# Configuring ADSL Internet Access in AOS

This guide explains how to configure an AdTran Operating System (AOS) router for Internet Access via an Asymmetric Digital Subscriber Line (ADSL). You should use this guide only if your AOS device has an ADSL interface and will be connected directly to an ADSL line. If you are using an external device to terminate the ADSL connection, please refer to the guide titled "Configuring PPPoE for ADSL Internet Connections in AOS".
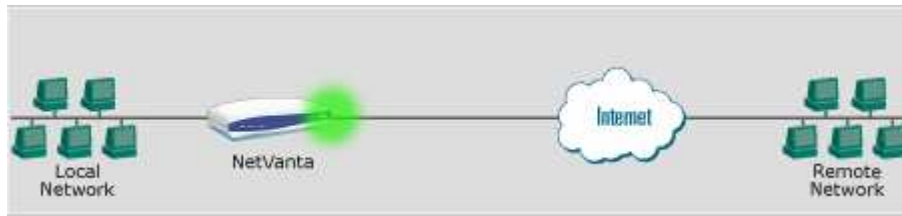
Your AOS device can provide all of the functionality (ADSL Access, Firewall, NAT and Routing) needed to act as a stand alone Internet Access Device. AOS is not meant to be used as a pass through device for ADSL access. You may however use an external firewall device, if your ISP has provided a range of Public IP Addresses for your use.

Information Requirements

You will need the following list of information before you can properly configure your AOS router. Only your service provider and your Network Administrator can provide you this information.

- ATM PVC   (VPI / VCI)
    - Two numbers that identify the Virtual Path and Virtual Circuit on the ATM layer; only your provider can tell you these
- ATM Interface Mode
    - Use routed-bridge mode?
    - PPP, PPoE or IP Routing
- Authentication Parameters (only for PPP or PPPoE)
    - Authentication Protocol (PAP or CHAP)
    - Username / Password
- ATM Encapsulation Mode
    - aal5snap, aal5mux IP or aal5mux PPP
- Public IP Address
    - May be dynamically assigned by your provider
- LAN IP Address
    - The AOS device's IP Address on your private network

Hardware Requirements

You will need all of the following hardware to be able to establish an ADSL Internet Connection in AOS.

- AOS Device with an ADSL Interface
- RJ-11 cable for ADSL line
- Computer for Configuring the AOS Device
- Power Adapter for the AOS Device

For Web Interface Access:
- Ethernet Cable for Access to AOS Device

For Console Port Access:
- 9 Pin Male to 9 Pin Female Straight Through Serial Cable

Software Requirements

The following software will be needed for configuring your AOS router.

For Web Interface Access:
- A Web Browser with Javascript Support (Example: Internet Explorer or FireFox)

For Console Port Access:
- A VT100 Terminal Program (Example: HyperTerminal)

Configuring

To configure your AOS device, you will need either Web Interface access using a Web Browser (this does not require Internet Access), or a VT100 Terminal program (Example: HyperTerminal) to access the Console Port. You do not need to use both methods; choose one or the other. You can use the Console Port to configure IP Addresses and Enable the Web GUI if necessary. Please consult the guide "Enabling the Web GUI in AOS" for more information.

Example Settings

This document will use the following settings as examples. You should not use these settings verbatim for your own network. Please review this document thoroughly and apply the information to your own network using your own settings.

Example ADSL Settings:
- Routed Bridge Mode: Disabled
- Interface Mode: PPP
- PVC (VPI / VCI) : 8 / 32

Example PPP Settings:
- Username: admin
- Password: adtran

Example IP Settings:
- Private LAN: 10.10.10.0 with a 255.255.255.0 Subnet Mask
  - AOS Router: 10.10.10.1
  - PC used for Configuring: 10.10.10.2
  - Default Gateway for Computers in LAN: 10.10.10.1
- WAN IP Address: 65.65.65.65 with a 255.255.255.252 Subnet Mask
  - ISPs Gateway: 65.65.65.66

Configuring via the Web Interface

From the factory your AOS device comes with an IP Address of 10.10.10.1 on the private interface. If you have not altered the Private IP Address, configure your computer with an IP Address of 10.10.10.2. If the Private IP Address of the AOS router has been altered, configure your PC with an IP in the same subnet (range).

