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RADIUS Accounting Extensions of Traffic Statistics
draft-yeh-radext-ext-traffic-statistics-01

Abstract

This document specifies the RADIUS attributes extensions of IPv4 and IPv6 traffic statistics for the differentiated accounting policies and traffic recording on the AAA server.

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1. Introduction

RADIUS has been widely used as the centralized Authentication and Authorization management method for the service provision to the users in Broadband network. [RFC3162], [RFC4818] and [ietf-radext-ipv6-access-05] has specified some attributes to support the service provision of IPv6-only and dual-stack. Radius is also a protocol for carrying accounting information between a Network Access Server and a shared accounting server. In the scenarios of dual-stack or any other IPv6 transition use case, such as DS-Lite, 6rd or the potential 4rd, there is a demand to report the separated IPv4 & IPv6 traffic statistics for the differential accounting and traffic recording.

[BBF TR-187] (Edited by ALU & Cisco), which dedicates for the network architecture models and elements requirements in the PPPoE scenario to support IPv6-only or dual stack for Internet access service, has expressed this demand in its section 9.4. The explicit texts are as follows:

The BNG must also be able to support separate queues for IPv4 and IPv6 traffic, as they may be used to offer IPv4 and IPv6 services with different policies.

Note that BNG of BBF is a kind of NAS of IETF.

R-60 The BNG MUST support forwarding IPv6 and IPv4 traffic in common traffic classes.

R-61 The BNG MUST support forwarding IPv6 and IPv4 traffic in separate traffic classes.

R-64 The BNG MUST support input and output octet counters that are separate for both IPv6 and IPv4 traffic.

R-65 The BNG MUST support input and output packet counters that are separate for both IPv6 and IPv4 traffic.

Per the section 9.4 of BBF TR-187, the NAS is required to support separate queues and counters for IPv4 or IPv6 traffic, and the Radius attributes of Acct-Input-Octets, Acct-Output-Octets, Acct-Input-Packets, Acct-Output-Packets are recommended to use for the combination traffic. That means some new RADIUS attributes is required to report the separated IPv4 or IPv6 traffic statistics.

[draft-maglione-radext-ipv6-acct-extensions-01] (Edited by Telecom Italia, Ericsson & Magyar Telekom) tries to define the following attributes:

IPv6-Acct-Input-Octets
IPv6-Acct-Output-Octets
IPv6-Acct-Input-Packets
IPv6-Acct-Output-Packets
IPv6-Acct-Input-Gigawords
IPv6-Acct-Output-Gigawords

for the collecting of IPv6 traffic statistics in RADIUS accounting messages. [draft-hu-v6ops-radius-issues-ipv6-00] (Edited by China Telecom & ZTE) presents the same issue on the accounting for dual-stack traffic statistics, but it sounds like limit to the PPP case. [draft-winter-radext-fancyaccounting-00] also shows the interest to define a group of attributes to report the statistics for various traffic classes, but tries to use the extended type space. And [draft-yeh-radext-dual-stack-access-02] (Edited Huawei) tries to use the traditional format defined in [RFC2865], [RFC2866] and [RFC2869] to extend some new attributes:

Acct-Input-IPv4-Octets
Acct-Output-IPv4-Octets
Acct-Input-IPv4-Packets
Acct-Output-IPv4-Packets
Acct-Input-IPv4-Gigawords
Acct-Output-IPv4-Gigawords
Acct-Input-IPv6-Octets
Acct-Output-IPv6-Octets
Acct-Input-IPv6-Packets
Acct-Output-IPv6-Packets
Acct-Input-IPv6-Gigawords
Acct-Output-IPv6-Gigawords

against the dual-stack case for traffic statistics reporting in RADIUS.

[draft-ietf-radext-radius-extensions-02], which is already in the phase of WGLC, has extended the type space of RADIUS attribute and defined the new formats for the extended type attributes with some new data types. That might means the type code in the new extended space will be used to define a new attribute, if it is agreed to move the 'Unassigned' code space (from 144 to 191) to be 'Deprecated'.

This document tries to use both the traditional format defined in [RFC2865] and the new format defined in [draft-ietf-radext-radius-extensions-02] for the extension of IPv4 and IPv6 traffic statistics, and let the WG decides which one is more suitable for the cases mentioned here.

