V.92 Modem-On-Hold signalling on L2TP

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Abstract

The Layer 2 Tunneling Protocol [L2TP] defines a mechanism for tunneling PPP [PPP] sessions.

One of the features introduced by V.92 [V92] is the ability of the client modem to put the call on hold. The L2TP base protocol does not provide any means to signal this event. This document describes a method used to indicate when a client modem has gone on-hold.
1. Introduction

L2TP defines a general purpose mechanism for tunneling PPP over various media. By design, it insulates L2TP operation from the details of the media from which the PPP session originated, including when a V.92 client modem requests to go on-hold. It may be desirable for this information to be provided to the LNS.

There are no standard AVPs that can communicate this information. This document provides additional AVPs and commands that may be used to provide modem information. However, it does not define what (if anything) will the LNS do with this information.

1.1 Specification of Requirements

This document uses the terms "MUST", "SHOULD", "MAY" and their negatives, as described in [BCP14].

2. Protocol Operation

L2TP can be used in many different topologies. This document looks at this particular topology:

```
+----+    ( )    +----+    [ packet ]    +----+    [ home ]
|    |---[M]---( PSTN )---| LAC |...[ network ]...| LNS |...[ network ]
+----+    ( )    +----+    [ ]    +----+    [ ]
```

Remote System

M is the client modem and it may be an integral part of the Remote System. If this modem implements V.92, it can request the server modem (part of the LAC) to go on-hold for some period of time.

If the server modem agrees, the client modem can signal the PSTN to go on-hold (usually, a flash hook). The user at the remote system may then use the same POTS line where the client modem is connected to make or receive another call.

If the LAC implements the functionality described here, it can signal to the LNS when the client modem has gone on-hold and when it comes back online.

This document does not define what (if anything) will the LNS do with this information.
2.1 Modem On-Hold

When the client modem requests the LAC to go on-hold, the LAC SHOULD send a MDMST command to the LNS with the H (Hold) bit set to 1 and the negotiated maximum on-hold time.

2.2 Modem Online

When the client modem returns back online after having gone on-hold, the LAC SHOULD send a MDMST command to the LNS with the H (Hold) bit set to 0.

3. Commands

The following commands MUST be sent with the M-bit in the Message Type AVP set to 0 to prevent interoperability issues. Messages with unknown values in the Message Type AVP with the M-bit set to 0 should be ignored by compliant L2TP peers.

3.1 Modem-Status (MDMST)

The Modem-Status (MDMST) command is a control message used by the LAC to notify the LNS when the client modem on-hold status changes.

The MDMST message MUST not be sent to peers that have not indicated in the SCCRQ or SCCRP that they implement this command with the Modem On-Hold Capable AVP. Furthermore, the MDMST message can only be sent after session establishment is successful, i.e., after the LAC has sent either an ICCN or an OCCN.

Currently, this command is encoded as follows:

Vendor ID = 529 Attribute Type = 0 (Message Type AVP) Attribute Value = 2 (MDMST)

The above encoding corresponds to a vendor-specific control message. Vendor ID 529 indicates Lucent Technologies, the initial developer of this specification.

There is currently no number assigned to this command by the IANA. A number will be requested if this draft is approved by the L2TP WG.

The following AVPs MUST be present in the MDMST message:

- Message Type
- Modem On-Hold Status

The M-bit on the Message Type AVP for this command MUST be set to 0.
4. Control Message Attribute Value Pairs

The following sections contain a list of the new L2TP AVPs defined in this document.

4.1 Modem On-Hold Capable AVP

The Modem On-Hold Capable AVP indicates that the sender is capable of sending or receiving MDMST commands. This AVP MUST be included on the SCCRQ or SCCRP commands to indicate that the sender implements this specification.

It is encoded as Vendor ID 529 with an Attribute Type of 2. The Vendor ID 529 indicates Lucent Technologies, the initial developer of this specification. It SHOULD be changed 0 and an official Attribute Type chosen if this specification advances on a standards track.

This AVP has no Attribute Value field.

This AVP MAY be hidden (the H-bit on the AVP header MAY be 0 or 1). The M-bit for this AVP MUST be set to 0. The Length is 6.

