Configuring an ADSL Connection on a Virtual Access Router

Issue 10.CL1
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1 Introduction ............................................................................................................. 3
1.1 What is ADSL technology? .................................................................................. 3
1.2 ADSL connections .............................................................................................. 3
1.3 ADSL connection options on your router ......................................................... 4
2 Configuring your ADSL PPP connections ............................................................. 6
2.1 Navigating to expert view .................................................................................. 6
2.2 Configuring your first dual ADSL PPP connection .............................................. 7
  2.2.1 Configure adsl-0 interface settings ................................................................. 7
  2.2.2 Configure AAL5-1 interface settings ........................................................... 8
  2.2.3 Configure PPP-1 interface settings ............................................................... 10
  2.2.4 Choose a descriptive name for PPP interface .............................................. 10
  2.2.5 Bind aal5 to the PPP interface .................................................................. 11
  2.2.6 Configure IP settings .................................................................................. 11
  2.2.7 Configure address translation ..................................................................... 13
  2.2.8 Configure IPCP options ............................................................................. 14
  2.2.9 Remote IP address negotiation ................................................................... 15
  2.2.10 Local primary DNS negotiation ................................................................ 16
  2.2.11 Local secondary DNS negotiation .......................................................... 17
  2.2.12 Configure PPP interface settings .............................................................. 18
  2.2.13 Configure PPP authentication .................................................................. 20
  2.2.14 Send CHAP username and password ...................................................... 21
  2.2.15 Send PAP username and password .......................................................... 21
  2.2.16 Configure LCP options ........................................................................... 22
  2.2.17 Local MRU negotiation ........................................................................... 22
  2.2.18 Remote MRU negotiation .......................................................................... 23
  2.2.19 Remote LCP magic number negotiation .................................................. 24
  2.2.20 Configure PPPoE setting (for PPPoEoA) .................................................. 25
  2.2.21 Set PPP to auto connect when terminated by the network ....................... 26
2.3 Configuring a default route .............................................................................. 27
3 Saving your configuration changes ..................................................................... 29
4 Diagnostics .......................................................................................................... 31
  4.1 Multilink diagnostics ....................................................................................... 31
   4.1.1 Physical connections .................................................................................. 31
   4.1.2 ADSL line history ..................................................................................... 31
   4.1.3 ADSL Tx and Rx counters ......................................................................... 32
   4.1.4 ATM Tx and Rx counters ........................................................................... 34
   4.1.5 AAL5 Tx and Rx counters .......................................................................... 35
   4.1.6 Connection monitor .................................................................................. 36
   4.1.7 Active data connections .......................................................................... 38
  4.2 General diagnostics ......................................................................................... 39
   4.2.1 Event log ................................................................................................... 39
   4.2.2 Change log ............................................................................................... 40
1 Introduction

1.1 What is ADSL technology?

Asymmetric Digital Subscriber Line (ADSL) is a technology for transmitting digital information at high speed on existing telephone lines to homes and businesses. Unlike a regular, dial-up telephone service, ADSL provides a continuously available, “always-on” connection. ADSL was specifically designed to exploit the asynchronous nature of most multimedia communication in which the user can obtain large amounts of information and only a small amount of interactive control information is returned. ADSL circuits can support data rates of up to 8 Mbps downstream from the network service to the user; and 1 Mbps upstream from the user to the network service.

1.2 ADSL connections

ADSL access services typically use the Asynchronous Transfer Mode (ATM) protocol to provide a low level communications path between the user’s access equipment and the service provider head end. The head end may be a Broadband Access Server (BAS) that sits, logically, behind the ADSL central office Digital Subscriber Line Access Multiplexer (DSLAM) and is connected using an ATM backbone. ATM is a high-speed switching technology where data is grouped into cells.

Connection between the user equipment and the BAS is then achieved using the Point-to-Point Protocol (PPP) running over the ATM connection path. PPP is a defined industry standard used widely to allow two devices to communicate across a logical link. It is extensively deployed by service providers as a means of connecting customers to Internet Protocol (IP)-based services, such as the Internet.

![Figure 1: PPP over a DSL connection](image)

The method of running PPP between the user equipment and the BAS may be either directly over the ATM layer (PPPoA) or over an intermediate Ethernet layer (PPPoE).
1.3 ADSL connection options on your router

You can configure two main types of ADSL service on your router:

- ADSL routed PPP connection
- ADSL bridged connection

If you select the Routed PPP service, you can run the PPP over ATM (PPPoA) or over Ethernet (PPPOE). The following diagrams illustrate the topology of these connections.

