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RADIUS Filter Rule Attribute

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Abstract

While RFC 2865 defines the Filter-Id attribute, it requires that the Network Access Server (NAS) be pre-populated with the desired filters. However, in situations where the server operator does not know which filters have been pre-populated, it is useful to specify filter rules explicitly. This document defines the NAS-Filter-Rule attribute within the Remote Authentication Dial In User Service (RADIUS). This attribute is based on the Diameter NAS-Filter-Rule Attribute Value Pair (AVP) described in RFC 4005, and the IPFilterRule syntax defined in RFC 3588.

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1. Introduction

This document defines the NAS-Filter-Rule attribute within the Remote Authentication Dial In User Service (RADIUS). This attribute has the same functionality as the Diameter NAS-Filter-Rule AVP (400) defined in [RFC4005], Section 6.6, and the same syntax as an IPFilterRule defined in [RFC3588], Section 4.3. This attribute may prove useful for provisioning of filter rules.

While [RFC2865], Section 5.11, defines the Filter-Id attribute (11), it requires that the Network Access Server (NAS) be pre-populated with the desired filters. However, in situations where the server operator does not know which filters have been pre-populated, it is useful to specify filter rules explicitly.

1.1. Terminology

This document uses the following terms:

Network Access Server (NAS)
A device that provides an access service for a user to a network.

RADIUS server
A RADIUS authentication server is an entity that provides an authentication service to a NAS.

RADIUS proxy
A RADIUS proxy acts as an authentication server to the NAS, and a RADIUS client to the RADIUS server.

1.2. 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 [RFC2119].

1.3. Attribute Interpretation

If a NAS conforming to this specification receives an Access-Accept packet containing a NAS-Filter-Rule attribute that it cannot apply, it MUST act as though it had received an Access-Reject. [RFC3576] requires that a NAS receiving a Change of Authorization Request (CoA-Request) reply with a CoA-NAK if the Request contains an unsupported attribute. It is RECOMMENDED that an Error-Cause attribute with value set to "Unsupported Attribute" (401) be included in the CoA-NAK. As noted in [RFC3576], authorization changes are atomic so that this situation does not result in session termination, and the pre-existing configuration remains unchanged. As a result, no accounting packets should be generated because of the CoA-Request.

2. NAS-Filter-Rule Attribute

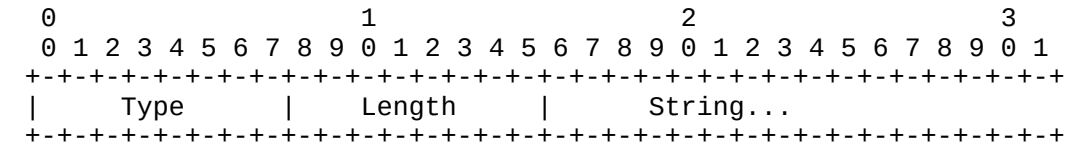
Description

This attribute indicates filter rules to be applied for this user. Zero or more NAS-Filter-Rule attributes MAY be sent in Access-Accept, CoA-Request, or Accounting-Request packets.

The NAS-Filter-Rule attribute is not intended to be used concurrently with any other filter rule attribute, including Filter-Id (11) and NAS-Traffic-Rule [Traffic] attributes. NAS-Filter-Rule and NAS-Traffic-Rule attributes MUST NOT appear in the same RADIUS packet. If a NAS-Traffic-Rule attribute is present, a NAS implementing this specification MUST silently discard any NAS-Filter-Rule attributes that are present. Filter-Id and NAS-Filter-Rule attributes SHOULD NOT appear in the same RADIUS packet. Given the absence in [RFC4005] of well-defined precedence rules for combining Filter-Id and NAS-Filter-Rule attributes into a single rule set, the behavior of NASes receiving both attributes is undefined, and therefore a RADIUS server implementation cannot assume a consistent behavior.

Where multiple NAS-Filter-Rule attributes are included in a RADIUS packet, the String field of the attributes are to be concatenated to form a set of filter rules. As noted in [RFC2865], Section 2.3, "the forwarding server MUST NOT change the order of any attributes of the same type", so that RADIUS proxies will not reorder NAS-Filter-Rule attributes.

A summary of the NAS-Filter-Rule Attribute format is shown below. The fields are transmitted from left to right.



Type

92

Length

>=3

String

The String field is one or more octets. It contains filter rules in the IPFilterRule syntax defined in [RFC3588], Section 4.3, with individual filter rules separated by a NUL (0x00). A NAS-Filter-Rule attribute may contain a partial rule, one rule, or more than one rule. Filter rules may be continued across attribute boundaries, so implementations cannot assume that individual filter rules begin or end on attribute boundaries.

The set of NAS-Filter-Rule attributes SHOULD be created by concatenating the individual filter rules, separated by a NUL (0x00) octet. The resulting data should be split on 253-octet boundaries to obtain a set of NAS-Filter-Rule attributes. On reception, the individual filter rules are determined by concatenating the contents of all NAS-Filter-Rule attributes, and then splitting individual filter rules with the NUL octet (0x00) as a delimiter.

3. Table of Attributes

The following table provides a guide to which attributes may be found in which kinds of packets, and in what quantity.

