

# Cisco DSL Router Configuration and Troubleshooting Guide – PPPoE: DSL Router as a PPPoE Client Troubleshooting

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## Introduction

There are many reasons why your Digital Subscriber Line (DSL) connection might not function properly. The goal of this document is to isolate the cause of the failure and repair it. The first troubleshooting step is to determine which layer of your Asynchronous Digital Subscriber Line (ADSL) service is failing. There are three layers in which the failure can occur.

- Layer 1 DSL physical connectivity to the Digital Subscriber Line Access Multiplexer (DSLAM) of your ISP
- Layer 2.1 ATM connectivity
- Layer 2.2 Point-to-Point Protocol over ATM (PPPoA), Point-to-Point Protocol over Ethernet (PPPoE), RFC1483 Bridging, or RFC1483 Routing
- Layer 3 IP

The easiest way to determine which layer you should begin to troubleshoot is to issue the command **show ip interface brief**. The output of this command differs slightly depending on your configuration.

```
827-ESC#show ip interface brief
Interface      IP-Address      OK?      Method      Status      Protocol
ATM0           unassigned      YES      manual      up          up
ATM0.1         unassigned      YES      unset       up          up
Ethernet0      10.10.10.1      YES      manual      up          up
```

If the statuses of ATM0 and ATM0.1 are up and the protocol is up, begin to troubleshoot at Layer 2.

If the ATM interfaces are down, or if they continue to come up and then go down (they do not stay up and up), begin to troubleshoot at Layer 1.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions.

### Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

## Layer 1 Issues

### Is the carrier detect (CD) light on the front panel of the Cisco DSL Router on or off?

If the CD light is on, go to the Layer 2 Issues section of this document.

If the CD light is off, continue with the next question.

### Is your ISP using a DSLAM that supports the Alcatel chipset?

Verify this information with your ISP.

### Is the DSL port on the back of the Cisco DSL Router plugged into the DSL wall jack?

If the DSL port is not plugged into the DSL wall jack, connect the port to the wall with a 4-pin or 6-pin RJ-11 cable. This is a standard telephone cable.

### Is the ATM interface in an administratively down state?

In order to determine if the ATM0 interface is administratively down, issue this command in **enable** mode on the router:

```
Router#show interface atm 0
ATM0 is administratively down, line protocol is down
<... snipped ...>
```

If the ATM0 interface status is administratively down, issue the **no shutdown** command under the ATM0 interface.

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 0
Router(config-if)#no shut
Router(config-if)#end
Router#write memory
```

## Is the cable pinout correct?

If the ATM0 interface status is down and down, the router does not see a carrier on the ADSL line. This generally indicates one of two issues:

1. The active pins on the DSL wall jack are incorrect.
2. Your ISP has not turned up a DSL service on this wall jack.

### Cisco DSL Router xDSL Port Pinouts

The RJ-11 connector provides an xDSL connection to external media via a standard RJ-11 6-pin modular jack.

Pin	Description
3	XDSL_Tip
4	XDSL_Ring

In order to determine if the ATM0 interface is down and down, issue the **show interface atm 0** command from enable mode of the router:

```
Router#show interface atm 0
ATM0 is down, line protocol is down
<... snipped ...>
```

If the ATM interface is down and down not administratively down check the pinout of your DSL wall jack. The DSL router uses a standard RJ-11 (4-pin or 6-pin) cable to provide the ADSL connection to the wall jack. The center pair of pins on the RJ-11 cable is used to carry the ADSL signal (pins 3 and 4 on a 6-pin cable, or pins 2 and 3 on a 4-pin cable).

If you are sure you have the right pins on the wall jack and the ATM0 interface is still down and down, replace the RJ-11 cable between the DSL port and your wall jack. If the interface is still down and down after you replace the RJ-11 cable, contact your ISP and have the ISP verify that DSL service has been enabled on the wall jack that you use.

If you are not sure what pins on your wall jack are active, ask your ISP.

## Do you have the correct power supply for the Cisco 827?

If you have verified that your DSL cable is good and that you have the correct pinouts, the next step is to make sure you have the correct power supply for the 827.

**Note:** The 827 does not use the same power supply as other 800 series routers.

In order to determine if you have the correct power supply, on the back of the power adapter look for **Output +12V 0.1A, -12V 0.1A, +5V 3A, -24V 0.12A, and -71V 0.12A**. If your power supply is missing the +12V and -12V feeds, then it is for a different Cisco 800 series router and does not work on the 827. Note that if you use the wrong power supply, the Cisco 827 powers up but is unable to train up (connect) to the ISP DSLAM.

## Is the DSL operating-mode correct?

If everything up to this point in the Layer 1 troubleshooting procedure is correct, the next step is to make sure you have the correct DSL operating mode. Cisco recommends using **dsl operating-mode auto** if you are not sure what DMT technology your ISP uses. These are the commands to configure operating-mode autodetection:

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 0
Router(config-if)#dsl operating-mode auto
Router(config-if)#end
Router#write memory
```

