CHAPTER 2

# Working with Your Access Server for the First Time

Refer to this chapter after performing the tasks described in the previous chapter, “Starting Up Your Access Server for the First Time.” This chapter will familiarize you with critical components of Cisco access servers while you configure the product for the first time. Spending a few minutes in this chapter just after you start up your access sever will save you time over the long term.

Complete the tasks in this chapter if you are not familiar with any of the following components and configuration tasks on a Cisco access server:

- The EXEC facility
- Line versus interface configuration tasks
- Different command modes in the command line interface
- Context-sensitive help
- How to view your configuration and Cisco IOS software release version
- The components that need to be configured on an access server to enable users to dial in from remote locations and access network resources (such as printers and file servers)

Specifically, this chapter describes the following:

- Working with the EXEC Facility, Lines, and Interfaces—This section provides important background information.
- First-Time Access Server Configuration Procedures—This section provides five lessons that enable you to learn while you configure the access server.

# Working with the EXEC Facility, Lines, and Interfaces

This section describes the following information:

- Choosing a Method of Connecting to the Network
- Accessing Different Command Modes
- Getting Context-Sensitive Help
- Configuring Asynchronous Interfaces

## Choosing a Method of Connecting to the Network

The prompt that appears when you first log in to an access server (`Router>`) is called the EXEC prompt. When you access the EXEC prompt, you are accessing the EXEC facility and you start an EXEC session. You can log in through the following ports on an access server:

- Console port
- LAN or WAN interface
- Asynchronous interface

To configure the access server (via the console port) to permit remote clients to dial in through asynchronous interfaces to access network resources (such as printers and file servers). You have two options:

- Have remote clients access the EXEC facility and then access network resources via the EXEC session
- Have remote clients connect directly to the network and bypass the EXEC facility

In general, you should give system administrators access to the EXEC facility, but give dialin clients access only to the network. The next section “Permitting Users to Connect Directly to the Network” describes how to enable users to log in to the network without ever seeing the access server.

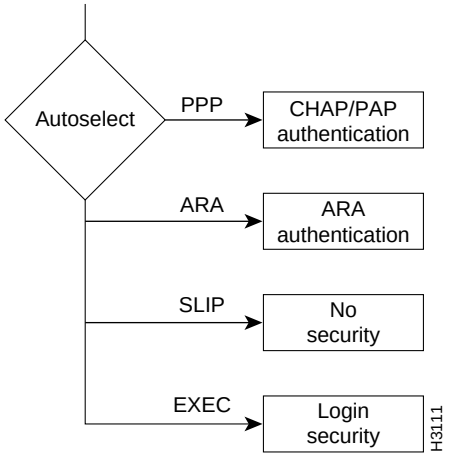
## Permitting Users to Connect Directly to the Network

When a user dials through the access server, the Cisco IOS software can detect the incoming protocol automatically if you configure it to *autoselect* the protocol. You autoselect a protocol by issuing the **autoselect ppp** or **autoselect arap** line configuration commands. If the Cisco IOS software detects one of these protocols, it can launch Point-to-Point Protocol (PPP) or AppleTalk Remote Access (ARA) sessions automatically.

**Caution** Autoselect bypasses security dialogs for users who log in to an EXEC session. If you use autoselect, Cisco strongly recommends that you use the authentication techniques built into the asynchronous protocols. If you configure a line to detect PPP automatically, Cisco recommends that you use Challenge Handshake Authentication Protocol (CHAP). If you configure a line to automatically detect ARA and the ARA protocol is detected, users are authenticated with ARA's built-in authentication. For complete security information, refer to the chapter "Configuring Access Service Security."

Figure 2-1 shows the authentication process when autoselect is used.

**Figure 2-1 Flowchart of EXEC Facility and Autoselect Authentication Options**



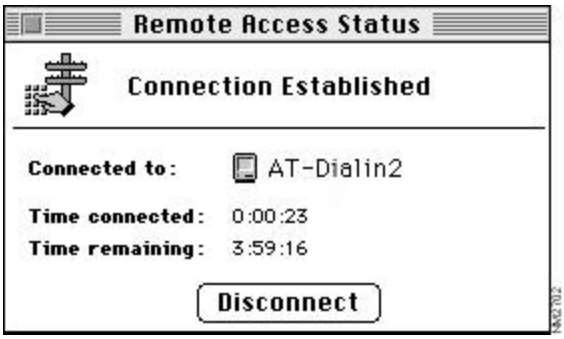
**Timesaver** If you issue the **autoselect ppp** line configuration command, you must first issue the **async mode interactive** asynchronous interface configuration command. The **async mode interactive** command enables the interface to select a protocol type dynamically. If you do not enter the **async mode interactive** command first, the warning message "%Autoselect w/o the interface command 'Async mode interactive' is useless" appears.

Figure 2-2 and Figure 2-3 show examples of what clients (dialin PC or Macintosh users) see when they connect to the network using PPP and ARA.

**Figure 2-2 Client Connection to an IP Network Using Windows 95**


After clients using PPP connect to the network, they have access to all IP network resources, such as UNIX hosts, other PCs on the network, or Windows NT servers.

