

Configuring for ISDN and Analog Calls

This chapter explains how to configure the access server to accept ISDN and analog calls so that remote clients can access network resources. It also includes configuration information for the access server to accept dial in calls from the Cisco 753 and Cisco 1004. Figure 3-1 shows a typical dial in scenario.

If you are configuring a Cisco 753 or Cisco 1004 router to dial in to an access server and need configuration information, you can receive a fax-back document from Cisco's Technical Assistance Center at 800 553-2447 or 408 526-7209 or call directly into the fax-on-demand service at 415 596-4408.

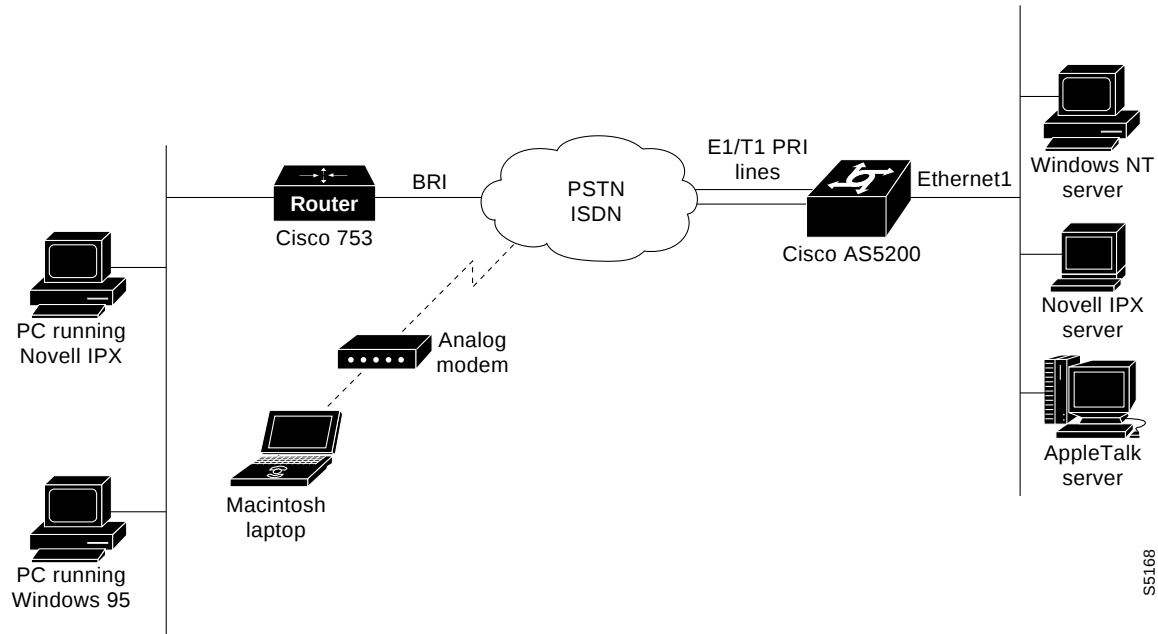
To configure the access server to accept calls from routers such as the Cisco 753 and Cisco 1004, follow the steps outlined in the these sections:

- Enabling Remote IP Users to Dial in to IP Networks
- Enabling Remote IPX Users to Dial in to IPX Networks
- Enabling Macintosh Users to Access AppleTalk Resources

A comprehensive configuration example is provided at the end of this chapter. Commands that are not specific to remote dial in and dial out access for the listed devices are described in previous chapters.

Assumption

Figure 3-1 Remote Clients Dialing in to the AS5200 to Access Network Resources



Assumption

The configuration information in this chapter builds on preceding configurations from previous chapters and assumes you understand group asynchronous interfaces, basic asynchronous modem configuration, and autoselect. Users dialing in must also be running one of the following applications:

- PPP application from a PC to dial in and access IP and IPX resources
- ARA application from a Macintosh to dial in and access AppleTalk services

For each of the following configuration examples, dialin users are assumed to belong to one subnet. In this way, all the remote clients appear to belong to one Ethernet segment from the access server's perspective.

Note Be sure your ISDN switch type matches your telco's switch type. Configure the switch type using the **isdn switch-type** global configuration command. Your options in the United States are NI1, 5ESS, and DMS 100. Additional options are available outside the United States.

Enabling Remote IP Users to Dial in to IP Networks

This section includes the base configuration to enable IP clients to access network resources by dialing through the access server. Configure remote IP dialin before you enter any commands for IPX or AppleTalk, even if you are setting up an IPX- or AppleTalk-only network.

Enter the following access server configuration sequentially, first entering the commands featured in the “Entering Configuration Mode” section (enter your own addresses, host names, and passwords where appropriate).

