

# Understanding Inbound and Outbound Dial Peers on Cisco IOS Platforms

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## Introduction

This document describes the differences between inbound and outbound dial-peers and call legs. Also, this document stresses the importance of *inbound* dial peer(s) that match when you use non-default services, applications, and/or capabilities to setup and complete voice calls.

## Prerequisites

### Requirements

Readers of this document need to have knowledge of [Understanding Dial Peers and Call Legs on Cisco IOS® Platforms](#).

### Components Used

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command. This document is not restricted to specific software and hardware versions.

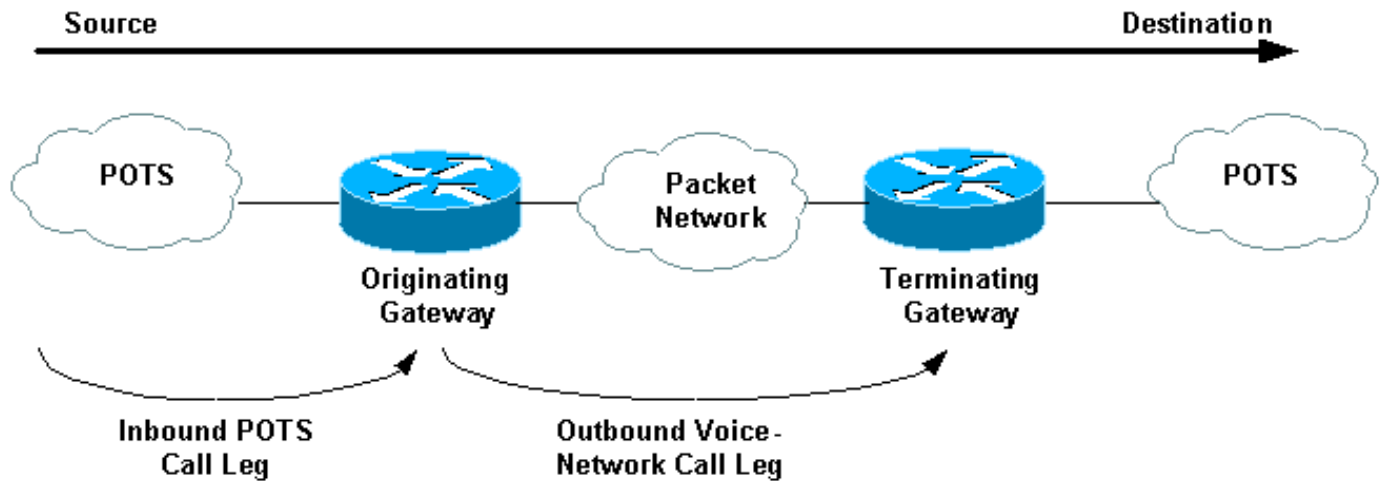
### Conventions

For more information on document conventions, refer to the [Cisco Technical Tips Conventions](#).

## Inbound and Outbound Dial Peers and Call Legs

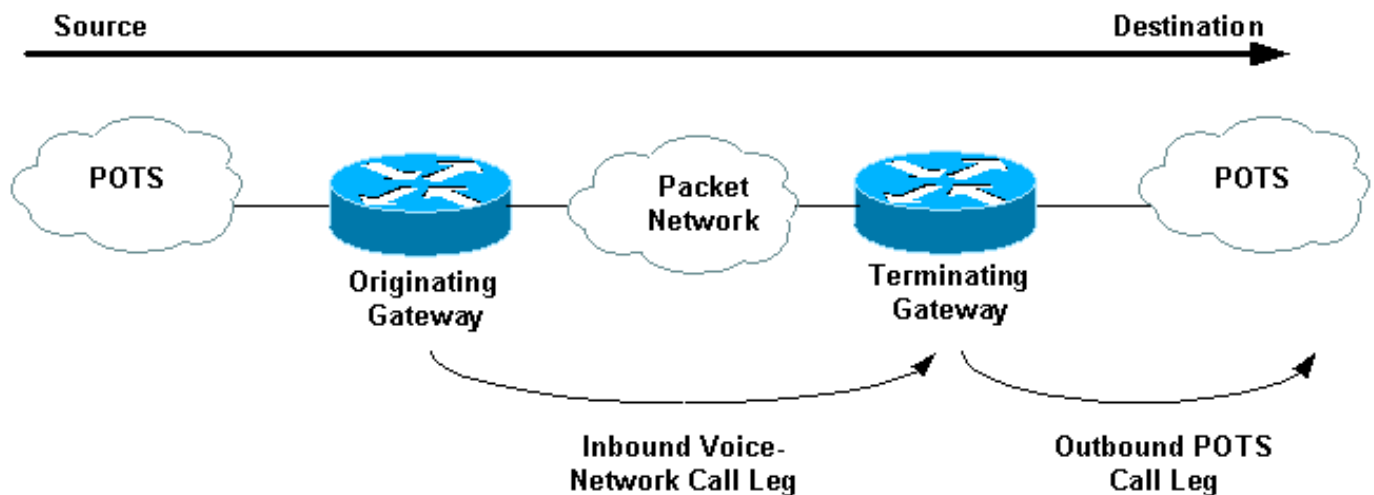
Dial peers are used for both *inbound* and *outbound* call legs. It is important to remember that these terms are defined from the perspective of the router/gateway. An *inbound* call leg originates when an incoming call comes into the router or gateway. An *outbound* call leg originates when a call is placed or bridged from the router/gateway.

