C H A P T E R **4**

Using the Cisco Unified Videoconferencing 3545 Gateway

This section describes the following topics:

About Dialing Out to the ISDN Network via the Gateway

This section describes how to dial between IP and ISDN networks using the gateway.

Note References to the ISDN network refer also to the serial side of the serial gateway. The references to B-channels refer also to the equivalent bandwidth for the serial gateway. To obtain the actual serial call rate, multiply the number of channels by 64 Kbps (56 Kbps for restricted calls).

When you dial out from an IP network to an ISDN network, you dial a service prefix followed by a string that usually includes the destination area code, the destination phone number and any required extra characters such as an asterisk (*), pound sign (#) or delimiter. The service prefix indicates that the call is to go through the gateway, and also indicates the properties of the call such as the call type or bandwidth requirements.

About Gateway Service Prefixes

Gateway services define different call types and bandwidths for IP network endpoints. The services are identified by service prefixes. The network administrator in charge of the H.323 network is responsible for defining services and informing users of available services. See the "About Gateway Services" section on page 3-42 for more information.

Note A service prefix should not be the same as the first digits of an IP endpoint phone number.

Dialing Example 1: Voice calls (PRI gateway and serial gateway only)

The number string 912015294300 is a voice call from an IP network terminal to an H.323 endpoint on another IP network or to a terminal on the ISDN network. This number string consists of:

- 9—The service prefix for a voice call.

- 12015294300—The destination phone number including the area code.

Dialing Example 2: Voice calls with the auto bit-rate setting service (PRI gateway and serial gateway only)

The number string 712015294300 is a voice call from an IP network terminal to an H.323 endpoint on another IP network or to a terminal on the ISDN network using a service with the bit rate setting of auto. This number string consists of:

- 7—The auto bit-rate setting service prefix for a voice call.

- 12015294300—The destination phone number including the area code.

The bit rate of the call is fixed according to the setting in the source IP network terminal.

Dialing Example 3: 1B video calls

The number string 821816455318 is a 1B video call from an IP network terminal to an H.323 endpoint on another IP network or to a terminal on the ISDN network. This number string consists of:

- 82—The service prefix for a 1B video call.

- 1816455318—The destination phone number including the area code.

About Second Number Delimiters

Note   Second number delimiters are available in PRI gateways only.

To dial an outgoing 2B call, you dial the service prefix for 1B calls and the two B channel phone numbers. Because some H.323 endpoints do not support dialing long number strings or two phone numbers, you can use a delimiter to indicate to the gateway the end of one number and the beginning of the other. See the "Configuring Outgoing Call Delimiters" section on page 3-21 for more information.

Dialing Example 4: 2B video calls

The number string 821816455318* is a 2B video call from an IP network terminal to an H.323 endpoint on another IP network or to a terminal on the ISDN network. Both B channels have the same number. This number string consists of:

- 82—The service prefix for a 2B video call.

- 1816455318—The destination phone number including the area code.

- *—The second number delimiter. The second number delimiter tells the gateway to dial the destination phone number a second time.

Dialing Example 5: 2B video calls

The number string 821816455318*1816455319 is a 2B video call from an IP network terminal to an H.323 endpoint on another IP network or to a terminal on the ISDN network. The B channels have different numbers (or your endpoint does not have two phone number fields). This number string consists of:

- 82—The service prefix for a 2B video call.

- 1816455318—The destination phone number including the area code.

- *—The second number delimiter.

- 1816455319—The second B channel number including the area code.

### Dialing Example 6: 6B bonded high quality video calls

The number string 867455001 is a 6B bonded high quality video call from an IP network terminal to an ISDN network terminal. This number string consists of:

- 86—The service prefix for 6B bonded calls.
- 7455001—The phone number of the destination terminal.

Dialing Example 7: IP-ISDN-IP direct dialing—Gateway supports TCS4

The number string 9825645000^3333 is a call from an IP network endpoint (Endpoint 1) to an IP network endpoint in another zone (Endpoint 2), through a public ISDN network, as shown in Figure 4-1. Gateway A dials using TCS4, while Gateway B is set to receive calls in TCS4 mode.

Figure 4-1   TCS4 Dialing
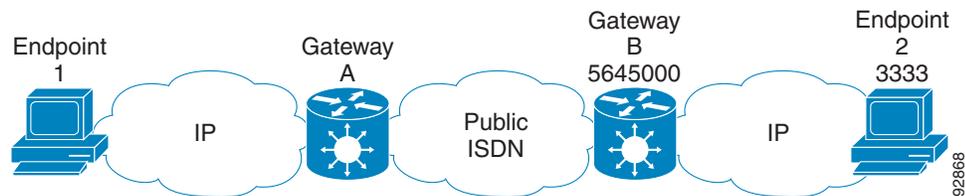
This number string consists of:

- 9—The voice call service prefix in Gateway A in Zone A.
- 82—The service prefix for a 2B video call in Gateway A in Zone A.
- 5645000—The number of the destination Gateway B on the public ISDN network.
- ^—The TCS4 delimiter configured in Gateway A.
- 3333—The E.164 number of the destination IP Endpoint 2.

About Dialing In to the IP Network via the Gateway

The gateway is responsible for routing incoming calls to the requested H.323 endpoints on the IP network.

When a terminal or phone on the ISDN network wants to reach an IP endpoint, it has to dial at least one of the phone numbers assigned to the ISDN line connected to the gateway PRI ISDN port.

About Incoming Call Routing

When a call originating on the ISDN or serial network reaches the gateway, the gateway routes it to an IP network endpoint. This is achieved through one of several incoming call routing methods that the gateway supports. You can enable any number of routing methods for each port, but at least one method must be enabled for incoming calls to be routed through that port. The gateway routes an incoming call from the ISDN or serial network according to the routing methods enabled for the ISDN or serial port, following this order of priority: DID →TCS4 →IVR→Default Extension.