Entering Configuration Mode

To enter configuration mode, follow these steps:

- Step 1** Connect a console to the access server and turn on the access server. If you need instructions to connect a terminal console to the access server, refer to the access server hardware installation guide.
- Step 2** To start configuration mode, enter the following commands:
- ```
Would you like to enter the initial dialog? [yes]: no
Router> enable
Router#
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

## Enabling Remote IP Users to Dial in to IP Networks

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```
Router(config)# hostname as5200
as5200(config)# enable password irongate
```

Proceed with the “Configuring Security” section.

### Configuring Security

To set up a base security and local database, enter the following commands starting in global configuration mode:

```
as5200(config)# aaa new-model
as5200(config)# aaa authentication login default local
as5200(config)# aaa authentication login console none
as5200(config)# aaa authentication ppp default if-needed local
as5200(config)# username jojackso password <password>
as5200(config)# username wmays password <password>
as5200(config)# username bruth password <password>
as5200(config)# username hwilliam password <password>
```

Proceed with the “Configuring the ISDN Switch Type” section.

### Configuring the ISDN Switch Type

To configure the ISDN switch servicing your T1 PRI or E1 PRI lines, enter the following command in global configuration mode. The switch type can be obtained from your telephone service provider:

```
as5200(config)# isdn switch-type primary-5ess
```

Proceed with the “Configuring the Controllers” section.

### Configuring the Controllers

Your access server is configured with a Dual T1 PRI card or a Dual E1 PRI card. Use one of the following procedures to configure your access server.

## Configuring T1 Controllers

To configure the T1 controllers, which accept incoming calls and send outgoing calls through ISDN PRI lines, follow these steps:

**Step 1** Enable the T0 controller:

```
as5200(config)# controller T1 0
as5200(config-controller)#
```

**Step 2** Set the framing and line code type. The framing and line code you configure must match your telco's offering. In most cases, these values are *esf* and *b8zs*.

```
as5200(config-controller)# framing esf
as5200(config-controller)# linecode b8zs
```

**Step 3** 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, which you enter later in this procedure.)

```
as5200(config-controller)# clock source line primary
```

Most T1 lines provide stable clocking, so choosing the correct primary and secondary clock source is not a vital part of the configuration. However, do not configure the clock source as internal unless you are performing back-to-back *advanced* testing between two routers in a network *simulated* environment (such as in a router lab).

**Step 4** Specify how you want to configure all 24 channels. To configure all channels for ISDN PRI, enter the following command:

```
as5200(config-controller)# pri-group timeslots 1-24
as5200(config-controller)# exit
as5200(config)#
```

If you are not running ISDN PRI but want to configure a channelized T1 to accept voice calls, substitute the **pri-group timeslots 1-24** command with the **cas-group 1 timeslots 1-24 type e&m-fgb** command on both T1 controllers. This command configures the E&M (ear and mouth) analog signal on each timeslot:

```
as5200(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb
as5200(config-controller)# exit
as5200(config)#
```

## Enabling Remote IP Users to Dial in to IP Networks

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Alternatively, you can configure a channelized T1 that is not running PRI ISDN with the **channel-group 1 timeslots 1-24** command on both T1 controllers:

```
as5200(config-controller)# channel-group 1 timeslots 1-24
as5200(config-controller)# exit
as5200(config)#
```

- Step 5** Configure the T1 controller. This controller's configuration is identical to the one you entered on the T0 controller except that it is used as the secondary clock source line:

```
as5200(config)# controller T1 1
as5200(config-controller)# framing esf
as5200(config-controller)# linecode b8zs
as5200(config-controller)# clock source line secondary
as5200(config-controller)# pri-group timeslots 1-24
as5200(config-controller)# exit
as5200(config)#
```

Proceed with the "Configuring the ISDN D Channel Serial Interfaces" section.

## Configuring E1 Controllers

To configure the E1 controllers, which accept and send incoming and outgoing calls through ISDN PRI lines, follow these steps:

- Step 1** Enable the E0 controller:

```
as5200(config)# controller E1 0
as5200(config-controller)#
```

- Step 2** Set the framing and line code type. The framing and line code you configure must match your telco's offering:

```
as5200(config-controller)# framing crc4
as5200(config-controller)# linecode hdb3
```

- Step 3** 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, which you enter later in this procedure.)

```
as5200(config-controller)# clock source line primary
```

Most E1 lines provide stable clocking, so choosing the correct primary and secondary clock source is not a vital part of the configuration. However, do not configure the clock source as internal unless you are performing back-to-back *advanced* testing between two routers in a network *simulated* environment (such as in a router lab).

