

# [MS-RSP]: Remote Shutdown Protocol

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# Contents

<b>1 Introduction</b>	<b>6</b>
1.1 Glossary	6
1.2 References	6
1.2.1 Normative References	6
1.2.2 Informative References	7
1.3 Overview	7
1.4 Relationship to Other Protocols	7
1.5 Prerequisites/Preconditions	7
1.6 Applicability Statement	8
1.7 Versioning and Capability Negotiation	8
1.8 Vendor-Extensible Fields	8
1.9 Standards Assignments	8
<b>2 Messages</b>	<b>9</b>
2.1 Transport	9
2.2 Common Data Types	9
2.2.1 RPC Binding Handles for Remote Shutdown Methods	9
2.2.2 REG_UNICODE_STRING	10
2.3 Shutdown Reasons	10
<b>3 Protocol Details</b>	<b>14</b>
3.1 WinReg Server Details	14
3.1.1 Abstract Data Model	14
3.1.2 Timers	14
3.1.3 Initialization	14
3.1.4 Message Processing Events and Sequencing Rules	15
3.1.4.1 BaseInitiateSystemShutdown (Opnum 24)	17
3.1.4.2 BaseAbortSystemShutdown (Opnum 25)	17
3.1.4.3 BaseInitiateSystemShutdownEx (Opnum 30)	18
3.1.5 Timer Events	18
3.1.6 Other Local Events	18
3.2 InitShutdown Server Details	19
3.2.1 Abstract Data Model	19
3.2.2 Timers	19
3.2.3 Initialization	19
3.2.4 Message Processing Events and Sequencing Rules	19
3.2.4.1 BaseInitiateShutdown (Opnum 0)	20
3.2.4.2 BaseAbortShutdown (Opnum 1)	20
3.2.4.3 BaseInitiateShutdownEx (Opnum 2)	21
3.2.5 Timer Events	21
3.2.6 Other Local Events	21
3.3 WindowsShutdown Server Details	21
3.3.1 Abstract Data Model	22
3.3.2 Timers	22
3.3.3 Initialization	22
3.3.4 Message Processing Events and Sequencing Rules	22
3.3.4.1 WsdrInitiateShutdown (Opnum 0)	22
3.3.4.2 WsdrAbortShutdown (Opnum 1)	24
3.3.5 Timer Events	24
3.3.6 Other Local Events	24

<b>4 Protocol Examples</b> .....	<b>25</b>
<b>5 Security</b> .....	<b>26</b>
5.1 Security Considerations for Implementers.....	26
5.2 Index of Security Parameters .....	26
<b>6 Appendix A: Full IDL</b> .....	<b>27</b>
6.1 Appendix A.1: initshutdown.idl .....	27
6.2 Appendix A.2: windowsshutdown.idl.....	28
6.3 Appendix A.3: winreg.idl.....	28
<b>7 Appendix B: Product Behavior</b> .....	<b>32</b>
<b>8 Change Tracking</b> .....	<b>34</b>
<b>9 Index</b> .....	<b>36</b>

# 1 Introduction

This document specifies the Remote Shutdown Protocol. The Remote Shutdown Protocol is a remote procedure call (RPC)-based protocol used to shut down or terminate shutdown on a remote computer.

Sections 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Sections 1.5 and 1.9 are also normative but cannot contain those terms. All other sections and examples in this specification are informative.

## 1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

- client**
- endpoint**
- handle**
- Interface Definition Language (IDL)**
- named pipe**
- opnum**
- remote procedure call (RPC)**
- RPC protocol sequence**
- server**
- Server Message Block (SMB)**
- universally unique identifier (UUID)**
- well-known endpoint**

The following terms are specific to this document:

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

## 1.2 References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

A reference marked "(Archived)" means that the reference document was either retired and is no longer being maintained or was replaced with a new document that provides current implementation details. We archive our documents online [\[Windows Protocol\]](#).

### 1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact [dochelp@microsoft.com](mailto:dochelp@microsoft.com). We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[C706] The Open Group, "DCE 1.1: Remote Procedure Call", C706, August 1997, <http://www.opengroup.org/public/pubs/catalog/c706.htm>

[MS-ERREF] Microsoft Corporation, "[Windows Error Codes](#)".

[MS-RPCE] Microsoft Corporation, "[Remote Procedure Call Protocol Extensions](#)".

[MS-RRP] Microsoft Corporation, "[Windows Remote Registry Protocol](#)".

[MS-SMB] Microsoft Corporation, "[Server Message Block \(SMB\) Protocol](#)".

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

## 1.2.2 Informative References

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".

[PRDCUSRESSHUTDOWN] Microsoft Corporation, "Predefined and custom reasons for shutting down", <http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/rcreasons.aspx?mfr=true>

## 1.3 Overview

The Remote Shutdown Protocol is designed for shutting down a remote computer or for terminating the shutdown of a remote computer during the shutdown waiting period. Following are some of the examples of this protocol's applications:

- Shut down a remote computer and display a message in the shutdown dialog box for 30 seconds.
- Terminate a requested remote system shutdown during the shutdown waiting period.
- Force applications to be closed, log off users, and shut down a remote computer.
- Reboot a remote computer.

In this document, the use of the terms **client** and **server** are in the protocol client and server context. This means that the client will initiate an **RPC** call and the server will respond.

This is an RPC-based protocol. The protocol operation is stateless.

This is a simple request-response protocol. For every method that the server receives, it executes the method and returns a completion. The client simply returns the completion status to the caller. This is a stateless protocol; each method call is independent of any previous method calls.

## 1.4 Relationship to Other Protocols

The Remote Shutdown Protocol is dependent upon RPC and **SMB** for its transport. For the `InitShutdown` interface (section 3.2), this protocol uses RPC [\[MS-RPCE\]](#) over **named pipes**. Named pipes, in turn, use the SMB protocol [\[MS-SMB\]](#).

No other protocol currently depends on the Remote Shutdown Protocol.