**Figure 2-3 Client Connection to an AppleTalk Network Using ARA 2.0**



After users connect to the network via ARA, they have access to all AppleTalk network resources, including AppleShare servers, the public folders of other users, and printers. They can also use ARA as the transport protocol to run IP applications.

## Connecting to the EXEC Facility

If you permit users to dial in to the EXEC facility, they can use terminal services (such as Telnet), run an asynchronous protocol over the line, or use one of many other access services. For example, you can enter the **ppp** command to initiate a PPP session to a device on the network.

To enable users to log in to the EXEC facility, issue the **autoselect during-login** line configuration command. When the Cisco IOS software detects a carriage return, the user is connected to the EXEC facility. You also access the EXEC facility any time you log in to the access server through the access server to configure it.

There are two primary levels to the EXEC facility:

- User level EXEC mode, which is what you see when you first log in to the access server, whether from a remote client or through a console-port connection:

  ```
  Router>
  ```

- Privileged level EXEC mode, which provides access to configuration mode. To enter privileged level EXEC mode, you issue the **enable** command, enter the enable password, and press **Return**, as shown in the following example:

  ```
  Router> enable
  Password:
  Router#
  ```

As the network administrator for an access server, you protect privileged level EXEC mode with a password that only administrators know. You give dialin users access only to user-level EXEC mode so that they can issue commands to connect with other network devices (such as the **ppp** command).

For an overview of configuration mode, refer to the section, “Accessing Different Command Modes.” For information about configuring security, refer to the “Configuring Access Service Security” chapter.

## Accessing Different Command Modes

In addition to the EXEC facility, you can access several different command modes on the access server. Each different command mode permits you to configure different components on the access server. Table 2-1 lists the most common components and configuration modes. You configure global parameters in global configuration mode, interface parameters in interface configuration mode, and line parameters in line configuration mode. For information about what you typically configure in line mode versus interface mode, refer to the section "Configuring Asynchronous Interfaces."

**Table 2-1 Common Command Modes**

| Command Mode | Access Method | Prompt | Exit Method |
|---|---|---|---|
| User EXEC | Log in. | `Router>` | Use the **logout** command. |
| Privileged EXEC | From user EXEC mode, enter the **enable** command. | `Router#` | To exit back to user EXEC mode, use the **disable**, **exit**, or **logout** command. |
| Global configuration | From privileged EXEC mode, enter the **config terminal** command. | `Router(config)#` | To exit to privileged EXEC mode, use the **exit** or **end** command or press **Ctrl-Z**. |
| Interface configuration | Enter the **interface** *type number* command, such as **interface ethernet 0**. | `Router(config-if)#` | To exit to global configuration mode, use the **exit** command. To exit directly to privileged EXEC mode, press **Ctrl-Z**. |
| Line configuration | Enter the **line** *start-number end-number* command, such as **line 1 48**. | `Router(config-line)#` | To exit to global configuration mode, use the **exit** command. To exit directly to privileged EXEC mode, press **Ctrl-Z**. |

## Getting Context-Sensitive Help

You can get help in any of the command modes listed in Table 2-1. The help available in the Cisco IOS software describes the syntax for each command or displays the complete name of the command. To get context-sensitive help, type **?** (a question mark) at the prompt. There are two types of help available:

- Full help—Type a **?** at the configuration prompt or after entering part of a command followed by a space. The configuration parser displays options available with the command. For example, in global configuration mode, if you typed the command **arap**, and want to see all the keywords and arguments for that command, type **arap ?**. The following example shows the resulting output:

```
Router(config)# arap ?
  callback  Enable callback of ARAP connections
  logging   Turn on logging of ARAP connections
  network   Internal Appletalk Network For Arap Clients
Router(config)# arap
```

- Partial help—Type part of the name of a command, then a **?**, without an intervening space. The configuration parser identifies the rest of the command being entered. For example, if you were in global configuration mode and wanted to see the complete spelling of the command, you could type **ar?**. The following example shows the resulting output:

```
Router(config)# ar?
arap   arp

Router(config)#
```

You can also type **?** at the command prompt and the Cisco IOS software displays all available commands for that command mode. The following example shows sample output for the commands available in privileged EXEC mode:

```
Router# ?
Exec commands:
  access-enable    Create a temporary Access-List entry
  access-template  Create a temporary Access-List entry
  bfe              For manual emergency modes setting
  clear            Reset functions
...
  write            Write running configuration to memory, network, or
terminal
  x3               Set X.3 parameters on PAD
  xremote          Enter XRemote mode
```

Refer to the chapter “Configuring the User Interface” in the *Configuration Fundamentals Configuration Guide* for more information about any aspect of working with the user interface in the Cisco IOS software. The *Configuration Fundamentals Configuration Guide* is part of the Cisco IOS documentation in Cisco IOS Releases 11.1 and later.