- Step 4** Specify how you want to configure all 30 channels. To configure all channels for ISDN PRI, enter the following command:

```
as5200(config-controller)# pri-group timeslots 1-31
as5200(config-controller)# exit
as5200(config)#
```

Alternatively, you can configure a channelized E1 that is not running PRI ISDN with the **channel-group 1 timeslots 1-31** command on both T1 controllers:

```
as5200(config-controller)# channel-group 1 timeslots 1-31
as5200(config-controller)# exit
as5200(config)#
```

- Step 5** Configure the E1 controller. This controller's configuration is identical to the one you entered on the E0 controller except that it is used as the secondary clock source line:

```
as5200(config)# controller E1 1
as5200(config-controller)# framing crc4
as5200(config-controller)# linecode hdb3
as5200(config-controller)# clock source line secondary
as5200(config-controller)# pri-group timeslots 1-31
as5200(config-controller)# exit
as5200(config)#
```

Proceed with the "Configuring the ISDN D Channel Serial Interfaces" section.

### Configuring the ISDN D Channel Serial Interfaces

After you configure the controller, two corresponding D channel serial interfaces are instantly created. For Dual T1 PRI cards, serial interface 0:23 is the D channel for the T0 controller, and serial interface 1:23 is the D channel for T1 controller. For Dual E1 PRI cards, serial interface 0:15 is the D channel for the E0 controller, and serial interface 1:15 is the D channel for E1 controller.

You must configure each serial interface to receive incoming and send outgoing modem signaling.

To configure the ISDN D channel serial interfaces, follow these steps:

**Step 1** Specify the D channel of the first PRI line:

```
as5200(config)# interface Serial 0:23
or, for E1 PRI
as5200(config)# interface Serial 0:15
as5200(config-if)#
```

**Step 2** Configure all incoming voice calls to go to the modems.

```
as5200(config-if)# isdn incoming-voice modem
```

Because some telcos charge more for ISDN data calls, you might want to configure the **isdn incoming-voice data** command to process ISDN calls as voice calls, which provides you with data service at a voice billing rate. However, incoming modem calls will not be passed to the modems with this command enabled. Native ISDN calls are directed like a protocol.

**Step 3** Wrap these configurations together under the umbrella of a dialer interface, which modularizes the configuration. The dialer interface serves as the parent interface that contains additional protocol characteristics:

```
as5200(config-if)# dialer rotary-group 1
as5200(config-if)# exit
```

This command also creates one interface with one address, which is helpful for the hunt group provided by the phone company.

**Step 4** Specify the D channel for the second PRI line and give it the same channel configurations you set for the first PRI line:

```
as5200(config-if)# interface Serial 1:23
or, for E1 PRI
as5200(config-if)# interface Serial 1:15
as5200(config-if)# isdn incoming-voice modem
as5200(config-if)# dialer rotary-group 1
as5200(config-if)# exit
as5200(config)#
```

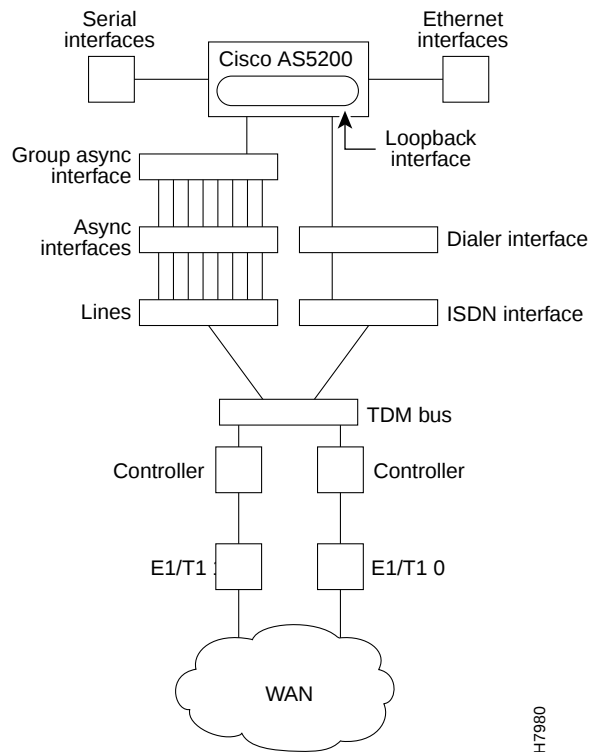
Continue on to the “Creating Interfaces for Asynchronous and ISDN Dialin Services” section.

### Creating Interfaces for Asynchronous and ISDN Dialin Services

This section describes how to configure the access server interfaces that enable dial in clients to make remote asynchronous and ISDN connections to the access server.

