CHAPTER 2

# Deployment Models

**Last revised on: October 30, 2009**

This chapter introduces four basic design models used to deploy Cisco Unified Videoconferencing solutions:

- Campus Single Zone, page 2-2
- Campus Multi Zone, page 2-4
- WAN Single Zone, page 2-5
- WAN Multi Zone, page 2-7

This chapter provides basic design criteria and guidelines for selecting the correct deployment model. Subsequent chapters of this design guide describe in more detail each of the basic models introduced here.

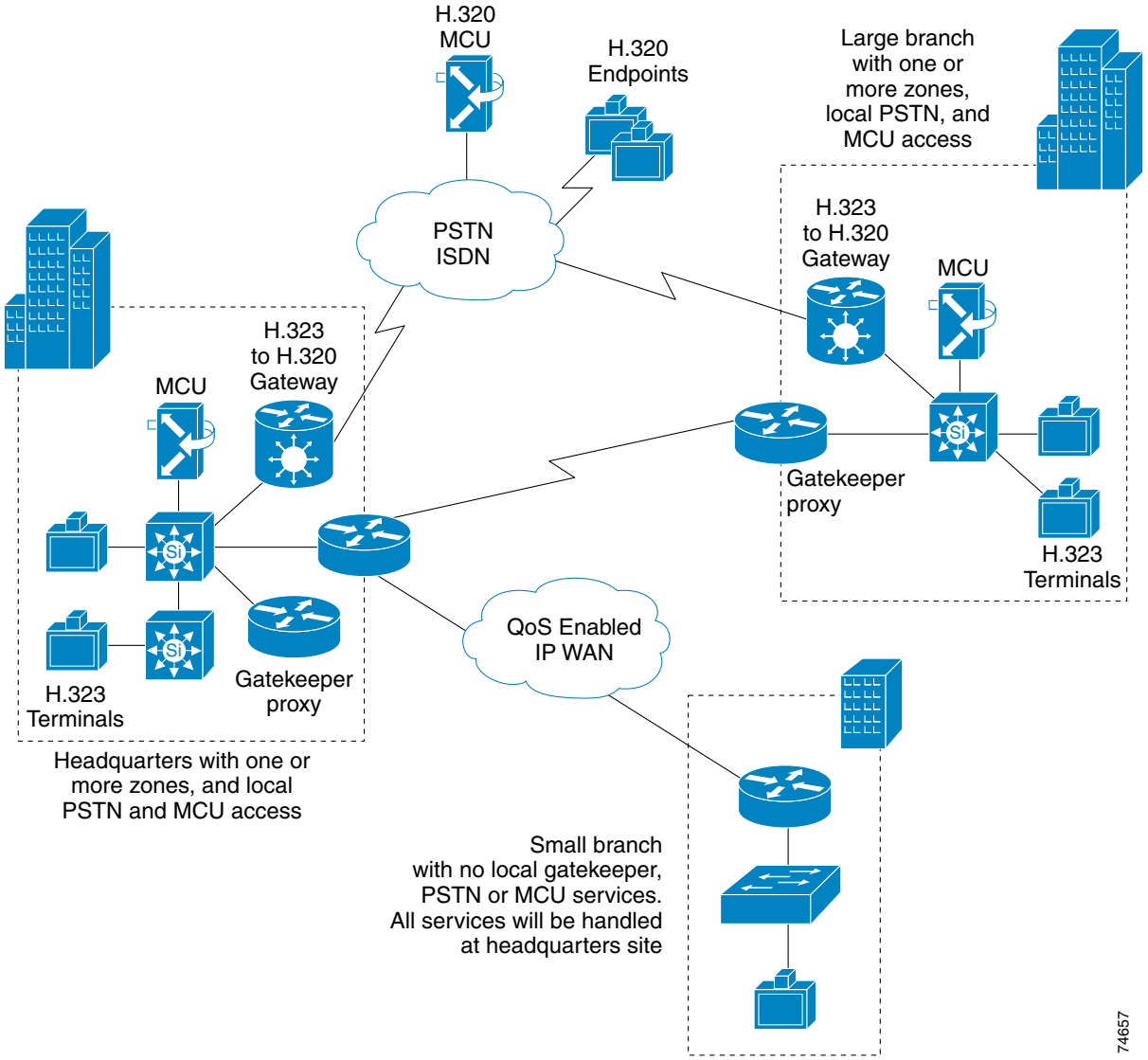
## Composite Deployment Model

Figure 2-1 illustrates a composite topology that encompasses all of the deployment models discussed in this guide. All designs discussed in this chapter are supported with currently shipping products.