## Is the circuit tested/provisioned correctly?

Obtain this information from your ISP or telephone company.

## Layer 2 Issues

### Do you have the correct PVC values (VPI/VCI)?

With a PPPoE deployment there is no easy way to dynamically discover your Permanent Virtual Circuit (PVC) virtual path identifier/virtual channel identifier (VPI/VCI) values. Contact your ISP if you are not sure of your PVC values.

### Are you receiving data from your ISP?

If you have the correct PVC values, the next step is to verify that you are attempting to negotiate PPP with your ISP. In order to do this, issue the command **show interface atm0** and check the input and output packets.

```
Router#show interface atm0
ATM0 is up, line protocol is up
Hardware is DSLSAR (with Alcatel ADSL Module)
MTU 4470 bytes, sub MTU 4470, BW 128 Kbit, DLY 16000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback not set
Encapsulation(s): AAL5, PVC mode
24 maximum active VCs, 256 VCS per VP, 1 current VCCs
VC idle disconnect time: 300 seconds
Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 5 bits/sec, 0 packets/sec
5 minute output rate 7 bits/sec, 0 packets/sec
100 packets input, 5600 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
```

```
250 packets output, 1400 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets
0 output buffer failures, 0 output buffers swapped out
```

If the input packet counters are incrementing, you should receive PPPoE negotiation packets from your ISP. If this is not the case, call your ISP.

If the output bound counters are incrementing, you should be sending PPPoE negotiation packets. If this is not the case, check the configuration on the router. If PPP is configured properly, PPP negotiation packets are continually sent out the ATM0 interface.

If packets are incrementing in only the outbound direction, continue with the troubleshooting steps in this document.

## Is a PPPoE session up?

PPPoE is executed in two phases. The first phase is PPPoE session establishment, and the second phase is the PPP negotiation. PPPoE must be established prior to the negotiation of standard PPP parameters. The easiest way to determine if you have an active PPPoE session is to issue the **show vpdn** command.

```
Router#show vpdn
%No active L2TP tunnels
%No active L2F tunnels
%No active PPTP tunnels
PPPoE Tunnel and Session Information Total tunnels 1 sessions 1
PPPoE Tunnel Information
Session count: 1
PPPoE Session Information
SID  RemMAC          LocMAC          Intf   Vast   OIntf  VP/VC
0    0000.0000.0000    0000.0000.0000    Intf   UNKN   ATM0   8/35
```

In this example, no PPPoE sessions are active. This is indicated by an **SID** of **0**, and the **RemMAC** and **LocMAC** of **0000.0000.0000**. If you are in this state, proceed to the next section.

A PPPoE session that is successfully negotiated looks like this:

```
Router#show vpdn
%No active L2TP tunnels
%No active L2F tunnels
PPPoE Tunnel and Session Information Total tunnels 1 sessions 1
PPPoE Tunnel Information
Session count: 1

PPPoE Session Information
SID  RemMAC          LocMAC          Intf   Vast   OIntf  VP/VC
1    0050.7359.35b7    0001.96a4.84ac    Vi1    UP     ATM0   8/35
```

In this example you can see that the **SID** is a non-zero number, and that both the **RemMAC** and **LocMAC** fields are populated. The other field of interest is the **Vast**, which indicates whether PPP has been successfully negotiated and authenticated. If the **Vast** is **UP**, PPP has been successfully negotiated and authenticated, and you can proceed to the [Why can I access some web pages with PPPoE but not others?](#) section of this document. If the **Vast** is **DOWN**, continue with the next section.