Figure 1. Call Legs from the Perspective of the Originating Router/Gateway



For inbound calls from a plain old telephone service (POTS) interface that are destined for the packet network, the originating router/gateway matches an *inbound* POTS dial peer for the *inbound call leg* first. Next, the originating router/gateway creates an outbound Voice-Network dial peer such as Voice over IP (VoIP) or Voice over Frame relay (VoFR) for the *outbound call leg*. After this, the router/gateway bridges the two call legs.

Figure 2. Call Legs from the Perspective of the Terminating Router/Gateway



For inbound calls from a Voice Network interface that are destined for a POTS interface, the terminating router/gateway matches an *inbound* Voice Network dial peer for the *inbound call leg*. Next, an outbound POTS dial peer is created for the *outbound call leg*.

## Importance of Inbound Dial Peers

A common misunderstanding with voice dial peers is that they are only configured for *outbound* functionality, that is, to map a dial string to a remote network device (with the Cisco IOS commands **destination-pattern** and **session target**) or a POTS voice port (with the Cisco IOS commands **destination-pattern** and **port**). However, dial peers need to be configured for *inbound* functionality when you deal with scenarios where non-default services, applications, and/or capabilities are present.

On *inbound* POTS call legs received at the originating router/gateway, some non-default services and applications of incoming calls include:

- Direct-inward-dial (DID). For more information on this subject, refer to [Understanding Direct-Inward-Dial \(DID\) on Cisco IOS Digital \(T1/E1\) Interfaces](#).
- Tool Command Language (TCL) Based Applications: Interactive Voice Response (IVR), VoIP Session Initiation Protocol (SIP) transfer, On-Ramp Faxing (in the context of store and forward fax).

When you use such services or applications, it is important to ensure that the correct *inbound* POTS dial peer configured with the appropriate service or application is matched. For more information, refer to [Understanding Inbound and Outbound Dial Peers Matching on IOS Platforms](#).

When non-default Voice Network capabilities or TCL applications are requested by the originating router/gateway, the terminating router/gateway must match those capabilities and applications configured with an *inbound* Voice Network dial peer. If the Cisco IOS Software is unable to match a non-default configured *inbound* dial peer, the software uses an internally defined default dial peer to match the *inbound* voice calls. The call setup can fail if the incoming call leg has non-default capabilities, services, or applications, and is matched to a default dial peer.

Default Voice-Network capabilities include:

- codec g729r8 (payload 20 bytes)
- vad enable
- dtmf-relay disable
- fax-relay disable
- fax rate voice
- req-qos best-effort
- acc-qos best-effort
- huntstop disabled
- preference 0
- playout-delay 40 ms
- register E.164 number with GK
- digit-strip enabled
- session protocol cisco (for H.323).

**Note:** Default capabilities are not displayed in the router/gateway IOS configuration output. Issue the command **show dial-peer voice number** in order to view the configured capabilities, services, and applications on POTS and Voice Network dial peers.

**Note:** The default DSCP for voice is ef codepoint 101110 (RFC 2598) and the default DSCP for signaling is af31 codepoint 011010 (RFC 2597). The default dial-peer, PID 0, does not mark packets to DSCP 0. All voice packets on the routers are marked by default (can be overridden by the dial-peer), signaling with AF31 and media with EF. Calls that match the default dial-peer 0 should also have this behavior.

For more information and a practical example, refer to the case study in [Understanding Inbound and Outbound Dial Peers Matching on IOS Platforms](#).