![Diagram of a routed ADSL connection over PPPoA]

**Figure 2: A routed ADSL connection over PPPoA**
Less commonly, you may need to configure a bridged connection over ADSL. A bridge is a device that connects two local networks, and forwards packets between them. If your ADSL service is delivered as a bridged connection, the router has no visibility of the IP, or other protocol. This type of service is often associated with single PC user connections where the higher level 'routing' is performed in the PC client software.
2 Configuring your ADSL PPP connection

To enable and configure connections on your router, it must be correctly installed. Your router contains an internal web server that is used for configurations. Before you can access the internal web server and start the router configuration, you must ensure that your PC has the correct networking setup.

The configuration consists of a number of steps for each ADSL link:

- Configure ADSL interface settings
- Configure AAL5 interface settings
- Configure PPP interface settings
- Configure default routes

Section 2.2 ‘Configuring your first ADSL connection’ contains instructions for configuring your first adsl link using adsl-0/aa5-1/ppp-1. For a second link, you should repeat these instructions using a different interface.

We use adsl-0/aa5-1/ppp-1 as the interfaces for the first ADSL connection.

2.1 Navigating to expert view

When your router is correctly connected to your PC, type the Ethernet IP address of the router into the URL line of your browser to display the home page. The default IP address is 192.168.100.1/24.

If you have not received a password, contact the Virtual Access support team.

2.2 Configuring your first ADSL PPP connection

2.2.1 Configure adsl-0 interface settings

In the Expert View menu, click `interfaces -> adsl-0 -> adsl interface`. The ADSL Interface page appears.
Configuring your ADSL PPP connection

2. Configuring an ADSL Connection on a Virtual Access Router

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Issue: 10.CL1

Page 8 of 40

### Figure 4: The ADSL interface on adsl-0 page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables the Adsl-0 interface.</td>
</tr>
<tr>
<td>Downstream Training Rate Cap</td>
<td>Defines a maximum downstream training rate for the ADSL connection.</td>
</tr>
<tr>
<td>Upstream Training Rate Cap</td>
<td>Defines a maximum upstream training rate for the ADSL connection.</td>
</tr>
<tr>
<td>Annex M Attenuation Triggered Restr</td>
<td>Enables power spectrum restriction to comply with BT ANFP (Access Network Frequency Plan) for Annex M lines in the United Kingdom.</td>
</tr>
</tbody>
</table>

| Note: if your ADSL service is an ADSL 2+ Annex M service in the United Kingdom you must set Annex M Attenuation Triggered Restriction to yes to ensure the router will comply with BT INFP power restrictions. |

Click Update. The Configuration Update Result page appears. It is not necessary to save to flash until you have completed all your configuration changes.

#### 2.2.2 Configure AAL5-1 interface settings

In the Expert View menu, click interfaces -> aal5-1 - > aal5 configuration. The AAL5 Configuration on aal5-1 page appears.
Configuring your ADSL PPP connection

Figure 5: The AAL5 configuration on aal5-1 page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables aal5-1 interface. Select yes.</td>
</tr>
<tr>
<td>ADSL Port</td>
<td>Defines the ADSL port used by this AAL5 interface. Select adsl-0.</td>
</tr>
<tr>
<td>VPI</td>
<td>Defines the virtual path identifier. Select as provided from your ADSL service provider.</td>
</tr>
<tr>
<td>VCI</td>
<td>Defines the virtual channel identifier. Select as provided from your ADSL service provider.</td>
</tr>
<tr>
<td>Service Class</td>
<td>Defines the class of service associated with an AAL5 connection. Leave as default.</td>
</tr>
<tr>
<td>VBR Sustained Bitrate</td>
<td>Leave as default.</td>
</tr>
<tr>
<td>Peak Bitrate</td>
<td>Defines the maximum bit rate at which the router will transmit. Applies to all connections of all Service Classes. Set to 0 to ensure no transmission rate cap applies.</td>
</tr>
<tr>
<td>Metasignaling</td>
<td>Defines the average bit rate as measured over a long interval of the connection lifetime. It applies only to VBR connections. Leave as default.</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>Define the encapsulation type associated with an AAL5 virtual connection.</td>
</tr>
<tr>
<td></td>
<td>PPP (RFC2364 vc mux)</td>
</tr>
<tr>
<td></td>
<td>PPP (RFC2364 llc)</td>
</tr>
<tr>
<td></td>
<td>Bridged (RFC 1483)</td>
</tr>
</tbody>
</table>

Table 2: Descriptions of the AAL5 configuration form fields
Note: ensure Peak Bitrate is set to 0 so that the router will not throttle the transmit bit rate to less than your line rate.

Click Update.

2.2.3 Configure PPP-1 interface settings

To configure the first ADSL connection you must select one of the PPP interfaces for use with the first ADSL interface. Throughout this guide, we use ppp-1 as the PPP interface for the first ADSL connection.

2.2.4 Choose a descriptive name for PPP interface

To quickly identify which PPP interface is in use when using the web interface, select a descriptive name for the PPP interface. This is for cosmetic purposes only and does not affect service.

In the Expert View menu, click interfaces ->ppp-1 -> inventory. The Interface Inventory page appears.

