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Diameter Parameter Query
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Abstract

In an emergency services environment a Location Information Server (LIS) receives requests from end hosts, SIP proxies or Public Safety Answering Points (PSAPs). When receiving these requests a LIS has to perform a location determination procedure that depends on the specific

network deployment. In any case, an interation with other network
elements is needed, particularly with AAA servers, that store
information about the current attachment of the end host.
This document descirbes a Diameter application, called Diameter
Parameter Query, which allows a Location Information Server to interact
with a Diameter server to obtain information needed for the location
determination procedure. The style of the described Diameter
application offers flexibility for different deployments.

Table of Contents
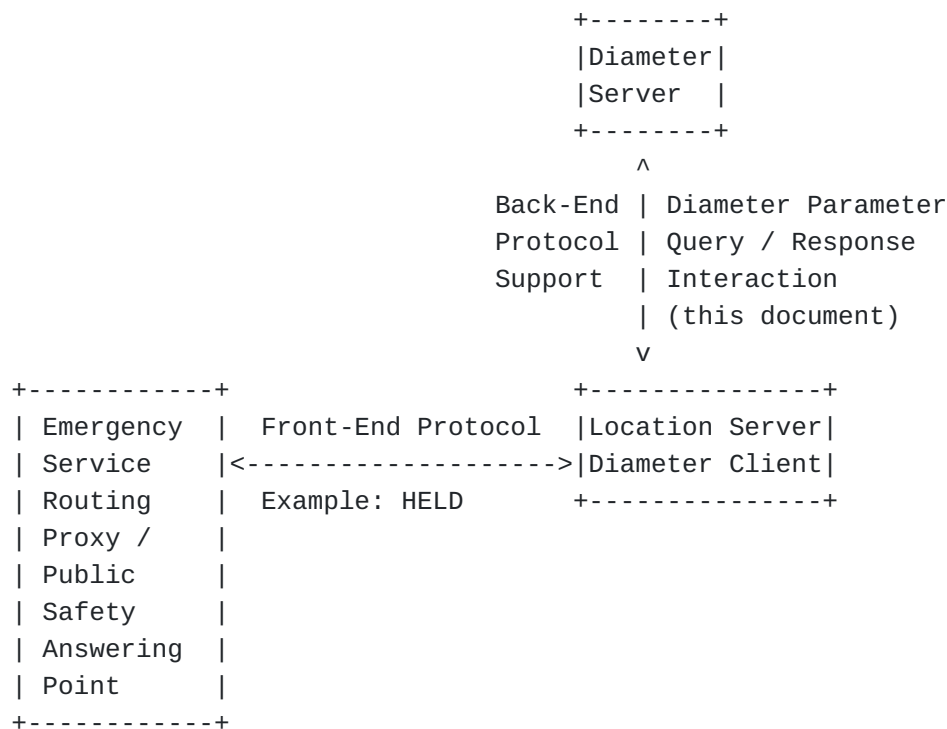
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1.   Introduction

The AAA backend infrastructure stores information about various device
related interactions, such as network attachments, accounting streams,

etc. In certain cases, parts of this information needs to be shared with other entities in the operators network to provide smooth network operation. An example of this interaction is when a Location Server is deployed in an IP-based network and needs to obtain information about the users point of attachment to make location information for emergency services. This document describes how such a Diameter based interface can help a location server to query inforation from the backend infrastructure. In particular, it allows the query to contain the IP address of the device and to request information about Figure 1 (Example Instantiation of involved Entities) shows an example of how the Diameter interface used in this document can be used by a Location Server receiving a request to query a Diameter Server.

```
                                 +--------+
                                 |Diameter|
                                 |Server  |
                                 +--------+
                                     ^
                            Back-End | Diameter Parameter
                            Protocol | Query / Response
                            Support  | Interaction
                                     | (this document)
                                     v
      +------------+         +---------------+
      | Emergency  |  Front-End Protocol  |Location Server|
      | Service    |<-------------------->|Diameter Client|
      | Routing    |   Example: HELD      +---------------+
      | Proxy /    |
      | Public     |
      | Safety     |
      | Answering  |
      | Point      |
      +------------+
```

Figure 1: Example Instantiation of involved Entities

1.1. Application Identifiers

This specification defines a Diameter applications and their respective Application Identifiers:

```
        Diameter Parameter Query   (DPQ)   TBD by IANA
```

The DPQ Application Identifier is used when a Diameter client utilizes
the Diameter Parameter Query Request and Response messages.