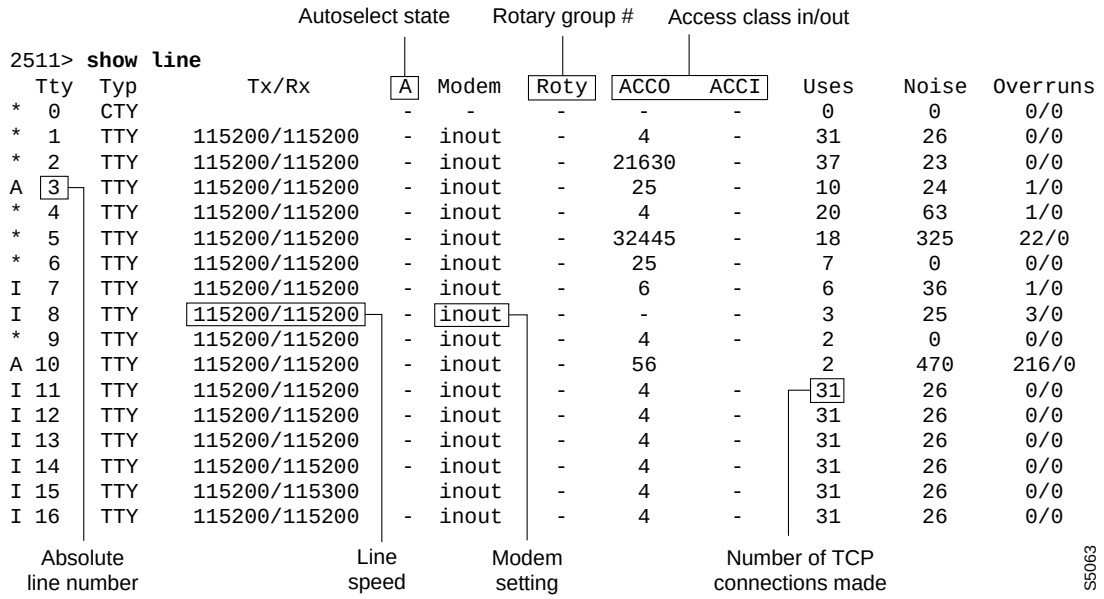
## Configuring Asynchronous Interfaces

The Cisco AS5200 is configured with either a Dual T1 PRI card or a Dual E1 PRI card. The T1 PRI or E1 PRI ports to which you connect T1 PRI or E1 PRI lines are located on the back panel of your access server. Remote clients dial in to the network through these T1 PRI or E1 PRI ports.

To enable clients to dial in, configure the following four types of interfaces used for dial in operations: ISDN interface, dialer interface, group asynchronous interface, and asynchronous interface. Asynchronous interfaces correspond to physical terminal (TTY) lines. For example, asynchronous interface 1 corresponds to TTY line 1.

Generally, commands entered in asynchronous interface mode enable you to configure protocol-specific parameters for asynchronous interfaces, whereas commands entered in line configuration mode permit you to configure the physical aspects for the same port. In Figure 2-4, which shows the **show line** output on a Cisco AS5200, TTY line 1 corresponds with asynchronous interface 1, TTY line 16 corresponds with asynchronous interface 16, and so on.

**Figure 2-4 Show Line Output—TTY Lines and Asynchronous Interfaces**




## Asynchronous Lines

Asynchronous line configuration commands configure ports for the following options:

- Physical layer options (such as modem configuration)
- Security for EXEC mode
- ARA protocol configuration (PPP is configured in interface configuration mode)
- Autoselect to detect incoming protocols (ARA and PPP)

To enter line configuration mode, first connect to the console port of the access server and enter privileged EXEC mode. Next, enter global configuration mode and then line configuration mode for the asynchronous lines that you want to configure.

**Note** The following example is for T1 lines. E1 lines are configured in the same manner, but include lines 1 through 60.

The following example of T1 line configuration (E1 is configured for lines 1 through 60) shows the sequence of entering line configuration mode for lines 1 through 48:

```
5200> enable
5200# configure terminal
5200(config)# line 1 48
5200(config-line)#
```

**Note** Router is the default name of your access server. This name appears in all system prompts (`Router>`). You can change the host name to any name you wish by using the **hostname** global configuration command. For example, to change the name of a host from Router to 5200, you would issue **hostname 5200** at the global configuration prompt.

## Asynchronous Interfaces

Generally, interfaces enable the Cisco IOS software to use routing functions. Specifically, you configure asynchronous interfaces to support PPP connections. You configure interfaces on an access server for the following functions:

- Network protocol support (such as IP, IPX, or AppleTalk)
- Encapsulation support (such as PPP)
- IP client addressing options (default and/or dynamic)
- IPX network addressing options
- PPP authentication

## Configuring Group Asynchronous Interfaces

To configure multiple asynchronous interfaces at the same time (with the same parameters), you can assign each asynchronous interface to a group and then configure the group. Configurations throughout this guide configure group asynchronous interfaces, rather than configuring each interface separately.

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**Note** After assigning asynchronous interfaces to a group, you cannot configure these interfaces separately. If you want to configure different attributes on different asynchronous interfaces, do not assign them to the group or assign different interfaces to different groups. For example, on a Cisco AS5200 access server with a Dual T1 PRI card, you could assign asynchronous interfaces 1 to 24 as part of one group (such as group-async1) and asynchronous interfaces 25 to 48 as part of another group (group-async2).