Use the table below to determine which Ethernet or Switch port should be connected to your PC, and which type of cable to use.

Table 1 - Private Port and Cable Type

Product	Port to Connect	Ethernet Cable Type
NetVanta 340	Private Port	Cross-Over
NetVanta 344	Eth 0/1	Straight Through
NetVanta 1000 Series	Any Port	Straight Through
NetVanta 3000 Series	Eth 0/1	Cross-Over
NetVanta 4000 Series	Eth 0/1	Cross-Over
NetVanta 7000 Series	Any Port	Straight Through

After configuring your computer's IP address and connecting the appropriate cable, open a web browser on your computer. In the web browser's address bar, enter the AOS device's Private IP Address. If you do not receive a Login Prompt or you receive an error, please use the "Configuring via the Command Line Interface" portion of this guide.

The AOS device will prompt you for a user name and password. From the factory, AOS is configured with:

Username: admin
Password: password

If you are unable to login, because the username and password are not working, please consult the guide titled "I lost the password to my AOS device".

Configuring Local Area Network Interface:

1) Click '**IP Interfaces**'.

Your LAN interface will vary based on your product, and port choice. If you are using a NetVanta 344, 1000 or 7000 Series Router, your LAN interface will be a VLAN. Click on the Interface that has the IP Address you entered to access the Web Interface. It will either be an Ethernet port (Example: 'Eth 0/1') or a VLAN interface (Example: 'Default').

2) Scroll down to '**IP Settings**'.

3) Set '**IP Address Type**' to 'Static'.

4) Enter the **IP Address** and **Subnet Mask** that you would like to give your AOS router on your LAN. If you wish to have an External Firewall Device, you should enter an IP Address in the block of IPs given to you by your ISP; this will be different from the Public WAN IP (or Customer WAN IP). The IP Address you choose to enter, will be the Default Gateway for all of the devices on your LAN.

Figure 1 - Private IP Settings

5) When you click **Apply**, you will immediately loose connection to your AOS router; you will not see an additional page. Close the Web Browser, reconfigure your computer's IP Address to be in the new subnet, open the web browser and access the AOS device using its new IP Address.

Configuring the ADSL Interface:

6) Click '**Physical Interfaces**' and click the appropriate adsl interface (Example: **adsl 1/1**). Note that your ADSL interface may have a different slot / port number.

> *Note*: In the NetVanta 300 Series click "Public Interface", scroll to the bottom of the Public Interface page and click the "Advanced Configuration" button.

7) Check the '**Enable**' checkbox.

8) Set '**Training Mode**' to "Multi".

9) Set '**SNR-Margin'** to "0 DB".

10) Choose '**Encapsulation'** type of "ATM".

11) Click '**Apply**'.

Configuring the ATM Interface:

12) Check the '**Enable**' checkbox to enable the ATM Interface.

13) Click '**Apply**'.

14) Scroll down to "Configured Permanent Virtual Circuits…" and click '**Add**'.

Configuring the ATM Sub-Interface:

15) Check the '**Enable**' checkbox to enable the ATM Sub-Interface.

16) Enter the '**PVC**' with the appropriate VPI / VCI number (*Example:* 8 / 32)

17) Check '**Routed Bridge IP**' if your service provider requires.

18) Choose the appropriate '**Interface Mode**'. Only your service provider can tell you the correct setting. If you service provider says not to use PPP, choose "IP Routing" and skip the "Configuring the PPP Interface" section.

19) Click '**Apply**'.

Configuring the PPP Interface:

Note: If you are not using PPP, skip this section and move on to "Configuring the Public IP Address". Use this section only if your provider requires PPP.