![Interface Inventory on ppp-1](image)

**Figure 4: Enter line Identifier on the PPP inventory interface page**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTU Identifier</td>
<td>Enter a description of the network termination device (Terminal Adapter) connected to the selected interface.</td>
</tr>
<tr>
<td>Line Identifier</td>
<td>Enter a string to identify the selected interface. This string is used to select the interface for maintenance activities, such as disconnecting and connecting the line, and to display status and monitoring information.</td>
</tr>
<tr>
<td>User 1</td>
<td>An arbitrary string to provide additional interface inventory information.</td>
</tr>
<tr>
<td>User 2</td>
<td>An arbitrary string to provide additional interface inventory information.</td>
</tr>
</tbody>
</table>

**Table 2: Descriptions of field names and drop-down menus in the IP interface page**

For the Line Identifier, enter a descriptive name that will appear beside ppp-1 interface in the Expert View menu.

Click Update to save your changes.
2.2.5 Bind aal5 to the PPP interface

The PPP interface must be bound to an aal5 interface. Throughout this guide, we use aal5-1 for the first ADSL connection.

In the Expert View menu, click **interfaces -> ppp-1 -> Wan interface**. The PPP WAN Interface page appears.

In the drop-down menu, select **aal5-1**.

Click **Update**.

2.2.6 Configure IP settings

To enable the interface and set parameters, from the ppp-1 folder, select **ip-> ip**. The IP Interface on ppp-1 page appears.
### 2: Configuring your ADSL PPP connection

#### Configuring an ADSL Connection on a Virtual Access Router

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<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enabled</strong></td>
<td>This option is used to enable or disable IP operation on the selected interface. Select <strong>yes</strong>.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Select numbered or unnumbered to define the point-to-point link associated with the PPP interface.</td>
</tr>
<tr>
<td>Numbered</td>
<td>Configure an IP point to point link for static IP address. This is the default option.</td>
</tr>
<tr>
<td>Unnumbered</td>
<td>Configure an IP point to point link for dynamic IP address.</td>
</tr>
<tr>
<td><strong>IP Address</strong></td>
<td>The IP address of the point to point link. When the Type field is set to numbered, type the IP address in to this field. When an interface is defined as unnumbered, set the IP Address field for the interfaces(s) to <strong>0.0.0.0</strong>. For static IP addressing set to required IP address For dynamic IP addressing leave as default 0.0.0.0. <strong>Note:</strong> if you want to statically assign an IP address to the PPP interface that will be used instead of the negotiated IP address, enable and select numbered for the Type, enter the required IP address in the IP Address field and set the Mask to <strong>255.255.255.255</strong>. If the IP address is dynamically assigned by the network, simply enable, ensure the Type is set to <strong>unnumbered</strong>, the IP address is set to <strong>0.0.0.0</strong> and Remote IP address is set to <strong>0.0.0.0</strong>.</td>
</tr>
<tr>
<td><strong>Mask</strong></td>
<td>Enter the subnet mask, in dotted decimal notation, to be assigned to the selected interface. For static IP addressing set to <strong>255.255.255.255</strong> otherwise leave as default <strong>255.255.255.0</strong>.</td>
</tr>
<tr>
<td><strong>Remote IP Address</strong></td>
<td>Enter the IP address of the peer at the opposite end of the point-to-point link associated with the selected interface. The IP router process establishes a host route to the end point of each point-to-point link based on the remote address. Leave as default.</td>
</tr>
<tr>
<td><strong>Remote Mask</strong></td>
<td>Specify the subnet mask, in dotted decimal notation, to be associated with the remote end point of an unnumbered IP link. Leave as default.</td>
</tr>
<tr>
<td><strong>MTU</strong></td>
<td>Enter the size, in bytes, of the largest IP datagram that can be sent by the selected interface. The MTU value includes the data link header, IP header, and IP data field. The MTU should be set according to the encapsulation protocol used on the ADSL connection. For PPPoA connections, set this to <strong>1500</strong>; for PPPoEoA set this to <strong>1492</strong>.</td>
</tr>
<tr>
<td><strong>BOOTP enabled</strong></td>
<td>Select yes to enable or no to disable BOOTP on the selected interface.</td>
</tr>
</tbody>
</table>

---

Table 3: Descriptions of field names and drop-down menus in the IP interface page

Click **Update**.
2.2.7 Configure address translation

To enable Network Address Translation (NAT) on the PPP interface. Select interfaces -> ppp-1 -> ip -> address translation -> outgoing. The Outgoing Address Translation page appears.

In the Enabled drop-down, menu select yes.

Click Update.

To allow the translation of the incoming packets, select interfaces -> ppp-1 -> ip -> address translation -> default incoming. The Default Incoming Address Translation page appears.
2. Configuring your ADSL PPP connection

2.2.8 Configure IPCP options

Generally the IPCP options to be negotiated during PPP negotiation vary depending on the ADSL service provider. However, we recommend enabling the following options.

