control Panel Sound name
'SystemAsterisk'	Asterisk
'SystemExclamation'	Exclamation
'SystemExit'	Exit Windows
'SystemHand'	Critical Stop
'SystemQuestion'	Question

For example:

```
import winsound
# Play Windows exit sound.
winsound.PlaySound("SystemExit", winsound.SND_ALIAS)

# Probably play Windows default sound, if any is registered (because
# "*" probably isn't the registered name of any sound).
winsound.PlaySound("*", winsound.SND_ALIAS)
```

winsound.**SND_LOOP**

Play the sound repeatedly. The *SND_ASYNC* flag must also be used to avoid blocking. Cannot be used with *SND_MEMORY*.

winsound.**SND_MEMORY**

The *sound* parameter to *PlaySound()* is a memory image of a WAV file, as a *bytes-like object*.

Note: This module does not support playing from a memory image asynchronously, so a combination of this flag and *SND_ASYNC* will raise *RuntimeError*.

winsound.**SND_PURGE**

Stop playing all instances of the specified sound.

Note: This flag is not supported on modern Windows platforms.

winsound.**SND_ASYNC**

Return immediately, allowing sounds to play asynchronously.

winsound.**SND_NODEFAULT**

If the specified sound cannot be found, do not play the system default sound.

winsound.**SND_NOSTOP**

Do not interrupt sounds currently playing.

winsound.**SND_NOWAIT**

Return immediately if the sound driver is busy.

Note: This flag is not supported on modern Windows platforms.

winsound.**MB_ICONASTERISK**
: Play the `SystemDefault` sound.

winsound.**MB_ICONEXCLAMATION**
: Play the `SystemExclamation` sound.

winsound.**MB_ICONHAND**
: Play the `SystemHand` sound.

winsound.**MB_ICONQUESTION**
: Play the `SystemQuestion` sound.

winsound.**MB_OK**
: Play the `SystemDefault` sound.