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To configure a group asynchronous interface, specify the group async number (an arbitrary number) and the group range (beginning and ending asynchronous interface number). The following example shows the process of creating a group asynchronous interface for asynchronous interfaces 1 through 24 on a Cisco AS5200 access server with a Dual T1 PRI card:

```
5200(config)# interface group-async 1
5200(config-if)# group-range 1 24

Building configuration...

5200(config-if)#
```

At this point, you have configured asynchronous interfaces 1 through 24 as part of the same group and you are in interface configuration mode for the group asynchronous interface. To enter asynchronous interface configuration mode at any point to configure this group, enter the following command:

```
5200(config)# interface group-async 1
5200(config-if)#
```

# First-Time Access Server Configuration Procedures

This section describes the use of Cisco IOS software to configure some fundamental parameters so that PC and Macintosh clients dial into your network to access resources, such as file servers and printers.

This section assumes you have referred to the user guide or installation and configuration guide that accompanied your router and that you have access to user level EXEC mode (`Router>`).

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**Note** If you do not type anything for ten minutes while you are configuring your system, the session times out and is disconnected. If it times out, the message "`Press RETURN to get started`" appears. This is not an error. If this message appears, press Return and the `Router>` prompt appears again. Lesson 1 shows you how to change this timeout interval.

---

Each step in the subsequent sections show information that appears on the screen before and after you type each command. On-screen text and system responses appear in `screen font`. Commands that you are instructed to type appear in examples as **`boldface screen font`**.

## What You Will Learn

The 5 lessons, and their content, are shown in the following list:

- Lesson 1, Configuration Basics
  - Understanding Cisco's command line interface
  - Moving between different configuration modes
  - What to do if the EXEC facility times out while you are configuring the system
  - How to get help in the Cisco IOS software
  - How to copy a running configuration to a startup configuration
  - How to view your configuration (running and startup)
- Lesson 2, Configuring T1 PRI Controllers

- Lesson 3, Configuring E1 PRI Controllers
- Lesson 4, Configuring Access Server Interfaces
- Lesson 5, Configuring Access Server Modems
- Lesson 6, Basic System Security

After you complete the tasks in all 5 lessons, you will have enabled remote PC users to dial in and access IP resources on your network.

Total time to complete all 5 lessons can range from 30 minutes to more than an hour. Each lesson takes approximately 10 minutes.

## Prerequisites

Before you begin, make sure you have completed the following tasks:

- Write down the IP address of your Ethernet (LAN) interface.
- Write down the set of available IP addresses to be assigned to dialin IP clients. If you do not have this information, you can use the sample addresses provided in the examples in these lessons.
- Make sure your access server is connected to the Ethernet network and the T1 PRI line. Refer to the quick reference cards and the *Cisco AS5200 Universal Access Server Hardware Installation Guide* , which shipped with your access server, for more information about connecting cables.
- Write down the ISDN switch type, framing type, and line code of your T1 PRI or E1 PRI line. Obtain this information from your telephone company service provider.

## Lesson 1, Configuration Basics

In this lesson, you will configure some basic parameters and learn how to work with the command line interface of the Cisco IOS software. This section requires 10 to 15 minutes to complete.

**Timesaver** Always make sure you are in the correct command mode before you enter a command. If you are not in the correct command mode when you enter a command, one of two problems occurs: either the command has no effect, or it has an unexpected (and possibly detrimental) effect.

Enter the commands in the following tables to configure basic parameters.

| Command | Purpose |
|---|---|
| `Router>` **`enable`**<br>`Password:`<br>`Router#` | Either or return to privileged EXEC mode (represented by `Router#`). If you are in user EXEC mode (represented by the `Router>` prompt), enter privileged EXEC mode by entering the **enable** command. If an enable password has been set, you are prompted for a password. If none has been set, you are not prompted for a password. If you are in any other mode, type **exit** and press Return until the `Router#` prompt appears. |
| `Router#` **`config term`**<br>`Enter configuration commands, one per line. End with CNTL/Z.`<br>`Router(config)#` | Enter global configuration mode. The abbreviated command **config term** represents the command **configure terminal**. You can abbreviate commands by entering the minimum number of characters that uniquely identify the command. |
| `Router(config)#` **`hostname 5200`**<br>`5200(config)#` | Change the name of the access server to a meaningful name. Substitute your own name for 5200. |
| `5200(config)#` **`enable secret guessme`**<br>`5200(config)#` | Enter a secret enable password. This password provides access to privileged EXEC mode. When a user types enable at the EXEC prompt (`Router>` or `5200>`), they must enter the enable secret password to gain access to configuration mode. Substitute your own enable secret instead of using the **guessme** password. |

| Command | Purpose |
|---|---|
| 5200(config)# **line con 0**<br>5200(config-line)# **exec-timeout 0 0**<br>5200(config-line)# **exit**<br>5200(config)# | Enter line configuration mode to configure the console port, which you are connected to. You can see when you enter line configuration mode, because the prompt changes to 5200(config-line)#. Prevent the access server's EXEC facility from timing out if you do not type any information on the console screen for an extended period. Exit back to global configuration mode. |
| 5200(config)# **exit**<br>5200#<br>%SYS-5-CONFIG_I: Configured from console by console | Exit back to privileged EXEC mode. If you have altered any parameters while in global configuration mode (or any other command mode), the message "%SYS-5-CONFIG_I: Configured from console by console" appears. This is normal and does not indicate an error condition. |
| 5200# **show version** | Display statistics about the Cisco IOS software image loaded on your access server, as well as available memory (NVRAM and Flash), and available interfaces. |