- Local IP Address negotiation
- Remote IP Address negotiation
- Local Primary DNS negotiation
- Local Secondary DNS negotiation
- Local IP address negotiation

---

### Field name | Description
--- | ---
Enabled | Enables default incoming address translation using the address specified in the IP Address option as the default destination. Select yes. Note: Default Incoming Address Translation Enabled allows end users to remotely access the router using the first ADSL interface by typing the ADSL interface IP address in a browser. This is not possible if Default Incoming Address Translation Enabled is set to 'no'. We recommend you enable the default incoming address translation option.

IP Address | Specifies the IP address of default destination for incoming address translation. Configure as 0.0.0.0 if redirecting to the router itself. Select 0.0.0.0.

---

Click Update.
From the ip folder, **select ipcp options—> local address**. The Local IP Address Negotiation page appears. Configure Local IP Address settings to negotiate an IP address for the ppp-1 interface.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables IP address negotiation on the local end of the link. Select <strong>yes</strong> to enable, or <strong>no</strong> to disable IP address negotiation on the local end of the link. Set Enabled to <strong>yes</strong> to get an IP address from the network.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether or not local IP address option is a required option during IPCP negotiation. Select <strong>no</strong>.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specifies whether or not the IP address is negotiable. Select <strong>yes</strong> if the IP address is negotiable or <strong>no</strong> if the IP address is not negotiable.</td>
</tr>
<tr>
<td>IP Address</td>
<td>If negotiable is disabled, enter the IP address to use during local IP address negotiation. The IP address is entered in dotted decimal notation. The default is 0.0.0.0. Leave this field as default.</td>
</tr>
</tbody>
</table>

**Table 5: Descriptions of the local IP address negotiation fields**

Click **Update** to save your configuration changes.

### 2.2.9 Remote IP address negotiation

From the ip folder, **select ipcp options—> remote address**. The Remote IP Address Negotiation on ppp-1 page appears.
Figure 10: The remote IP address negotiation fields

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables IP address negotiation on the remote end of the link. Select <strong>yes</strong> to enable, or <strong>no</strong> to disable IP address negotiation on the local end of the link. Set Enabled to <strong>yes</strong>.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether or not the remote IP address option is a required option during IPCP negotiation. Select <strong>no</strong>.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specifies whether or not the IP address is negotiable. Select <strong>yes</strong> if the IP address is negotiable.</td>
</tr>
<tr>
<td>IP Address</td>
<td>If Negotiable is disabled, enter the IP address to use during local IP address negotiation. The IP address is entered in dotted decimal notation. By default is 0.0.0.0. Leave this field as default.</td>
</tr>
</tbody>
</table>

Click **Update** to update the configuration.

### 2.2.10 Local primary DNS negotiation

From the ip folder, select **ipcp options-> local primary dns**. The Local Primary DNS page appears.
2. Configuring your ADSL PPP connection

2.2.11 Local secondary DNS negotiation

To enable full IP configuration on the router, from the ip folder, select `ipcp options->local secondary dns`. The Local Secondary DNS Negotiation page appears.
Figure 12: The local secondary DNS negotiation on ppp-1 page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables negotiation of the secondary DNS IP address on the local end of the link. Select <strong>yes</strong> to enable.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether or not local DNS address option is a required option during IPCP negotiation. Select <strong>no</strong>.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Indicates whether secondary DNS negotiation is negotiable or not negotiable by the local end of the link. Select <strong>yes</strong>.</td>
</tr>
<tr>
<td>Address</td>
<td>If Negotiable is disabled, defines IP address of the secondary DNS server to be used by the local end of the link. Setting the IP address to 0.0.0.0 is an explicit request for the remote end to provide the address information.</td>
</tr>
</tbody>
</table>

Table 8: Descriptions of local secondary DNS negotiation fields

Click **Update** to update the configuration.

