                 Diameter Congestion and Filter Attributes
              draft-ietf-dime-congestion-flow-attributes-00.txt

Abstract

   This document defines optional ECN and filter related attributes that
   can be used for improved traffic identification, support of ECN and
   minimized filter administration within Diameter.

   RFC 5777 defines a Filter-Rule AVP that accommodates extensions for
   classification, conditions and actions. It does not support traffic
   identification for packets using Explicit Congestion Notification as
   defined in RFC 3168 and does not provide specific actions when the
   flow(s) described by the Filter-Rule are congested.

   A Filter-Rule can describe multiple flows but not the exact number of
   flows. Flow count and other associated data (e.g. packets) is not
   captured in Accounting applications, leaving administrators without
   useful information regarding the effectiveness or understanding of
   the filter definition.

   These optional attributes are forward and backwards compatible with
   RFC 5777.

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Table of Contents

1. Introduction

   Two optional Explicit Congestion Notification (ECN) [RFC3168] related
   AVPs are specified in the document. The first AVP provides direct
   support for ECN [RFC3168] in the IP header and the second AVP
   provides the ability to define alternate traffic treatment when
   congestion is experienced.

   This document also defines two optional AVPs, Flow-Count and Packet-
   Count, used for conveying flow information within the Diameter
   protocol [RFC6733]. These AVPs were found to be useful for a wide
   range of applications. The AVPs provide a way to convey information
   of the group of flows described by the Filter-Rule, IPFilterRule or
   other Diameter traffic filters.

   The semantics and encoding of all AVPs can be found in Section 3.

   Such AVPs are, for example, needed by some ECN applications to
   determine the number of flows congested or used by administrators to
   determine the impact of filter definitions.

   Additional parameters may be defined in future documents as the need
   arises. All parameters are defined as Diameter-encoded Attribute
   Value Pairs (AVPs), which are described using a modified version of
   the Augmented Backus-Naur Form (ABNF), see [RFC6733]. The data types
   are also taken from [RFC6733].

2. Terminology and Abbreviations

   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 [RFC2119].

3. ECN-IP-Codepoint, Congestion-Treatment and Filter Attributes

3.1. ECN-IP-Codepoint AVP

   The ECN-IP-Codepoint AVP (AVP Code TBD) is of type Enumerated and
   specifies the Explicit Congestion Notification codepoint values to
   match in the IP header.

```
Value | Binary | Keyword                              | References
----------------------------------------------------------------
0     | 00     | Non-ECT (Not ECN-Capable Transport)| [RFC3168]
1     | 01     | ECT(1) (ECN-Capable Transport)     | [RFC3168]
2     | 10     | ECT(0) (ECN-Capable Transport)     | [RFC3168]
3     | 11     | CE (Congestion Experienced)        | [RFC3168]
```

When this AVP is used for classification in the Filter-Rule it MUST
be part of Classifier Grouped AVP as defined in RFC5777.

3.2. Congestion-Treatment AVP

The Congestion-Treatment AVP (AVP Code TBD) is of type Grouped and
indicates how congested traffic, i.e., traffic that has Explicit
Congestion Notification Congestion Experienced marking set or some
other administratively defined criteria, is treated. In case the
Congestion-Treatment AVP is absent the treatment of the congested
traffic is left to the discretion of the node performing QoS
treatment.

```
         Congestion-Treatment ::= < AVP Header: TBD >
                       { Treatment-Action }
                       [ QoS-Profile-Template ]
                       [ QoS-Parameters ]
                     * [ AVP ]
```

Treatment-Action, QoS-Profile-Template and QoS-Parameters are defined
in [RFC5777]. The Congestion-Treatment AVP is an action and MUST be
an attribute of the Filter-Rule Grouped AVP as defined in RFC5777.

3.3. Flow-Count AVP

The Flow-Count AVP (AVP Code TBD) is of type Unsigned64.

It indicates the number of protocol specific flows. The protocol is
determined by the filter (e.g. IPFilterRule, Filter-Id, etc.).

3.4. Packet-Count AVP

The Packet-Count AVP (AVP Code TBD) is of type Unsigned64.

It indicates the number of protocol specific packets. The protocol
is determined by the filter (e.g. IPFilterRule, Filter-Id, etc.).

4. IANA Considerations

4.1. AVP Codes

IANA allocated AVP codes in the IANA-controlled namespace registry
specified in Section 11.1.1 of [RFC6733] for the following AVPs that
are defined in this document.

```
+-----------------------------------------------------------------+
|                                     AVP   Section               |
|AVP                                  Code Defined Data Type   |
```

```
+----------------------------------------------------------------+
|ECN-IP-Codepoint                    TBD 3.1      Enumerated     |
|Congestion-Treatment                TBD 3.2      Grouped        |
|Flow-Count                          TBD 3.3      Unsigned64     |
|Packet-Count                        TBD 3.4      Unsinged64     |
+----------------------------------------------------------------+
```

5. Security Considerations

The document does not raise any new security concerns. This document describes an extension of RFC5777 that introduces a new filter parameter applied to ECN as defined by [RFC3168]. It also defines a new Grouped AVP that expresses what action to take should congestion be detected. The Grouped AVP reuses attributes defined in RFC5777.

The security considerations of the Diameter protocol itself have been discussed in RFC 6733 [RFC6733]. Use of the AVPs defined in this document MUST take into consideration the security issues and requirements of the Diameter base protocol.

6. Acknowledgements

We would like to thank Avi Lior for his guidance and feedback during the development of this specification.

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.

[RFC3168] Black, D., Floyd, S., and K. Ramakrishnan, "The Addition
           of Explicit Congestion Notification (ECN) to IP", RFC
           3168, September 2001.

[RFC6733] Fajardo, V., Arkko, J., Loughney, J., and G. Zorn,
           "Diameter Base Protocol", RFC 6733, October 2012.

[RFC5777] Korhonen, J., Tschofenig, H., Arumaithurai, M., Lior, A.
           and Jones, M. Ed., "Traffic Classification and Quality of
           Service (QoS) Attributes for Diameter", RFC 5777, February
           2010.

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