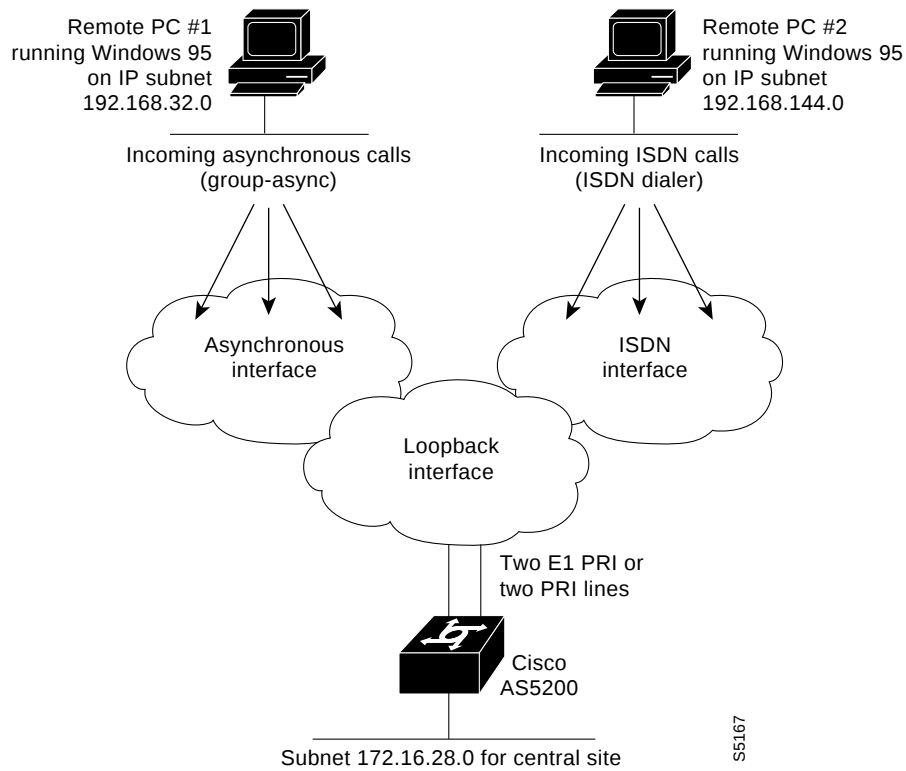
To configure remote services, you must configure three interrelated interfaces on the access server. The loopback interface makes the network appear as if the dialin users exist on one Ethernet segment. The loopback interface has the following four types of neighboring interfaces used for dialin operations: ISDN interface, dialer interface, group asynchronous interface, and asynchronous interface. Figure 3-2 shows an internal view of the components used to process incoming ISDN and analog calls on an access server.

**Figure 3-2 Internal View of Access Server Call Processing Components**



All dial in users exist on one dialin subnet. Remote asynchronous users dial in through the group asynchronous interface to the access server. Remote ISDN users dial in through the ISDN dialer interface to the access server. Figure 3-3 shows an external view of how remote users dial in to the access server.

**Figure 3-3 External View of Access Server Call Processing Components**



### Configuring the Loopback and Ethernet Interfaces

The loopback 0 interface is a *virtual* IP interface carrying all the dialin users, and it exists only in the access server. You assign an IP network number to the loopback interface, then let each asynchronous interface borrow this network number.

## Enabling Remote IP Users to Dial in to IP Networks

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To configure the loopback and Ethernet interface, follow these steps:

- Step 1** Create interface loopback 0, which is the logical IP subnet containing all the dial in users' addresses:

```
as5200(config)# interface loopback 0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed
state to up
as5200(config-if)#
```

- Step 2** Give the loopback interface an IP address using an existing subnet reserved for asynchronous dialin users (such as subnet 172.16.254.254):

```
as5200(config-if)# ip address 172.16.254.254 255.255.255.0
as5200(config-if)# exit
as5200(config)#
```

- Step 3** Configure Ethernet interface 0 and assign it an IP address from the subnet address on the network to which you are enabling dialin access:

```
as5200(config)# interface Ethernet 0
as5200(config-if)# ip address 172.16.1.1 255.255.255.0
as5200(config-if)# exit
as5200(config)#
```

Proceed with the “Creating the Group Asynchronous Interface” section.

