

[MS-THCH-Diff]:

Tracing HTTP Correlation Header Protocol

Intellectual Property Rights Notice for Open Specifications Documentation

- **Technical Documentation.** Microsoft publishes Open Specifications documentation (“this documentation”) for protocols, file formats, data portability, computer languages, and standards support. Additionally, overview documents cover inter-protocol relationships and interactions.
- **Copyrights.** This documentation is covered by Microsoft copyrights. Regardless of any other terms that are contained in the terms of use for the Microsoft website that hosts this documentation, you can make copies of it in order to develop implementations of the technologies that are described in this documentation and can distribute portions of it in your implementations that use these technologies or in your documentation as necessary to properly document the implementation. You can also distribute in your implementation, with or without modification, any schemas, IDLs, or code samples that are included in the documentation. This permission also applies to any documents that are referenced in the Open Specifications documentation.
- **No Trade Secrets.** Microsoft does not claim any trade secret rights in this documentation.
- **Patents.** Microsoft has patents that might cover your implementations of the technologies described in the Open Specifications documentation. Neither this notice nor Microsoft's delivery of this documentation grants any licenses under those patents or any other Microsoft patents. However, a given Open Specifications document might be covered by the Microsoft [Open Specifications Promise](#) or the [Microsoft Community Promise](#). If you would prefer a written license, or if the technologies described in this documentation are not covered by the Open Specifications Promise or Community Promise, as applicable, patent licenses are available by contacting iplg@microsoft.com.
- **Trademarks.** The names of companies and products contained in this documentation might be covered by trademarks or similar intellectual property rights. This notice does not grant any licenses under those rights. For a list of Microsoft trademarks, visit www.microsoft.com/trademarks.
- **Fictitious Names.** The example companies, organizations, products, domain names, email addresses, logos, people, places, and events that are depicted in this documentation are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

Reservation of Rights. All other rights are reserved, and this notice does not grant any rights other than as specifically described above, whether by implication, estoppel, or otherwise.

Tools. The Open Specifications documentation does not require the use of Microsoft programming tools or programming environments in order for you to develop an implementation. If you have access to Microsoft programming tools and environments, you are free to take advantage of them. Certain Open Specifications documents are intended for use in conjunction with publicly available standards specifications and network programming art and, as such, assume that the reader either is familiar with the aforementioned material or has immediate access to it.

Revision Summary

Date	Revision History	Revision Class	Comments
12/16/2011	1.0	New	Released new document.
3/30/2012	1.0	None	No changes to the meaning, language, or formatting of the technical content.
7/12/2012	1.0	None	No changes to the meaning, language, or formatting of the technical content.
10/25/2012	1.0	None	No changes to the meaning, language, or formatting of the technical content.
1/31/2013	1.0	None	No changes to the meaning, language, or formatting of the technical content.
8/8/2013	1.0	None	No changes to the meaning, language, or formatting of the technical content.
11/14/2013	1.0	None	No changes to the meaning, language, or formatting of the technical content.
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.
10/16/2015	2.0	None	No changes to the meaning, language, or formatting of the technical content.
7/14/2016	2.0	None	No changes to the meaning, language, or formatting of the technical content.
<u>3/16/2017</u>	<u>3.0</u>	<u>Major</u>	<u>Significantly changed the technical content.</u>

Table of Contents

1	Introduction	4
1.1	Glossary	4
1.2	References	4
1.2.1	Normative References	4
1.2.2	Informative References	5
1.3	Overview	5
1.4	Relationship to Other Protocols	5
1.5	Prerequisites/Preconditions	6
1.6	Applicability Statement	6
1.7	Versioning and Capability Negotiation	6
1.8	Vendor-Extensible Fields	6
1.9	Standards Assignments.....	6
2	Messages.....	7
2.1	Transport.....	7
2.2	Message Syntax.....	7
3	Protocol Details.....	8
3.1	HTTP/1.1 Client Details	8
3.1.1	Abstract Data Model.....	8
3.1.2	Timers	8
3.1.3	Initialization.....	8
3.1.4	Higher-Layer Triggered Events	8
3.1.5	Message Processing Events and Sequencing Rules	8
3.1.6	Timer Events.....	8
3.1.7	Other Local Events.....	8
4	Protocol Examples	9
5	Security.....	10
5.1	Security Considerations for Implementers	10
5.2	Index of Security Parameters	10
6	Appendix A: Product Behavior	11
7	Change Tracking.....	12
8	Index.....	13

1 Introduction

The Tracing HTTP Correlation Header Protocol specifies the E2EActivity HTTP header which can be used by an HTTP/1.1 client to communicate a unique identifier for an HTTP message to an HTTP server. The identifier is used in turn by the server to correlate traces generated by the server to messages received from the client.

Sections 1.5, 1.8, 1.9, 2, and 3 of this specification are normative. All other sections and examples in this specification are informative.