## 1.5 Prerequisites/Preconditions

The Remote Shutdown Protocol is an RPC interface and, as a result, has the prerequisites specified in [\[MS-RPCE\]](#) (section 1.5) as being common to RPC interfaces.

It is assumed that a Remote Shutdown Protocol client has obtained the name of a remote computer that supports the Remote Shutdown Protocol before this protocol is invoked.

All remote shutdown methods are RPC calls from the client to the server that perform the complete operation in a single call. No shared state between the client and server is assumed.

## 1.6 Applicability Statement

This protocol is only appropriate for shutting down a remote computer or terminating shutdown during the shutdown waiting period.

## 1.7 Versioning and Capability Negotiation

This document covers versioning issues in the following areas:

- **Supported Transports:** The Remote Shutdown Protocol uses RPC over named pipes and RPC over TCP/IP as its only transports. The protocol sequences are specified in section [2.1](#).
- **Protocol Versions:** Information about RPC versioning and capability negotiation in this situation is specified in [\[C706\]](#) and [\[MS-RPCE\]](#) (section [1.7](#)).
- **Security and Authentication Methods:** As specified in [\[MS-RPCE\]](#) section 3.2.1.4.1.

## 1.8 Vendor-Extensible Fields

This protocol cannot be extended by any party other than Microsoft.

This protocol uses Win32 error codes. These values are taken from the Windows error number space specified in [\[MS-ERREF\]](#). Vendors SHOULD reuse those values with their indicated meaning. Choosing any other value runs the risk of a collision in the future.

## 1.9 Standards Assignments

This protocol has no standards assignments.

## 2 Messages

### 2.1 Transport

This protocol uses the following **RPC protocol sequences** as specified in [\[MS-RPCE\]](#) (sections [2.1.1.1](#) for TCP/IP - NCACN\_IP\_TCP, [2.1.1.2](#) for SMB - NCACN\_NP):

- RPC over TCP/IP (for the WindowsShutdown RPC interface)
- RPC over named pipes (for the WinReg and InitShutdown RPC interfaces)

This protocol uses the following RPC **endpoints**:

- dynamic endpoints as specified in [\[C706\] part 4](#) (for the WindowsShutdown RPC interface)
- **well-known endpoint** \PIPE\InitShutdown over named pipes (for the InitShutdown RPC interface)
- well-known endpoint \PIPE\winreg over named pipes (for the WinReg RPC interface)

This protocol MUST use the following **UUIDs**:

- WinReg Interface: 338CD001-2244-31F1-AAAA-900038001003
- InitShutdown Interface: 894DE0C0-0D55-11D3-A322-00C04FA321A1
- WindowsShutdown Interface: D95AFE70-A6D5-4259-822E-2C84DA1DDB0D

### 2.2 Common Data Types

This protocol MUST indicate to the RPC runtime that it is to support both the NDR and NDR64 transfer syntaxes and provide a negotiation mechanism for determining which transfer syntax will be used ([\[MS-RPCE\]](#) section 3.1.1.5.1.1).

In addition to RPC base types and definitions specified in [\[C706\]](#) and [\[MS-RPCE\]](#), additional data types are defined in this section.

The following list summarizes the datatypes that are defined in this specification:

- [PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)
- [REG\\_UNICODE\\_STRING \(section 2.2.2\)](#)

#### 2.2.1 RPC Binding Handles for Remote Shutdown Methods

RPC binding is the process of creating a logical connection between a client and a server. The information that composes the binding between client and server is represented by a structure called a binding **handle**. RPC binding handles are specified in [\[MS-RPCE\]](#) section 3.1.1.5.1.1.2.

All remote shutdown RPC methods accept an RPC binding handle as the first parameter. The shutdown methods (sections [3.3.4.1](#) and [3.3.4.2](#)) use an RPC primitive binding handle. The WinReg and InitShutdown RPC methods use a custom binding handle.

This type is declared as follows:

```
typedef [handle] wchar_t* PREGISTRY_SERVER_NAME;
```

This custom binding handle is actually a wrapper around a primitive RPC binding handle (type `handle_t`); the `PREGISTRY_SERVER_NAME` type is maintained only for backward. This custom binding handle is mapped to a primitive binding handle using `bind` and `unbind` routines, as specified in [MS-RPCE].

### 2.2.2 REG\_UNICODE\_STRING

This structure represents a counted string of Unicode (UTF-16) characters.

```
typedef struct {
    unsigned short Length;
    unsigned short MaximumLength;
    [size_is(MaximumLength/2), length_is(Length/2)]
    unsigned short* Buffer;
} REG_UNICODE_STRING,
*PREG_UNICODE_STRING;
```

**Length:** The number of bytes actually used by the string. Because all UTF-16 characters occupy 2 bytes, this **MUST** be an even number in the range [0...65534]. The behavior for odd values is unspecified.

**MaximumLength:** The number of bytes allocated for the string. This **MUST** be an even number in the range [**Length**...65534].

**Buffer:** The Unicode UTF-16 characters comprising the string described by the structure. Note that counted strings may or may not be terminated by a 0x0000 character, by convention; if such a terminator is present, it **SHOULD NOT** count toward the **Length** (but **MUST**, of course, be included in the **MaximumLength**).

### 2.3 Shutdown Reasons

This type is declared as follows:

```
typedef ULONG dwReason;
```

Some **opnums** allow the transmission of a shutdown reason. This reason is composed of a major reason code, an optional minor reason code, and optional flags, which **MUST** be a bitwise OR of the flags.

Major reason codes are described in the following table.

Constant/value	Description
SHTDN_REASON_MAJOR_APPLICATION 0x00040000	Application issue
SHTDN_REASON_MAJOR_HARDWARE 0x00010000	Hardware issue

Constant/value	Description
SHTDN_REASON_MAJOR_LEGACY_API 0x00070000	The InitiateSystemShutdown function was used instead of InitiateSystemShutdownEx
SHTDN_REASON_MAJOR_OPERATINGSYSTEM 0x00020000	Operating system issue
SHTDN_REASON_MAJOR_OTHER 0x00000000	Other issue
SHTDN_REASON_MAJOR_POWER 0x00060000	Power failure
SHTDN_REASON_MAJOR_SOFTWARE 0x00030000	Software issue
SHTDN_REASON_MAJOR_SYSTEM 0x00050000	System failure

Any minor reason code MAY be used with any major reason code. Minor reason codes are described in the following table.