## Creating the Group Asynchronous Interface

A group asynchronous interface is the parent interface that applies protocol characteristics to specified asynchronous ports. To configure the group asynchronous interface, follow these steps:

- Step 1** Enter the following commands to configure the group asynchronous interfaces:

```
as5200(config)# interface Group-Async 1
as5200(config-if)# ip unnumbered Loopback 0
as5200(config-if)# ip tcp header-compression passive
as5200(config-if)# encapsulation ppp
as5200(config-if)# async mode interactive
as5200(config-if)# ppp authentication chap pap
as5200(config-if)# group-range 1 48
or, for E1 PRI
as5200(config-if)# group-range 1 60
```

Building configuration...

```
as5200(config-if)#
```

- Step 2** Assign dialin clients an IP address from a pool of addresses named default. The pool is defined later in this procedure:

```
as5200(config-if)# peer default ip address pool default
```

- Step 3** Specify the packets that keep the asynchronous links up. This command derives its definition from the **dialer list** command, which is configured in the “Configuring the ISDN Dialer Interface” section:

```
as5200(config-if)# dialer-group 1
as5200(config-if)# exit
```

- Step 4** Assign a pool of IP addresses (in this example, from 172.16.254.1 to 172.16.254.48 for T1 PRI and from 172.16.254.1 to 172.16.254.60 for E1 PRI), all of which are on the same IP subnet as loopback interface 0.

```
as5200(config)# ip local pool default 172.16.254.1 172.16.254.48
or, for E1 PRI
as5200(config)# ip local pool default 172.16.254.1 172.16.254.60
as5200(config)#
```

Proceed with the “Configuring the ISDN Dialer Interface” section.

### Configuring the ISDN Dialer Interface

The ISDN dialer interface is the parent interface that holds the central protocol characteristics for the two ISDN D channels that are part of dialer rotary-group 1. The previous section “Configuring the ISDN D Channel Serial Interfaces” described how to configure the ISDN D channels on serial interfaces.

## Enabling Remote IP Users to Dial in to IP Networks

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To configure the ISDN dialer interface, follow these steps:

- Step 1** Enable both D channels to access their core protocol intelligence from interface dialer 1:

```
as5200(config)# interface Dialer 1
```

- Step 2** Associate all ISDN users with the subnet configured on loopback interface 0:

```
as5200(config-if)# ip unnumbered Loopback 0
```

- Step 3** Configure PPP on the dialer interface:

```
as5200(config-if)# encapsulation ppp
```

- Step 4** Assign a common IP address pool. PPP packets coming through an asynchronous line and an ISDN line share this common IP pool. The default address pool is specified in the “Creating the Group Asynchronous Interface” section.

```
as5200(config-if)# peer default ip address pool default
```

- Step 5** Enable the access server to build dynamic mapping of IP addresses to the ISDN B channels:

```
as5200(config-if)# dialer in-band
```

- Step 6** Specify the dialer group number for this interface:

```
as5200(config-if)# dialer-group 1
```

- Step 7** Define the number of seconds that a line is idle before it hangs up. The default is 300 seconds (5 minutes):

```
as5200(config-if)# dialer idle-timeout 3600
```

The **dialer list** command defines the *interesting traffic*, which is the traffic that resets the idle-timeout or triggers a dial if the line is down and you have a number to send.

- Step 8** Enable PPP multilink, which uses multiple bundled B channels from the remote user who is likely to be running BRI with two available B channels:

```
as5200(config-if)# ppp multilink
```

**Step 9** Enable CHAP and PAP authentication on dialer interface 1:

```
as5200(config-if)# ppp authentication chap pap
as5200(config-if)# exit
```

**Step 10** Specify which packets reset the idle timer. Ping packets cannot reset the idle timer with this configuration. In this case, any IP packet resets the timer:

```
as5200(config)# dialer-list 1 protocol ip permit
```

Proceed with the “Configuring Modem Lines” section.

## Configuring Modem Lines

To configure the modem lines, use the following series of commands:

```
as5200(config)# line 1 48
! or, for E1 PRI
as5200(config)# line 1 60
as5200(config-line)# modem InOut
as5200(config-line)# modem autoconfigure type microcom_hdms
as5200(config-line)# transport input all
as5200(config-line)# stopbits 1
as5200(config-line)# rxspeed 57600 (or rxspeed 64000 for E1 PRI)
as5200(config-line)# txspeed 57600 (or txspeed 64000 for E1 PRI)
as5200(config-line)# flowcontrol hardware
as5200(config-line)# login local
as5200(config-line)# autoselect during-login
as5200(config-line)# autoselect ppp
```

Proceed with the “Defining a Routing Protocol and Domain Name” section.

### Defining a Routing Protocol and Domain Name

To complete the configuration, you must define a routing protocol and a domain name. You also can specify a domain name server to resolve host names and IP addresses.

```
as5200(config)# router eigrp 202
as5200(config-router)# network 172.16.0.0
as5200(config-router)# exit
as5200(config)# ip domain-name cisco.com
as5200(config)# ip name-server 172.16.99.99
```

Proceed with the “Enabling DNS and NBNS Services for PPP Users” section.

