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RADIUS Delegated-IPv6-Prefix Attribute
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Abstract

This document defines a RADIUS (Remote Authentication Dial In User Service) attribute that carries an IPv6 prefix that is to be delegated to the user. This attribute is usable within either RADIUS or Diameter.

1. Introduction

The Delegated-IPv6-Prefix is a RADIUS attribute [1] that carries an IPv6 prefix to be delegated to the user, for use in the user's network. For example, the prefix in a Delegated-IPv6-Prefix attribute can be delegated to another node through DHCP Prefix Delegation [2].

The Framed-IPv6-Prefix attribute [4] serves a similar purpose, but may also be used for other purposes other than delegating a prefix for use in a user's network. Definition of the Delegated-IPv6-Prefix allows the simultaneous use of the Framed-IPv6-Prefix for other purposes and the Delegated-IPv6-Prefix for prefix delegation.

2. Terminology

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 [3].

3. Attribute format

The format of the Delegated-IPv6-Prefix is:

```

      0                               1                               2                               3
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   Type   |   Length   |  Reserved   | Prefix-Length |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
                        Prefix
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
                        Prefix
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
                        Prefix
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
                        Prefix
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Type

TBD for Delegated-IPv6-Prefix

Length

The length of the entire attribute, in bytes. At least 4 (to hold Type/Length/Reserved/Prefix-Length for a 0-bit prefix), and no larger than 20 (to hold Type/Length/Reserved/Prefix-Length for a 128-bit prefix)

Reserved

Always set to zero by sender; ignored by receiver

Prefix-Length

The length of the prefix being delegated, in bits. At least 0 and no larger than 128 bits (identifying a single IPv6 address)

Note that the prefix field is only required to be long enough to hold the prefix bits and can be shorter than 16 bytes. Any bits in the prefix field that are not part of the prefix MUST be zero.

The definition of the Delegated-IPv6-Prefix Attribute is based on the Framed-IPv6-Prefix attribute [4].

The Delegated-IPv6-Prefix MAY appear in an Access-Accept packet, and can appear multiple times. It MAY appear in an Access-Request packet as a hint by the NAS to the server that it would prefer these prefix(es), but the server is not required to honor the hint.

The Delegated-IPv6-Prefix attribute MAY appear in an Accounting-Request packet.

The Delegated-IPv6-Prefix MUST NOT appear in any other RADIUS packets.

The following table describes which messages the Delegated-IPv6-Prefix attribute can appear in and in what quantity.

+-----+				
Request	Accept	Accounting	#	Attribute
		Request		
0+	0+	0+	TBD	Delegated-IPv6-Prefix
+-----+				

In this table 0+ means that zero or more instances of this attribute MAY be present in packet. This attribute MUST NOT appear in any packet not listed in the table.

4. Diameter Considerations

When used in Diameter, the attribute defined in this specification can be used as a Diameter AVP from the Code space 1-255, i.e., RADIUS attribute compatibility space. No additional Diameter Code values are therefore allocated. The data types of the attributes are as follows:

Delegated-IPv6-Prefix	OctetString
-----------------------	-------------

The attribute in this specification has no special translation requirements for Diameter to RADIUS or RADIUS to Diameter gateways, i.e., the attribute is copied as is, except for changes relating to headers, alignment, and padding. See also [RFC 3588](#) [5], Section 4.1, and [RFC 4005](#) [6], Section 9.

The text in this specification describing the applicability of the Delegated-IPv6-Prefix attribute for RADIUS Access-Request applies in Diameter to AA-Request [6] or Diameter-EAP-Request [7].

The text in this specification describing the applicability of the Delegated-IPv6-Prefix attribute for RADIUS Access-Accept applies in Diameter to AA-Answer or Diameter-EAP-Answer that indicates success.

The text in this specification describing the applicability of the Delegated-IPv6-Prefix attribute for RADIUS Accounting-Request applies to Diameter Accounting-Request [6] as well.

5. IANA Considerations

IANA is requested to assign a Type value, TBD, for this attribute from the RADIUS Attribute Types registry.

6. Security Considerations

Known security vulnerabilities of the RADIUS protocol are discussed in [RFC 2607](#) [8], [RFC 2865](#) [1] and [RFC 2869](#) [9]. Use of IPsec [10] for providing security when RADIUS is carried in IPv6 is discussed in [RFC 3162](#).

Security considerations for the Diameter protocol are discussed in [RFC 3588](#) [5].

7. Change Log

This section to be removed before publication as an RFC.

The following changes were made in revision -01 of this document:

- o Added additional details to Abstract; defined that this attribute can be used in both RADIUS and Diameter. (Issue 188)
- o Moved and clarified text describing which packets this attribute can appear in adjacent to table in [section 3](#). (Issue 188)
- o Fixed [RFC 2119](#) boilerplate in [section 2](#). (Issue 185)
- o Fixed table in [section 3](#) to clarify which packets this attribute cannot appear in. (Issue 188)
- o Added [section 4](#), Diameter Considerations. (Issue 188)
- o Made some references in [section 6](#), Security Considerations, Informative rather than Normative. (Issue 188)
- o Updated reference to [RFC 2401](#) [9] to [RFC 4301](#). (Issue 188)
- o Changed "IP SEC" to "IPsec" in [section 6](#). (Issues 185 and 188)

The following changes were made in revision -02 of this document:

- o Added a second paragraph to the Introduction, referencing the Framed-IPv6-Prefix attribute
- o Improved description of attribute fields in [section 3](#)
- o Added border to table in [section 3](#)
- o Updated [Section 4](#), Diameter Considerations, to describe how this attribute would be used in Diameter.
- o Added reference to [RFC 3588](#) in [Section 6](#), Security Considerations.

8. References

8.1. Normative References

- [1] Rigney, C., Willens, S., Rubens, A., and W. Simpson, "Remote Authentication Dial In User Service (RADIUS)", [RFC 2865](#), June 2000.
- [2] Troan, O. and R. Droms, "IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6", [RFC 3633](#), December 2003.
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

8.2. Non-normative References

- [4] Aboba, B., Zorn, G., and D. Mitton, "RADIUS and IPv6", [RFC 3162](#), August 2001.

- [5] Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol", [RFC 3588](#), September 2003.
- [6] Calhoun, P., Zorn, G., Spence, D., and D. Mitton, "Diameter Network Access Server Application", [RFC 4005](#), August 2005.
- [7] Eronen, P., Hiller, T., and G. Zorn, "Diameter Extensible Authentication Protocol (EAP) Application", [RFC 4072](#), August 2005.
- [8] Aboba, B. and J. Vollbrecht, "Proxy Chaining and Policy Implementation in Roaming", [RFC 2607](#), June 1999.
- [9] Rigney, C., Willats, W., and P. Calhoun, "RADIUS Extensions", [RFC 2869](#), June 2000.
- [10] Kent, S. and K. Seo, "Security Architecture for the Internet Protocol", [RFC 4301](#), December 2005.

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