### 2.2.12 Configure PPP interface settings

Enable the PPP interface on ppp-1. From the ppp-1 folder select `ppp -> ppp`. The PPP Interface on PPP page appears.
If you are statically assigning DNS IP addresses for use on this interface, you can also configure this on this page.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables PPP operation on the selected interface. PPP must be enabled on the interface before you are allowed to configure the PPP authentication or LCP options for the interface. Select yes.</td>
</tr>
<tr>
<td>Maximum Receive Unit (MRU)</td>
<td>The MRU is sent to inform the peer that the router can receive larger packets, or to request that the peer send smaller packets. Enter the MRU for the specified PPP interface.</td>
</tr>
<tr>
<td>Minimum value</td>
<td>512</td>
</tr>
<tr>
<td>Default value</td>
<td>1524</td>
</tr>
<tr>
<td>Maximum value</td>
<td>1524</td>
</tr>
<tr>
<td>Units</td>
<td>bytes</td>
</tr>
<tr>
<td></td>
<td>Leave this field as default.</td>
</tr>
<tr>
<td>Maximum Remote Receive Unit (MRRU)</td>
<td>The MRRU is sent to inform the peer that the remote router can receive larger packets, or to request that the peer send smaller packets. Enter the MRRU for the specified PPP interface.</td>
</tr>
<tr>
<td>Minimum value</td>
<td>512</td>
</tr>
<tr>
<td>Default value</td>
<td>1524</td>
</tr>
<tr>
<td>Maximum value</td>
<td>1524</td>
</tr>
<tr>
<td>Units</td>
<td>bytes</td>
</tr>
<tr>
<td></td>
<td>Leave this field as default.</td>
</tr>
<tr>
<td>IP Enabled</td>
<td>Enables or disables IP negotiation operation on the selected PPP interface. This option must be enabled to allow IPCP option negotiation and operation on the interface. The default is yes. Leave this field as default.</td>
</tr>
<tr>
<td>Bridging Enabled</td>
<td>Enables or disables bridging negotiation and operation on the selected PPP interface. The default value is no.</td>
</tr>
</tbody>
</table>
### 2.2.13 Configure PPP authentication

To configure a username and password, select `interfaces -> ppp-1 -> ppp -> authentication -> name and password`. The Username and Password on ppp-1 page appears.

**Figure 14: Username and password fields**

The settings for local username and password are defined by the company that provides the ADSL service. Set a valid local username and password.

**Note**: only use the remote username and password if the router is acting as authentication server, for example when the interface is authenticating a dial in connection.

Click `Update`.

---

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary DNS IP Address</td>
<td>IP address of the primary DNS server for the network. If the DNS IP address negotiation is enabled on IPCP options, this field will overwrite the DNS IP address assigned by the network. To accept and use the DNS IP address provided by the network leave this field as <strong>0.0.0.0</strong>.</td>
</tr>
<tr>
<td>Secondary DNS IP Address</td>
<td>IP address of the secondary DNS server, if applicable, for the network. If the DNS IP address negotiation is enabled on IPCP options this field will overwrite the DNS IP address assigned by the network. To accept and use the DNS IP address provided by the network leave this field as <strong>0.0.0.0</strong>.</td>
</tr>
<tr>
<td>ADSL Auto Disconnect Enabled</td>
<td>Defines whether to disconnect the ADSL connection when PPP terminates. The default is <strong>no</strong>.</td>
</tr>
</tbody>
</table>

**Table 9: Descriptions of PPP interface fields**

Click **Update**.
2.2.14 **Send CHAP username and password**

To send the CHAP username and password to an authentication server at the time of establishing connection set up. From the ppp-1 folder, select `ppp -> authentication -> send CHAP`. The Send CHAP Password on ppp-1 page appears.

![Send CHAP Password on ppp-1](image)

Figure 15: The send CHAP password fields

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables sending the CHAP password in response to a validation request on this interface. Select <strong>yes</strong>.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether or not the CHAP authentication option must be negotiated during LCP negotiation. Select <strong>no</strong>.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specify whether or not sending the CHAP password is negotiable. Select <strong>yes</strong>.</td>
</tr>
</tbody>
</table>

Table 10: Descriptions of CHAP password fields

Click **Update**.

2.2.15 **Send PAP username and password**

To send the PAP username and password to an authentication server at the time of establishing connection set up. From the IP folder, select `ppp -> authentication -> send PAP`. The Send PAP Password on ppp-1 page appears.
2: Configuring your ADSL PPP connection

Figure 18: The send PAP password page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables sending the PAP password after LCP has successfully</td>
</tr>
<tr>
<td></td>
<td>negotiated on this interface.</td>
</tr>
<tr>
<td></td>
<td>Select yes.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether the PAP authentication option must be negotiated during</td>
</tr>
<tr>
<td></td>
<td>LCP negotiation.</td>
</tr>
<tr>
<td></td>
<td>Select no.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specify whether or not sending the PAP password is negotiable. Select yes.</td>
</tr>
</tbody>
</table>

Table 11: Descriptions of PAP password on ppp-1 fields

Click Update.

2.2.16 Configure LCP options

The LCP options to be negotiated during PPP negotiation vary depending on the ADSL service provider. However we recommend enabling the following options.

- Local MRU (Maximum Receive Unit) negotiation;
- Remote MRU negotiation; and
- Remote Magic Number negotiation.

2.2.17 Local MRU negotiation

The local MRU Negotiation Option negotiates the largest IP datagram that can be received by the router.

To set local MRU select **ppp -> lcp options -> local MRU**. The Local MRU Negotiation page appears.
2. Configuring your ADSL PPP connection

2.2.18 Remote MRU negotiation

The remote MRU Negotiation Option negotiates the largest IP datagram that can be received by the PPP peer.

To set the remote MRU select `ppp -> lcp options -> remote MRU`. The Remote MRU Negotiation page appears.

