DIME WG
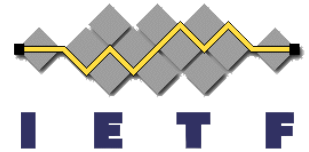# IETF 95

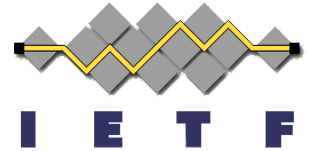**Buenos Aires, Argentina**

Protocol errors, 'E' bit
and answer command CCF

Friday, April 8th 2016

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I E T F

'E' bit used in RFC6733

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    Version    |                 Message Length                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|R P E T r r r r|                  Command Code                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Application-ID                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Hop-by-Hop Identifier                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      End-to-End Identifier                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  AVPs ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

E(rror)

> If set, the message contains a **protocol error**, and **the message will not conform to the CCF described for this command**. Messages with the 'E' bit set are commonly referred to as error messages. This bit MUST NOT be set in request messages (see Section 7.2).

Generic answer CCF

The 'E' (Error Bit) in the Diameter header is set **when the request caused a protocol-related error (see Section 7.1.3)**. A message with the 'E' bit MUST NOT be sent as a response to an answer message. Note that a message with the 'E' bit set is still subjected to the processing rules defined in Section 6.2. **When set**, **the answer message** will not conform to the CCF specification for the command; instead, it and **will conform to the following CCF**:

```
Message Format

<answer-message> ::= < Diameter Header: code, ERR [, PXY] >
              0*1< Session-Id >
                 { Origin-Host }
                 { Origin-Realm }
                 { Result-Code }
                 [ Origin-State-Id ]
                 [ Error-Message ]
                 [ Error-Reporting-Host ]
                 [ Failed-AVP ]
                 [ Experimental-Result ]
               * [ Proxy-Info ]
               * [ AVP ]
```
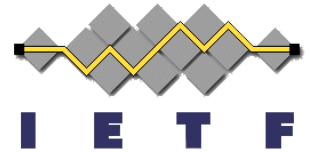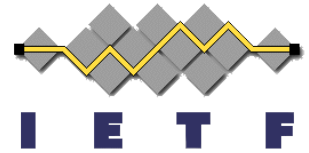
Protocol Errors

Errors that fall within the Protocol Error category SHOULD be treated on a per-hop basis, and Diameter proxies MAY attempt to correct the error, if it is possible. Note that these errors MUST only be used in answer messages whose 'E' bit is set.

```
DIAMETER_COMMAND_UNSUPPORTED            (3001)
DIAMETER_UNABLE_TO_DELIVER              (3002)
DIAMETER_REALM_NOT_SERVED               (3003)
DIAMETER_TOO_BUSY                       (3004)
DIAMETER_LOOP_DETECTED                  (3005)
DIAMETER_REDIRECT_INDICATION            (3006)
DIAMETER_APPLICATION_UNSUPPORTED        (3007)
DIAMETER_INVALID_HDR_BITS               (3008)
DIAMETER_INVALID_AVP_BITS               (3009)
DIAMETER_UNKNOWN_PEER                   (3010)
```
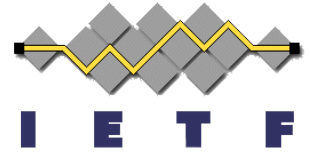
So…

- When a protocol error occurs (e.g. DIAMETER_UNABLE_TO_DELIVER (3002) or DIAMETER_REDIRECT_INDICATION (3006)) when processing a request (e.g. DER), the answer must not conform to the normal CCF grammar of the answer command (e.g. DEA) but must conform to the grammar given in the section 7.2.

But…

- In the specific redirection error case, the trouble comes from that redirect information is put as potential information that you can find in normal answers for a lot of answer commands including in the base protocol commands, e.g. Session-Termination-Answer

```
<STA> ::= < Diameter Header: 275, PXY >
        < Session-Id >
        { Result-Code }
        { Origin-Host }
        { Origin-Realm }
        [ User-Name ]
      * [ Class ]
        [ Error-Message ]
        [ Error-Reporting-Host ]
        [ Failed-AVP ]
        [ Origin-State-Id ]
-->   * [ Redirect-Host ]
-->     [ Redirect-Host-Usage ]
-->     [ Redirect-Max-Cache-Time ]
      * [ Proxy-Info ]
      * [ AVP ]
```
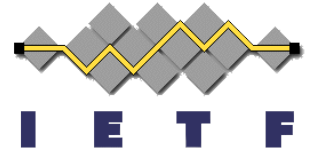
But…

- imply that the normal answer CCF is used instead of the generic one defined in the section 7.2 of RFC 6733.

- Not a real issue with the STA CCF syntax compliant with the generic answer message CCF.

- But same principle applied to a lot of application commands, e.g. DEA

```
<Diameter-EAP-Answer> ::= < Diameter Header: 268, PXY >
          < Session-Id >
          { Auth-Application-Id }
          { Auth-Request-Type }
          { Result-Code }
          { Origin-Host }
          { Origin-Realm }
          [ User-Name ]
          [ ...... ]
          [ Error-Message ]
          [ Error-Reporting-Host ]
        * [ Failed-AVP ]
          [ ...... ]
          [ Origin-State-Id ]
          [ ...... ]
        * [ Redirect-Host ]
          [ Redirect-Host-Usage ]
          [ Redirect-Max-Cache-Time ]
        * [ Proxy-Info ]
        * [ AVP ]
```
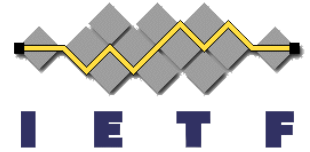
And even worse…

- The redirection error case is a specific example but the issue exists for any protocol error (e.g. DIAMETER_UNABLE_TO_DELIVER) or **even for permanent error** when:

  In error conditions where it is not possible or efficient to compose application-specific answer grammar, answer messages with the 'E' bit set and which comply to the grammar described in Section 7.2 MAY also be used for permanent errors.
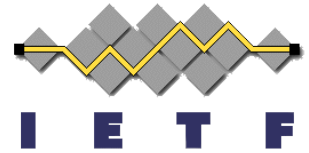
Basic Assumption

- the RFC6733 is correct regarding the generation of answers with the 'E' bit set.

- As a consequence, any answer command CCF grammar including the redirection information related AVPs are not correct (or not relevant regarding base protocol commands).

- As a consequence, a general update procedure should be initiated to correct this issue.

- OK/NOK on the assumption and the issue?
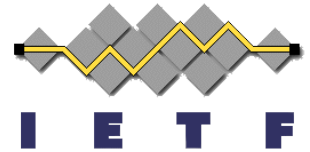
Proposed way forward

- A new RFC updating all the existing IETF RFCs.

- Also used as trigger for other vendors (including SDOs) to correct their own specification.

- Could be used to clarify that some protocol errors are meant to be handled on a per-hop basis and that some errors should not be forwarded to other peers.

  - ex: Redirection
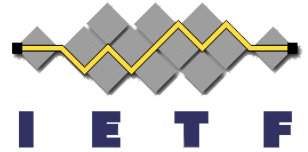
Your view?

- Good solution?
- If yes, volunteers to work on it?
- If not, what is the proposed alternative?