### Enabling DNS and NBNS Services for PPP Users

Dialin clients using PPP and applications such as CiscoRemote, Windows NT, and Windows '95 need domain name service (DNS) and NetBIOS Name Service (NBNS) address information as described in RFC 1877. Use the following procedure to enter parameters to enable Telnet users to gather this information transparently as part of the PPP negotiation:

**Step 1** Specify the list of available DNS servers:

```
as5200(config)# async-bootp dns-server 172.16.10.100 172.16.39.67
```

**Step 2** Specify the list of available NBNS servers:

```
as5200(config)# async-bootp nbns-server 172.16.200.200
172.16.201.200
as5200(config)# exit
```

**Step 3** This completes the IP configuration. Save the running configuration to startup configuration:

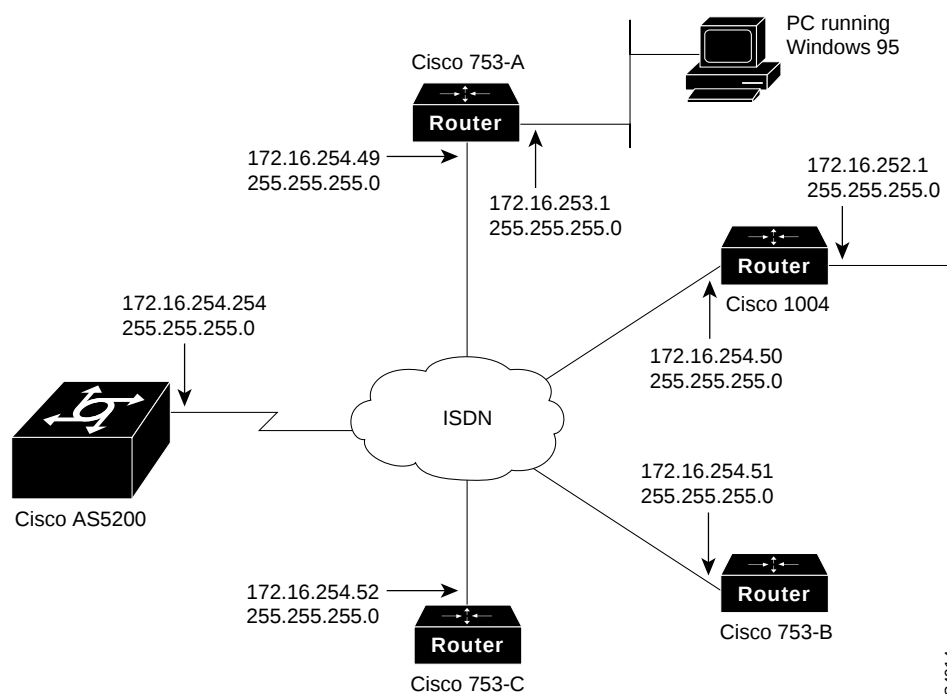
```
as5200# copy running-config startup-config
[OK]
as5200#
```

Proceed with the “Configuring the Access Server to Accept Dialin Calls from the Cisco 753 and Cisco 1004” section if you want to enable ISDN and analog calls to enter the access server from a Cisco 753 or Cisco 1004 router.

## Configuring the Access Server to Accept Dialin Calls from the Cisco 753 and Cisco 1004

This section explains how to enable a remote ISDN user to dial in to an access server through a Cisco 753 or Cisco 1004 on an IP network. See Figure 3-4.

**Figure 3-4 Sample Addressing Scheme for ISDN Routers Dialing in to the Access Server**



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## Enabling Remote IP Users to Dial in to IP Networks

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**Note** The host names, user names, IP addresses, and passwords for the Cisco 753 and Cisco 1004 routers entered in this section match the device addressing schemes documented in the *Configuring the Cisco 753 and Cisco 1004 to Dial in to an Access Server* publication. This is done to help describe the internetworking relationships between devices.

If you are configuring the Cisco 753 or Cisco 1004 and need configuration information, you can receive a fax-back document from Cisco's Technical Assistance Center at 800 553-2447 or 408 526-7209 or call directly into the fax-on-demand service at 415 596-4408.

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**Step 1** Create a dialer map from the access server to the Cisco 753-A router shown in Figure 3-4. The dialer map name (for example, 753-A) must match the device name entered in the **username password** command, which is configured in Step 3.

```
as5200(config)# interface dialer 1
as5200(config-if)# dialer map ip 172.16.254.49 name 753-A
```

Dialer maps are needed even to receive calls. If you do not want to place calls, do not enter a phone number at the end of the dialer map.