The following output shows statistics for a Cisco IOS 11.2 image running on an access server:

```
5200# show version
Cisco Internetwork Operating System Software
IOS (tm) 3000 Software (IGS-J-L), Version 11.2(1.0), RELEASED SOFTWARE
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Wed 23-Oct-96 15:18 by susingh
Image text-base: 0x0303CE40, data-base: 0x00001000

ROM: System Bootstrap, Version 4.14(9.1), SOFTWARE

5200 uptime is 3 minutes
System restarted by power-on
System image file is "igs-j-l", booted via flash

5200 (68030) processor (revision D) with 8192/4096K bytes of memory.
Processor board ID 02007583, with hardware revision 00000000
Bridging software.
SuperLAT software copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
```

```
Primary Rate ISDN software, Version 1.0.
1 Ethernet/IEEE 802.3 interface.
50 Serial network interfaces.
48 terminal lines.
2 Channelized T1/PRI ports.
128K bytes of non-volatile configuration memory.
8192K bytes of processor board System flash (Read ONLY)
4096K bytes of processor board Boot flash (Read/Write)

Configuration register is 0x2102

AS5200>
```

To continue with this lesson, enter the commands listed in the following table:

| Command | Purpose |
|---|---|
| 5200# **configure terminal**<br>5200(config)# **?** | Get help about all commands available in global configuration mode. The output that follows is based on the igs-j-l software image shown in the output of the **show version** command. Your output can differ and depends on your image type. |

The following output shows the commands and their definitions available in privileged EXEC mode:

```
5200(config)# ?

Configure commands:
  aaa                         Authentication, Authorization and
Accounting.
  access-list                 Add an access list entry
  alias                       Create command alias
  appletalk                   Appletalk global configuration commands
  arap                        Appletalk Remote Access Protocol
... (some output deleted for brevity)
  username                    Establish User Name Authentication
  vines                       VINES global configuration commands
  vpdn                        Virtual Private Dialup Network
  vty-async                   Enable virtual async line configuration
```

```
  x25                           X.25 Level 3
  x29                           X29 commands
  xremote                       Configure XRemote

5200(config)#
```

To continue with this lesson, enter the commands listed in the following table:

| Command | Purpose |
|---|---|
| `5200(config)# arap ?`<br>`callback  Enable callback of ARAP connections`<br>`logging  Turn on logging of ARAP connections`<br>`network  Internal Appletalk Network For Arap Clients`<br>`5200(config)# arap` | Get help about all keywords and arguments associated with the **arap** global configuration command. The help system lists each argument and describes it. To find out if there are additional arguments with this command, you can type any portion of the command followed by a space and a question mark, as shown in the next step. |
| `5200(config)# arap network ?`<br>`  <1-65279>  Network number` | Get help about the **arap network** command. The system displays the range of network numbers you can select for an ARA network. For more information about any command in the Cisco IOS software, you can refer to the Cisco IOS software command references. |
| `5200(config)# exit`<br>`5200#` | Exit back to privileged EXEC mode. |
| `5200# copy running startup`<br>`Building configuration...`<br>`[OK]`<br>`5200#` | Copy the contents of your running configuration (what you have just entered) to the startup configuration for the access server. The Cisco IOS software displays `[OK]`, indicating that the copy process was successful. The full name of the command is **copy running-config startup-config**. |
| `5200# show startup-config` | Display your startup configuration. If you want to view your current configuration (if it differed from your running configuration), issue the **show running-config** command. |

The following output shows the configuration that you saved when you issued the **copy running startup** command:

```
5200# show startup-config
Using 419 out of 32762 bytes
!
```

```
version 11.2
service slave-log
service udp-small-servers
service tcp-small-servers
!
hostname 5200
!
enable secret 5 $1$oiqW$zIoVcK4tkGdpoBarDXcFz0
username jim password 7 04091E020A
!
interface Ethernet0
 no ip address
 shutdown
!
interface Serial0
 no ip address
 shutdown
 no fair-queue
!
no ip classless
!
!
line con 0
line 1 8
line aux 0
line vty 0 4
 login
!
end
```

## Lesson 2, Configuring T1 PRI Controllers

In this lesson, you will configure some line parameters to enable the access server to work with a modem. This section requires 5 to 7 minutes to complete. For more information about any of the parameters in this lesson, refer to the "Configuring Modems" chapter later in this guide.

For more information about any of the parameters in this lesson, refer to the "Configuring for ISDN and Analog Calls" chapter in this guide.