2. Terminology and Language

This document describes some new RADIUS attributes and the associated usage on NAS and AAA server. This document should be read in conjunction with the relevant RADIUS specifications, including [RFC2865], [RFC2866], [RFC2869], and [draft-ietf-radext-radius-extensions-02], for a complete mechanism. Definitions for terms and acronyms not specifically defined in this document are defined in RFC2865, RFC2866, RFC2869, and [draft-ietf-radext-radius-extensions-02].

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in BCP 14, [RFC2119].

3. Deployment Scenarios

Figure 1 show the typical use case of the traffic statistics reporting for the dual-stack users.

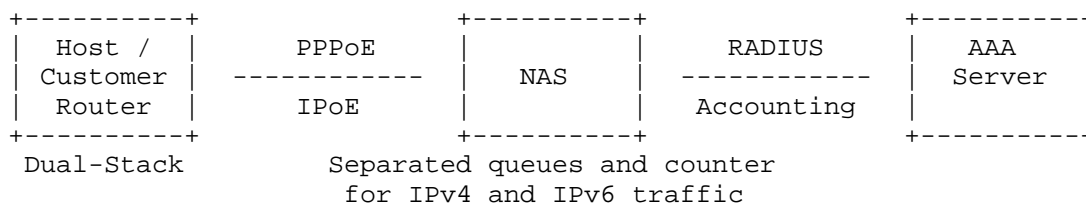


Figure 1: Traffic Statistics of Dual-Stack Users for RADIUS Accounting

Note that traffic statistics reporting is also needed in the IPv6 transition cases, such as DS-Lite, 6rd or the potential 4rd.

4. Traffic Statistics Attributes

4.1. Define the Attributes in the Traditional Unsigned Type Space

There are 8 new attributes of the traffic statistics, including:

Acct-Input-IPv4-Octets
Acct-Output-IPv4-Octets
Acct-Input-IPv4-Packets
Acct-Output-IPv4-Packets
Acct-Input-IPv6-Octets
Acct-Output-IPv6-Octets
Acct-Input-IPv6-Packets
Acct-Output-IPv6-Packets

defined in this section per the traditional format defined in [RFC2865].

Description

The traffic statistics attributes, including Acct-Input-IPv4-Octets, Acct-Output-IPv4-Octets, Acct-Input-IPv4-Packets, Acct-Output-IPv4-Packets and Acct-Input-IPv6-Octets, Acct-Output-IPv6-Octets, Acct-Input-IPv6-Packets, Acct-Output-IPv6-Packets, indicate how many octets or packets of IPv4 or IPv6 received from the user or sent to the user from the starting of this service provided, and can be present in Accounting-Request records while the Acct-Status-Type is set to Interim-Update or Stop.

For the attribute of Acct-Input-IPv4-Octets, NAS report how many Octets of IPv4 traffic received from the user from the starting of the service authorized.

For the attribute of Acct-Output-IPv4-Octets, NAS report how many Octets of IPv4 traffic sent to the user from the starting of the service authorized.

For the attribute of Acct-Input-IPv4-Packets, NAS report how many packets of IPv4 traffic received from the user from the starting of the service authorized.

For the attribute of Acct-Output-IPv4-Packets, NAS report how many packets of IPv4 traffic sent to the user from the starting of the service authorized.

For the attribute of Acct-Input-IPv6-Octets, NAS report how many Octets of IPv6 traffic received from the user from the starting of the service authorized.

For the attribute of Acct-Output-IPv6-Octets, NAS report how many Octets of IPv6 traffic sent to the user from the starting of the service authorized.

For the attribute of Acct-Input-IPv6-Packets, NAS report how many packets of IPv6 traffic received from the user from the starting of the service authorized.

For the attribute of Acct-Output-IPv6-Packets, NAS report how many packets of IPv6 traffic sent to the user from the starting of the service authorized.