Constant/value	Description
SHTDN_REASON_MINOR_BLUESCREEN 0x0000000F	Blue screen crash event
SHTDN_REASON_MINOR_CORDUNPLUGGED 0x0000000b	Unplugged
SHTDN_REASON_MINOR_DISK 0x00000007	Disk
SHTDN_REASON_MINOR_ENVIRONMENT 0x0000000c	Environment
SHTDN_REASON_MINOR_HARDWARE_DRIVER 0x0000000d	Driver
SHTDN_REASON_MINOR_HOTFIX 0x00000011	Hot fix
SHTDN_REASON_MINOR_HOTFIX_UNINSTALL 0x00000017	Hot fix uninstallation
SHTDN_REASON_MINOR_HUNG 0x00000005	Unresponsive
SHTDN_REASON_MINOR_INSTALLATION 0x00000002	Installation
SHTDN_REASON_MINOR_MAINTENANCE 0x00000001	Maintenance

Constant/value	Description
SHTDN_REASON_MINOR_MMC 0x00000019	Management tool<1>
SHTDN_REASON_MINOR_NETWORK_CONNECTIVITY 0x00000014	Network connectivity
SHTDN_REASON_MINOR_NETWORKCARD 0x00000009	Network card
SHTDN_REASON_MINOR_OTHER 0x00000000	Other issue
SHTDN_REASON_MINOR_OTHERDRIVER 0x0000000e	Other driver event
SHTDN_REASON_MINOR_POWER_SUPPLY 0x0000000a	Power supply
SHTDN_REASON_MINOR_PROCESSOR 0x00000008	Processor
SHTDN_REASON_MINOR_RECONFIG 0x00000004	Reconfigure
SHTDN_REASON_MINOR_SECURITY 0x00000013	Security issue
SHTDN_REASON_MINOR_SECURITYFIX 0x00000012	Security patch
SHTDN_REASON_MINOR_SECURITYFIX_UNINSTALL 0x00000018	Security patch uninstallation
SHTDN_REASON_MINOR_SERVICEPACK 0x00000010	Service pack
SHTDN_REASON_MINOR_SERVICEPACK_UNINSTALL 0x00000016	Service pack uninstallation
SHTDN_REASON_MINOR_TERMSRV 0x00000020	Terminal services
SHTDN_REASON_MINOR_UNSTABLE 0x00000006	Unstable
SHTDN_REASON_MINOR_UPGRADE 0x00000003	Installation of software on the system required reboot
SHTDN_REASON_MINOR_WMI 0x00000015	WMI issue

The following optional flags provide additional information about the event.

Constant/Value	Description
SHTDN_REASON_FLAG_USER_DEFINED 0x40000000	The reason code is defined by the user. <2> If this flag is not present, the reason code is defined by the system.
SHTDN_REASON_FLAG_PLANNED 0x80000000	The shutdown was planned. If this flag is not present, the shutdown was unplanned.

## 3 Protocol Details

The remote shutdown RPC interfaces are used to shut down or, during the shutdown waiting period, abort shutdown on a remote computer.

This section presents the details of the Remote Shutdown Protocol:

- Section [3.1](#) specifies the WinReg RPC interface.
- Section [3.2](#) specifies the InitShutdown RPC interface.
- Section [3.3](#) specifies the WindowsShutdown RPC interface.

All remote shutdown methods return 0x00000000 on success; otherwise, they return a 32-bit, nonzero Win32 error code. For more information on Win32 error values, see [\[MS-ERREF\]](#).

The default pointer type for the shutdown RPC interface is pointer\_default(unique). Method calls are received at a dynamically assigned endpoint ([\[MS-RPCE\]](#) section 2.1.1.1). The endpoints for the Netlogon service are negotiated by the RPC endpoint mapper ([\[MS-RPCE\]](#) section 2.1.1.1).

The client side of this protocol is simply a pass-through. That is, there are no additional timers or other states required on the client side of this protocol. Calls made by the higher-layer protocol or application are passed directly to the transport, and the results returned by the transport are passed directly back to the higher-layer protocol or application.

### 3.1 WinReg Server Details

The following section specifies data and state maintained by the WinReg RPC server. It includes details about receiving WinReg RPC methods on the server side of the client-server communication. The provided data is to facilitate the explanation of how the protocol behaves. This section does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

#### 3.1.1 Abstract Data Model

This is an RPC-based protocol. The server does not maintain client state information. The protocol operation is stateless.

This is a simple request-response protocol. For every method that the server receives, it executes the method and returns a completion. The client simply returns the completion status to the caller. This is a stateless protocol; each method call is independent of any previous method calls.

#### 3.1.2 Timers

No protocol timers are required beyond those used internally by RPC to implement resiliency to network outages.

#### 3.1.3 Initialization

The WinReg server side registers an endpoint with RPC over named pipes transport ([\[MS-RPCE\]](#) section 2.1.1.2), using the "\PIPE\Shutdown" named pipe.

### 3.1.4 Message Processing Events and Sequencing Rules

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 5.0 ([\[MS-RPCE\]](#) section 3.1.1.5.3).

Remote shutdown communication between a client and a server occurs through RPC calls.