At the end of Lesson 1, the `5200#` prompt appeared, and this is where you start Lesson 2. Enter the commands in the following tables to configure modems.

| Command | Purpose |
|---|---|
| 5200# **configure terminal**<br>Enter configuration commands, one per line. End with CNTL/Z.<br>5200(config)# | Enter global configuration mode and accept configuration commands from the console. |
| 5200(config)#**isdn switch-type primary-5ess** | Enter the Telco switch type |
| 5200(config)# **controller T1 0**<br>[or]<br>5200(config)# **controller T1 1**<br>5200(config-controller)# | Enter controller configuration mode to configure a T1 controller port. The T1 controller ports are 0 and 1. The ports are labeled on the Dual T1 PRI card. |
| 5200(config-controller)# **framing esf**<br>5200(config-controller)# | Enter the framing type for the T1 line. The framing type must match you Telco's offering. |
| 5200(config-controller)# **linecode b8zs**<br>5200(config-controller)# | Enter the line code type for the T1 line. The line code must match your Telco's offering. |
| 5200(config-controller)# **clock source line primary**<br>[or]<br>5200(config-controller)# **clock source line secondary**<br>5200(config-controller)# | Enter the clock source for the T1 line. Configure one T1 line to serve as the primary or most stable clock source line. The other T1 line is configured as the secondary clock source line. |
| 5200(config-controller)# **pri-group timeslots 1-24**<br>5200(config-controller)# | Enter how you want to configure all 24 channels. |
| 5200(config-controller)# **exit**<br>5200(config)# | Exits controller configuration mode. |

The resulting configuration configures T1 controllers to function with T1 PRI lines. Proceed to Lesson 3.

## Lesson 3, Configuring E1 PRI Controllers

In this lesson, you will configure some line parameters to enable the access server to work with a modem. This section requires 5 to 7 minutes to complete. For more information about any of the parameters in this lesson, refer to the "Configuring Modems" chapter later in this guide.

For more information about any of the parameters in this lesson, refer to the "Configuring for ISDN and Analog Calls" chapter in this guide.

At the end of Lesson 1, the `5200#` prompt appeared, and this is where you start Lesson 2. Enter the commands in the following tables to configure modems.

| Command | Purpose |
|---|---|
| `5200#` **`configure terminal`**<br>`Enter configuration commands, one per line. End with CNTL/Z.`<br>`5200(config)#` | Enter global configuration mode and accept configuration commands from the console. |
| `5200(config)#`**`isdn switch-type primary-net5`** | Enter the European Telco switch type |
| `5200(config)#` **`controller E1 0`**<br>`[or]`<br>`5200(config)#` **`controller E1 1`**<br>`5200(config-controller)#` | Enter controller configuration mode to configure a E1 controller port. The E1 controller ports are 0 and 1. The ports are labeled on the Dual E1 PRI card. |
| `5200(config-controller)#` **`framing crc4`**<br>`5200(config-controller)#` | Enter the framing type for the E1 line. The framing type must match you Telco's offering. |
| `5200(config-controller)#` **`linecode hdb3`**<br>`5200(config-controller)#` | Enter the line code type for the E1 line. The line code must match your Telco's offering. |
| `5200(config-controller)#` **`clock source line primary`**<br>`[or]`<br>`5200(config-controller)#` **`clock source line secondary`**<br>`5200(config-controller)#` | Enter the clock source for the E1 line. Configure one E1 line to serve as the primary or most stable clock source line. The other E1 line is configured as the secondary clock source line. |

| | |
|---|---|
| `5200(config-controller)# pri-group timeslots 1-31`<br>`5200(config-controller)#` | Enter how you want to configure all 24 channels. |
| `5200(config-controller)# exit`<br>`5200(config)#` | Exits controller configuration mode. |

The resulting configuration configures E1 controllers to function with E1 PRI lines. Proceed to Lesson 3.

## Lesson 4, Configuring Access Server Interfaces

In this lesson, you will configure interfaces to enable dial-in to IP networks. This section requires 10 to 15 minutes to complete.

You will configure the following interfaces in this lesson:

- Ethernet 0 is configured by assigning an IP address and subnet mask
- Serial0:23 is the D channel interface for the T0 controller. Serial1:23 is the D channel interface for the T1 controller. The serial interface is configured to receive incoming and send outgoing modem signalling
- Group-async 1 is the parent interface that applies specific protocol characteristics to specified asynchronous ports.

You will also enter the following global configuration parameters:

- IP address pool is created to assign IP addresses to dialin IP clients
- Dialer list 1 is created to control dialing by protocol or protocol and access list

For more information about any of the parameters in this lesson, refer to the “Configuring for ISDN and Analog Calls” chapter in this guide.

At the end of Lesson 2, the `5200(config)#` prompt appeared, and this is where you start Lesson 3. Enter the commands in the following table to enable clients to dial in to IP networks.

## Ethernet Interface

Ethernet 0 interface is configured with the following commands:

| Command | Purpose |
|---|---|
| `5200(config)# interface ethernet 0`<br>`5200(config-if)#` | Enter Ethernet interface configuration mode. |
| `5200(config-if)# ip address 172.16.254.254 255.255.255.0` | Assign an IP address and subnet mask to the interface. |
| `5200(config-if)# no shutdown` | Do not shut down the interface. |
| `5200(config-if)# exit`<br>`5200(config)#` | Configure interactive mode on the asynchronous interfaces. |