1.1 Glossary

This document uses the following terms:

base64 encoding: A binary-to-text encoding scheme whereby an arbitrary sequence of bytes is converted to a sequence of printable ASCII characters, as described in [RFC4648].

client: A computer on which the remote procedure call (RPC) client is executing.

ETW: Event Tracing for Windows. For more information, see [MSDN-ETW].

globally unique identifier (GUID): A term used interchangeably with universally unique identifier (UUID) in Microsoft protocol technical documents (TDs). Interchanging the usage of these terms does not imply or require a specific algorithm or mechanism to generate the value. Specifically, the use of this term does not imply or require that the algorithms described in [RFC4122] or [C706] must be used for generating the GUID. See also universally unique identifier (UUID).

HTTP client: A program that establishes connections for the purpose of sending requests, as specified in [RFC2616].

HTTP server: An application that accepts connections in order to service requests by sending back responses. For more information, see [RFC2616].

Representational State Transfer (REST): A class of web services that is used to transfer domain-specific data by using HTTP, without additional messaging layers or session tracking, and returns textual data, such as XML.

tracing: A mechanism used to write out diagnostic information.

WCF service: Windows Communication Foundation (WCF) service. A program that exposes a collection of endpoints for communicating with client applications or other service applications.

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 dohelp@microsoft.com. We will assist you in finding the relevant information.

[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>

[RFC2616] Fielding, R., Gettys, J., Mogul, J., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, <http://www.rfc-editor.org/rfc/rfc2616.txt>

1.2.2 Informative References

[MSDN-ETW] Microsoft Corporation, "Improving Debugging and Performance Tuning with ETW", [April 2007](http://msdn.microsoft.com/en-us/magazine/cc163437.aspx), <http://msdn.microsoft.com/en-us/magazine/cc163437.aspx>

[MSDN-WCFRESTWCFETW] Microsoft Corporation, "~~REST in WCF Services and Event Tracing for Windows Communication Foundation (WCF)~~", ~~http~~, [https://msdn.microsoft.com/en-us/netframework/cc950529-library/dd764466\(v=vs.110\).aspx](https://msdn.microsoft.com/en-us/netframework/cc950529-library/dd764466(v=vs.110).aspx)

[MSDN-WCFREST] Microsoft Corporation, "A Guide to Designing and Building RESTful Web Services with WCF 3.5", <https://msdn.microsoft.com/en-us/library/dd203052.asp>

[MSDN-WCF] Microsoft Corporation, "Windows Communication Foundation", <http://msdn.microsoft.com/en-us/library/ms735119.aspx>

[SOAP1.1] Box, D., Ehnebuske, D., Kakivaya, G., et al., "Simple Object Access Protocol (SOAP) 1.1", [W3C Note](http://www.w3.org/TR/2000/NOTE-SOAP-20000508/), May 2000, <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>

1.3 Overview

The Tracing HTTP Correlation Header Protocol specifies the E2EActivity HTTP header.

In HTTP/1.1, an HTTP client can specify a unique identifier for an HTTP message by including the E2EActivity HTTP header in the HTTP message. When the message is received by the HTTP server, the identifier can be used when emitting traces to provide a correlation between generated traces and incoming messages from the client. <1>

There are no changes to the HTTP messages sent from the server to the client based on receipt of the E2EActivity HTTP header.

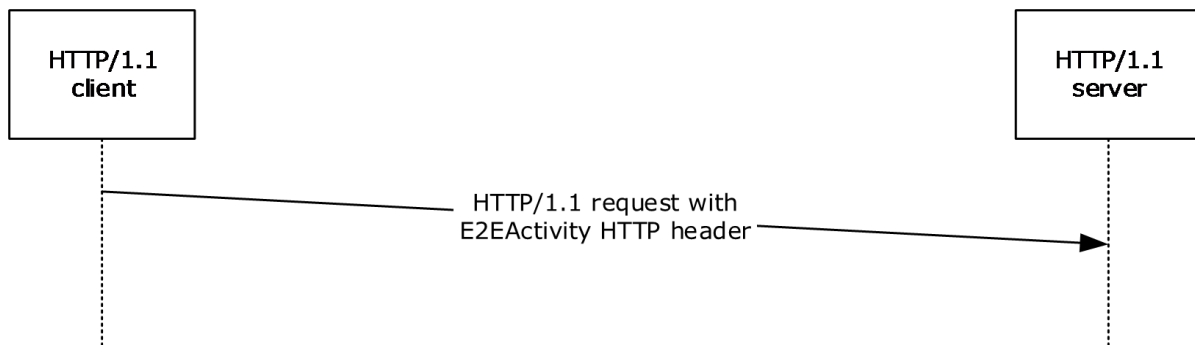


Figure 1: Sequence diagram showing communication of the E2EActivity HTTP header between the HTTP client and HTTP server

1.4 Relationship to Other Protocols

None.

