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Procedures for Modifying the Resource reSerVation Protocol (RSVP)

Status of this Memo

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Abstract

This memo specifies procedures for modifying the Resource reSerVation Protocol (RSVP). This memo also lays out new assignment guidelines for number spaces for RSVP messages, object classes, class-types, and sub-objects.

1. Introduction

This memo specifies procedures for modifying the Resource reSerVation Protocol (RSVP) [RSVP], including (but not limited to) adding, updating, extending or obsoleting: messages, message formats and procedures, object classes and class types, object formats and procedures; header formats, error codes and subcodes and semantics, and procedures for sending, receiving, and addressing RSVP messages.

IANA recognizes the following RSVP name spaces: Message Types, Class Names, Class Numbers, Class Types and Sub-objects, Virtual Destination Ports, and Error Codes and (Subcode) Values (all of these will collectively be referred to as RSVP entities in this document). This memo specifies ranges for each name space and assignment policies for each range. New RSVP name spaces must be defined in a Standards Track RFC which include guidelines for IANA assignments within the new name spaces.

The assignment policies used in this document are: Standards Action (as defined in [IANA]), Expert Review, and Organization/Vendor Private (more simply, "Vendor Private"); the last two are defined in this document. The intent of these assignment policies is to ensure

that extensions to RSVP receive adequate review before code-points are assigned, without being overly rigid. Thus, if an extension is widely accepted and its ramifications are well understood, it may receive an assignment from the Standards Action space; however, if an extension is experimental in nature, it receives an assignment from the Expert Review space, and may, with maturity, move to Standards Track. Assignments from the Vendor Private space are not reviewed, but there are mechanisms in place to ensure that these codepoints can co-exist in a network without harm.

A standards body other than the IETF that wishes to obtain an assignment for an RSVP entity must decide from which type of name/number space they desire their assignment be made from, and then submit the appropriate documentation. For example, if the assignment is to be made from a number space designated as Standards Action, a Standards Track RFC MUST be submitted in support of the request for assignment.

This memo updates the IANA Considerations section (section 7) of [RSVP-TE], replacing the assignment policies stated there.

Conventions used in this document

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 BCP 14, RFC 2119 [KEYWORDS].

2. Assignment Policies for RSVP Entities

For each of the RSVP name spaces identified by IANA, the space is divided into assignment ranges; the following terms are used in describing the procedures by which IANA assigns values: "Standards Action" (as defined in [IANA]), "Expert Review", and "Organization/Vendor Private", defined below.

"Expert Review" ranges refer to values that are to be reviewed by an Expert designated by the IESG. The code points from these ranges are typically used for experimental extensions; such assignments MUST be requested by Experimental RFCs that document their use and processing, and the actual assignments made during the IANA actions for the document. Values from "Expert Review" ranges MUST be registered with IANA.

"Organization/Vendor Private" ranges refer to values that are enterprise-specific; these MUST NOT be registered with IANA. For Vendor Private values, the first 4-octet word of the data field MUST be an enterprise code [ENT] as registered with the IANA SMI Network

Management Private Enterprise Codes, and the rest of the data thereafter is for the private use of the registered enterprise. (For each RSVP entity that has a Vendor Private range, it must be specified where exactly the data field starts; see below for examples.) In this way, different enterprises, vendors, or Standards Development Organizations (SDOs) can use the same code point without fear of collision.

2.1. Message Types

A Message Type is an 8-bit number that identifies the function of the RSVP message. Values from 0 through 239 are to be assigned by Standards Action. Values from 240 through 255 are to be assigned by Expert Review.

2.2. Class Names and Numbers

Each class of data objects in an RSVP message is identified by an all upper-case Class Name and an 8-bit Class Number (also known as Class-Num or C-Num). Class Numbers are divided broadly into three ranges (0-127, 128-191, and 192-255) determined by the two high-order bits of the Class-Num object (the 'b' below represents a bit).

Note: the first 32-bit word of an Object whose Class-Num or Class-Type is from the Vendor Private range MUST be that vendor's SMI enterprise code in network octet order (these enterprise codes can be obtained from, and registered with, IANA). An implementation encountering a Vendor Private object with an SMI enterprise code that it does not recognize MUST treat that object (and enclosing message) based on the Class-Num, as specified in [RSVP], section 3.10.

- Class-Num = 0bbbbbbb

  Class Numbers from 0 through 119 are to be assigned by Standards Action. Class Numbers from 120 through 123 are to be assigned by Expert Review. Class Numbers from 124 through 127 are reserved for Vendor Private Use.