Depending on your ISDN provider's setup offering, you may need to set the line speed to 56 kbps for long distance ISDN calls. In this case, you enter this replacement command:

```
as5200(config-if)# dialer map ip 172.16.254.49 name 753-A speed 56
```

Likewise you enter the **set speed 56** command under the user profile on the Cisco 753.

**Step 2** If you want to accept dialin calls from a Cisco 1004, as shown in Figure 3-4, you must configure a dialer map to the Cisco 1004.

```
as5200(config-if)# dialer map ip 172.16.254.50 name 1004
as5200(config-if)# exit
as5200(config)#
```

As mentioned in Step 1, you may need to set the line speed to 56 kbps for long distance ISDN calls, depending on your service provider's setup offering.

- Step 3** In global configuration mode, configure a static route from the access server to the Cisco 753-A as shown in Figure 3-4.

```
as5200(config)# username 753-A password letmein
as5200(config)# ip route 172.16.253.1 255.255.255.0 172.16.254.49
```

To reach network 172.16.253.1 at netmask 255.255.255.0, the access server connects to the IP address 172.16.254.49, which is the access server's profile address configured on the Cisco 753-A router.



**Caution** The same password (for example, letmein) is entered in three places for successful authentication. It is entered at the **set ppp secret client** command on the Cisco 753-A, at the **set ppp secret host** command on the Cisco 753-A, and with the **username** global configuration command on the access server. This password is case sensitive on each device.

- Step 4** Configure a static route from the access server to the Cisco 1004:

```
as5200(config)# username 1004 password openup
as5200(config)# ip route 172.16.252.1 255.255.255.0 172.16.253.50
as5200(config)# exit
```

- Step 5** Write the new configuration to NVRAM:

```
as5200# copy running-config startup-config
#####[OK]
as5200#
```

The access server will startup with your configuration at the next power up.

# Enabling Remote IPX Users to Dial in to IPX Networks

To enable IPX clients to access network resources by dialing through the access server over ISDN, complete the following tasks (enter your own addresses where appropriate).

**Step 1** Enter the following commands:

```
as5200(config)# ipx routing
as5200(config)# interface loopback 0
as5200(config-if)# ipx network FEF EFE
as5200(config-if)# exit
as5200(config)# interface ethernet 0
as5200(config-if)# ipx network 123ABCD encapsulation SAP
as5200(config-if)# exit
as5200(config)# interface group-Async 1
as5200(config-if)# group-range 1 48
or, for E1 PRI
as5200(config-if)# group-range 1 60
Building configuration...

as5200(config-if)# ipx ppp-client Loopback 0
as5200(config-if)# exit
```

**Step 2** Create a dialer interface. This is the parent interface for all of the ISDN interfaces (this was set using the **dialer rotary-group 1** command in the IP configuration):

```
as5200(config)# interface dialer 1
as5200(config-if)# ipx unnumbered loopback 0
```

**Step 3** Create a dialer map for the single IPX network address that contains all the dial in users (for example, FEF EFE). The map for each IPX address differs and is activated by each dialin user's login sessions.

```
as5200(config-if)# dialer map ipx FEF EFE.0000.0c00.1234 name jordan
as5200(config-if)# dialer map ipx FEF EFE.0000.0c00.4567 name rodman
as5200(config-if)# dialer map ipx FEF EFE.0000.0c00.89AB name kemp
as5200(config-if)# exit
```

For IP configurations, dialer mapping is automatically constructed when the access server receives a user's name and address. However, when you use IPX configuration, you must statically configure each user name's IPX address.

**Step 4** Enable IPX packets to reset the idle timer:

```
as5200(config)# dialer-list 1 protocol ipx permit
as5200(config)# exit
```

**Step 5** This completes the configuration for IPX. Save the running configuration to start up configuration:

```
as5200# copy running-config startup-config
#####[OK]
as5200#
```

The access server will startup with your configuration at the next power up.

## Enabling Macintosh Users to Access AppleTalk Resources

To enable Macintosh clients to access network resources by dialing through the access server over ISDN, follow these steps (enter your own addresses where appropriate):

**Step 1** Enable AppleTalk routing and set the AppleTalk zone ATCP on network 2 (your network number and zones may differ):

```
as5200# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
as5200(config)# appletalk routing
as5200(config)# appletalk virtual-net 2 ATCP Zone
```

All users that dial in to the system will belong to the AppleTalk network 2 in the AppleTalk zone ATCP Zone. All the dialin users will look as though they are on a single network. Links will not have their own network numbers. This applies to configurations using PPP instead of ARAP encapsulation.