## Serial Interface

The serial interface is configured with the following commands:

| Command | Purpose |
|---|---|
| `5200(config)# interface serial0:23`<br>`[or]`<br>`5200(config)# interface serial1:23`<br>`5200(config-if)#` | Enter serial interface configuration mode. Once you configure the T1 controller, two corresponding D channel serial interfaces are instantly created. Serial interface 0:23 is the D channel for the T0 controller, and serial interface 1:23 is the D channel for T1 controller. You must configure each serial interface to receive incoming and send outgoing modem signaling. |
| `5200(config-if)# ip address 172.16.254.253 255.255.255.0` | Assign an IP address and subnet mask to the interface. |
| `5200(config-if)# isdn incoming-voice modem` | Configure all incoming voice calls to go to the modems. |
| `5200(config-if)# encapsulation ppp` | Enable the point-to-point protocol (PPP) to run on the set of interfaces in the group. |

| | |
|---|---|
| `5200(config-if)# dialer-group 1` | Assign the serial interface to dialer group 1 to control dialing access to the interface. Access is controlled by a combination of protocol and access list define in the dialer-list command. |
| `5200(config-if)# ppp multilink` | |
| `5200(config-if)# ppp authentication chap pap` | Enable CHAP and PAP authentication on the serial interface. |
| `5200(config-if)# exit`<br>`5200(config)#` | Exit serial interface configuration mode. |

## Asynchronous Group Interface

The asynchronous group interface is configured with the following commands:

| Command | Purpose |
|---|---|
| `5200(config)# interface group-async 1`<br>`5200(config-if)#` | Place all asynchronous interfaces in a single group, so that you configure the same parameters quickly on all interfaces at one time. This example assigns asynchronous interfaces 1 through 24 to group asynchronous interface 1. You can see that you have entered interface configuration mode, because the prompt changed to `5200(config-if)#`.<br>The number you use with the **group-range** command depends on the number of asynchronous interfaces you have on your access server. That is, if your access server has 48 asynchronous interfaces, you can specify **group-range 1 48**. If 60, specify **group-range 1 60**. |
| `5200(config-if)# ip unnumbered ethernet 0` | To conserve IP addresses, configure the asynchronous interfaces as unnumbered and assign the IP address of the Ethernet interface to them. |
| `5200(config-if)# encapsulation ppp` | Enable the point-to-point protocol (PPP) to run on the set of interfaces in the group. |
| `5200(config-if)# async mode interactive` | Configure interactive mode on the asynchronous interface. |

| | |
|---|---|
| `5200(config-if)# peer default ip address pool default` | Assign a common IP address pool. PPP packets coming through an asynchronous line and ISDN line share this common IP pool. |
| `5200(config-if)# ppp authentication chap pap` | Enable CHAP and PAP authentication on the interface. |
| `5200(config-if)# group-range 1 24` | Define the group range of the interface. |
| `5200(config-if)# exit`<br>`5200(config)#` | Exit the interface configuration mode. |

## Global Configuration Commands

Enter the following commands to specify the IP address pool and control access by IP protocol

| Command | Purpose |
|---|---|
| `5200(config)# ip local pool default 172.16.254.1 172.16.254.48` | Assign a pool of IP addresses (in this example, from 172.16.254.1 to 172.16.254.48), all of which are on the same IP subnet. If your access server has 60 modems, the IP address pool is 172.16.254.1 to 172.16.254.60. |
| `5200(config)# dial-list 1 protocol ip permit`<br>`5200(config-if)# exit` | Specify a dial list to control dialing by protocol. In this example, dialing is permitted by anyone using the IP protocol. |

This lesson configured interfaces for dial-in to IP networks. Before you can allow users to dial in to the network, you must configure the modems, which are described in Lesson 4.

## Lesson 5, Configuring Access Server Modems

In this lesson, you will configure the access server modems, which will allow users to dial in to your network. This section requires 5 to 7 minutes to complete.

For more information about any of the parameters in this lesson, refer to the "Configuring for ISDN and Analog Calls" chapter in this guide.

At the end of Lesson 3, the `5200(config)#` prompt appeared, and this is where you start Lesson 4. Enter the commands in the following table to configure the access server modems.

| Command | Purpose |
|---|---|
| `5200(config)# line 1 24`<br>`5200(config-line)#` | Exit from interface configuration mode and return to global configuration mode. |
| `5200(config-line)# modem autoconfigure type microcom_hdms` | Configure the access server modems automatically. A string of modem configuration commands is sent to the modem each time a modem is reset. |
| `5200(config-line)# transport input all` | Allow all protocols to be used when connecting the line. |
| `5200(config-line)# autoselect ppp` | Enable remote IP users running a PPP application to dial in, bypass the EXEC facility, and connect directly to the network. |
| `5200(config-line)# autoselect during-login` | Send a username and password prompt to the user. The autoselect function begins after the user logs in. |
| `5200(config-line)# modem inout` | Enable both incoming and outgoing calls. |
| `5200(config-line)# stopbits 1` | Specify the number of stop bits transmitted per byte. |
| `5200(config-line)# rxspeed 57600` | Set the line receive speed. |
| `5200(config-line)# txspeed 57600` | Set the line transmit speed. |
| `5200(config-line)# exit`<br>`5200(config)#` | Exit to global configuration mode. |

The resulting configuration enables clients to dial in to the network to access IP and AppleTalk resources. At this point, you must configure security, or your network will be open to significant security breaches.