20) Check the '**Enable**' check box to enable the PPP Interface.

21) If your Service Provider requires PPP authentication, select the appropriate '**Sent Authentication Type**'. Only your service provider can tell you the correct setting; either PAP or CHAP.

Note: Your service provider may not require authentication, in which case you should select 'None' for the 'Sent Authentication Type'.

22) Set 'Peer Authentication Type' to 'None'.

Configuring the Public IP Address:

23) Choose the appropriate '**IP Address Type**'. If your provider will dynamically assign you an address, choose 'Negotiated' or 'DHCP'. If your provider will not dynamically assign a Public IP Address, and you have been given a Public IP Address to enter manually, choose 'Static'.

    a.   For Static IP, Enter the '**IP Address**' and '**Subnet Mask**' given by your provider.

    b.   For Negotiated, check the '**Default Route**' check box.

24) Click '**Apply**'.

Configuring the Default Route:

25) Click '**Route Table'** in the left hand menu.

26) In the '**Destination Address**' and '**Subnet Mask**' fields enter "0.0.0.0".

27) Choose the '**Interface**' radio button option.

28) From the '**Interface**' drop down menu choose the Public Interface you created above.

    a.   For PPP, choose "PPP 1".

    b.   For ATM, choose "ATM 1.1"

29) Click '**Add**'.

Configuring the Firewall and NAT:

Note: running the 'Firewall Wizard' completely erases all prior Firewall and NAT settings. Fore more information about 'Port Forwarding' please consult the guide titled "Configuring Port Forwarding in AOS".

30) Click '**Firewall Wizard**'. This wizard will establish all firewall and NAT settings required to access the Internet from your Private LAN via the NetVanta 2054.

31) Read the 'Welcome' Message and click '**Next**'.

32) Select the '**Public Interface**' and click '**Next**'. The Public Interface will be the ATM or PPP interface with the Public IP settings you configured above.

33) Select '**No, I do not …**' and click '**Next**'. For more information about Port Forwarding, consult the guide "Configuring Port Forwarding in AOS".

34) Review the 'Confirm Settings' page, and click '**Finish**'.

Saving the Configuration:

It is important that you save your configuration!

35) After you have completed configuring your AOS router, click the '**Save'** button in the top right corner.
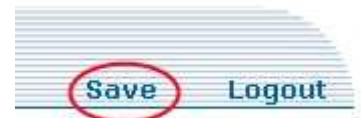
36) You should also consider downloading the configuration to your computer. This ensures that you will always have a backup copy of the configuration for your AOS device.

37) Click **'Configuration'** in the left hand menu.

38) Click **'Download Configuration'**. Save this file on your computer, and create backup copies. You can use this file to restore your router to its current settings.

Note: Your configuration is now complete. Please consult the section titled "Testing Internet Access" if you experience difficulties accessing the Internet.

Configuring via the Command Line Interface

Accessing the Command Line Interface:

The command line interface is available via the Console Port and via Telnet through the Ethernet interface.

Using the Console Port

You will need a 9 Pin Male to 9 Pin Female straight through cable and a VT100 emulator (Example: HyperTerminal) to access the Console Port. Use the following settings in the VT100 emulator.

- 9600 Baud
- 8 Data Bits
- 1 Stop Bit
- No Parity Bits
- No Flow Control

Using Telnet

Telnet is a service that can be accessed via an Ethernet connection to the NetVanta 2054. Configure a computer with an IP Address in the same subnet as the NetVanta's private interface. From the factory the NetVanta uses 10.10.10.1; your computer can use the IP Address 10.10.10.2. Use the section titled "Resetting the NetVanta 2054" to return your NetVanta 2054 to the factory default settings.

Gaining Administrative Access via the Command Line Interface:

1) Type '**enable**' to gain access to privileged mode.

2) Type '**configure terminal**' to access configuration mode.