1.5 Prerequisites/Preconditions

None.

1.6 Applicability Statement

When no other mechanism exists for an HTTP server to uniquely identify an HTTP message received from an HTTP client, the client can use the E2EActivity HTTP header to correlate the traces generated by the server in response to messages received from the client.

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

HTTP/1.1 is the only transport supported by this protocol for use of the E2EActivity HTTP header.

2.2 Message Syntax

The E2EActivity HTTP header defined by this protocol can be used by HTTP clients when sending HTTP/1.1 messages. The syntax for HTTP/1.1 messages is defined in [RFC2616].

To provide the unique identifier, the HTTP client SHOULD base64-encode the identifier as a GUID and include it as the value for the E2EActivity HTTP header in the HTTP header collection in the HTTP message. The client SHOULD specify a unique identifier value for each HTTP message it sends. The following example shows a typical E2EActivity header with a base64-encoded value:

```
E2EActivity: GWABtfYCDEu4hxOZR7sWGQ==
```

Upon receipt of the HTTP message from the client, the HTTP server SHOULD base64-decode the GUID value of the E2EActivity HTTP header in the HTTP message. The server MUST then include this identifier value when emitting traces for the corresponding HTTP message. By doing so, the server traces can be correlated to the received HTTP message which caused the trace to be generated.

3 Protocol Details

3.1 HTTP/1.1 Client 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

An HTTP/1.1 client can include the E2EActivity HTTP header (section 2.2) in the HTTP messages it sends to the HTTP server.

3.1.5 Message Processing Events and Sequencing Rules

When an HTTP/1.1 client includes the E2EActivity HTTP header in the HTTP messages it sends to the HTTP server, the response message from the server is not affected. Therefore, the client processing rules for response messages received from the server MUST NOT change.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

4 Protocol Examples

The following example shows how an HTTP/1.1 client specifies a base64-encoded unique identifier as the value for the E2EActivity HTTP header in the HTTP message. In this example, the GUID value "100f44d4-c7ac-45dc-98f7-974c064d61dd" is base64-encoded as "1EQPEKzH3EWY95dMBk1h3Q==" in the E2EActivity HTTP header in the HTTP message. When a value is specified for the E2EActivity HTTP header, the HTTP server includes the value when generating tracing data related to the received message.

```
POST http://server/Service/Service1.svc HTTP/1.1
Content-Type: text/xml; charset=utf-8
E2EActivity: 1EQPEKzH3EWY95dMBk1h3Q==
Content-Length: 157
```

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

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.

- Microsoft .NET Framework 4.5
- Microsoft .NET Framework 4.6
- [Microsoft .NET Framework 4.7](#)

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 1.3: The Windows implementation of this protocol is exercised in Windows Communication Foundation [MSDN-WCF] when ETW tracing [MSDN-ETW] is enabled on the client and the client is communicating with a WCF service over the HTTP transport. In this scenario, common message exchange patterns can include ~~Representational State Transfer (REST)~~ [MSDN-WCFREST] and SOAP [SOAP1.1]. [For a sample demonstration on how to use the analytic tracing in WCF to emit events in ETW, see \[MSDN-WCFETW\]](#).

7 Change Tracking

~~No table of This section identifies changes is available. The that were made to this document is either new or has had no changes since its the last release. Changes are classified as Major, Minor, or None.~~

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.
- A document revision that captures changes to protocol functionality.

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 **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

Section	Description	Revision class
1.3 Overview	Updated product behavior note references. Added reference to [MSDN-WCFETW].	Minor
6 Appendix A: Product Behavior	Updated product list with .NET Framework 4.7.	Major

8 Index

A

- Abstract data model
 - client 8
- Applicability 6

C

- Capability negotiation 6
- Change tracking 12
- Client
 - abstract data model 8
 - higher-layer triggered events 8
 - initialization 8
 - message processing 8
 - other local events 8
 - sequencing rules 8
 - timer events 8
 - timers 8

D

- Data model - abstract
 - client 8

E

- Example 9

F

- Fields - vendor-extensible 6

G

- Glossary 4

H

- Higher-layer triggered events
 - client 8

I

- Implementer - security considerations 10
- Index of security parameters 10
- Informative references 5
- Initialization
 - client 8
- Introduction 4

M

- Message processing
 - client 8
- Messages
 - transport 7

N

Normative references 4

O

Other local events
client 8
Overview (synopsis) 5

P

Parameters - security index 10
Preconditions 6
Prerequisites 6
Product behavior 11

R

References 4
informative 5
normative 4
Relationship to other protocols 5

S

Security
implementer considerations 10
parameter index 10
Sequencing rules
client 8
Standards assignments 6

T

Timer events
client 8
Timers
client 8
Tracking changes 12
Transport 7
Triggered events - higher-layer
client 8

V

Vendor-extensible fields 6
Versioning 6