## Are you receiving a PPPoE response from the aggregation router?

If you do not have an active PPPoE session established, you need to issue the **debug vpdn pppoe-events** command to determine what PPPoE does not come up.

```

Router#debug vpdn pppoe-events
*Mar 3 21:49:38.030: Sending PADI: vc=8/35
*Mar 3 21:49:38.030: padi timer expired
*Mar 3 21:50:10.030: Sending PADI: vc=8/35
*Mar 3 21:50:10.030: padi timer expired
*Mar 3 21:50:42.030: Sending PADI: vc=8/35
*Mar 3 21:50:42.030: padi timer expired
*Mar 3 21:51:14.030: Sending PADI: vc=8/35
*Mar 3 21:51:14.030: padi timer expired
*Mar 3 21:51:46.030: Sending PADI: vc=8/35
*Mar 3 21:51:46.030: padi timer expired
Router#undebug all

```

In this example, the Cisco DSL router continuously sends PPPoE Active Discovery Initiation (PADI) frames to the ISP with no response. The PADI frame is the first in a series of PPPoE call-setup frames. If your ISP does not respond with a PPPoE Active Discovery Offer (PADO), PPPoE negotiation does not succeed. The only solution for this problem is to contact your ISP.

If you successfully negotiate PPPoE, your **debug vpdn pppoe-events** output looks like this output:

```

Router#debug vpdn pppoe-events
*Mar 3 21:49:38.030: Sending PADI: vc=8/35
*Mar 3 21:50:10.030: PPPOE: we've got our pado and the pado timer went off
*Mar 3 21:50:35.030: OUT PADR from PPPoE tunnel
*Mar 3 21:50:50.030: IN PADS from PPPoE tunnel
Router#undebug all

```

If PPPoE is successfully negotiated, continue with the next section about troubleshooting PPP.

## Is PPP negotiating properly?

If Layer 1 is up and you have the correct VPI/VCI, the next step is to make sure PPP comes up properly. In order to accomplish this, you need to run a series of **debug** commands on the Cisco DSL router and interpret the output. The primary **debug** you use is **debug ppp negotiation**. This output of the command is an example of a successful PPP negotiation:

```

Router#debug ppp negotiation

PPP protocol negotiation debugging is on

Router#
2w3d: Vi1 PPP: No remote authentication for call-out
2w3d: Vi1 PPP: Phase is ESTABLISHING
2w3d: Vi1 LCP: O CONFREQ [Open] id 146 len 10
2w3d: Vi1 LCP: MagicNumber 0x8CCF0E1E (0x05068CCF0E1E)
2w3d: Vi1 LCP: O CONFACK [Open] id 102 Len 15
2w3d: Vi1 LCP: AuthProto CHAP (0x0305C22305)
2w3d: Vi1 LCP: MagicNumber 0xD945AD0A (0x0506D945AD0A)
2w3d: Di1 IPCP: Remove route to 20.20.2.1
2w3d: Vi1 LCP: I CONFACK [ACKsent] id 146 Len 10
2w3d: Vi1 LCP: MagicNumber 0x8CCF0E1E (0x05068CCF0E1E)
2w3d: Vi1 LCP: State is Open
2w3d: Vi1 PPP: Phase is AUTHENTICATING, by the peer
2w3d: Vi1 CHAP: I CHALLENGE id 79 Len 33 from "6400-2-NRP-2"
2w3d: Vi1 CHAP: O RESPONSE id 79 Len 28 from "John"
2w3d: Vi1 CHAP: I SUCCESS id 79 Len 4
2w3d: Vi1 PPP: Phase is UP
2w3d: Vi1 IPCP: O CONFREQ [Closed] id 7 Len 10
2w3d: Vi1 IPCP: Address 0.0.0.0 (0x030600000000)
2w3d: Vi1 IPCP: I CONFREQ [REQsent] id 4 Len 10
2w3d: Vi1 IPCP: Address 20.20.2.1 (0x030614140201)
2w3d: Vi1 IPCP: O CONFACK [REQsent] id 4 Len 10

```

```

2w3d: Vi1 IPCP: Address 20.20.2.1 (0x030614140201)
2w3d: Vi1 IPCP: I CONFNAK [ACKsent] id 7 Len 10
2w3d: Vi1 IPCP: Address 40.1.1.2 (0x030628010102)
2w3d: Vi1 IPCP: O CONFREQ [ACKsent] id 8 Len 10
2w3d: Vi1 IPCP: Address 40.1.1.2 (0x030628010102)
2w3d: Vi1 IPCP: I CONFACK [ACKsent] id 8 Len 10
2w3d: Vi1 IPCP: Address 40.1.1.2 (0x030628010102)
2w3d: Vi1 IPCP: State is Open
2w3d: Di1 IPCP: Install negotiated IP interface address 40.1.1.2
2w3d: Di1 IPCP: Install route to 20.20.2.1
Router#