If a routing method fails, the gateway automatically tries to route the call through the next routing method in line. If all methods fail, the call is rejected. The call might also be rejected if the gateway routes the call to an endpoint that is busy or not available.

Table 4-1 explains the routing methods.

Table 4-1   Routing Methods

Routing Method	Explanation
DID	The gateway supports two forms of DID (Direct Inward Dialing): Multiple Subscriber Network (MSN) and sub-addressing.
	• MSN—The telephone company assigns a group of phone numbers to a particular ISDN line by the telephone company. PRI ISDN lines are usually assigned multiple numbers in the US and in Europe.
	When MSN is used, an ISDN terminal or phone can dial directly to an IP network endpoint. The call is still routed through the gateway but the gateway is transparent to the person dialing from an ISDN terminal.
	An H.323 endpoint on the IP network registers with the gatekeeper using one of the MSN numbers. When an ISDN terminal dials the MSN number, the call routes through the gateway ISDN port connected to the line with the MSN service to the endpoint that registered using the requested number.
	• Sub-addressing (PRI gateways only)—Sub-addressing is a one-stage DID dialing mechanism in which a phone sends two numbers. One number is for routing on the circuit switched network. The other number is forwarded to the gateway inside a Q.931 sub-addressing information element for IP address resolution by the gatekeeper.
	Sub-addressing can also be used for implementing ISDN fallback when not enough bandwidth is available for routing an IP-oriented call over IP. Implementing ISDN fallback requires the support of the gatekeeper.
TCS4	TCS4 is a special routing method for incoming H.320 video calls. TCS4 allows direct inward dialing to an endpoint on the IP network through the gateway when DID is not available. H.323 endpoints on the IP network register with the gatekeeper using extension numbers. When an ISDN terminal dials one of the gateway phone numbers followed by a TCS4 extension, the call is routed directly to the corresponding IP endpoint registered with that extension.

Table 4-1   Routing Methods

Routing Method	Explanation
IVR	IVR (Interactive Voice Response) is a widely deployed automated call answering system that responds with a voice menu allowing you to make choices for routing the call. The gateway can operate with its own internal IVR or an external IVR located in another device.
	When an incoming call activates the IVR system, it initiates an interactive session with the caller. The caller directs the call to its destination endpoint by responding with the dialer to prompts from the IVR system. If the caller appropriately enters the destination endpoint phone number, the IVR connects the caller to the requested IP network endpoint. Otherwise, the call can be forwarded to an operator. The IVR call transfer is enabled by a proprietary mechanism that the gateway uses to transfer a call from one IP network endpoint to another. The gateway supports call transfer for incoming calls from the ISDN network to an IP network endpoint whether you are using a Cisco gatekeeper or a third-party gatekeeper. The gateway internal IVR can handle up to 30 simultaneous incoming calls.
	With the gateway, you can define an endpoint on the IP network as an IVR operator (see the "Configuring IVR Settings" section on page 3-20 for more information). This provides an alternative if the requested destination endpoint is not available.
Default Extension	Any endpoint on the IP network can be defined as a default destination for calls using the default extension number (including the gateway prefix plus the H.320 or PSTN phone number) that is registered with the gatekeeper. All calls not routed through one of the above incoming call routing methods are forwarded to this endpoint.

About the IVR Operator

You can define an IP network endpoint as an IVR operator and configure the gateway ports accordingly. See the "Configuring IVR Settings" section on page 3-20 for more information.

Dialing Example 8: Direct dialing to an IP network endpoint (gateway supports DID)

The number string 5645001 is a call from an ISDN network terminal to an IP network endpoint. This number string consists of:

- 5645001—The destination endpoint phone number.

The call is routed to the requested endpoint according to its registration identity in the gatekeeper.

Dialing Example 9: Direct dialing to an IP network endpoint (gateway supports TCS4 but not DID)

The number string 5645000^5776 is a call from an ISDN terminal to an IP network endpoint. The dialing endpoint must also support TCS4. This number string consists of:

- 5645000—The gateway phone number.
- ^—The TCS4 delimiter of the dialing endpoint (if required).
- 5776—The extension number of the requested endpoint.

Note   TCS4 only routes H.320 video calls.

About Dialing through the IVR

When the gateway does not support DID or TCS4, you can reach an endpoint using the Interactive Voice Response (IVR) routing mechanism.

When IVR is enabled, you are answered by a recorded message prompting you to enter the destination endpoint phone number followed by the pound (#) sign. If you enter the number of an endpoint that is online and currently not busy, the IVR connects the call to the requested endpoint.

Dialing Example 10: Dialing to an IP network endpoint through the IVR

The number string 5645000 <wait for the IVR to respond> 5561# is a call through an IVR routing mechanism. This number string consists of:

- 5645000—The gateway phone number.
- 5561—The number of the requested endpoint.
- #—This is required by the IVR for call completion.

About Dialing Indirectly through an Operator

If you do not dial the number of a destination endpoint when requested to do so by the IVR, the IVR automatically passes you to an operator. You can define any endpoint on the IP network as the IVR operator (see the "Configuring IVR Settings" section on page 3-20 for more information).

When IVR is enabled, you are answered by a recorded message prompting you to enter the destination endpoint phone number. If you do not know the destination endpoint number, the IVR routes the call from the gateway using ISDN to the IP network endpoint that is defined as the IVR operator.

Dialing Example 11: Dialing to an IP network endpoint through an operator

The number string 5645000 <wait for the IVR to respond>* is a call to an IP network through an IVR operator. This number string consists of:

- 5645000—The gateway phone number.
- *—This character is optional.