Configure the LAN Interface:

3) Depending on your AOS product, the private LAN interface type will vary. Use the table below to determine which interface to use as the private interface.

Table 2 - Private Port and Cable Type

Product	Private Interface Name
NetVanta 340	Eth 0/1
NetVanta 344	Vlan 1
NetVanta 1000 Series	Vlan 1
NetVanta 3000 Series	Eth 0/1
NetVanta 4000 Series	Eth 0/1
NetVanta 5000 Series	Eth 0/1
NetVanta 7000 Series	Vlan 1

   a. *For NetVanta 344, 1000 & 7000 Series*
      Type **interface vlan 1**

   b. *For all other AOS Products*:
      Type **interface eth 0/1**

4) Choose an IP Address you would like to assign to this private interface. If you plan to use an External Firewall Device, you should assign the Ethernet port of your AOS device an IP from the Block of Public IPs given to you by your ISP. You may also use a private IP Address. In this example we will use the private IP 10.10.10.1, and the subnet mask 255.255.255.0

5) Type **ip address 10.10.10.1 255.255.255.0** to assign the LAN interface an IP Address.

6) Type **access-policy Private** to assign this interface to the Private Policy-Class that will be configured later in this guide.

7) Enable the interface with the **no shutdown** command.

8) Type **exit** to return to global-config mode.

Configuring the ADSL Interface:

9) Type **interface adsl 0/1** to enter configuration mode.

> *Note*: Your ADSL interface may be in a different *slot* **/** *port* number.

10) Type **training-mode multi-mode** to set the ADSL Interface to automatically detect the training mode on the ADSL line.

11) Type **no shutdown** to enable the ADSL interface.

12) Type **exit** to leave ADSL Interface configuration mode.

Configuring the ATM Interface:

13) Type **interface atm 1** to create the ATM interface.

14) Type **cross-connect 1 adsl 0/1 atm 1** to logically connect the ATM interface to the ADSL interface. You may need to choose a different cross-connect number (first digit). Your ADSL interface may have a different *slot* / *port* number.

15) Type **no shutdown** to enable the ATM 1 interface.

16) Type **exit** to return to global configuration mode.

Configuring the ATM Sub-Interface:

17) Type **interface atm 1.1** to create the ATM Sub-Interface.

18) Type **pvc 8/35** to define the *vpi / vci* numbers. Only your provider can tell you the correct VPI and VCI numbers for your ADSL circuit.

19) Type **no shutdown** to enable the ATM Sub-Interface.

Note: If your provider requires the use of PPP over your ADSL circuit, skip to "Configuring the PPP Interface". Do not follow the next steps. Perform these steps only if your provider uses IP directly over ATM.

20) Assign the ATM 1.1 interface an IP Address. If your provider has asked you to configure your device with a static address, use option 'a'. If your provider will dynamically assign you an address, use option 'b'.

> a. For static addresses, type **ip address 65.65.65.65 255.255.255.0**

> b. For dynamically assigned addresses, type **ip address dhcp**

21)   If your provider tells you that this circuit is routed-bridged, type **atm routed-bridged ip** to set the link up for atm routed-bridged encapsulation.

Note: If after finishing this configuration you can still not get on the internet, please modify the MTU value for the ATM circuit. In many instances providers lower the MTU value on these links down to 1492. From the ATM Sub-interface (**interface atm 1.1**), type **mtu 1492** and then attempt to reach the internet.

22) Type **access-policy Public** to assign this interface to the Public Policy class that will be configured later in this guide.

23) Type **exit** to return to global configuration mode.

Configuring a PPP Interface:

Note: Use this "PPP" section only if your provider requires the use of PPP or PPPoE over your ADSL connection.

24) Type **interface ppp 1** to create the PPP interface. You may need to choose a different PPP interface number if number 1 is already in use.

25) Choose one of the following *cross-connect* commands based on whether your provider requires PPPoE or PPP.