```

There are four main points of failure in a PPP negotiation:

- No response from the remote device (your ISP)
- Link Control Protocol (LCP) not open
- Authentication failure
- IP Control Protocol (IPCP) failure

### No Response from Your ISP

Your ISP not responding should not be a problem since you already verified that packets are incrementing on the ATM0 interface in the inbound direction. However, if you see packets incrementing on ATM0 in the inbound direction, and when you run a **debug ppp negotiation** you receive this output, contact your ISP to verify that packets are sent to the Cisco DSL router.

```

Router#debug ppp negotiation
*Mar 1 04:04:50.718: Vi1 PPP: Treating connection as a callout
*Mar 1 04:04:50.718: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
*Mar 1 04:04:50.718: Vi1 PPP: No remote authentication for call-out
*Mar 1 04:04:50.722: Vi1 LCP: O CONFREQ [Closed] id 1 Len 10

!--- "O" specifies an outbound packet.

*Mar 1 04:04:50.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:04:52.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:04:52.722: Vi1 LCP: O CONFREQ [REQsent] id 2 Len 10

!--- "O" specifies an outbound packet.

*Mar 1 04:04:52.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:04:54.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:04:54.722: Vi1 LCP: O CONFREQ [REQsent] id 3 Len 10
*Mar 1 04:04:54.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:04:56.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:04:56.722: Vi1 LCP: O CONFREQ [REQsent] id 4 Len 10
*Mar 1 04:04:56.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:04:58.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:04:58.722: Vi1 LCP: O CONFREQ [REQsent] id 5 Len 10
*Mar 1 04:04:58.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:05:00.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:05:00.722: Vi1 LCP: O CONFREQ [REQsent] id 6 Len 10
*Mar 1 04:05:00.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
*Mar 1 04:05:02.722: Vi1 LCP: TIMEOUT: State REQsent
*Mar 1 04:05:02.722: Vi1 LCP: O CONFREQ [REQsent] id 7 Len 10

!--- "O" specifies an outbound packet.

*Mar 1 04:05:02.722: Vi1 LCP: MagicNumber 0x317722F4 (0x0506317722F4)
Router#undebug all

```

In this output there are only **O** packets, which are outbound packets. In order to successfully negotiate PPP,

there should be an **I** inbound packet from your ISP for each **O** packet sent. If packets are incrementing inbound but you do not see **I** packets, contact your ISP in order to verify the packets that are sent to the Cisco DSL router.

## LCP Not Open

The LCP not being open is usually caused by a mismatch in PPP options. This mismatch occurs when the Cisco DSL router has a PPP parameter configured that your ISP does not support, or when your ISP has a parameter configured that the Cisco DSL router does not support. This output shows an example of a PPP option mismatch:

```
Router#debug ppp negotiation
*Mar 1 04:52:43.254: Vi1 PPP: Treating connection as a callout
*Mar 1 04:52:43.258: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
*Mar 1 04:52:43.258: Vi1 PPP: No remote authentication for call-out
*Mar 1 04:52:43.258: Vi1 LCP: O CONFREQ [Closed] id 3 len 10
*Mar 1 04:52:43.262: Vi1 LCP: MagicNumber 0x31A2F808 (0x050631A2F808)
*Mar 1 04:52:43.310: Vi1 LCP: I CONFREQ [REQsent] id 180 Len 14
*Mar 1 04:52:43.310: Vi1 LCP: AuthProto PAP (0x0304C023)
*Mar 1 04:52:43.310: Vi1 LCP: MagicNumber 0x39D50E9B (0x050639D50E9B)
*Mar 1 04:52:43.314: Vi1 LCP: O CONFNAK [REQsent] id 180 Len 9

!--- PPP option reject

*Mar 1 04:52:43.314: Vi1 LCP: AuthProto CHAP (0x0305C22305)

!--- PPP option that is rejected

*Mar 1 04:52:43.314: Vi1 LCP: I CONFACK [REQsent] id 3 Len 10
*Mar 1 04:52:43.318: Vi1 LCP: MagicNumber 0x31A2F808 (0x050631A2F808)
*Mar 1 04:52:43.366: Vi1 LCP: I CONFREQ [ACKrcvd] id 181 Len 14
*Mar 1 04:52:43.366: Vi1 LCP: AuthProto PAP (0x0304C023)
*Mar 1 04:52:43.366: Vi1 LCP: MagicNumber 0x39D50E9B (0x050639D50E9B)
*Mar 1 04:52:43.370: Vi1 LCP: O CONFNAK [ACKrcvd] id 181 Len 9

!--- PPP option reject

*Mar 1 04:52:43.370: Vi1 LCP: AuthProto CHAP (0x0305C22305)

!--- PPP option that is rejected

*Mar 1 04:52:43.418: Vi1 LCP: I CONFREQ [ACKrcvd] id 182 Len 14
*Mar 1 04:52:43.418: Vi1 LCP: AuthProto PAP (0x0304C023)
*Mar 1 04:52:43.418: Vi1 LCP: MagicNumber 0x39D50E9B (0x050639D50E9B)
Router#undebug all
```