The WinReg interface includes the following methods.[<3>](#)

Methods in RPC Opnum Order

Method	Description
<b>Opnum0NotImplemented</b>	Not implemented. Opnum: 0
<b>Opnum1NotImplemented</b>	Not implemented. Opnum: 1
<b>Opnum2NotImplemented</b>	Not implemented. Opnum: 2
<b>Opnum3NotImplemented</b>	Not implemented. Opnum: 3
<b>Opnum4NotImplemented</b>	Not implemented. Opnum: 4
<b>Opnum5NotImplemented</b>	Not implemented. Opnum: 5
<b>Opnum6NotImplemented</b>	Not implemented. Opnum: 6
<b>Opnum7NotImplemented</b>	Not implemented. Opnum: 7
<b>Opnum8NotImplemented</b>	Not implemented. Opnum: 8
<b>Opnum9NotImplemented</b>	Not implemented. Opnum: 9
<b>Opnum10NotImplemented</b>	Not implemented. Opnum: 10
<b>Opnum11NotImplemented</b>	Not implemented. Opnum: 11
<b>Opnum12NotImplemented</b>	Not implemented. Opnum: 12
<b>Opnum13NotImplemented</b>	Not implemented. Opnum: 13

Method	Description
<b>Opnum14NotImplemented</b>	Not implemented. Opnum: 14
<b>Opnum15NotImplemented</b>	Not implemented. Opnum: 15
<b>Opnum16NotImplemented</b>	Not implemented. Opnum: 16
<b>Opnum17NotImplemented</b>	Not implemented. Opnum: 17
<b>Opnum18NotImplemented</b>	Not implemented. Opnum: 18
<b>Opnum19NotImplemented</b>	Not implemented. Opnum: 19
<b>Opnum20NotImplemented</b>	Not implemented. Opnum: 20
<b>Opnum21NotImplemented</b>	Not implemented. Opnum: 21
<b>Opnum22NotImplemented</b>	Not implemented. Opnum: 22
<b>Opnum23NotImplemented</b>	Not implemented. Opnum: 23
<a href="#"><u>BaseInitiateSystemShutdown</u></a>	The <b>BaseInitiateSystemShutdown</b> method is used to initiate the shutdown of the remote computer. Opnum: 24
<a href="#"><u>BaseAbortSystemShutdown</u></a>	The <b>BaseAbortSystemShutdown</b> method is used to abort the shutdown of the remote computer within the waiting period. Opnum: 25
<b>Opnum26NotImplemented</b>	Not implemented. Opnum: 26
<b>Opnum27NotImplemented</b>	Not implemented. Opnum: 27
<b>Opnum28NotImplemented</b>	Not implemented. Opnum: 28
<b>Opnum29NotImplemented</b>	Not implemented. Opnum: 29
<a href="#"><u>BaseInitiateSystemShutdownEx</u></a>	The <b>BaseInitiateShutdownEx</b> method is used to initiate the shutdown of the remote computer with the reason for initiating the

Method	Description
	shutdown given as a parameter to the call. Opnum: 30

**Note** Gaps in the opnum numbering sequence represent opnums of methods specified in [\[MS-RRP\]](#). Exceptions MUST NOT be thrown beyond those thrown by the underlying RPC protocol [MS-RPCE], unless specified otherwise.

### 3.1.4.1 BaseInitiateSystemShutdown (Opnum 24)

The **BaseInitiateSystemShutdown** method is used to initiate the shutdown of the remote computer. [<4>](#)

```
unsigned long BaseInitiateSystemShutdown(
    [in, unique] PREGISTRY_SERVER_NAME ServerName,
    [in, unique] PREG_UNICODE_STRING lpMessage,
    [in] unsigned long dwTimeout,
    [in] unsigned char bForceAppsClosed,
    [in] unsigned char bRebootAfterShutdown
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**lpMessage:** Null-terminated Unicode string that contains the message to display during the shutdown waiting period. If this parameter is NULL, no message MUST be displayed.

**dwTimeout:** Number of seconds to wait before shutting down.

**bForceAppsClosed:** If TRUE, all applications SHOULD be terminated unconditionally.

**bRebootAfterShutdown:** If TRUE, the system SHOULD shut down and reboot. If FALSE, the system SHOULD only shut down.

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED.

### 3.1.4.2 BaseAbortSystemShutdown (Opnum 25)

The **BaseAbortSystemShutdown** method is used to terminate the shutdown of the remote computer within the waiting period. [<5>](#)

```
unsigned long BaseAbortSystemShutdown(
    [in, unique] PREGISTRY_SERVER_NAME ServerName
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED.

### 3.1.4.3 BaseInitiateSystemShutdownEx (Opnum 30)

The **BaseInitiateSystemShutdownEx** method is used to initiate the shutdown of the remote computer with the reason for initiating the shutdown given as a parameter to the call. [<6>](#)

```
unsigned long BaseInitiateSystemShutdownEx(  
    [in, unique] PREGISTRY_SERVER_NAME ServerName,  
    [in, unique] PREG_UNICODE_STRING lpMessage,  
    [in] unsigned long dwTimeout,  
    [in] unsigned char bForceAppsClosed,  
    [in] unsigned char bRebootAfterShutdown,  
    [in] unsigned long dwReason  
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**lpMessage:** Null-terminated Unicode string that contains the message to display during the shutdown waiting period. If this parameter is NULL, no message MUST be displayed.

**dwTimeout:** Number of seconds to wait before shutting down.

**bForceAppsClosed:** If TRUE, all applications SHOULD be terminated unconditionally.

**bRebootAfterShutdown:** If TRUE, the system SHOULD shutdown and reboot. If FALSE, the system SHOULD only shut down.

**dwReason:** Reason for initiating the shutdown (section [2.3](#)). The **dwReason** SHOULD be used for log entries for the shutdown event.

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED.

### 3.1.5 Timer Events

None.

### 3.1.6 Other Local Events

None.

## 3.2 InitShutdown Server Details

The following section specifies data and state maintained by the InitShutdown RPC server. It includes details about receiving InitShutdown RPC methods on the server side of the client-server communication. The provided data is to facilitate the explanation of how the protocol behaves. This section does not mandate that implementations adhere to this model, as long as their external behavior is consistent with that described in this document.

### 3.2.1 Abstract Data Model

This is an RPC-based protocol. The server does not maintain client state information. The protocol operation is stateless.

This is a simple request-response protocol. For every method that the server receives, it executes the method and returns a completion. The client simply returns the completion status to the caller. This is a stateless protocol; each method call is independent of any previous method calls.

### 3.2.2 Timers

No protocol timers are required beyond those used internally by RPC to implement resiliency to network outages.

### 3.2.3 Initialization

The InitShutdown interface server side registers an endpoint with RPC over named pipes transport ([\[MS-RPCE\]](#) section 2.1.1.2), using the "\\PIPE\InitShutdown" named pipe.

### 3.2.4 Message Processing Events and Sequencing Rules

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 5.0 ([\[MS-RPCE\]](#) section 3.1.1.5.3).

The **InitShutdown** interface includes the following methods. [<7>](#)

Methods in RPC Opnum Order

Method	Description
<a href="#">BaseInitiateShutdown</a>	The <b>BaseInitiateShutdown</b> method is used to initiate the shutdown of the remote computer. Opnum: 0
<a href="#">BaseAbortShutdown</a>	The <b>BaseAbortShutdown</b> method is used to terminate the shutdown of the remote computer within the waiting period. Opnum: 1
<a href="#">BaseInitiateShutdownEx</a>	The <b>BaseInitiateShutdownEx</b> method extends <b>BaseInitiateShutdown</b> to include a reason for shut down. Opnum: 2

**Note** Exceptions MUST NOT be thrown beyond those thrown by the underlying RPC protocol [[MS-RPCE](#)], unless specified otherwise.

### 3.2.4.1 BaseInitiateShutdown (Opnum 0)

The **BaseInitiateShutdown** method is used to initiate the shutdown of the remote computer. <8>

