OIF Application of Vendor Private Extensions in RSVP

IA # OIF RSVP-PVT-EXT-01.0

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Working Group: **Networking&Operations**

TITLE: **OIF Application of Vendor Private Extensions in RSVP**

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ABSTRACT: This implementation agreement specifies how to add OIF vendor private extensions to RSVP in OIF implementation agreements. Abiding by such guidelines will ensure all OIF private extensions to RSVP are defined in a consistent way across OIF implementation agreements.

1 Table of Contents

2 List of Figures

3 List of Tables

4 Introduction

Multiple OIF implementation agreements, and amendments to OIF implementation agreements, MAY define OIF private extensions to the RSVP protocol.

It is highly desirable that such OIF documents define such extensions in a consistent way.

This implementation agreement defines some guidelines for the specification of OIF private extensions to RSVP. All OIF implementation agreements and amendments to OIF implementation agreements that define OIF private extensions to the RSVP protocol MUST abide by such guidelines.

5 OIF Vendor Private Extensions to RSVP

5.1 Vendor private RSVP extensions: IETF rules

Two IETF RFCs specify how organization/vendor private RSVP extensions can be defined:

- RFC3936 allocates three class number ranges for vendor private objects:
  - 124 through 127 (0bbbbbbb class numbers, i.e., per RFC2205, an implementation that does not recognize such an object will reject the message and return an error);
  - 188 through 191 (10bbbbbb class numbers, i.e., per RFC2205, an implementation that does not recognize such an object will drop this object without error and forward the message);
  - 252 through 255 (11bbbbbb class numbers, i.e., per RFC2205, an implementation that does not recognize such an object will ignore and forward it unchanged).
- For EXPLICIT_ROUTE sub-objects, RFC3936 allocates a type range for vendor private sub-object: 124 through 127.
- For RECORD_ROUTE sub-objects, RFC3936 allocates a type range for vendor private sub-object: 252 through 255.
- RFC5284 defines a new RSVP Error Code: "User Error Spec (31)" and a new RSVP object: USER_ERROR_SPEC (Class-Num = 194). When this new error code is used in a PathErr, ResvErr or Notify messages, then a USER_ERROR_SPEC object MUST be included.

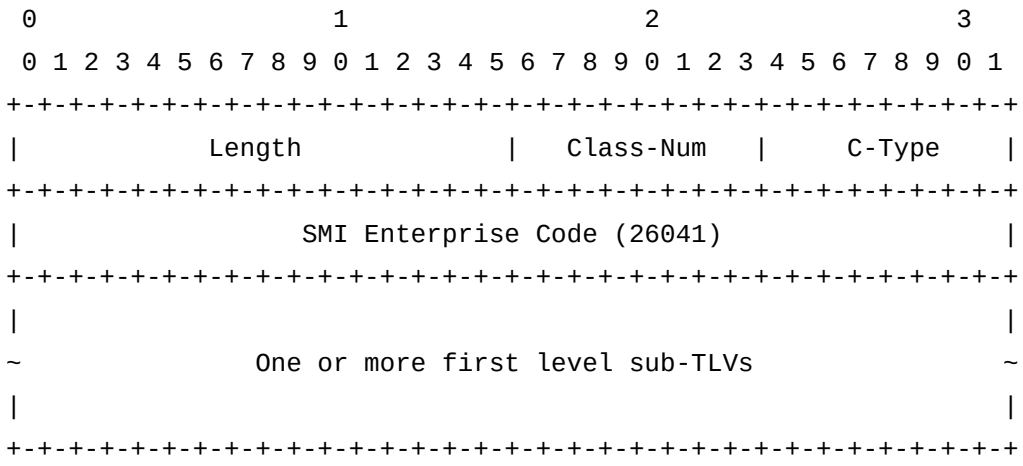
  Note: RFC3936 defines a vendor private error codes range as well. Such error codes should not be used in OIF implementation agreements. The USER_ERROR_SPEC object should be used to specify OIF private errors.