![Local MRU Negotiation on ppp-1](image)

**Figure 12: The local MRU negotiation page**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enable or disable MRU negotiation on the local end of the link. The Local MRU Negotiation Option negotiates the largest IP datagram that can be received by the router. Select yes.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether the local MRU authentication option must be negotiated during LCP negotiation. Select no.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specifies whether or not the local MRU value is negotiable. Select yes.</td>
</tr>
<tr>
<td>MRU</td>
<td>Defines the MRU value to be sent in the first LCP configure request. Set the local MRU according to the encapsulation protocol used on the ADSL connection. For PPPoA connections set to <strong>1500</strong>. For PPPEoA set to <strong>1492</strong>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>Specifies whether or not the local MRU value is negotiable. Select yes.</td>
</tr>
<tr>
<td>MRU</td>
<td>Defines the MRU value to be sent in the first LCP configure request. Set the local MRU according to the encapsulation protocol used on the ADSL connection. For PPPoA connections set to <strong>1500</strong>. For PPPEoA set to <strong>1492</strong>.</td>
</tr>
</tbody>
</table>

Table 12: Descriptions of local MRU negotiation fields

Click **Update**.
2: Configuring your ADSL PPP connection

Configuring an ADSL Connection on a Virtual Access Router

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Page 24 of 40

Figure 12: The remote MRU negotiation page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables or disables MRU negotiation on the remote end of the link. The remote MRU Negotiation Option negotiates the largest IP datagram that can be received by the PPP peer. Select yes.</td>
</tr>
<tr>
<td>Required</td>
<td>Specifies whether the remote MRU authentication option must be negotiated during LCP negotiation. Select no.</td>
</tr>
<tr>
<td>Negotiable</td>
<td>Specifies whether or not the local MRU value is negotiable. Select yes.</td>
</tr>
<tr>
<td>MRU</td>
<td>Defines the MRU option value allowed in configure requests sent by the PPP peer. This value is only relevant if Negotiable is set to no. Set the remote MRU according to the encapsulation protocol used on the ADSL connection. For PPPoA connections set to 1500. For PPPoEoA set to 1492.</td>
</tr>
</tbody>
</table>

Table 13: Descriptions of remote MRU negotiation fields

Click Update.

2.2.19 Remote LCP magic number negotiation

To enable the remote LCP magic number negotiation, from the ppp-1 folder select ppp - > lcp options - > remote magic number. The Remote LCP Magic Number on ppp-1 page appears.
2. Configuring your ADSL PPP connection

Configuring an ADSL Connection on a Virtual Access Router

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Issue: 10.CL1

Page 25 of 40

Field name | Description
--- | ---
Enabled | Enables or disables the remote LCP Magic Number on interface. Select yes.
Required | Specifies whether the remote LCP Magic Number option must be negotiated during LCP negotiation. Select no.
Negotiable | Specifies whether or not option is negotiable. Select yes.
Value | Enter a unique eight character hexadecimal value that identifies the link. This value is only relevant if Negotiable is set to 'no'.

Table 11: Remote LCP magic number field descriptions

Click Update.

2.2.20 Configure PPPoE setting (for PPPoEoA)

For PPPoEoA ADSL connections from the ppp-1 folder select pppoe -> pppoe configuration. The pppoe on ppp-1 page appears.
Configuring your ADSL PPP connection

2. Configuring an ADSL Connection on a Virtual Access Router

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Issue: 10.CL1

Page 26 of 40

Figure 17: The PPPoE page

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables PPPoE. Select <strong>yes</strong>.</td>
</tr>
<tr>
<td>Type</td>
<td>Defines whether to act as a host or a concentrator Select <strong>Host</strong>.</td>
</tr>
<tr>
<td>Access Name</td>
<td>Specifies access name. Enter access name if known, otherwise leave blank.</td>
</tr>
<tr>
<td>Service Name</td>
<td>Specifies service name. Enter service name if known, otherwise leave blank.</td>
</tr>
</tbody>
</table>

Table 11: PPPoE field descriptions

Click **Update**.

### 2.2.21 Set PPP to auto connect when terminated by the network

To enable Auto Connect, from the ppp-1 folder select **call control -> call**. The Call Details on ppp-1 page appears.
### 2. Configuring your ADSL PPP connection

#### 2.3 Configuring a default route

In the Expert View menu, click `system -> ip -> ip routing -> default route`.

Configure a default route for your ADSL connection, setting the metrics to reflect the desired route preference.

---

**Table 14: The call details on ppp-1 page**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Connect Enabled</td>
<td>Controls automatic connection of PPP for the selected interface.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Automatically establishes the PPP connection on this interface when PPP terminates.</td>
</tr>
<tr>
<td>No</td>
<td>Does not automatically PPP connection on this interface when PPP terminates.</td>
</tr>
</tbody>
</table>

Set Auto Connect Enabled to `yes`.