```
unsigned long BaseInitiateShutdown(  
    [in, unique] PREGISTRY_SERVER_NAME ServerName,  
    [in, unique] PREG_UNICODE_STRING lpMessage,  
    [in] unsigned long dwTimeout,  
    [in] unsigned char bForceAppsClosed,  
    [in] unsigned char bRebootAfterShutdown  
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**lpMessage:** Null-terminated Unicode string that contains the message to display during the shutdown waiting period. If this parameter is NULL, no message MUST be displayed.

**dwTimeout:** Number of seconds to wait before shutting down.

**bForceAppsClosed:** If TRUE, all applications SHOULD be terminated unconditionally.

**bRebootAfterShutdown:** If TRUE, the system SHOULD shut down and reboot. If FALSE, the system SHOULD only shut down.

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code. <9>

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED.

### 3.2.4.2 BaseAbortShutdown (Opnum 1)

The **BaseAbortShutdown** method is used to terminate the shutdown of the remote computer within the waiting period. <10>

```
unsigned long BaseAbortShutdown(  
    [in, unique] PREGISTRY_SERVER_NAME ServerName  
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED.

### 3.2.4.3 BaseInitiateShutdownEx (Opnum 2)

The **BaseInitiateShutdownEx** method is used to initiate the shutdown of the remote computer. [<11>](#)

```
unsigned long BaseInitiateShutdownEx(  
    [in, unique] PREGISTRY_SERVER_NAME ServerName,  
    [in, unique] PREG_UNICODE_STRING lpMessage,  
    [in] unsigned long dwTimeout,  
    [in] unsigned char bForceAppsClosed,  
    [in] unsigned char bRebootAfterShutdown,  
    [in] unsigned long dwReason  
);
```

**ServerName:** The custom RPC binding handle ([PREGISTRY\\_SERVER\\_NAME \(section 2.2.1\)](#)).

**lpMessage:** Null-terminated Unicode string that contains the message to display during the shutdown waiting period. If this parameter is NULL, no message MUST be displayed.

**dwTimeout:** Number of seconds to wait before shutting down.

**bForceAppsClosed:** If TRUE, all applications SHOULD be terminated unconditionally.

**bRebootAfterShutdown:** If TRUE, the system SHOULD shut down and reboot. If FALSE, the system SHOULD only shut down.

**dwReason:** Reason for initiating the shutdown (section [2.3](#)).

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_ACCESS\_DENIED. [<12>](#)

### 3.2.5 Timer Events

None.

### 3.2.6 Other Local Events

None.

## 3.3 WindowsShutdown Server Details

The following section specifies data and state maintained by the WindowsShutdown RPC server. It includes details about receiving WindowsShutdown RPC methods on the server side of the client-server communication. The provided data is to facilitate the explanation of how the protocol behaves. This section does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

### 3.3.1 Abstract Data Model

This is an RPC-based protocol. The server does not maintain client state information. The protocol operation is stateless.

This is a simple request-response protocol. For every method that the server receives, it executes the method and returns a completion. The client simply returns the completion status to the caller. This is a stateless protocol; each method call is independent of any previous method calls.

### 3.3.2 Timers

No protocol timers are required beyond those used internally by RPC to implement resiliency to network outages.

### 3.3.3 Initialization

The WindowsShutdown interface server side registers a dynamic endpoint with RPC over the TCP/IP (ncacn\_ip\_tcp) transport ([MS-RPCE] section 2.1.1.1).

### 3.3.4 Message Processing Events and Sequencing Rules

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 5.0 ([MS-RPCE] section 3.1.1.5.3).

Remote shutdown communication between a client and a server occurs through RPC calls.

The WindowsShutdown interface includes the following methods. <13>

Methods in RPC Opnum Order

Method	Description
<a href="#">WsdriInitiateShutdown</a>	The <b>WsdriInitiateShutdown</b> method is used to initiate the shutdown of the remote computer. Opnum: 0
<a href="#">WsdriAbortShutdown</a>	The <b>WsdriAbortShutdown</b> method is used to abort the shutdown of the remote computer within the waiting period. Opnum: 1

**Note** Exceptions MUST NOT be thrown, except those thrown by the underlying RPC protocol [MS-RPCE], unless specified otherwise.

#### 3.3.4.1 WsdriInitiateShutdown (Opnum 0)

The **WsdriInitiateShutdown** method is used to initiate the shutdown of the remote computer. <14>

