



## Preface

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This preface describes the purpose, intended audience, organization, and conventions for the *Cisco IP Telephony Network Design Guide*.

## Purpose

This document serves as an implementation guide for Cisco AVVID (Architecture for Voice, Video and Integrated Data) networks based on Cisco CallManager Release 3.0(5). With such a high level of industry interest regarding IP telephony, customers are aggressively pursuing Cisco solutions for both large and small networks. Solutions based on Cisco CallManager Release 3.0(5) allow Cisco to deliver large-scale IP telephony systems with many capabilities.

However, it is important to ensure that these systems fit successfully within a set of boundaries. This document serves as a guide to all aspects of designing Cisco AVVID networks, and includes working configurations. The many new hardware and software capabilities in Cisco CallManager Release 3.0(5) are covered in detail in the various solutions and deployment models. Important components such as minimum Cisco IOS release requirements and recommended platforms are noted for each model.

This document will be updated as the Cisco AVVID solution set grows with subsequent releases of Cisco CallManager.

## Audience

This guide is intended for systems engineers and others responsible for designing Cisco AVVID networks based on Cisco CallManager Release 3.0(5).



### Caution

The design guidelines in this document are based on the best currently available knowledge about the functionality and operation of the Cisco AVVID components. The information in this document is subject to change without notice.

## Organization

Following are the chapters of this guide and the subjects they address:

Chapter	Title	Description
Chapter 1	Introduction	Gives a high-level overview of each Cisco AVVID deployment model and defines the boundaries for these designs.
Chapter 2	Campus Infrastructure Considerations	Discusses issues to consider when preparing a LAN infrastructure for a Cisco AVVID solution.
Chapter 3	Cisco CallManager Clusters	Discusses the concept, provisioning, and configuration of Cisco CallManager clusters.
Chapter 4	Gateway Selection	Discusses issues concerning the selection of gateways for connecting an IP telephony network to the PSTN or to legacy PBX and key systems.
Chapter 5	Dial Plan Architecture and Configuration	Discusses the architecture and operation of the Cisco CallManager dial plan and provides design recommendations for campus environments.
Chapter 6	Multisite WAN with Distributed Call Processing	Provides design guidelines for multi-site WAN systems using Cisco CallManager Release 3.0(5) for distributed call processing.

Chapter	Title	Description
Chapter 7	Multisite WAN with Centralized Call Processing	Provides design guidelines for multi-site WAN systems using Cisco CallManager Release 3.0(5) for centralized call processing.
Chapter 8	Quality of Service	Addresses the QoS requirements for Cisco AVVID implementations over the enterprise WAN.
Chapter 9	Catalyst DSP Provisioning	Describes the Catalyst digital signal processor (DSP) resources and discusses how to provision these resources.
Chapter 10	Migrating to an IP Telephony Network	Explains how an enterprise can migrate from a conventional PBX and its adjunct systems (principally voice messaging) to a Cisco AVVID network.
Chapter 11	Network Management	Introduces features of CiscoWorks2000 and Remote Serviceability for Cisco CallManager that provide network management capabilities for Cisco AVVID networks.

## Revision History

The following revisions have been made to this document:

Revision Date	Major Changes Since Previous Edition
12/08/00	<ul style="list-style-type: none"><li>• Added Chapter 11 on network management.</li><li>• Revised gatekeeper information in Chapter 6.</li></ul>
11/22/00	<ul style="list-style-type: none"><li>• Revised document for Cisco CallManager Release 3.0(5).</li><li>• Updated details of campus infrastructure design in Chapter 2.</li><li>• Revised bandwidth requirements for inter-cluster calls in Chapter 3.</li><li>• Updated gateway information in Chapter 4.</li><li>• Added gatekeeper information to Chapter 5.</li><li>• Updated details of call admission control and gatekeepers in Chapter 6.</li><li>• Revised major portions of the Quality of Service (QoS) information in Chapter 8.</li><li>• Updated details of Catalyst DSP provisioning in Chapter 9.</li><li>• Removed the chapter on Cisco uOne from this book. This information will be covered in a separate document.</li><li>• Updated migration information in Chapter 10.</li></ul>
06/30/00	<ul style="list-style-type: none"><li>• Reformatted document to allow for online display.</li><li>• Updated details of cluster provisioning in Chapter 3.</li><li>• Updated details of Catalyst DSP provisioning in Chapter 9.</li></ul>

# Conventions

This document uses the following conventions:

Convention	Description
<b>boldface font</b>	Commands and keywords are in <b>boldface</b> .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[ ]	Elements in square brackets are optional.
{ x   y   z }	Alternative keywords are grouped in braces and separated by vertical bars.
[ x   y   z ]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
screen font	Terminal sessions and information the system displays are in <i>screen font</i> .
<b>boldface screen font</b>	Information you must enter is in <b>boldface screen font</b> .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .
→	This pointer highlights an important line of text in an example.
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords, are in angle brackets.

Notes use the following conventions:



**Note**

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Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

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Timesavers use the following conventions:



**Timesaver**

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Means *the described action saves time*. You can save time by performing the action described in the paragraph.

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Tips use the following conventions:



**Tips**

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Means *the information contains useful tips*.

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Cautions use the following conventions:



**Caution**

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Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

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Warnings use the following conventions:



**Warning**

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**This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and familiar with standard practices for preventing accidents.**

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## Additional Information

This section contains references to documents that provide additional information on subjects covered in this guide.

- High availability design:
  - [http://www.cisco.com/warp/partner/synchronicd/cc/sol/mkt/ent/ndsgn/highd\\_wp.htm](http://www.cisco.com/warp/partner/synchronicd/cc/sol/mkt/ent/ndsgn/highd_wp.htm)
  - <http://www.zdnet.com/zdtag/whitepaper/campuslan.pdf>
- Power protection:
  - <http://www.apcc.com/go/machine/cisco/3a.cfm>
- Simple Mail Transfer Protocol (SMTP):
  - <http://www.cisco.com/univercd/cc/td/doc/product/software/ioss390/ios390ug/ugsmtmp.htm>
- Internet Message Access Protocol (IMAP):
  - <http://www.imap.org/whatisIMAP.html>
- Lightweight Directory Access Protocol Version 3 (LDAPv3):
  - <http://www.critical-angle.com/ldapworld/ldapv3.html>
- Glossary of terms and acronyms:
  - <http://www.cisco.com/univercd/cc/td/doc/cisintwk/ita/index.htm>
  - <http://www.cisco.com/univercd/cc/td/doc/product/voice/index.htm>

## Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

### Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

### Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:  
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

## Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.  
Document Resource Connection  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

### Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online

technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

<http://www.cisco.com>

## Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

### Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

<http://www.cisco.com/register/>

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

<http://www.cisco.com/tac/caseopen>

## Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