**Note:** all other fields on this page are not relevant to ADSL.

Click **Update**.

Repeat the steps in xx, using adsl-1/aal5-2/ppp-2, to configure your second interface.
Figure 18: The IP default route page
3 Saving your configuration changes

![Configuration Update Result](image)

**Figure 19: The configuration update results page**

On the Configuration Update Result page, click **saved to flash** to save the changes to flash memory. The Save Configuration to Flash page appears.

![Save Configuration to Flash](image)

**Figure 20: The save configuration to flash page**

In the Save Committed Changes To drop-down menu, select the specified Config. Click **Save** to commit the changes. The Configuration Saved page appears.
Configuration Saved

Your configuration has been successfully saved.

The system's software image is **image1** and will restart using **image1**

The system's flash configuration file is **config2** and will restart using **config2**

Some of your recent changes require a reload to take effect. To reload your Service Managed Gateway now, click on the button below. You should only reload after you have completed all your configuration changes.

[Reload Router]

Figure 21: The configuration saved page

Click **Reload Router** to enable the changes.
4 Diagnostics

The Virtual Access router supports extensive remote diagnostics, status and SLA monitoring capabilities.

The status and diagnostic tools are provided as a series of Java applets described below.

The command line interactive command used by each Java applet is also described.

4.1 Multilink diagnostics

4.1.1 Physical connections

To view the ADSL Spectrum Analyzer statistics, from the Start page, click Status.

In the Status menu, select ADSL Line Spectrum.

![Image of DSL spectrum analyzer page]

Figure 22: The DSL spectrum analyzer page

Command line: show adsl graph <adsl-0|adsl-1>

4.1.2 ADSL line history

ADSL Line History is a graphical tool that records and displays the operational status of the WAN interface, highlights breaks in service and indicates up-time and connection speed.

To view the ADSL Line History statistics, in the Start page, click Status.
In the Status menu, select Line History.
4.1.3 **ADSL Tx and Rx counters**

The ADSL Tx and Rx counters measure the number of received and transmitted packets on the ADSL interface. This view also contains FEC, HEC, CRC and BER error counters as well as detailed ADSL information.

To view the ADSL Tx and Rx statistics, from the Start page, click **Advanced-> Expert View**.

In the top menu, click **Operations**.

In the Operations menu, click **performance->interface stats->adsl stats->statistics**.
**Figure 25: ADSL Tx and Rx statistics**

Command line: `show stats adsl <adsl-0>`

```
super> show stats adsl
Info Detail                Near End     Far End
Modem Status               Down        -
Operational Mode           -           -
ADSL Software              13.9.48     -
ITU Country                15          255
ITU Vendor Code            414c4342   ffffffff
ITU Vendor Specific        0           55535
ITU Standard Revision      1           255
DNT Version                0x0000     -
Capacity Occupation (%)    0           0
Noise Margin (dB)          0.0         0.0
Output Power (dBm)         0.0         0.0
Attenuation (dB)           0.0         0.0
Fast Bitrate (kbps)        0           0
Fast Margin (kbps)         0           0
Fast Cells tx / rx         0           0
Fast FEC                   0           0
Fast CRC                   0           0
Fast HEC                   0           0
Fast BER Accum             0           -
Fast BER Valid             0           -
Fast BER Invalid           0           -
```

**Figure 26: Output of the command line show stats adsl**
4.1.4 **ATM Tx and Rx counters**

The ATM Tx and Rx counters measure the number of received and transmitted packets on the ATM interface. This view also contains information about discarded and error cells received.

To view the ATM Tx and Rx statistics, from the Start page, click **Advanced -> Expert View**.

In the top menu, click **Operations**.

In the Operations menu, click **performance->interface stats->adsl stats->atm**.

![Figure 27: ATM Tx and Rx statistics](image)

**Command line: show stats atm**

```
super> sh stats atm
*** Cells transmitted 0
*** OAM cells transmitted 0
*** CLPI-1 cells transmitted 0
*** EFCT-1 cells transmitted 0
*** RM cells transmitted 0
*** Valid cells received 0
*** OAM cells received 0
*** CLPI-1 cells received 0
*** EFCT-1 cells received 0
*** RM cells received 0
*** Cells discarded 0
*** HEC error cells received 0
*** OCD counts 0
*** OCD cumulative time (ms) 2939650
```

![Figure 28: Output from the command line show stats atm](image)
4.1.5 **AAL5 Tx and Rx counters**

The AAL5 Tx and Rx counters measure the number of received and transmitted packets on the ATM interface.

To view the AAL5 Tx and Rx statistics, from the Start page, click **Advanced -> Expert View**.

In the top menu, click **Operations**.

In the Operations menu, click **performance->interface stats->adsl stats->aal5**.