```
unsigned long WsdriInitiateShutdown(  
    [in] handle_t Binding,  
    [in, unique] PREG_UNICODE_STRING lpMessage,  
    [in] unsigned long dwGracePeriod,  
    [in] unsigned long dwShutdownFlags,  
    [in] unsigned long dwReason,  
    [in, unique] PREG_UNICODE_STRING lpClientHint
```

);

**Binding:** Primitive RPC handle that identifies a particular client/server binding.

**IpMessage:** Null-terminated Unicode string that contains the message to display during the shutdown waiting period. If this parameter is NULL, no message MUST be displayed.

**dwGracePeriod:** Number of seconds to wait before shutting down.

**dwShutdownFlags:** A set of bit flags in little-endian format used as a mask to indicate shutdown options. The value is constructed from zero or more bit flags from the following table, with the exception that flag "B" cannot be combined with "C" or "D".

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G	F	E	D	C	B	0	A

The bits are defined as follows.

Value	Meaning
A 0x00000001	All applications SHOULD be terminated unconditionally. An alternate for this field is SHUTDOWN_FORCE_OTHERS.
B 0x00000004	Restart computer. Cannot be used with "C" or "D". An alternate name for this field is SHUTDOWN_RESTART.
C 0x00000008	The shutdown SHOULD turn off the computer. Cannot be used with "B" or "D". An alternate name for this field is SHUTDOWN_POWEROFF.
D 0x00000010	The shutdown SHOULD leave the computer powered but SHOULD NOT cause a reboot. Cannot be used with "B" or "C". An alternate name for this field is SHUTDOWN_NOREBOOT.
E 0x00000020	If a shutdown is currently in progress, setting this bit on a subsequent shutdown request SHOULD cause the ongoing request's waiting period to be ignored and SHOULD cause an immediate shutdown. An alternate name for this field is SHUTDOWN_GRACE_OVERRIDE.
F 0x00000040	The shutdown SHOULD install pending software updates before proceeding. An alternate name for this field is SHUTDOWN_INSTALL_UPDATES.
G 0x00000080	The shutdown SHOULD restart the computer and then restart any applications that have registered for restart. An alternate name for this field is SHUTDOWN_RESTARTAPPS.

All other bits MUST be zero and ignored upon receipt.

**dwReason:** Reason for initiating the shutdown (section 2.3). The **dwReason** SHOULD be used for log entries for the shutdown event.

**IpClientHint:** Used only for diagnostic purposes (logging the image file name of the process initiating a shutdown).

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_BAD\_NETPATH.

If there are other sessions logged on and "A" is not set, the server MUST return ERROR\_SHUTDOWN\_USERS\_LOGGED\_ON.

The shutdown SHOULD turn off the computer when "B," "C," and "D" are not set or when multiple bits are set.

### 3.3.4.2 WsdrAbortShutdown (Opnum 1)

The **WsdrAbortShutdown** method is used to terminate the shutdown of the remote computer within the waiting period. <15>

```
unsigned long WsdrAbortShutdown(  
    [in] handle_t Binding,  
    [in, unique] PREG_UNICODE_STRING lpClientHint  
);
```

**Binding:** Primitive RPC handle that identifies a particular client/server binding.

**lpClientHint:** Used only for diagnostic purposes (logging the image file name of the process canceling a shutdown).

**Return Values:** The method returns ERROR\_SUCCESS (0x00000000) on success; otherwise, it returns a nonzero error code.

On receiving this call, the server MUST perform the following validation step:

- Verify that the caller has sufficient privileges to shut down the computer; otherwise, the server MUST return ERROR\_BAD\_NETPATH.

### 3.3.5 Timer Events

None.

### 3.3.6 Other Local Events

None.

## 4 Protocol Examples

The following example shows a sample call from a client to a server, asking the server to reboot in 30 seconds and to display a message.

In this example, the client contacts the server with the following [WsdriInitiateShutdown](#) call.

```
ULONG = (return value, not yet set)
WsdriInitiateShutdown(
    [ in ] handle_t Binding = (set by RpcBindingFromStringBinding()),
    [ in, unique ] PREG_UNICODE_STRING lpMessage =
L"Restarting system. Please save your work.",
    [ in ] DWORD dwGracePeriod = 30,
    [ in ] DWORD dwShutdownFlags = SHUTDOWN_RESTART,
    [ in ] DWORD dwReason = SHUTDOWN_MAJOR_OTHER,
    [ in, unique ] PREG_UNICODE_STRING lpClientHint = L""
);
```

The server receives this call, verifies that the caller has sufficient privileges to shut down the computer, displays the message to the interactively logged on users, and after waiting 30 seconds, reboots the server.

The server responds with the following **WsdriInitiateShutdown** return.

```
ULONG = ERROR_SUCCESS
WsdriInitiateShutdown(
    [ in ] handle_t Binding = (unchanged),
    [ in, unique ] PREG_UNICODE_STRING lpMessage = (unchanged),
    [ in ] DWORD dwGracePeriod = (unchanged),
    [ in ] DWORD dwShutdownFlags = (unchanged),
    [ in ] DWORD dwReason = (unchanged),
    [ in, unique ] PREG_UNICODE_STRING lpClientHint = (unchanged)
);
```

## **5 Security**

### **5.1 Security Considerations for Implementers**

There are no special security considerations for this protocol.

### **5.2 Index of Security Parameters**

There are no security parameters for this protocol.

## 6 Appendix A: Full IDL

The protocol uses three **Interface Definition Language (IDL)** files: `initshutdown.idl`, `windowsshutdown.idl`, and `winreg.idl`.

### 6.1 Appendix A.1: `initshutdown.idl`

For ease of implementation, the full IDL is provided in this section.

`initshutdown.idl`

```
typedef struct _REG_UNICODE_STRING {
    unsigned short Length;
    unsigned short MaximumLength;
    [size_is(MaximumLength / 2), length_is((Length) / 2) ]
    unsigned short* Buffer;
} REG_UNICODE_STRING,
 *PREG_UNICODE_STRING;

[
    uuid(894de0c0-0d55-11d3-a322-00c04fa321a1),
    pointer_default( unique ),
    version(1.0)
]
interface InitShutdown
//
// Interface body
//
{

//
// Server name, binding handles.
//
typedef [handle] wchar_t* PREGISTRY_SERVER_NAME;