## Lesson 6, Basic System Security

This lesson uses the authentication, authorization, and accounting (AAA) facility to configure basic local authentication. Local authentication means that an internal username database authenticates users, rather than a remote user authentication (security) server. This section requires 10 to 15 minutes to complete.

For more information about any of the parameters in this lesson, refer to the "Configuring Access Service Security" chapter in this guide.

At the end of Lesson 4, the `5200(config)#` prompt appeared, and this is where you start Lesson 5. Enter the commands in the following table to configure basic system security.

| Command | Purpose |
|---|---|
| `5200(config)# aaa new-model` | Enable the AAA facility globally on the access server. |
| `5200(config)# aaa authentication login default local` | Define an authentication method list for users logging in to the access server. |
| `5200(config)# aaa authentication ppp default local` | Define an authentication method list for clients using a PPP application to dial in to the network. |
| `5200(config)# aaa authentication arap default local` | Define an authentication method list for clients using ARA to dial in to the network. |
| `5200(config)# username jim password 2ude` | Populate the local username database by specifying a username-and- password pair for every user who needs access to the network. |

You have configured PPP dialin to an IP network and security. Each task in these lessons is described in much greater detail in the subsequent chapters in this guide.

Refer to the next section “Sample Access Server Configuration” to view the configuration resulting from the 5 lessons.

## Sample Access Server Configuration

The following Cisco AS5200 configurations show the results of Lessons 1 through 5. These configurations are typically sufficient to enable remote users to dial in as a node on a local network. For additional information, refer to the subsequent chapters in this guide.

**Note** Substitute your own IP addresses and network numbers, usernames, and passwords in this example. Also, ensure that you consider your security policies carefully. For more information, refer to the *Security Configuration Guide*.

## T1 Access Server Configuration

The following shows a typical T1 configuration:

```
5200# show running-config
Building configuration...

Current configuration:
version 11.2
service slave-log
service udp-small-servers
service tcp-small-servers
!
hostname 5200
!
aaa new-model
aaa authentication login default local
aaa authentication arap default local
aaa authentication ppp default local
enable secret 5 $1$ltBE$Slq0BUs/5mwqw6B4DOapg/
!
username jim password 7 02150C5A110702
!
enable password cisco
!
modem startup-test
no ip domain-lookup
isdn switch-type primary-5ess
!
controller T1 0
 framing esf
 clock source line primary
 linecode b8zs
 pri-group timeslots 1-24
!
controller T1 1
 shutdown
 clock source line secondary
!
interface Ethernet0
 ip address 172.16.254.254 255.255.255.0
!
interface Serial0
 no ip address
 shutdown
```

```
 no fair-queue
!
interface Serial1
 no ip address
 shutdown
!
interface Serial0:23
 ip address 172.16.254.253 255.255.255.0
encapsulation ppp
isdn incoming-voice modem
dialer-group 1
 no fair-queue
 ppp multilink
 ppp authentication chap pap
!
interface Group-Async1
 ip unnumbered Ethernet0
 encapsulation ppp
 async mode interactive
 peer default ip address pool default
 no cdp enable
 ppp authentication chap pap
 group-range 1 24
!
ip local pool default 172.16.254.1 172.16.254.48
!
dialer-list 1 protocol ip permit
!
line con 0
line 1 24
 exec
 autoselect during-login
 autoselect ppp
 modem InOut
 modem autoconfigure type microcom_hdms
 transport input all
 stopbits 1
 rxspeed 57600
 txspeed 57600
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

## E1 Access Server Configuration

The following shows a typical E1 configuration:

```
5200# show running-config
Building configuration...

Current configuration:
version 11.2
service slave-log
service udp-small-servers
service tcp-small-servers
!
hostname 5200
!
aaa new-model
aaa authentication login default local
aaa authentication arap default local
aaa authentication ppp default local
enable secret 5 $1$ltBE$Slq0BUs/5mwqw6B4DOapg/
!
username jim password 7 02150C5A110702
!
enable password cisco
!
modem startup-test
no ip domain-lookup
isdn switch-type primary-net5
!
controller E1 0
 framing crc4
 clock source line primary
 linecode hdb3
 pri-group timeslots 1-31
!
controller E1 1
 shutdown
 clock source line secondary
!
interface Ethernet0
 ip address 172.16.254.254 255.255.255.0
!
interface Serial0
 no ip address
 shutdown
```

```
 no fair-queue
!
interface Serial1
 no ip address
 shutdown
!
interface Serial0:23
 ip address 172.16.254.253 255.255.255.0
encapsulation ppp
isdn incoming-voice modem
dialer-group 1
 no fair-queue
 ppp multilink
 ppp authentication chap pap
!
interface Group-Async1
 ip unnumbered Ethernet0
 encapsulation ppp
 async mode interactive
 peer default ip address pool default
 no cdp enable
 ppp authentication chap pap
 group-range 1 24
!
ip local pool default 172.16.254.1 172.16.254.48
!
dialer-list 1 protocol ip permit
!
line con 0
line 1 31
 exec
 autoselect during-login
 autoselect ppp
 modem InOut
 modem autoconfigure type microcom_hdms
 transport input all
 stopbits 1
 rxspeed 57600
 txspeed 57600
line aux 0
line vty 0 4
 password cisco
 login
!
end
```