> a. If your provider requires PPPoE, type **cross-connect 2 atm 1.1 ppp 1 pppoe-client** to logically connect the PPP interface through the ATM interface using the PPPoE protocol.

> b. If your provider requires PPP, type **cross-connect 2 atm 1.1 ppp 1** to logically connect the PPP interface through the ATM interface.

26) Choose one of the following methods to assign the PPP interface, based on your provider's requirements. Your provider may either dynamically assign you an IP Address, or may require you to configure a static IP Address.

> a. For Dynamically Assigned, type **ip address negotiated**

> b. For Statically Assigned, type **ip address 5.5.5.5 255.255.255.0**. Be sure to use the IP Address and Subnet Mask given by your provider.

27) Type **no shutdown** to enable the PPP interface.

28) Type **exit** to return to global configuration mod.

Configure the Default Route:

29) Assign your AOS device a default route based on the method your provider requires for IP transport; either directly over ATM or PPP.

> a. For PPP connections, type **ip route 0.0.0.0 0.0.0.0 ppp 1**. Be sure to use the correct PPP interface number.

> b. For IP directly over ATM, type **ip route 0.0.0.0 0.0.0.0 atm 1.1**. Be sure to use the correct ATM sub-interface number.

Create the MATCHALL Access-List:

30) Type **ip access-list standard MATCHALL** to create an access-list that will be referenced in the Private Policy-Class NAT statement.

31) Type **permit ip any** to match all traffic in the MATCHALL access-list.

32) Type **exit** to return to global configuration mode.

Create the Private Policy-Class:

33) Type **ip policy-class Private** to create the Private Policy-Class that is referenced in the LAN interface configuration.

34) Type **allow list MATCHALL self** to allow management access from the Private interface. Without this command you may be unable to configure the router.

35) Create the Network Address Translation rule in the Private Policy-Class with the appropriate public interface.

a. For PPP connections, type **nat source list MATCHALL interface ppp 1**

b. For IP directly over ATM, type **nat source list MATCHALL interface atm 1.1**

36) Type **exit** to return to global configuration mode.

Create the Public Policy-Class:

37) Type **ip policy-class Public** to create the Public Policy-Class. This policy class is referenced in the "access-policy" command under the public interface. For now, this policy-class will remain empty, which will deny all inbound connection requests.

38) Type **exit** to return to global configuration mode.

Enable the Firewall:

39) Type **ip firewall** to enable the firewall.

Save the Configuration:

It is important that you save the configuration!

40) Type **end** to return to enable mode.

41) Type **write** to save the current configuration to permenant storage.

42) You should copy the output of the **show run** command to a text file as a backup. The output of show run can be used to restore this configuration should the configuration or the router be lost.

Testing Internet Access

Be sure that your computer's settings fulfill these two requirements:

1) Your computer's IP Address must be in the same IP Subnet as the AOS device's Private IP. If your AOS device is configured with 10.10.10.1, your computer's IP Address should be 10.10.10.2.

2) Your computer's "Default Gateway" setting should be the AOS device's Private IP Address. If your AOS device is configured with 10.10.10.1, your computer's "Default Gateway" should be 10.10.10.2.

To test Internet access, from your computer's "Command Line" or "Command Prompt", issue the command "ping 4.2.2.2".

If you are able to ping the IP Address 4.2.2.2, you have successfully configured Internet Access in your AOS device, and you should not alter its settings.

If you are able to ping 4.2.2.2, but are not able to browse the Web, check your computer's DNS settings. Your ISP will provide you IP Addresses of their DNS servers.

If you are unable to ping 4.2.2.2, please double check that you followed all of the steps in this guide. Then login to the Command Line Interface of the AOS device (click 'Telnet to Unit' in the Web Interface'), issue these commands, and capture the output for AdTran Technical Support.

> **enable**
> **(enter your password; Default is 'password')**
> **show version**
> **show run**
> **show interface**
> **show ip route**
> **show ip policy-stat**