//
// Shutdown APIs.
//

    unsigned long
    BaseInitiateShutdown(
        [ in, unique ] PREGISTRY_SERVER_NAME ServerName,
        [ in, unique ] PREG_UNICODE_STRING lpMessage,
        [ in ] unsigned long dwTimeout,
        [ in ] unsigned char bForceAppsClosed,
        [ in ] unsigned char bRebootAfterShutdown
    );

    unsigned long
    BaseAbortShutdown(
        [ in, unique ] PREGISTRY_SERVER_NAME ServerName
    );

    unsigned long
    BaseInitiateShutdownEx(
        [ in, unique ] PREGISTRY_SERVER_NAME ServerName,
        [ in, unique ] PREG_UNICODE_STRING lpMessage,
        [ in ] unsigned long dwTimeout,
```

```

    [ in ] unsigned char bForceAppsClosed,
    [ in ] unsigned char bRebootAfterShutdown,
    [ in ] unsigned long dwReason
    );
}

```

## 6.2 Appendix A.2: windowsshutdown.idl

For ease of implementation, the full IDL is provided in this section.

The windowsshutdown.idl file appears as follows.

```

typedef struct _REG_UNICODE_STRING {
    unsigned short Length;
    unsigned short MaximumLength;
    [size_is(MaximumLength / 2), length_is((Length) / 2) ] unsigned short* Buffer;
} REG_UNICODE_STRING, *PREG_UNICODE_STRING;
[
    uuid(d95afe70-a6d5-4259-822e-2c84da1ddb0d),
    pointer_default( unique ),
    version(1.0)
]
interface WindowsShutdown
{
    unsigned long
    WsdrInitiateShutdown(
        [ in ] handle_t Binding,
        [ in, unique ] PREG_UNICODE_STRING lpMessage,
        [ in ] unsigned long dwGracePeriod,
        [ in ] unsigned long dwShutdownFlags,
        [ in ] unsigned long dwReason,
        [ in, unique ] PREG_UNICODE_STRING lpClientHint
    );

    unsigned long
    WsdrAbortShutdown(
        [ in ] handle_t Binding,
        [ in, unique ] PREG_UNICODE_STRING lpClientHint
    );
}

```

## 6.3 Appendix A.3: winreg.idl

For ease of implementation, the full IDL is provided in this section.

winreg.idl

```

typedef struct _REG_UNICODE_STRING {
    unsigned short Length;
    unsigned short MaximumLength;
    [size_is(MaximumLength / 2), length_is((Length) / 2) ]
        unsigned short* Buffer;
} REG_UNICODE_STRING,
    *PREG_UNICODE_STRING;

```

```
[
    uuid( 338CD001-2244-31F1-AAAA-900038001003 ),
    pointer_default( unique ),
    version( 1.0 )
]
interface winreg
{
    typedef [handle] wchar_t* PREGISTRY_SERVER_NAME;

    //
    // Windows Remote Registry Server APIs.
    //

    //opcode 0
    void Opnum0NotImplemented();

    //opcode 1
    void Opnum1NotImplemented();

    //opcode 2
    void Opnum2NotImplemented();

    //opcode 3
    void Opnum3NotImplemented();

    //opcode 4
    void Opnum4NotImplemented();

    //opcode 5
    void Opnum5NotImplemented();

    //opcode 6
    void Opnum6NotImplemented();

    //opcode 7
    void Opnum7NotImplemented();

    //opcode 8
    void Opnum8NotImplemented();

    //opcode 9
    void Opnum9NotImplemented();

    //opcode 10
    void Opnum10NotImplemented();

    //opcode 11
    void Opnum11NotImplemented();

    //opcode 12
    void Opnum12NotImplemented();

    //opcode 13
    void Opnum13NotImplemented();

    //opcode 14
    void Opnum14NotImplemented();
}
```

```
//opcode 15
void Opnum15NotImplemented();

//opcode 16
void Opnum16NotImplemented();

//opcode 17
void Opnum17NotImplemented();

//opcode 18
void Opnum18NotImplemented();

//opcode 19
void Opnum19NotImplemented();

//opcode 20
void Opnum20NotImplemented();

//opcode 21
void Opnum21NotImplemented();

//opcode 22
void Opnum22NotImplemented();

//opcode 23
void Opnum23NotImplemented();

//opcode 24
unsigned long BaseInitiateSystemShutdown(
    [in, unique] PREGISTRY_SERVER_NAME ServerName,
    [in, unique] PREG_UNICODE_STRING lpMessage,
    [in] unsigned long dwTimeout,
    [in] unsigned char bForceAppsClosed,
    [in] unsigned char bRebootAfterShutdown
);

//opcode 25
unsigned long BaseAbortSystemShutdown(
    [in, unique] PREGISTRY_SERVER_NAME ServerName
);

//opcode 26
void Opnum26NotImplemented();

//opcode 27
void Opnum27NotImplemented();

//opcode 28
void Opnum28NotImplemented();

//opcode 29
void Opnum29NotImplemented();

//opcode 30
unsigned long BaseInitiateSystemShutdownEx(
    [in, unique] PREGISTRY_SERVER_NAME ServerName,
    [in, unique] PREG_UNICODE_STRING lpMessage,
    [in] unsigned long dwTimeout,
    [in] unsigned char bForceAppsClosed,
```