A summary of the Traffic Statistics attributes format is shown as below. The fields are transmitted from left to right.

```

      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      |      Value      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Value (cont.)      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Value (cont.)      |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

Type

TBA_n (by IANA)

Length

=10

Value

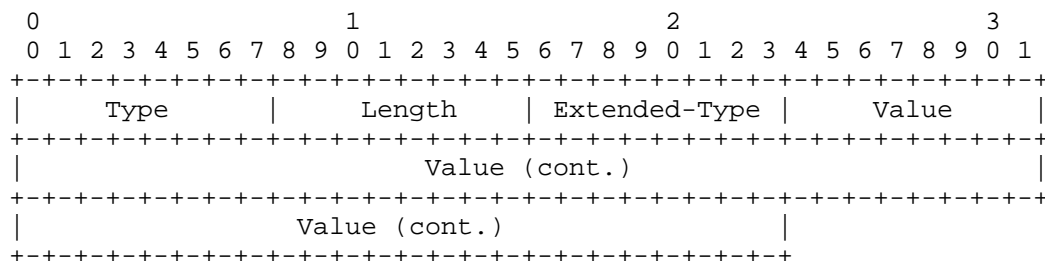
The Value field is 8 octets and uses Integer64 defined in [draft-ietf-radext-radius-extensions-02], for its data type.

4.2. Define the Attributes in the Extended Type Space

Description

The definition and usage of the traffic statistics attributes, including Acct-Input-IPv4-Octets, Acct-Output-IPv4-Octets, Acct-Input-IPv4-Packets, Acct-Output-IPv4-Packets and Acct-Input-IPv6-Octets, Acct-Output-IPv6-Octets, Acct-Input-IPv6-Packets, Acct-Output-IPv6-Packets, are the same as that described in section 4.1

A summary of the Traffic Statistics attributes format is shown as below. The fields are transmitted from left to right.



Type

Acct-Input-IPv4-Octets	241.TBA1 (by IANA) or 241.42 (suggested)
Acct-Output-IPv4-Octets	241.TBA2 (by IANA) or 241.43 (suggested)
Acct-Input-IPv4-Packets	241.TBA3 (by IANA) or 241.47 (suggested)
Acct-Output-IPv4-Packets	241.TBA4 (by IANA) or 241.48 (suggested)
Acct-Input-IPv6-Octets	241.TBA5 (by IANA) or 242.42 (suggested)
Acct-Output-IPv6-Octets	241.TBA6 (by IANA) or 242.43 (suggested)
Acct-Input-IPv6-Packets	241.TBA7 (by IANA) or 242.47 (suggested)
Acct-Output-IPv6-Packets	241.TBA8 (by IANA) or 242.48 (suggested)

Length

=11

Value

The Value field is 8 octets and uses Integer64 defined in [draft-ietf-radext-radius-extensions-02], for its data type.

5. Table of Attributes

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

Req- uest	Acc- ept	Rej- ect	Chall -enge	Accounting # Request	Attribute
0	0	0	0	0-1	TBA1 Acct-Input-IPv4-Octets
0	0	0	0	0-1	TBA2 Acct-Output-IPv4-Octets
0	0	0	0	0-1	TBA3 Acct-Input-IPv4-Packets
0	0	0	0	0-1	TBA4 Acct-Output-IPv4-Packets
0	0	0	0	0-1	TBA5 Acct-Input-IPv6-Octets
0	0	0	0	0-1	TBA6 Acct-Output-IPv6-Octets
0	0	0	0	0-1	TBA7 Acct-Input-IPv6-Packets
0	0	0	0	0-1	TBA8 Acct-Output-IPv6-Packets

The meaning of the above table entries is as follows:

- 0 This attribute MUST NOT be present.
- 0+ Zero or more instances of this attribute MAY be present.
- 0-1 Zero or one instance of this attribute MAY be present.
- 1 Exactly one instance of this attribute MUST be present.
- 1+ One or more of these attributes MUST be present.

6. Security Considerations

Security issues related RADIUS are described in section 8 of RFC2865 and section 5 of RFC3162.

7. IANA Considerations

IANA is requested to assign 8 new attribute types code in the "Radius Types" registry (<http://www.iana.org/assignments/radius-types> for the following attributes:

- Acct-Input-IPv4-Octets
- Acct-Output-IPv4-Octets
- Acct-Input-IPv4-Packets
- Acct-Output-IPv4-Packets
- Acct-Input-IPv6-Octets
- Acct-Output-IPv6-Octets
- Acct-Input-IPv6-Packets
- Acct-Output-IPv6-Packets

IANA should allocate these codes from the standardized type space of the RADIUS attributes using the "IETF Review" policy [RFC5226].

8. Acknowledgements

TBD

9. References

9.1. Normative References

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9.2. Informative References

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