Whether its an **I** or an **O** packet, a Configure–Negative–Acknowledge (CONFNAK) is indicative of a PPP configuration mismatch. What this means is that one side of the PPP connection is asking for a PPP option that the other side is unable or not configured to perform. If the Cisco DSL router sends the CONFNAK (indicated by "**O** CONFNAK"), the Cisco DSL router is not able to perform or not configured for the option the ISP sends. If the CONFNAK is sent by your ISP (indicated by "**I** CONFNAK"), you have configured an option on the Cisco DSL router that your ISP is not willing to perform.

The line after the CONFNAK describes the option that is rejected. In this example output, the option is CHAP but it could be any option. The only place on the Cisco DSL router where PPP options can be configured is interface dialer 1. Issue the command **show run interface dialer 1** in order to view your interface dialer 1 configuration.

If your ISP sends the **I** CONFNAK, look for commands under interface dialer 1 that match the line after the CONFNAK and remove them. If the Cisco DSL router sends the **O** CONFNAK, add a command to interface

dialer 1 to properly negotiate PPP with your ISP. In the case of the router sending packets, you might need to call the Cisco TAC in order to determine which command(s) need to be enabled on the Cisco DSL router.

## Authentication Failure

An authentication failure occurs when your ISP is unable to authenticate your PPP username or password. There are two scenarios in which this can occur. The first scenario is an authentication type mismatch, which is caused when you do not properly configure the router. All the authentication configurations listed in this document account for both PAP and CHAP authentication types. For configuration flexibility, you should have both CHAP and PAP configured. If you do not have both configured, you might see output from a **debug ppp** command like this output:

```
Router#debug ppp negotiation
00:34:29: Vi1 LCP: O CONFREQ [REQsent] id 53 Len 15
00:34:29: Vi1 LCP: AuthProto CHAP (0x0305C22305)

!--- Sends CHAP requests

00:34:29: Vi1 LCP: MagicNumber 0x01B63483 (0x050601B63483)
00:34:29: Vi1 LCP: I CONFREQ [REQsent] id 252 Len 14
00:34:29: Vi1 LCP: AuthProto PAP (0x0304C023)

!--- Receives PAP requests from the service provider

00:34:29: Vi1 LCP: MagicNumber 0xBC5233F9 (0x0506BC5233F9)
00:34:29: Vi1 LCP: O CONFREQ [REQsent] id 252 Len 8
Router#undebug all
```

or

```
Router#debug ppp negotiation
00:45:44: Vi1 LCP: I CONFREQ [Listen] id 141 Len 15
00:45:44: Vi1 LCP: AuthProto CHAP (0x0305C22305)

!--- Receives CHAP requests from the service provider

00:45:44: Vi1 LCP: MagicNumber 0xBC5C7DDC (0x0506BC5C7DDC)
00:45:44: Vi1 LCP: O CONFREQ [Listen] id 255 Len 14
00:45:44: Vi1 LCP: AuthProto PAP (0x0304C023)

!--- Sends out PAP requests

Router#undebug all

!--- Turn off ppp debug
```

In order to correct both authentication mismatch problems, refer to the appropriate PPPoA implementation option configuration and reconfigure PPP authentication.