The first 32 bit word of a vendor private object, a vendor private EXPLICIT_ROUTE or RECORD_ROUTE sub-object, or the USER_ERROR_SPEC object is the vendor's SMI enterprise code.

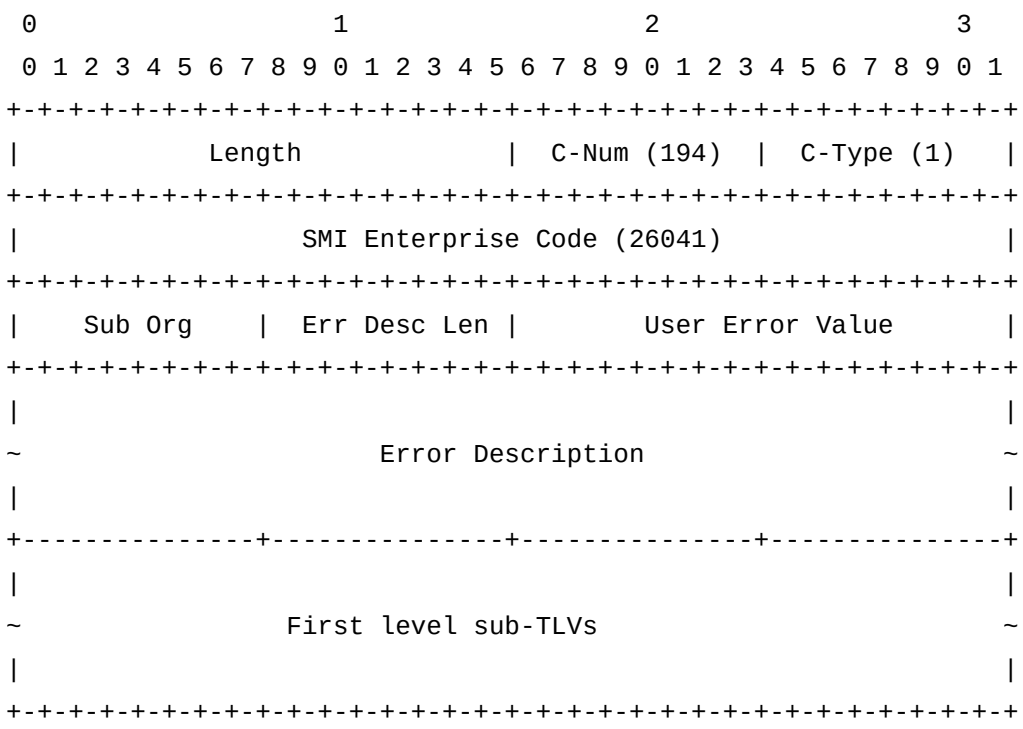
5.2 OIF SMI enterprise code

The OIF SMI enterprise code is 26041.

Therefore, an OIF vendor private object has the following format (the enterprise code is encoded in network byte order):

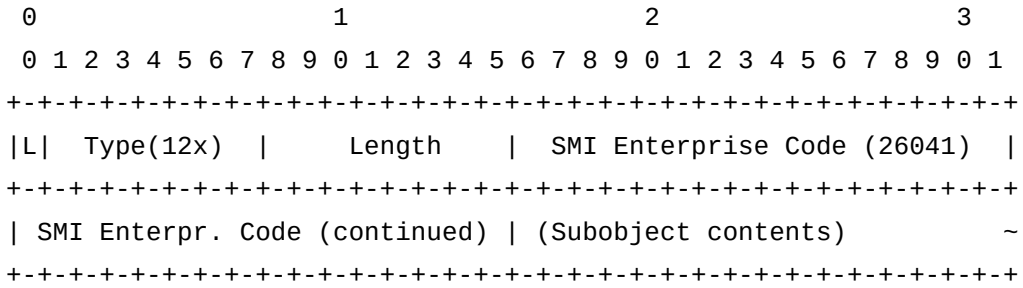


The USER_ERROR_SPEC object has the following format (the enterprise code is encoded in network byte order):



The value portion of the USER_ERROR_SPEC object, including the format for sub-TLVs (if any), must follow [RFC 5284].