1.2. Session Management

The Diameter server is stateless in the protocol interaction described
by this document. As such, the Session-Termination-Request (STR), the
Session-Termination-Answer (STA), Abort-Session-Request (ASR) nor the
Abort-Session-Answer (ASA) message is used by this Diameter
application.

1.3. Accounting

This Diameter application does not make use of accounting. Hence, the
Accounting-Request and the Accounting-Answer message is not used.

1.4. Command Codes

The DQP application uses two command codes as shown below.

```
    Command-Name            Abbrev. Code  Reference     Application
    ------------------------------------------------------------------
    Diameter-PQ-Request     PQR     TBD  This doc.      DPQ
    Diameter-PQ-Answer      PQA     TBD  This doc.      DPQ
```

Figure 2: Command Codes

1.4.1. Diameter-PQ-Request

The Diameter-PQ-Request (PQR) message, indicated by the Command-Code
field set to TBD and the 'R' bit set in the Command Flags field, is

sent by the Diameter Client to the Diameter server to query for
parameters. This Diameter application builds on top of Diameter NASREQ.

```
<Diameter-PQ-Request> ::= < Diameter Header: TBD, REQ, PXY >
                             < Session-Id >
                             { Auth-Application-Id }
                             { Origin-Host }
                             { Origin-Realm }
                             { Destination-Realm }
                             { Auth-Request-Type }
                             [ Destination-Host ]
                             [ NAS-Identifier ]
                             [ NAS-IP-Address ]
                             [ NAS-IPv6-Address ]
                             [ NAS-Port-Type ]
                             ...
                             Diameter NASREQ defined AVPs
                             ...
                             { Device-Identity }
                           * [ Requested-Info ]
                           * [ AVP ]
```

1.4.2. Diameter-PQ-Answer

The Diameter-PQ-Answer (PQA) message, indicated by the Command-Code
field set to TBD and 'R' bit cleared in the Command Flags field, is
sent in response to the Diameter-PQ-Request message. The Application-Id
field in the Diameter message header MUST be set to DPQ Application-Id
(value of TBD).

```
<Diameter-PQ-Answer> ::= < Diameter Header: TBD, REQ, PXY >
                            < Session-Id >
                            { Auth-Application-Id }
                            { Auth-Request-Type }
                            { Result-Code }
                            { Origin-Host }
                            { Origin-Realm }
                             ...
                             Diameter NASREQ defined AVPs
                             ...
                            { Device-Identity }
                          * [ AVP ]
```

In case of a successful processing of the request the desired AVPs as
indicated in the Requested-Info AVPs are returned.

1.5. AVPs

This document re-uses AVPs defined in Diameter NASREQ (RFC 4005 [RFC4005] (Calhoun, P., Zorn, G., Spence, D., and D. Mitton, "Diameter Network Access Server Application," August 2005.)). Additionally, the following AVPs are used as shown in the table below.

```
                                      +-------------------+
                                      |   AVP Flag Rules  |
                                      +----+---+------+----+----+
                        AVP  Defined  |    |   |SHOULD|MUST|MAY |
    Attribute Name     Code in        Value Type |MUST|MAY| NOT  | NOT|Encr|
   +-------------------------------------+----+---+------+----+----+
   |Device-Identity TBD  TBD      Grouped   | M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
   |User-Name        1   RFC3588  UTF8String| M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
   |IP-Address       TBD TBD      Address   | M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
   |Requested-Info   TBD TBD      Grouped   | M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
   |AVP-Code         TBD TBD      Integer32 | M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
   |Vendor-ID        TBD TBD      Integer32 | M | P |      | V  | Y  |
   +-------------------------------------+----+---+------+----+----+
```

1.5.1. IP-Address AVP

The IP-Address AVP (AVP Code TBD) is of type Address and contains IPv6 or IPv4 address of the device.