The second authentication problem scenario you can encounter is an incorrect PAP username or password. In order to determine if this is the problem, issue the command **debug ppp negotiation**. Assuming your router is configured for both Challenge Handshake Authentication Protocol (CHAP) and Password Authentication Protocol (PAP), as the configuration outlined earlier in this guide shows, your ISP might not be using PAP authentication.

In order to determine the authentication used by your ISP, check the options in the **I CONFREQ** packet sent to you from your ISP. If this packet is followed by an option called **AuthProto PAP**, you are using PAP. If the **I CONFREQ** is followed by an option called **AuthProto CHAP**, you are using CHAP and should

proceed to How do I know if my CHAP username and password are correct?

## How do I know if my PAP username and password are correct?

After you have confirmed that your ISP is using PAP, issue the **debug ppp negotiation** command to confirm that your PAP username and password are correct.

```
Router#debug ppp negotiation
*Mar 2 00:50:15.741: Vi1 PPP: Treating connection as a callout
*Mar 2 00:50:15.745: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
*Mar 2 00:50:15.745: Vi1 PPP: No remote authentication for call-out
*Mar 2 00:50:15.745: Vi1 LCP: O CONFREQ [Closed] id 177 Len 10
*Mar 2 00:50:15.745: Vi1 LCP: MagicNumber 0x35EB5D4F (0x050635EB5D4F)
*Mar 2 00:50:15.789: Vi1 LCP: I CONFACK [REQsent] id 177 Len 10
*Mar 2 00:50:15.793: Vi1 LCP: MagicNumber 0x35EB5D4F (0x050635EB5D4F)
*Mar 2 00:50:17.241: Vi1 LCP: I CONFREQ [ACKrcvd] id 203 Len 14
*Mar 2 00:50:17.241: Vi1 LCP: AuthProto PAP (0x0304C023)
*Mar 2 00:50:17.241: Vi1 LCP: MagicNumber 0x3E1D1E5E (0x05063E1D1E5E)
*Mar 2 00:50:17.245: Vi1 LCP: O CONFACK [ACKrcvd] id 203 Len 14
*Mar 2 00:50:17.245: Vi1 LCP: AuthProto PAP (0x0304C023)
*Mar 2 00:50:17.245: Vi1 LCP: MagicNumber 0x3E1D1E5E (0x05063E1D1E5E)
*Mar 2 00:50:17.249: Vi1 LCP: State is Open
*Mar 2 00:50:17.249: Vi1 PPP: Phase is AUTHENTICATING, by the peer [0 sess, 1 load]
*Mar 2 00:50:17.249: Vi1 PAP: O AUTH-REQ id 9 Len 14 from "cisco"

!--- "cisco" is the PAP username configured on this DSL router.

*Mar 2 00:50:17.297: Vi1 PAP: I AUTH-NAK id 9 Len 27 msg is "Authentication failure"
*Mar 2 00:50:17.301: Vi1 LCP: I TERMREQ [Open] id 204 Len 4
*Mar 2 00:50:17.301: Vi1 LCP: O TERMACK [Open] id 204 Len 4
*Mar 2 00:50:17.305: Vi1 PPP: Phase is TERMINATING [0 sess, 1 load]u
*Mar 2 00:50:19.305: Vi1 LCP: TIMEOUT: State TERMSent
*Mar 2 00:50:19.305: Vi1 LCP: State is Closed
*Mar 2 00:50:19.305: Vi1 PPP: Phase is DOWN [0 sess, 1 load]
```

If you have a PAP authentication problem, you should see the LCP state go to **Open**. Directly after the LCP state change you should see PPP go into an **Authenticating** phase. If one of the next two lines contains **I AUTH-NAK**, either your PAP username or PAP password is incorrect. At this point, you need to reconfigure your PAP username and password using this sequence of commands. Note that your PAP username and password are case sensitive.

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface dialer 1
Router(config-if)#ppp pap sent-username <username> password <password>
Router(config-if)#end
Router#write memory
```

## How do I know if my CHAP username and password are correct?

After you have confirmed that your ISP uses CHAP, issue the **debug ppp negotiation** command in order to confirm that your CHAP username and password are correct.