Access-Request	Access-Accept	Access-Reject	Access-Challenge	CoA-Req	Acct-Req	#	Attribute
0	0+	0	0	0+	0+	92	NAS-Filter-Rule

The following table defines the meaning of the above table entries.

0	This attribute MUST NOT be present in the packet.
0+	Zero or more instances of this attribute MAY be present in the packet.
0-1	Zero or one instance of this attribute MAY be present in the packet.

4. Diameter Considerations

[RFC4005], Section 6.6, defines the NAS-Filter-Rule AVP (400) with the same functionality as the RADIUS NAS-Filter-Rule attribute. In order to support interoperability, Diameter/RADIUS gateways will need to be configured to translate RADIUS attribute 92 to Diameter NAS-Filter-Rule AVP (400) and vice versa.

When translating Diameter NAS-Filter-Rule AVPs to RADIUS NAS-Filter-Rule attributes, the set of NAS-Filter-Rule attributes is created by concatenating the individual filter rules, separated by a NUL octet. The resulting data SHOULD then be split on 253-octet boundaries.

When translating RADIUS NAS-Filter-Rule attributes to Diameter NAS-Filter-Rule AVPs, the individual rules are determined by concatenating the contents of all NAS-Filter-Rule attributes, and then splitting individual filter rules with the NUL octet as a delimiter. Each rule is then encoded as a single Diameter NAS-Filter-Rule AVP.

Note that a translated Diameter message can be larger than the maximum RADIUS packet size (4096 bytes). Where a Diameter/RADIUS gateway receives a Diameter message containing a NAS-Filter-Rule AVP that is too large to fit into a RADIUS packet, the Diameter/RADIUS gateway will respond to the originating Diameter peer with a Result-Code AVP with the value DIAMETER_RADIUS_AVP_UNTRANSLATABLE (5018), and with a Failed-AVP AVP containing the NAS-Filter-Rule AVP. Since repairing the error will probably require re-working the filter rules, the originating peer should treat the combination of a Result-Code AVP with value DIAMETER_RADIUS_AVP_UNTRANSLATABLE and a Failed-AVP AVP containing a NAS-Filter-Rule AVP as a terminal error.

5. IANA Considerations

This specification does not create any new registries.

This document uses the RADIUS [RFC2865] namespace, see <http://www.iana.org/assignments/radius-types>. One value has been allocated in the section "RADIUS Attribute Types". The RADIUS attribute for which a value has been assigned is:

92 - NAS-Filter-Rule

This document also utilizes the Diameter [RFC3588] namespace. A Diameter Result-Code AVP value for the DIAMETER_RADIUS_AVP_UNTRANSLATABLE error has been allocated. Since this is a permanent failure, the allocation (5018) is in the 5xxx range.

6. Security Considerations

This specification describes the use of RADIUS for purposes of authentication, authorization and accounting. Threats and security issues for this application are described in [RFC3579] and [RFC3580]; security issues encountered in roaming are described in [RFC2607].

This document specifies a new attribute that can be included in existing RADIUS packets, which are protected as described in [RFC3579] and [RFC3576]. See those documents for a more detailed description.

The security mechanisms supported in RADIUS and Diameter are focused on preventing an attacker from spoofing packets or modifying packets in transit. They do not prevent an authorized RADIUS/Diameter server or proxy from modifying, inserting, or removing attributes with malicious intent. Filter attributes modified or removed by a RADIUS/Diameter proxy may enable a user to obtain network access without the appropriate filters; if the proxy were also to modify accounting packets, then the modification would not be reflected in the accounting server logs.

Since the RADIUS protocol currently does not support capability negotiation, a RADIUS server cannot automatically discover whether a NAS supports the NAS-Filter-Rule attribute. A legacy NAS not compliant with this specification may silently discard the NAS-Filter-Rule attribute while permitting the user to access the network. This can cause users to improperly receive unfiltered access to the network. As a result, the NAS-Filter-Rule attribute SHOULD only be sent to a NAS that is known to support it.

7. References

7.1. Normative References

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

[RFC2865] Rigney, C., Willens, S., Rubens, A., and W. Simpson, "Remote Authentication Dial In User Service (RADIUS)", RFC 2865, June 2000.

[RFC3588] Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol", RFC 3588, September 2003.

[RFC4005] Calhoun, P., Zorn, G., Spence, D., and D. Mitton, "Diameter Network Access Server Application", RFC 4005, August 2005.

7.2. Informative References

[RFC2607] Aboba, B. and J. Vollbrecht, "Proxy Chaining and Policy Implementation in Roaming", RFC 2607, June 1999.

[RFC3576] Chiba, M., Dommety, G., Eklund, M., Mitton, D., and B. Aboba, "Dynamic Authorization Extensions to Remote Authentication Dial In User Service (RADIUS)", RFC 3576, July 2003.

[RFC3579] Aboba, B. and P. Calhoun, "RADIUS (Remote Authentication Dial In User Service) Support For Extensible Authentication Protocol (EAP)", RFC 3579, September 2003.

[RFC3580] Congdon, P., Aboba, B., Smith, A., Zorn, G., and J. Roese, "IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines", RFC 3580, September 2003.

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