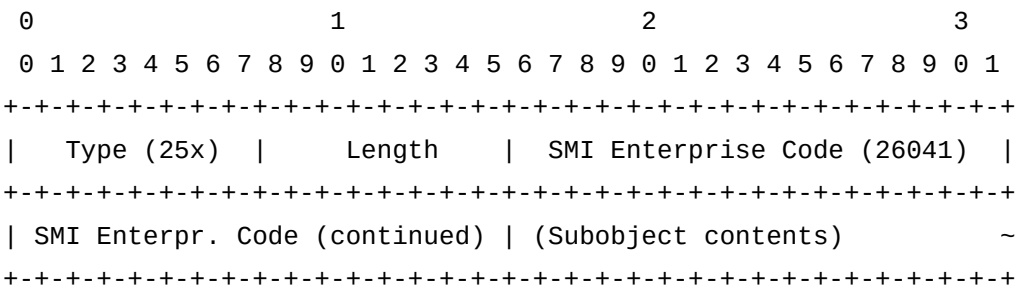
OIF private sub-objects in an EXPLICIT_ROUTE object have the following formats (the enterprise code is encoded in network byte order):



Type values 124, 125 and 126 are reserved for future assignment.

For type value 127, the subobject format is further specified in section 5.4.

OIF private sub-objects in an RECORD_ROUTE object have the following formats (the enterprise code is encoded in network byte order):



Type values 252, 253 and 254 are reserved for future assignment.

For type value 255, the subobject format is further specified in section 5.5.

5.3 OIF vendor private objects

This implementation agreement defines three RSVP OIF vendor private objects, one within each [RFC2205/RFC3936] class number range.

- OIF_VENDOR_PRIVATE_ EXTENSION_TYPE_1 (Class-Num = 124)
- OIF_VENDOR_PRIVATE_ EXTENSION_TYPE_2 (Class-Num = 188)
- OIF_VENDOR_PRIVATE_ EXTENSION_TYPE_3 (Class-Num = 252)

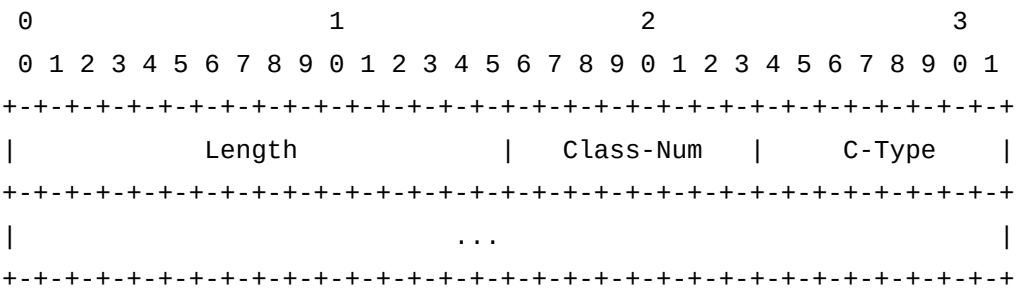
Only zero or one OIF vendor private object of each type should be present in an RSVP message.

OIF implementation agreements MUST use the appropriate OIF_VENDOR_PRIVATE_EXTENSION_TYPE_x object depending on the desired forward or backward compatibility behavior.

5.3.1 OIF vendor private object format: first-level TLV

When C-Type = 1 is used for any of the three OIF vendor private objects defined in section 5.3, the OIF vendor private object value that follows the OIF enterprise number MUST contain one or more first-level sub-TLVs.

Each first-level sub-TLV MUST conform to RSVP Class-Num/C-Type object format:



The first level sub-TLVs class numbers and C-Types are assigned and managed by OIF. Each OIF vendor private object (defined in 5.3) has its own class number space: the same class number may be assigned to two different first level sub-TLVs if they are carried in two different OIF vendor private objects.