```
Router#debug ppp negotiation
*Mar 3 02:51:47.287: Vi1 PPP: Treating connection as a callout
*Mar 3 02:51:47.287: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
*Mar 3 02:51:47.291: Vi1 PPP: No remote authentication for call-out
*Mar 3 02:51:47.291: Vi1 LCP: O CONFREQ [Closed] id 188 Len 10
*Mar 3 02:51:47.291: Vi1 LCP: MagicNumber 0x3B821FF1 (0x05063B821FF1)
*Mar 3 02:51:47.339: Vi1 LCP: I CONFREQ [REQsent] id 204 Len 15
*Mar 3 02:51:47.343: Vi1 LCP: AuthProto CHAP (0x0305C22305)
```

```

*Mar 3 02:51:47.343: Vi1 LCP: MagicNumber 0x43B3F393 (0x050643B3F393)
*Mar 3 02:51:47.343: Vi1 LCP: O CONFACK [REQsent] id 204 Len 15
*Mar 3 02:51:47.347: Vi1 LCP: AuthProto CHAP (0x0305C22305)
*Mar 3 02:51:47.347: Vi1 LCP: MagicNumber 0x43B3F393 (0x050643B3F393)
*Mar 3 02:51:47.347: Vi1 LCP: I CONFACK [ACKsent] id 188 Len 10
*Mar 3 02:51:47.351: Vi1 LCP: MagicNumber 0x3B821FF1 (0x05063B821FF1)
*Mar 3 02:51:47.351: Vi1 LCP: State is Open
*Mar 3 02:51:47.351: Vi1 PPP: Phase is AUTHENTICATING, by the peer [0 sess, 1 load]
*Mar 3 02:51:47.395: Vi1 CHAP: I CHALLENGE id 1 Len 32 from "6400-2-NRP3"
*Mar 3 02:51:47.395: Vi1 CHAP: Using alternate hostname cisco
*Mar 3 02:51:47.399: Vi1 CHAP: Username 6400-2-NRP3 not found
*Mar 3 02:51:47.399: Vi1 CHAP: Using default password
*Mar 3 02:51:47.399: Vi1 CHAP: O RESPONSE id 1 Len 26 from "cisco"

!--- "cisco" is the CHAP username configured on this DSL router.

*Mar 3 02:51:47.447: Vi1 CHAP: I FAILURE id 1 Len 26 MSG is "Authentication failure"
*Mar 3 02:51:47.447: Vi1 LCP: I TERMREQ [Open] id 205 Len 4
*Mar 3 02:51:47.451: Vi1 LCP: O TERMACK [Open] id 205 Len 4
*Mar 3 02:51:47.451: Vi1 PPP: Phase is TERMINATING [0 sess, 0 load]
*Mar 3 02:51:49.451: Vi1 LCP: TIMEout: State TERMSent
*Mar 3 02:51:49.451: Vi1 LCP: State is Closed
*Mar 3 02:51:49.451: Vi1 PPP: Phase is DOWN [0 sess, 0 load]
Router#undebg all

```

If you have a CHAP authentication problem, you should see the LCP state go to **Open**. Directly after the LCP state change you should see PPP go into an **Authenticating** phase. From this point you see a series of **CHAP** lines. If the last of these lines shows **I FAILURE**, you have the wrong CHAP username and password. Use this sequence of commands in order to correct your CHAP username and password. Note that your username and password are case sensitive.

```

Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface dialer 1
Router(config-if)#ppp chap hostname <username>
Router(config-if)#ppp chap password <password>
Router(config-if)#end
Router#write memory

```

## How do I know when PPP authentication is successful?

This example shows a successful CHAP negotiation.

```

Router#debug ppp negotiation
<... snipped ...>
*Mar 3 03:30:09.335: Vi1 LCP: State is Open
*Mar 3 03:30:09.335: Vi1 PPP: Phase is AUTHENTICATING, by the peer [0 sess, 1 load]
*Mar 3 03:30:09.379: Vi1 CHAP: I CHALLENGE id 41 len 32 from "6400-2-NRP3"
*Mar 3 03:30:09.379: Vi1 CHAP: Using alternate hostname cisco
*Mar 3 03:30:09.379: Vi1 CHAP: Username 6400-2-NRP3 not found
*Mar 3 03:30:09.383: Vi1 CHAP: Using default password
*Mar 3 03:30:09.383: Vi1 CHAP: O RESPONSE id 41 Len 26 from "cisco"
*Mar 3 03:30:09.431: Vi1 CHAP: I SUCCESS id 41 Len 4

!--- CHAP negotiation was a success.