**Step 2** Set the AppleTalk cable range and the AppleTalk zone on the Ethernet:

```
as5200(config)# appletalk cable-range 1-1 1.120
as5200(config-if)# appletalk zone Ethernet
as5200(config-if)# exit
as5200(config)# exit
```

## Comprehensive Configuration for the Access Server

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**Step 3** This completes configuration for AppleTalk operation. Save the running configuration to startup configuration:

```
as5200# copy running-config startup-config
[OK]
as5200#
```

The access server will startup with your configuration at the next power up.

## Comprehensive Configuration for the Access Server

This section includes a complete start up configuration for the access server. This configuration includes a comprehensive setup for dialing in to IP, IPX, and AppleTalk networks.

### Configuring Security

The following configuration establishes a base security and local database:

```
aaa new-model
aaa authentication login default local
aaa authentication login console none
aaa authentication ppp default if-needed local
username jojackso password
username wmays password
username bruth password
username hwilliam password
!
```

### Setting the ISDN Switch Type

The following global configuration command sets the ISDN switch type:

```
isdn switch-type primary-5ess
```

## Configuring IP Dialin

The following commands configure the appropriate interfaces for IP dial in:

```
! T1 PRI controller configuration
```

```
controller T1 0
 framing esf
 linecode b8zs
 clock source line primary
 pri-group timeslots 1-24
!
controller T1 1
 framing esf
 linecode b8zs
 clock source line secondary
 pri-group timeslots 1-24
```

```
or
```

```
! E1 PRI controller configuration
```

```
controller E1 0
 framing crc4
 linecode hdb3
 clock source line primary
 pri-group timeslots 1-31
!
controller E1 1
 framing crc4
 linecode hdb3
 clock source line secondary
 pri-group timeslots 1-31
```

```
!
interface Serial0:23
! or, for E1 PRI
interface Serial0:30
 isdn incoming-voice modem
 dialer rotary-group 1
!
interface Serial1:23
! or, for E1 PRI
interface Serial1:30
```

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---

```
isdn incoming-voice modem
dialer rotary-group 1
!
interface Loopback0
 ip address 172.16.254.254 255.255.255.0
!
interface Ethernet0
 ip address 172.16.1.1 255.255.255.0
!
interface Group-Async1
 ip unnumbered Loopback0
 ip tcp header-compression passive
 encapsulation ppp
 async mode interactive
 peer default ip address pool default
 dialer-group 1
 ppp authentication chap pap default
 group-range 1 48
! or, for E1 PRI
 group-range 1 60
!
interface Dialer1
 ip unnumbered Loopback0
 encapsulation ppp
 peer default ip address pool default
 ip local pool default 172.16.254.1 172.16.254.48
! or, for E1 PRI
 ip local pool default 172.16.254.1 172.16.254.60
 dialer in-band
 dialer-group 1
 dialer idle-timeout 3600
 ppp multilink
 ppp authentication chap pap default
```

## Configuring Modem Lines

The following example configures modem lines 1 to 48:

```
line 1 48
! or, for E1 PRI
line 1 60
 autoselect during-login
 autoselect pppmodem InOut
 modem autoconfigure type microcom_hdms
```

```
transport input all
stopbits 1
rxspeed 57600 (64000 for E1 PRI)
txspeed 57600 (64000 for E1 PRI)
flowcontrol hardware
login local
```

### Assigning a Routing Protocol

The following commands configure enhanced IGRP:

```
as5200 eigrp 202
network 172.16.0.0
```

### Configuring a Dialin Pool, Domain Name, DNS Server, and NBNS Server

The following commands configure a range of IP addresses in an IP address pool, a domain name, and name servers:

```
ip domain-name cisco.com
ip name-server 172.16.99.99
!
async-bootp dns-server 172.16.10.100 172.16.39.67
async-bootp nbns-server 172.16.200.200 172.16.201.200
```

### Enabling IPX Dialin

The following commands enable IPX dial in:

```
dialer-list 1 protocol ip permit
ipx routing 0060.3ef1.6f74

interface Loopback0
 ipx network FEF EFE

interface Ethernet 0
 ipx network 123ABCD encapsulation SAP

interface Group-Async1
 group-range 1 48
! or, for E1 PRI
 group-range 1 60
```

## Comprehensive Configuration for the Access Server

---

```
ipx ppp-client Loopback0

interface Dialer1
 ipx unnumbered loopback 0
 dialer map ipx FEFEFE.0000.0c00.1234 name stock
 dialer map ipx FEFEFE.0000.0c00.4567 name john
 dialer map ipx FEFEFE.0000.0c00.89AB name cisco
 dialer-list 1 protocol ipx permit
```

## Configuring AppleTalk Dialin

The following commands enable users running PPP applications to dial in to an AppleTalk network:

```
appletalk routing
appletalk virtual-net 2 ATCP Zone
appletalk cable-range 1-1 1.120
appletalk zone Ethernet
```