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                    Flow Metadata Signaling with RSVP
                 draft-zamfir-tsvwg-flow-metadata-rsvp-00

Abstract

   This specification proposes RSVP protocol extensions for signaling
   flow metadata attributes.

Status of This Memo

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1. Introduction

Flow Metadata attributes are information elements (attributes) that
identify flow characteristics, such as the type of media carried by
application flows (e.g. video), the service class, the application
that originated the flow, and others. The description of the Flow
Metadata technology and some of the attribute definitions can be
found in [I-D.eckert-intarea-flow-metadata-framework]. The flow
attributes can be signaled over the flow path and inspected by
intermediate network nodes for the purpose of applying differentiated
flow treatment or collect network analytics. This specification
proposes the use of RSVP as signaling protocol to carry the Flow
Metadata using a new RSVP object. Two C-Type values are proposed for
this object to allow for two possible encodings.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in RFC 2119 [RFC2119].

2. Flow Metadata Object

This specification proposes a new RSVP object with Class-Num from the
0x11bbbbbb range. To support informational metadata attribute
processing on the path to the receiver, the sender inserts the
Metadata object into an IPv4 or IPv6 Path message (i.e. Path messages
with SESSION Class = 1 and SENDER_TEMPLATE Class = 11). The Metadata
object SHOULD appear only once in the message.

The object definition is given in Section 2.1 while the details of
processing are covered in Section 2.2

2.1. FLOW_METADATA Class

FLOW_METADATA Class = 234

Two encodings are defined, both of which carry the same IPFIX
registered attributes as defined in
[I-D.eckert-intarea-flow-metadata-framework]. The first encoding
(Basic IPFIX FLOW_METADATA) has less flexibility and lower encoding
efficiency. This version of the encoding is refrenced here for
legacy reasons. It does not suport a range of options that the
second one does, including the signaling of sender and receiver
attributes, security elements, distinction of originator of the
attributes and ease of extensibility.

2.1.1. Basic IPFIX FLOW_METADATA Object

Basic IPFIX FLOW_METADATA Object: Class = 234, C-Type = 1

o The metadata attributes are encoded in IPFIX format, as described
   in [RFC5101], with the following restrictions when creating the
   object:

   * Options Template Record MUST NOT be present

   * One and only one Template Record MUST be present

   * One and only one Data Record MUST be included

o An intermediate node that supports this specification SHOULD
   ignore any Options Template Record. It SHOULD only decode and
   process the first occurring Template and Data Records.

2.1.2. Enhanced Protocol Independent FLOW_METADATA Object

Enhanced Protocol Independent FLOW_METADATA Object: Class = 234,
C-Type = 2

o The contents and encoding rules for this object are specified in
   [I-D.eckert-intarea-flow-metadata-framework] and
   [I-D.choukir-tsvwg-flow-metadata-encoding].

2.2. Semantic of carrying the Metadata Object

The Metadata Object included in the Path message carries attributes
from the sender of the flow towards the receiver. In some cases,
e.g. if the sender does not support the generation and signaling of
Metadata attribute, these attributes may be inserted by a proxy along
the path of the flow. Metadata RSVP nodes on path may modify the

metadata attributes for purpose of influencing policy toward the
receiver.

The node that originates Metadata information in a Path message may
do so for the sole purpose of signaling Metadata information. In
this case, the SENDER_TSPEC objects fields (as defined by [RFC2210])
should be set to 0:

o Token Bucket Rate [r]

o Token Bucket Size [b]

o Peak Data Rate [p]

o Minimum Policed Unit [m]

If the Metadata object is inserted in a Path message used for IntServ
service [[RFC2210]] reservation requests, then all the rules of RSVP
reservation request apply and in addition any actions driven purely
by the metadata attributes may equally take place.

While the Metadata Object may be included in a Resv message, the
specific processing rules for this option is left for followup
documents or future versions of this specification.

2.3. Processing by a Non-Metadata Capable RSVP Router

As described in [RFC2205], a node that does not understand the
Metadata object, should ignore but forward it, unexamined and
unmodified. When received in Path or Resv messages, it should be
saved with the corresponding state and forwarded in any refresh
message resulting from that state.

2.4. Processing by a Metadata Capable RSVP Router

The Metadata object may be inserted by the data flow initiating
endpoint or network nodes along the path. The means by which an
implementation determines the content of the Metadata object is
outside the scope of this document.

Intermediate nodes that support this specification, decode the Flow
Metadata information as indicated by the C-Type field only when
received in Path message. Depending on the attributes, local
configuration and policies, the node may take some actions. The
Metadata attribute semantics are described in
[I-D.eckert-intarea-flow-metadata-framework]. The received Flow
Metadata object is stored against the Path state. When a subsequent
Path message is received with a modified Metadata object, the

intermediate node determines the attributes that have been removed,
modified and/or added by comparing the old and new objects, and takes
appropriate actions.

As a result of these actions, an intermediate node may add new
attributes to the Metadata object received in the Path message and
signal them downstream. It can also modify some of the attributes
present in the Flow Metadata object. RSVP does not have any
transport protocol specific restrictions and the exact set of
attributes that can be inserted and modified by intermediate nodes is
described in [I-D.eckert-intarea-flow-metadata-framework]. Depending
on local policies, an intermediate node may also remove some of the
attributes received in the Metadata object of a Path message before
forwarding downstream.

An intermediate node that receives a Resv message with a Metadata
Object SHOULD store the object against the state and forward it
unexamined and unmodified.

3. References

3.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
           Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2205] Braden, B., Zhang, L., Berson, S., Herzog, S., and S.
           Jamin, "Resource ReSerVation Protocol (RSVP) -- Version 1
           Functional Specification", RFC 2205, September 1997.

[RFC2210] Wroclawski, J., "The Use of RSVP with IETF Integrated
           Services", RFC 2210, September 1997.

[RFC5101] Claise, B., "Specification of the IP Flow Information
           Export (IPFIX) Protocol for the Exchange of IP Traffic
           Flow Information", RFC 5101, January 2008.

3.2. Informative References

[I-D.choukir-tsvwg-flow-metadata-encoding]
           Eckert, T., Zamfir, A., Choukir, A., and C. Eckel,
           "Protocol Independent Encoding for Signaling Flow
           Characteristics", draft-choukir-tsvwg-flow-metadata-
           encoding-00 (work in progress), July 2013.

[I-D.eckert-intarea-flow-metadata-framework]
           Eckert, T., Penno, R., Choukir, A., and C. Eckel, "A
           Framework for Signaling Flow Characteristics between

Applications and the Network", draft-eckert-intarea-flow-metadata-framework-00 (work in progress), July 2013.

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