```
        [in] unsigned char bRebootAfterShutdown,  
        [in] unsigned long dwReason  
    );  
}
```

## 7 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Windows NT operating system
- Windows 2000 operating system
- Windows XP operating system
- Windows Server 2003 operating system
- Windows Vista operating system
- Windows Server 2008 operating system
- Windows 7 operating system
- Windows Server 2008 R2 operating system
- Windows 8 operating system
- Windows Server 2012 operating system
- Windows 8.1 operating system
- Windows Server 2012 R2 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 2.3:](#) Shutdown request is from the Microsoft Management Console (MMC)

[<2> Section 2.3:](#) For more information, see [\[PRDCUSRESSHUTDOWN\]](#).

[<3> Section 3.1.4:](#) Supported in Windows NT, Windows 2000, Windows XP, and Windows Server 2003.

[<4> Section 3.1.4.1:](#) Supported in Windows NT, Windows 2000, Windows XP, and Windows Server 2003.

[<5> Section 3.1.4.2:](#) Supported in Windows NT, Windows 2000, Windows XP, and Windows Server 2003.

[<6> Section 3.1.4.3:](#) Supported in Windows NT, Windows 2000, Windows XP, and Windows Server 2003.

[<7> Section 3.2.4:](#) Not supported on Windows NT.

[<8> Section 3.2.4.1](#): Not supported on Windows NT.

[<9> Section 3.2.4.1](#): Windows returns error ERROR\_SHUTDOWN\_IN\_PROGRESS if a shutdown is already in progress on the specified computer. Windows returns the error ERROR\_NOT\_READY if fast-user switching is enabled but no user is logged on.

[<10> Section 3.2.4.2](#): Not supported on Windows NT.

[<11> Section 3.2.4.3](#): Not supported on Windows NT.

[<12> Section 3.2.4.3](#): Windows returns error ERROR\_SHUTDOWN\_IN\_PROGRESS, if a shutdown is already in progress on the specified computer. Windows returns the error ERROR\_NOT\_READY if fast-user switching is enabled but no user is logged on.

[<13> Section 3.3.4](#): Not supported on Windows NT, Windows 2000, Windows XP, or Windows Server 2003.

[<14> Section 3.3.4.1](#): Not supported on Windows NT, Windows 2000, Windows XP, or Windows Server 2003.

[<15> Section 3.3.4.2](#): Not supported on Windows NT, Windows 2000, Windows XP, or Windows Server 2003.

## 8 Change Tracking

This section identifies changes that were made to the [MS-RSP] protocol document between the January 2013 and August 2013 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact [protocol@microsoft.com](mailto:protocol@microsoft.com).

<b>Section</b>	<b>Tracking number (if applicable) and description</b>	<b>Major change (Y or N)</b>	<b>Change type</b>
<a href="#">2.2.2 REG_UNICODE_STRING</a>	67350 Changed UCS-2 to UTF-16.	Y	Content updated.
<a href="#">Z Appendix B: Product Behavior</a>	Modified this section to include references to Windows 8.1 operating system and Windows Server 2012 R2 operating system.	Y	Content updated.

## 9 Index

### A

Abstract data model

[InitShutdown server](#) 19

[Windows Remote Registry server](#) 14

[Windows shutdown server](#) 22

[Applicability](#) 8

### B

[BaseAbortShutdown method](#) 20

[BaseAbortSystemShutdown method](#) 17

[BaseInitiateShutdown method](#) 20

[BaseInitiateShutdownEx method](#) 21

[BaseInitiateSystemShutdown method](#) 17

[BaseInitiateSystemShutdownEx method](#) 18

### C

[Capability negotiation](#) 8

[Change tracking](#) 34

### D

Data model - abstract

[InitShutdown server](#) 19

[Windows Remote Registry server](#) 14

[Windows shutdown server](#) 22

[Data types](#) 9

### E

Events

local

[InitShutdown server](#) 21

[Windows Remote Registry server](#) 18

[Windows shutdown server](#) 24

timer

[InitShutdown server](#) 21

[Windows Remote Registry server](#) 18

[Windows shutdown server](#) 24

[Examples](#) 25

### F

[Fields - vendor-extensible](#) 8

Full IDL ([section 6.1](#) 27, [section 6.2](#) 28)

### G

[Glossary](#) 6

### I

IDL ([section 6.1](#) 27, [section 6.2](#) 28)

[Implementers - security considerations](#) 26

[Informative references](#) 7

Initialization

[InitShutdown server](#) 19

[Windows Remote Registry server](#) 14

[Windows shutdown server](#) 22

InitShutdown server

[abstract data model](#) 19

[initialization](#) 19

[local events](#) 21

[message processing](#) 19

[overview](#) 19

[sequencing rules](#) 19

[timer events](#) 21

[timers](#) 19

[Introduction](#) 6

### L

Local events

[InitShutdown server](#) 21

[Windows Remote Registry server](#) 18

[Windows shutdown server](#) 24

### M

Message processing

[InitShutdown server](#) 19

[Windows Remote Registry server](#) 15

[Windows shutdown server](#) 22

[Messages - transport](#) 9

### N

[Normative references](#) 6

### O

[Overview](#) 7

### P

[Parameters - security](#) 26

[Preconditions](#) 7

[PREG\\_UNICODE\\_STRING](#) 10

[Prerequisites](#) 7

[Product behavior](#) 32

### R

References

[informative](#) 7

[normative](#) 6

[REG\\_UNICODE\\_STRING structure](#) 10

[Relationship to other protocols](#) 7

### S

[Security](#) 26

Sequencing rules

[InitShutdown server](#) 19

[Windows Remote Registry server](#) 15  
[Windows shutdown server](#) 22  
[Shutdown reasons](#) 10  
[Standards assignments](#) 8

## T

Timer events

[InitShutdown server](#) 21  
[Windows Remote Registry server](#) 18  
[Windows shutdown server](#) 24

Timers

[InitShutdown server](#) 19  
[Windows Remote Registry server](#) 14  
[Windows shutdown server](#) 22

[Tracking changes](#) 34

[Transport - message](#) 9

## V

[Vendor-extensible fields](#) 8

[Versioning](#) 8

## W

Windows Remote Registry server

[abstract data model](#) 14  
[initialization](#) 14  
[local events](#) 18  
[message processing](#) 15  
[overview](#) 14  
[sequencing rules](#) 15  
[timer events](#) 18  
[timers](#) 14

Windows shutdown server

[abstract data model](#) 22  
[initialization](#) 22  
[local events](#) 24  
[message processing](#) 22  
[overview](#) 21  
[sequencing rules](#) 22  
[timer events](#) 24  
[timers](#) 22

[WsdAbortShutdown method](#) 24

[WsdInitiateShutdown method](#) 22