[MS-RDPET]:

Remote Desktop Protocol: Telemetry Virtual Channel Extension

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Revision Summary

Date	Revision History	Revision Class	Comments
11/14/2013	1.0	New	Released new document.
2/13/2014	1.0	None	No changes to the meaning, language, or formatting of the technical content.
5/15/2014	1.0	None	No changes to the meaning, language, or formatting of the technical content.
6/30/2015	2.0	Major	Significantly changed the technical content.

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1 Introduction

This document specifies the Remote Desktop Protocol: Telemetry Virtual Channel Extension to the Remote Desktop Protocol: Basic Connectivity and Graphics Remoting, as specified in [MS-RDPBCGR]. The telemetry protocol defined in section 2.2 is used to send client performance metrics to the server, thus providing a way to collate statistics about the quality of the RDP experience.

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 [RFC2119]. Sections 1.5 and 1.9 are also normative but do not contain those terms. All other sections and examples in this specification are informative.

1.1 Glossary

The following terms are specific to this document:

ANSI character: An 8-bit Windows-1252 character set unit.

little-endian: Multiple-byte values that are byte-ordered with the least significant byte stored in the memory location with the lowest address.

terminal server: A computer on which terminal services is running.

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

1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the Errata.

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. We will assist you in finding the relevant information.

[MS-RDPBCGR] Microsoft Corporation, "Remote Desktop Protocol: Basic Connectivity and Graphics Remoting".

[MS-RDPEDYC] Microsoft Corporation, "Remote Desktop Protocol: Dynamic Channel Virtual Channel Extension".

[MS-RDPEGFX] Microsoft Corporation, "Remote Desktop Protocol: Graphics Pipeline Extension".

[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

None.

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1.3 Overview

The Remote Desktop Protocol: Telemetry Virtual Channel Extension consists of a single client-to-server PDU (section 2.2.1) sent over an RDP dynamic virtual channel (section 2.1) every time a connection is established.

1.4 Relationship to Other Protocols

The Remote Desktop Protocol: Telemetry Virtual Channel Extension is embedded in a dynamic virtual channel transport, as specified in [MS-RDPEDYC] sections 1 to 3.

1.5 Prerequisites/Preconditions

The Remote Desktop Protocol: Telemetry Virtual Channel Extension operates only after the dynamic virtual channel transport is fully established. If the dynamic virtual channel transport is terminated, the Remote Desktop Protocol: Telemetry Virtual Channel Extension is also terminated. The protocol is terminated by closing the underlying virtual channel. For details about closing the dynamic virtual channel, see [MS-RDPEDYC] section 3.1.5.2.

1.6 Applicability Statement

The Remote Desktop Protocol: Telemetry Virtual Channel Extension is applicable in scenarios where a mechanism to transmit telemetry data to a **terminal server** is required.

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

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2 Messages

2.1 Transport

The Remote Desktop Protocol: Telemetry Virtual Channel Extension is designed to operate over a dynamic virtual channel, as specified in [MS-RDPEDYC] sections 1 to 3. The dynamic virtual channel name is the null-terminated **ANSI character** string "Microsoft::Windows::RDS::Telemetry". The usage of channel names in the context of opening a dynamic virtual channel is specified in [MS-RDPEDYC] section 2.2.2.1.

2.2 Message Syntax

The following sections specify the Remote Desktop Protocol: Telemetry Virtual Channel Extension message syntax.

All multiple-byte fields within a message MUST be marshaled in **little-endian** byte order, unless otherwise specified.

2.2.1 RDP_TELEMETRY_PDU

The **RDP_TELEMETRY_PDU** message is a client-to-server PDU that is used to transmit metrics with respect to the time it took the client to complete a fully functional connection to the server.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="8">Id</td><td colspan="8">Length</td><td colspan="24">PromptForCredentialsMillis</td></tr>
<tr><td colspan="16">...</td><td colspan="24">PromptForCredentialsDoneMillis</td></tr>
<tr><td colspan="16">...</td><td colspan="24">GraphicsChannelOpenedMillis</td></tr>
<tr><td colspan="16">...</td><td colspan="24">FirstGraphicsReceivedMillis</td></tr>
<tr><td colspan="16">...</td><td colspan="24"></td></tr>
</table>

Id (1 byte): An 8-bit unsigned integer that MUST contain the value 0x01.

Length (1 byte): An 8-bit unsigned integer that specifies the length, in bytes, of the PDU. This field MUST be set to 0x12.

PromptForCredentialsMillis (4 bytes): A 32-bit unsigned integer that specifies the difference, in milliseconds, between the time when the connection was initiated, and the time when a credentials prompt dialog was shown to the user. This value MUST be zero if no credentials prompt dialog was displayed.

PromptForCredentialsDoneMillis (4 bytes): A 32-bit unsigned integer that specifies the difference, in milliseconds, between the time when the connection was initiated, and the time when credentials were successfully provided by the user. This value MUST be zero if no credentials prompt dialog was displayed.

GraphicsChannelOpenedMillis (4 bytes): A 32-bit unsigned integer that specifies the difference, in milliseconds, between the time when the connection was initiated, and the time when the Remote Desktop Protocol: Graphics Pipeline Extension dynamic virtual channel ([MS-RDPEGFX] section 2.1) was accepted by the client.

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FirstGraphicsReceivedMillis (4 bytes): A 32-bit unsigned integer that specifies the difference in milliseconds, between the time when the connection was initiated, and the time when the first Desktop Protocol: Graphics Pipeline Extension graphics message ([MS-RDPEGFX] section 2.2) was received by the client.

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3 Protocol Details

3.1 Server Details

3.1.1 Abstract Data Model

None.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Higher-Layer Triggered Events

None.

3.1.5 Processing Events and Sequencing Rules

3.1.5.1 Processing RDP_TELEMETRY_PDU

The structure and fields of the RDP_TELEMETRY_PDU message are specified in section 2.2.1. Processing of this message is optional. Upon receiving this message, the server SHOULD log an event with the connection information contained in the **PromptForCredentialsMillis**, **PromptForCredentialsDoneMillis**, **GraphicsChannelOpenedMillis** and **FirstGraphicsReceivedMillis** fields.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

3.2 Client Details

3.2.1 Abstract Data Model

None.

3.2.2 Timers

None.

3.2.3 Initialization

None.

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3.2.4 Higher-Layer Triggered Events

None.

3.2.5 Processing Events and Sequencing Rules

3.2.5.1 Sending RDP_TELEMETRY_PDU

The structure and fields of the RDP_TELEMETRY_PDU message are specified in section 2.2.1. The message fields MUST be populated in accordance with this description. Transmission of the RDP_TELEMETRY_PDU message to the server is optional.

3.2.6 Timer Events

None.

3.2.7 Other Local Events

None.

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4 Protocol Examples

None.

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5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

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6 Appendix A: 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 8.1 operating system
- Windows Server 2012 R2 operating system
- Windows 10 operating system
- Windows Server 2016 Technical Preview operating system

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.

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.

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7 Change Tracking

This section identifies changes that were made to this document since the last release. 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.
- The removal of a document from the documentation set.

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 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 changes were introduced. Minor editorial and formatting changes may have been made, but the technical content of the document is identical to the last released version.

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.
- 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:

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- **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 dochelp@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
6 Appendix A: Product Behavior	Added Windows 10 to applicability list.	Y	Content update.

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