1.5.2. Requested-Info AVP

The Requested-Info AVP (AVP Code TBD) is of type grouped and is defined as shown below:

```
    <Requested-Info> ::= < AVP Header: TBD >
                        { AVP-Code }
                        [ Vendor-ID ]
```

1.5.3. AVP-Code AVP

The AVP-Code AVP (AVP Code TBD) is of type Integer32 and contains the Diameter AVP code.

1.5.4. Vendor-ID AVP

The Vendor-ID AVP (AVP Code TBD) is of type Integer32 and contains the vendor id of a Diameter AVP.

1.6. Result-Code AVP Values

This section defines new Result-Code [RFC3588] (Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol," September 2003.) values that MUST be supported by all Diameter implementations that conform to this specification.

1.6.1. Success

Errors that fall within the Success category are used to inform a peer that a request has been successfully completed.

1.6.2. Permanent Failures

Errors that fall within the permanent failures category are used to inform the peer that the request failed and SHOULD NOT be attempted again.

1.7. AVP Occurrence Tables

The following tables present the AVPs defined in this document and their occurrences in Diameter messages. Note that AVPs that can only be present within a Grouped AVP are not represented in this table.
The table uses the following symbols:

0:

   The AVP MUST NOT be present in the message.

0+:
     Zero or more instances of the AVP MAY be present in the
   message.

0-1:
     Zero or one instance of the AVP MAY be present in the message.

1:
   One instance of the AVP MUST be present in the message.

1.8. PQR/PQA AVP/Command-Code Table

```
                                  +-----------------------+
                                  |     Command-Code      |
                                  |-----+-----+-----------+
               AVP Name           | PQR | PQA |
               -------------------------------|-----+-----+
               Device-Identity            | 1  | 1  |
               Requested-Info             | 0+ | 0  |
                                          +-----+-----+
```

1.9. IANA Considerations

1.9.1. Command Codes

IANA is requested to allocate a command code value for the following
new commands from the Command Code namespace defined in [RFC3588]
(Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko,
"Diameter Base Protocol," September 2003.). See Section 1.4 (Command
Codes) for the assignment of the namespace in this specification.

```
Command Code                      | Value
----------------------------------+------
Diameter-PQ-Request (PQR)         | TBD
Diameter-PQ-Answer (PQA)          | TBD
```

1.9.2. AVP Codes

This specification requires IANA to register the following new AVPs
from the AVP Code namespace defined in [RFC3588] (Calhoun, P.,
Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base
Protocol," September 2003.).

    *Device-Identity

    *IP-Address

    *Requested-Info

    *AVP-Code

    *Vendor-ID

The AVPs are defined in Section 1.5 (AVPs).