*Mar 3 03:30:09.431: Vi1 PPP: Phase is UP [0 sess, 1 load]
<... snipped ...>
Router#undebg all

```

This example shows a successful PAP negotiation.

```

Router#debug ppp negotiation

```

```

<... snipped ...>
*Mar 3 03:33:19.491: Vi1 LCP: State is Open
*Mar 3 03:33:19.491: Vi1 PPP: Phase is AUTHENTICATING, by the peer [0 sess, 0 load]
*Mar 3 03:33:19.495: Vi1 PAP: O AUTH-REQ id 255 Len 16 from "cisco"
*Mar 3 03:33:19.539: Vi1 PAP: I AUTH-ACK id 255 Len 5
*Mar 3 03:33:19.539: Vi1 PPP: Phase is UP [0 sess, 0 load]

!--- PAP negotiation was a success.

<... snipped ...>
Router#undebg all

```

## Why can I access some web pages with PPPoE but not others?

Access to only some web pages is a common problem when you run a PPPoE client on a router. By design, PPPoE can support an MTU of up to 1492 bytes. Therefore, you must ensure that end devices send out frames no larger than 1492 bytes. Limiting the MTU to 1492 bytes can be a problem because most PCs and end-user workstations have a default MTU of 1500 bytes.

There are two options for adjusting the MTU size: adjust the MTU size at the router and adjust the MTU size at the PC.

## Adjust the PPPoE MTU Size on the Cisco DSL Router

### Important Notes:

These configuration commands work only if you run Network Address Translation (NAT) or Port Address Translation (PAT) on the Cisco DSL router.

The **ip adjust-mss** command in Cisco IOS® Software Release 12.2(2)XH has changed to **ip tcp adjust-mss <mss value>**. This change is documented in Release Notes for the Cisco 800 Series Routers and Cisco 820 Series Routers for Cisco IOS Release 12.2(2)XH.

```

!
vpdn enable
no vpdn logging
!
vpdn-group pppoe
request-dialin
protocol pppoe
!
interface ethernet0
no shut
ip address <ip address> <subnet mask>
ip adjust-mss 1452

!--- The TCP MSS command requires an MSS of 1452, not 1492.

ip nat inside
no ip directed-broadcast
!
interface atm0
no shut
no ip address
no ip directed-broadcast
no atm ilmi-keepalive
bundle-enable
!
interface atm0.1 point-to-point
no ip directed-broadcast

```

```

pvc <vpi/vci>
pppoe-client dial-pool-number 1
!
!
interface dialer1
ip address negotiated
mtu 1492
ip nat outside
encapsulation ppp
dialer pool 1
ppp chap hostname <username>
ppp chap password <password>
ppp pap sent-username <username> password <password>
!
ip nat inside source list 1 interface dialer1 overload
!
ip classless
ip route 0.0.0.0 0.0.0.0 dialer1
access-list 1 permit <ip address of ethernet0> 0.0.255.255
!

```

## Adjust the PPPoE MTU Size on the PC Using the Dr. TCP Utility

Complete these steps in order to change the MTU size on the PC. The registry change is saved when the procedure finishes.

**Note:** The Dr. TCP utility is compatible with all Windows-based PCs.

1. Download the latest version of the Dr. TCP utility .
2. Refresh your browser page to ensure the page is current.
3. Run the Dr.TCP utility.
4. From the menu choose your Ethernet adapter.
5. In the MTU field, type **1492**.
6. Click **Apply** to save the change, and then click **Exit**.
7. Reboot the PPPoE PC client.

You need to run the utility only once per PPPoE client PC.

## Additional MTU Troubleshooting Steps

If you change the MTU size with Dr. TCP or on the Cisco DSL router and are still not able to browse certain web sites, adjust the MTU size again. Change the MTU size to 1452 in Dr. TCP, or change the MSS adjust value on the Cisco DSL router to 1412. If these sizes are too large, continue to lower the MTU sizes until you reach a baseline of 1400 for Dr. TCP or 1360 for MSS adjust on the Cisco DSL Router.

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## Related Information

- **ADSL Technology Support**
  - **PPPoE Implementation Options**
  - **Cisco DSL Router Configuration and Troubleshooting Guide**
  - **Technical Support & Documentation – Cisco Systems**
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