---

**Figure 29: AAL5 Tx and Rx statistics**

**Command line: show stats aal5-1**

```
super> show stats aal5-1
Statistics for interface aal5-1

*** Transmitted frames: 9844
*** Transmitted data bytes: 1132558
*** Transmitted cells (all types): 36992
*** Transmitted OAM cells: 13251
*** Transmitted EFCI (1 cells): 0
*** Transmitted CLPI (1 cells): 0
*** Received data bytes: 992256
*** Received frames: 9234
*** Received user cells: 20672
*** Received OAM cells: 13250
*** Received bad OAM cells: 0
*** Received RM cells: 0
*** Received bad RM cells: 0
*** Received EFCI (1 cells): 0
*** Received CLPI (1 cells): 0
*** Discarded transmit cells: 0
```

**Figure 30: Output for the command line show stats aal5-1**
4.1.6 Connection monitor

Connection Monitor is a graphical tool for checking and testing the connection over the WAN interface. It identifies at which layer within the protocol a connection may be failing.

Connection Monitor allows you to:
- display a graphical overview of the status of a data connection;
- connect and disconnect a selected interface; and
- test your connection to another IP-addressable device using the ping command.

To view the Connection Monitor window, from the Start page, click Advanced -> Expert View.

In the top menu, click Operations.

In the Operations menu, click status-> connection monitor.

![Connection Monitor Window]

**Figure 31: The connection monitor window**

**Command line:** IPCP - show state ipcp
Figure 32: Output for the command line IPCP – show state ipcp

```
super> sh state ipcp
Up,Up,,
Up,Down,,
Up,Down,,
Up,Down,,
Up,Down,,
Up,Down,,
Up,Down,,
Up,Down,,
Up,Down,,
```

Figure 33: Output for the command line CHAP/PAP – show state authentication

```
super> sh state authentication
Up,Up,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
```

Figure 34: Output for the command line LCP – show state lcp

```
super> sh state lcp
Up,Up,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
Down,Down,,
```

Figure 35: Output for the command line ATM VC – show state aal5 aal5-1

```
super> show state aal5 aal5-1
Up,Up,0,VPI/VCI = 0 / 38,
```

Figure 36: Output for the command line ADSL – show state adsl

```
super> show state adsl
Up,Up,13057560,G.992 – Fast (1152 Kbps/256 Kbps),
```
4.1.7 Active data connections

The Active Data Connection table shows information regarding active data calls. To view Active Data Connections statistics, from the Start page, click Status. In the Status menu, click Active Data Connections.

```
Command line: Serial - sh oid 1.3.6.1.2.1.2.1.8.28

super> sh oid 1.3.6.1.2.1.2.1.8.28

Figure 37: Output for the command line serial – sh oid 1.3.6.1.2.1.2.1.8.28
```

```
Command line: sh active connections

super> sh active connections

Figure 39: Output for the command line sh active connections
```
4.2 General diagnostics

4.2.1 Event log

The event log is a history of informational events with timestamps. It contains the time and date the event occurred, the severity of the event, and the event message text.

To view event logs, from the Start page, click Advanced.

In the Advanced menu, click Diagnostics.

On the Diagnostics page, click Event Log.

![Event Log window](image)

Figure 40: The event log window

```
Command line: show events
```

```
Index | Time Stamp       | Class | Severity | Details                                                                 
---|-----------------|-------|----------|-------------------------------------------------------------------------
 1 | 01:06:45 Apr-20-2007 | UPDA | INFO     | HTTP: User: super IP:12.1.10.36 web login                              
 2 | 04:47:47 Apr-20-2007 | UPDA | INFO     | HTTP: Client session 10.1.10.36 (super) timed out                      
 4 | 12:40:42 Apr-20-2007 | UPDA | INFO     | HTTP: User session 10.1.10.36 (super) timed out                       
 5 | 12:44:46 Apr-20-2007 | UPDA | INFO     | HTTP: User session 10.1.10.36 (super) timed out                       
 6 | 12:44:46 Apr-20-2007 | UPDA | INFO     | HTTP: User session 10.1.10.36 (super) timed out                       
 7 | 12:44:46 Apr-20-2007 | UPDA | INFO     | HTTP: User session 10.1.10.36 (super) timed out                       
 8 | 14:01:25 Apr-20-2007 | UPDA | INFO     | HTTP: TCP Conn req from 10.1.10.36                                   

Figure 41: Output from the command line show events
4.2.2 Change log

The Change Log records all configuration changes made to the router. You can use it to check whether the configuration has been modified recently, and if so, to discover exactly what was changed.

To view change logs, from the Start page, click Advanced.
In the Advanced menu, click Diagnostics.
On the Diagnostics page, click Change Log.

Figure 42: The change log window

Command line: show changes all

```
Super> sh changes all
--- console on 01-Jan-2004 ---
00:00:17  System restarted
00:05:22  Set next config config1
00:05:22  Reload
```

Figure 43: Output from the command line show changes all