- Class-Num = 10bbbbbb

  Class Numbers from 128 through 183 are to be assigned by Standards Action. Class Numbers from 184 through 187 are to be assigned by Expert Review. Class Numbers from 188 through 191 are reserved for Vendor Private Use.

- Class-Num = 11bbbbbb

  Class Numbers from 192 through 247 are to be assigned by Standards Action. Class Numbers from 248 through 251 are to be assigned by Expert Review. Class Numbers from 252 through 255 are reserved for Vendor Private Use.

2.3. Class Types

Within each object class there is an 8-bit Class Type (also known as a C-Type). Class Types are scoped to a Class Number. In general, the appropriateness of allowing assignments of Class Types through Expert Review or Vendor Private depends on the semantics of the Class Number itself. Thus, any new Class Number definition must specify an appropriate IANA Considerations policy for assigning additional Class Type values.

For Class Numbers that pre-date this document (specifically, 0, 1, 3-25, 30-37, 42-45, 64, 65, 128-131, 161-165, 192-196, and 207), the default assignment policy for new Class Types is Standards Action, unless a Standards Track or Best Current Practice RFC supercedes this.

2.3.1. Sub-objects

Within an object, sub-objects may be defined, generally as a Type-Length-Value triple. This memo defines the assignment policies for sub-objects of EXPLICIT_ROUTE and RECORD_ROUTE. An RFC defining new sub-objects MUST state how IANA is to assign the sub-object Types.

The EXPLICIT_ROUTE object [RSVP-TE] carries a variable length sub-object that is identified by a 7-bit Type field. Types 0 through 119 are to be assigned by Standards Action. Types 120 through 123 are to be assigned by Expert Review. Types 124 through 127 are to be reserved for Vendor Private Use.

The RECORD_ROUTE object [RSVP-TE] carries a variable length sub-object that is identified by an 8-bit Type field. Types 0 through 191 are to be assigned by Standards Action. Types 192 through 251 are to be assigned by Expert Review. Types 252 through 255 are to be reserved for Vendor Private Use.

The first four octets of the sub-object contents of a Vendor Private sub-object of an EXPLICIT_ROUTE or RECORD_ROUTE object MUST be that vendor’s SMI enterprise code in network octet order.

2.4. Virtual Destination Ports

Virtual destination ports are described in [RSVP-IPSEC], which also specifies how IANA assignments are to be made.

2.5. Error Codes and Values

An Error Code is an 8-bit quantity that appears in an ERROR_SPEC object to broadly define an error condition. With each Error Code there may be a 16-bit Error Value that further specifies the cause of the error. Error Value may be globally defined, in which case the sub-code component is assigned by IANA.

Error Code values from 0 through 239 are to be assigned by Standards Action. Values from 240 through 251 are to be assigned by Expert Review. Values from 252 through 255 are reserved for Vendor Private Use. If the Error Code is for Vendor Private Use, the first four octets following the Error Value MUST be the vendor's SMI enterprise code in network octet order.

Globally defined Error Values are assigned by Standards Action.

3. Modifying RSVP Procedures

RSVP entities have associated procedures describing when and how they are to be sent, received, processed, and responded to. A change to a procedure that affects the processing of an RSVP entity that belongs to a range designated "Standards Action" MUST be documented in a Standards Track RFC. A change to a procedure that affects the processing of an RSVP entity that belongs to a range designated "Expert Review" MUST be documented in an Experimental RFC.

4. Acknowledgements

Many thanks to Scott Bradner, who encouraged this project, and made several helpful comments and suggestions.

5. Security Considerations

It is hoped that the procedures outlined in this memo will ensure that changes made to RSVP will be better reviewed and thus more architecturally sound, thereby enhancing the security both of the protocol and of networks deploying it.

6. IANA Considerations

See section 2.

7. References

7.1. Normative References

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

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

[RSVP-TE] Awduche, D., Berger, L., Gan, D., Li, T., Srinivasan, V., and G. Swallow, "RSVP-TE: Extensions to RSVP for LSP Tunnels", RFC 3209, December 2001.

7.2. Informative References

[ENT] IANA PRIVATE ENTERPRISE NUMBERS, http://www.iana.org/assignments/enterprise-numbers

[IANA] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

[RSVP-IPSEC] Berger, L. and T. O'Malley, "RSVP Extensions for IPSEC Data Flows", RFC 2207, September 1997.

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