1.10. Application Identifier

This specification requires IANA to allocate a new Diameter Application
"Diameter Parameter Query (DPQ)" from the Application Identifier
namespace defined in [RFC3588] (Calhoun, P., Loughney, J., Guttman, E.,
Zorn, G., and J. Arkko, "Diameter Base Protocol," September 2003.).
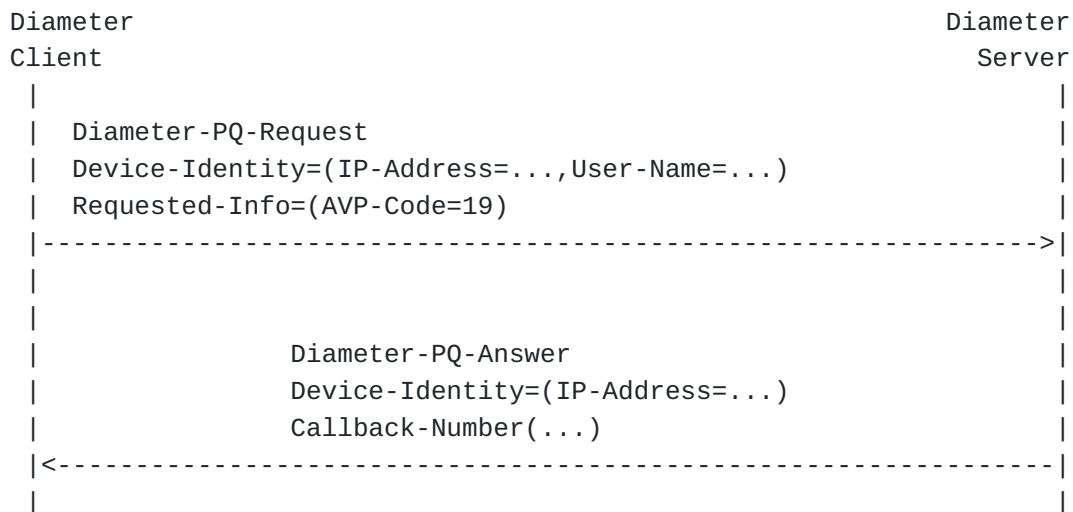
2. Example

The following example shows a request with an IP address and User-Name
as the device identity asking for the Callback-Number AVP defined in
RFC 2865 [RFC2865] (Rigney, C., Willens, S., Rubens, A., and W.

Simpson, "Remote Authentication Dial In User Service (RADIUS),"
June 2000.) to be returned.

```
      Diameter                                                  Diameter
      Client                                                    Server
       |                                                          |
       |  Diameter-PQ-Request                                     |
       |  Device-Identity=(IP-Address=...,User-Name=...)          |
       |  Requested-Info=(AVP-Code=19)                            |
       |--------------------------------------------------------->|
       |                                                          |
       |                                                          |
       |               Diameter-PQ-Answer                         |
       |               Device-Identity=(IP-Address=...)           |
       |               Callback-Number(...)                       |
       |<---------------------------------------------------------|
       |                                                          |
```

Figure 3: Example Exchange

3. Security Considerations   TOC

AAA servers MUST prevent exposure of information (particularly the
mapping of IP address to the subscriber information like identity or
some form of location information, which can be an invasion of the
subscribers privacy) by employing access control techniques. A pre-
requisity of this authorization step is authentication, which is
provided by the Diameter base specification [RFC3588] (Calhoun, P.,
Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base
Protocol," September 2003.). Furthermore, it is recommended that a AAA
server configuration is available to control the granularity of the
information exchange to restrict the exposure of information to those
attributes previously agreed on between the involved parties, namely
the Diameter client, the Diameter server and the subscriber as the
owner of the information. The latter aspect is particularly important
since the distribution of information for a stated purpose requires
explicit consent of the subscriber since is a regulatory requirement in
many juristictions. Because of the strong security requirements stated
above it is envisioned that the Diameter application described in this
document is used only between two entities belonging to the same
administrative domain. Distributed denial of service attacks against

the Diameter by repeated requests from the Diameter client are not considered a threat since the Diameter client will be known to the Diameter server once cryptographic authentication, using TLS or IPsec as described in [RFC3588] (Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol," September 2003.), is completed.

4. Acknowledgements

Add your name here.

5. References

5.1. Normative References

[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," BCP 14, RFC 2119, March 1997 (TXT, HTML, XML).
[RFC3588]	Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol," RFC 3588, September 2003 (TXT).
[RFC4005]	Calhoun, P., Zorn, G., Spence, D., and D. Mitton, "Diameter Network Access Server Application," RFC 4005, August 2005 (TXT).

5.2. Informative References

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

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