4.2 Modem On-Hold Status AVP

The Modem On-Hold Status AVP indicates the current on-hold status of the client modem. This AVP MUST be present on the MDMST command.

It is encoded as Vendor ID 529 with an Attribute Type of 3. The Vendor ID 529 indicates Lucent Technologies, the initial developer of this specification. It SHOULD be changed 0 and an official Attribute Type chosen if this specification advances on a standards track.

The Attribute Value field for this AVP has the following format:

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+-----------------------------+
|H|      reserved       |Timeout|
+-----------------------------+
```

The Modem On-Hold Status AVP is a 16-bit quantity, containing two fields that indicate whether the client modem has gone on-hold and the maximum amount of time that the modem is allowed to remain on-hold.

The H field is a single bit that indicates whether the client modem has gone on-hold. If the H bit is 1, the client modem is on-hold. If the H bit is 0, the client modem is back online.
The Timeout field is a 4 bits quantity that indicates the negotiated maximum amount of time that the client modem can remain on-hold. It is only valid if the H bit is 1 and it MUST be ignored if the H bit is 0. The value of this field is defined in \[V92\] and it is reproduced here for easy reference:

<table>
<thead>
<tr>
<th>Bits</th>
<th>Decimal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>0</td>
<td>Reserved for the ITU</td>
</tr>
<tr>
<td>0001</td>
<td>1</td>
<td>10 seconds</td>
</tr>
<tr>
<td>0010</td>
<td>2</td>
<td>20 seconds</td>
</tr>
<tr>
<td>0011</td>
<td>3</td>
<td>30 seconds</td>
</tr>
<tr>
<td>0100</td>
<td>4</td>
<td>40 seconds</td>
</tr>
<tr>
<td>0101</td>
<td>5</td>
<td>1 minute</td>
</tr>
<tr>
<td>0110</td>
<td>6</td>
<td>2 minutes</td>
</tr>
<tr>
<td>0111</td>
<td>7</td>
<td>3 minutes</td>
</tr>
<tr>
<td>1000</td>
<td>8</td>
<td>4 minutes</td>
</tr>
<tr>
<td>1001</td>
<td>9</td>
<td>6 minutes</td>
</tr>
<tr>
<td>1010</td>
<td>10</td>
<td>8 minutes</td>
</tr>
<tr>
<td>1011</td>
<td>11</td>
<td>12 minutes</td>
</tr>
<tr>
<td>1100</td>
<td>12</td>
<td>16 minutes</td>
</tr>
<tr>
<td>1101</td>
<td>13</td>
<td>No limit</td>
</tr>
<tr>
<td>1110</td>
<td>14</td>
<td>Reserved for the ITU</td>
</tr>
<tr>
<td>1111</td>
<td>15</td>
<td>Reserved for the ITU</td>
</tr>
</tbody>
</table>

Since V.92 has not been approved yet by the ITU, it is possible for this mapping to change.

Bits 1 through 11 are reserved. These bits MUST be set to 0 when sending this AVP and MUST be ignored on reception.

This AVP MAY be hidden (the H-bit on the AVP header MAY be 0 or 1). The M-bit for this AVP MUST be set to 0. The Length is 8.

5. IANA Considerations

The Modem On-Hold Status AVP includes an enumerated value, called "Timeout", whose value is defined by ITU in \[V92\].

This AVP also contains a set of reserved bits (bits 1 through 11) that are assigned by IANA through IETF Consensus \[BCP26\].

6. Security Considerations

The integrity and confidentiality of the method described in this document relies on the underlying L2TP security mechanisms. The new command and AVPs are intended to indicate when a client modem has gone on-hold and cannot receive data. It does not define what will
the LNS do with this information (if anything).

It is believed that the defined extension does not provide information that would be useful to an attacker, and as such, it should not pose a threat to system security.

If desired, the new AVPs MAY be hidden as described in section 4.3 of RFC 2661.

7. References


8. Acknowledgments

Thanks to Josh Bailey of Lucent Technologies for help in reviewing this draft.

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