The length field provides the total length of the first-level sub-TLV, including its header.

The compatibility rules, based on the two high-order bits of an object Class-Number and defined in [RFC2205], do not apply to the first-level sub-TLV class number. All first-level sub-TLVs contained in an OIF vendor private object (defined in 5.3) will be processed according to the compatibility rules yield by this OIF vendor private object class number.

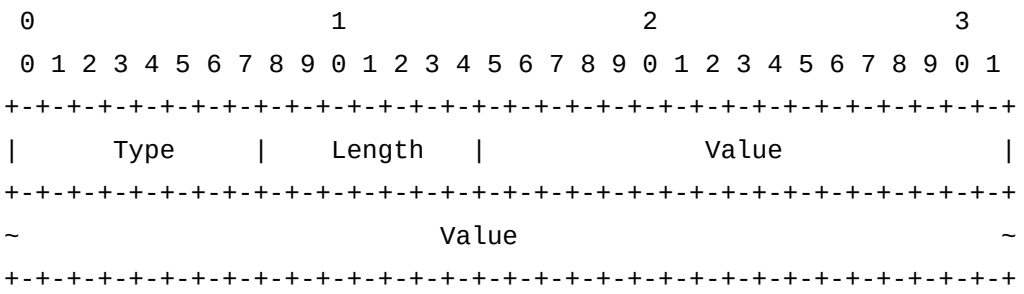
The OIF implementation agreement that defines a first-level sub-TLV MUST specify its value part. It MUST also specify whether a given first-level sub-TLV may be encoded once or multiple times within the OIF vendor private object.

A value field whose length is not a multiple of four MUST be zero-padded so that the TLV is four-octet aligned.

5.3.2 OIF vendor private objects format: second-level TLV

The OIF implementation agreement or amendment that defines a first level sub-TLV will specify its value part format. This value part may consist of one or more second level sub-TLVs, and in such a case, those second level sub-TLVs formats SHOULD be defined by the same OIF implementation agreement or amendment.

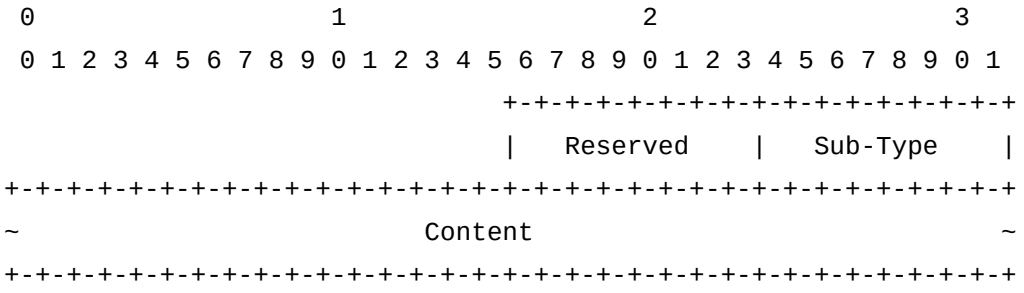
This document recommends that the value part of a first-level sub-TLV consist of one or more second level sub-TLVs that conform to the following format:



The length field provides the total length in octets of the second-level sub-TLV, including the Type and Length fields. The entire TLV is padded with between zero and three trailing zeros to make it four-octet aligned. The Length field does not count any padding.

5.4 OIF vendor private EXPLICIT_ROUTE sub-objects

This implementation agreement defines one EXPLICIT_ROUTE OIF vendor private sub-object. Its type is 127. Its content (following the SMI enterprise number as shown in section 5.2) is encoded using the following format:

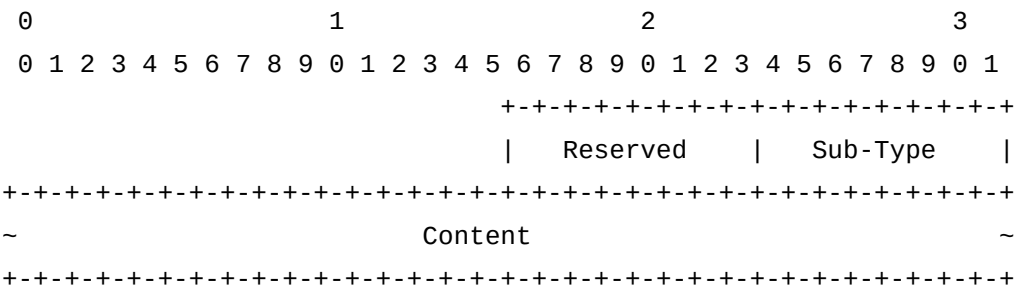


The Sub-Type field identifies a particular OIF private sub-object. It also defines the format of the Content part.

Such a sub-object may appear multiple times in an EXPLICIT_ROUTE.

5.5 OIF vendor private RECORD_ROUTE sub-objects

This implementation agreement defines one RECORD_ROUTE OIF vendor private sub-object. Its type is 255. Its content (following the SMI enterprise number as shown in section 5.2) is encoded using the following format:



The Sub-Type field identifies a particular OIF private sub-object. It also defines the format of the Content part.

Such a sub-object may appear multiple times in a RECORD_ROUTE.

6 Codepoint allocation

The editor of an OIF (draft) implementation agreement or amendment must request the allocation of codepoints for:

- Class-Num and C-Types for first-level TLVs in OIF private objects;
- Types for second level sub-TLVs;
- Sub-Types for EXPLICIT_ROUTE and RECORD_ROUTE OIF private sub-objects;
- Sub-org and error values in OIF private USER_ERROR_SPEC object.

7 References

7.1 Normative references

[RFC2205] Braden, R., Ed., Zhang, L., Berson, S., Herzog, S., and S. Jamin, "Resource ReSerVation Protocol (RSVP) -- Version 1 Functional Specification", RFC 2205, September1997.

[RFC3936] K. Kompella, J. Lang, "Procedures for Modifying the Resource reSerVation Protocol (RSVP)", RFC 3936, October 2004.

[RFC5284] G. Swallow, A. Farrel, "User-Defined Errors for RSVP", RFC 5284, August 2008.

7.2 Informative references

8 Appendix A: List of companies belonging to OIF when document is approved

Acacia Communications
ADVA Optical Networking
Alcatel-Lucent
Altera
AMCC
Amphenol Corp.
Anritsu
AT&T
Avago Technologies Inc.
Broadcom
Brocade
Centellax, Inc.
China Telecom
Ciena Corporation
Cisco Systems
ClariPhy Communications
Cogo Optronics
Comcast
Cortina Systems
CyOptics
Department of Defense
Deutsche Telekom
ECI Telecom Ltd.
Emcore
Ericsson
ETRI
EXFO
FCI USA LLC
Fiberhome Technologies Group
Finisar Corporation
Force 10 Networks
France Telecom

Fujitsu
Furukawa Electric Japan
Gennum Corporation
GigOptix Inc.
Hewlett Packard
Hitachi
Hittite Microwave Corp
Huawei Technologies
IBM Corporation
Infinera
Inphi
IP Infusion
JDSU
Juniper Networks
KDDI R&D Laboratories
LeCroy
Lightwire
LSI Corporation
Luxtera
Macom Technology Solutions
Marben Products
Mayo Clinic
Metaswitch
Mitsubishi Electric Corporation
Molex
MoSys, Inc.
NEC
NeoPhotonics
Nokia Siemens Networks
NTT Corporation
Oclaro
Opnext
Picometrix
PMC Sierra
QLogic Corporation
Semtech
SHF Communication Technologies
Sumitomo Electric Industries
Sumitomo Osaka Cement
TE Connectivity
Tektronix
Telcordia Technologies
Tellabs
TeraXion
Texas Instruments
Time Warner Cable
TriQuint Semiconductor
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Xilinx
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ZTE Corporation