The overall goals of a Cisco-based H.323 videoconferencing solution are as follows:

- Provide end-to-end IP video connectivity across the corporate infrastructure, with *business quality* transmission. Business quality video is defined as 30 frames per second operation with a minimum of Common Intermediate Format (CIF) resolution. Typically, this level of quality requires 384 kbps of application bandwidth for most video terminals.
- Provide quality of service (QoS) — high availability with low latency and jitter (delay variability).
- Reduce Integrated Services Digital Network (ISDN) costs by eliminating the need for ISDN attachments directly to video terminals.
- Allow Public Switched Telephone Network (PSTN) access to legacy H.320 systems through shared gateway resources.
- Support multipoint calling through Multipoint Control Units (MCUs).
- Conserve WAN bandwidth by distributing MCU and gateway resources across the IP infrastructure.
- Lower total cost of ownership for the video network by utilizing the existing IP infrastructure.
- Support manageability of multiple H.323 elements in a distributed network topology.

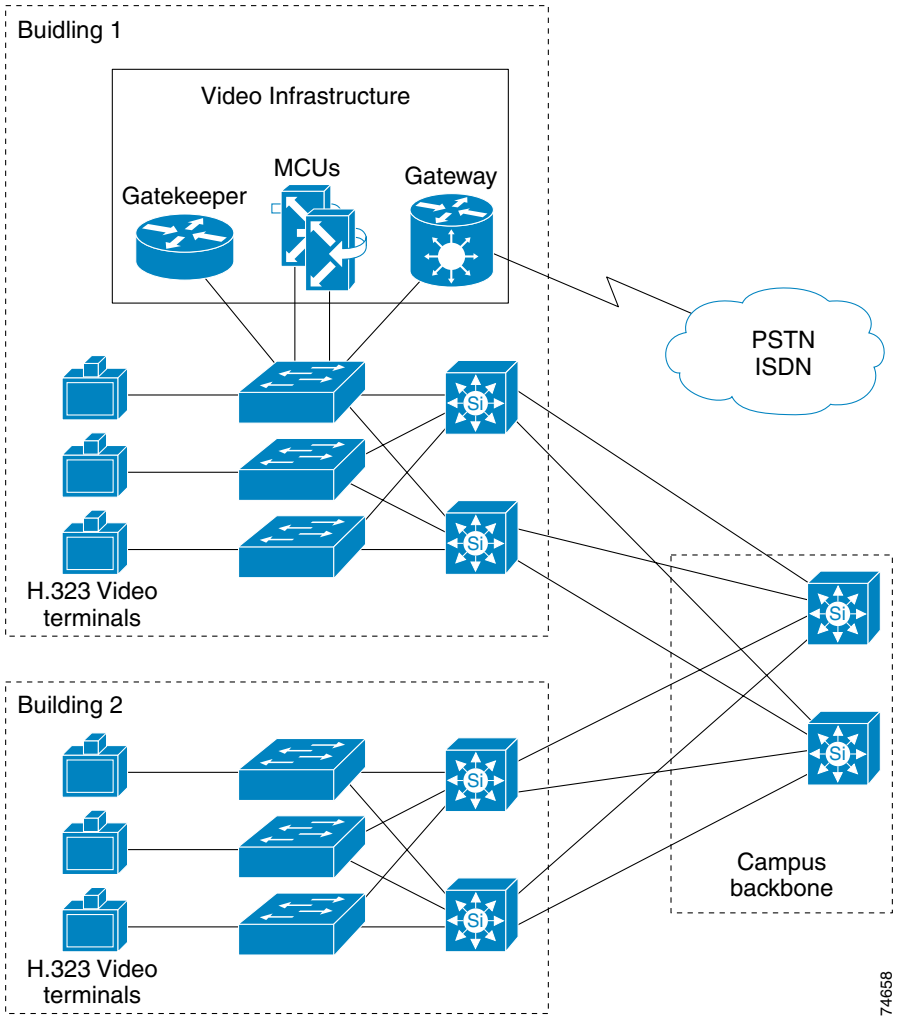
*Figure 2-1 Composite Deployment Model*




# Campus Single Zone

Figure 2-2 illustrates an H.323 network in a campus environment configured with a single zone. This is the most basic design model to implement and is used in pilot installs and smaller video environments.

*Figure 2-2 Campus Single Zone*




The campus single-zone deployment model has the following design characteristics:

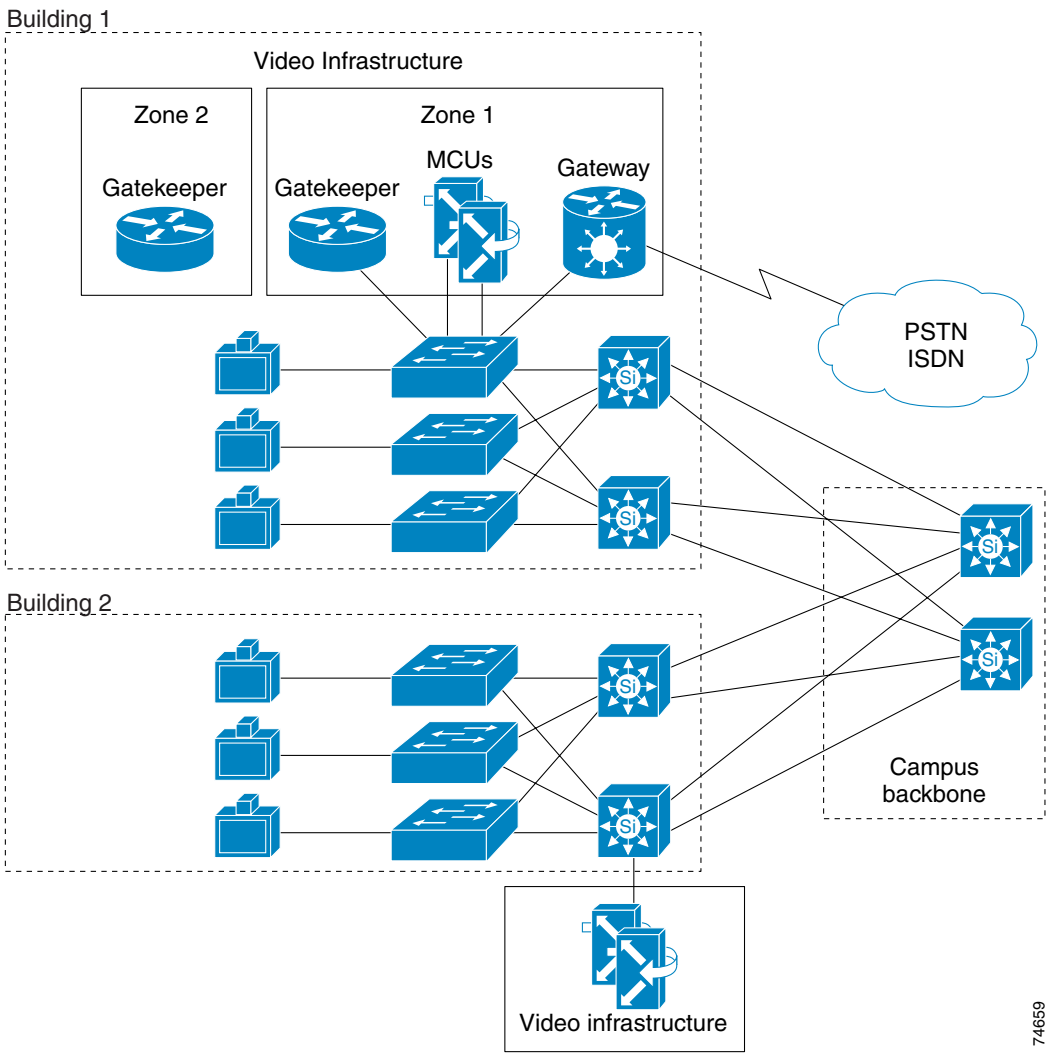
- A single gatekeeper supporting a single zone for H.323 video.
- All H.323 video users registered with the single gatekeeper. (For additional scalability details, refer to the Cisco IOS Gatekeeper information at www.cisco.com/go/cube.)
- Optional PSTN access available through the Cisco Unified Videoconferencing 3500 Series gateways.
- Optional multipoint conferencing available through the Cisco Unified Videoconferencing 3500 Series MCU.
- Zone bandwidth managed by the configured gatekeeper.
- All gateway and MCU services registered and managed by a single gatekeeper.
- Call routing between endpoints using fully qualified E.164 addresses or H.323-ID.

# Campus Multi Zone

Figure 2-3 illustrates a multi-zone H.323 video network in a campus environment. This model is most often implemented in an enterprise campus network. Depending on business function, administrators may choose to create different zones for security reasons. For example, company executives may be registered in a single zone that is separate from other users to allow administrators to limit access to those video terminals. In addition, as a video network grows, a single zone may not be manageable because of the number of users or the ability to manage network resources.

**Note** Multiple zones can be configured on a single router. If you configure multiple local zones on a single router, and MCUs and/or gateways are registered with the zones, you must add hopoff statements for each service prefix. If hopoffs are not added for each service prefix, the video terminal will not be able to access MCUs or gateways outside its local zone. See Routing Inter-Zone Calls Using Hopoff Statements, page 7-8, for more information.

***Figure 2-3 Campus Multi Zone***



The campus multi-zone deployment model has the following design characteristics:

- Multiple gatekeepers supporting multiple zones for H.323 video.
- H.323 endpoints register with one of the multiple gatekeepers. (For additional scalability details, refer to the Cisco IOS Gatekeeper information at www.cisco.com/go/cube.)
- Bandwidth management for each zone and between zones is controlled by configured gatekeepers.
- Optional PSTN access available through Cisco Unified Videoconferencing 3500 Series gateways.
- Gateway and MCU services are registered and managed across multiple gatekeepers.
- Gateway and MCU services may be distributed throughout the campus.
- H.323 users and services are segmented for security, bandwidth control, and resource allocation.
- Intra-zone and inter-zone call routing using fully qualified E.164 address or H.323-ID.

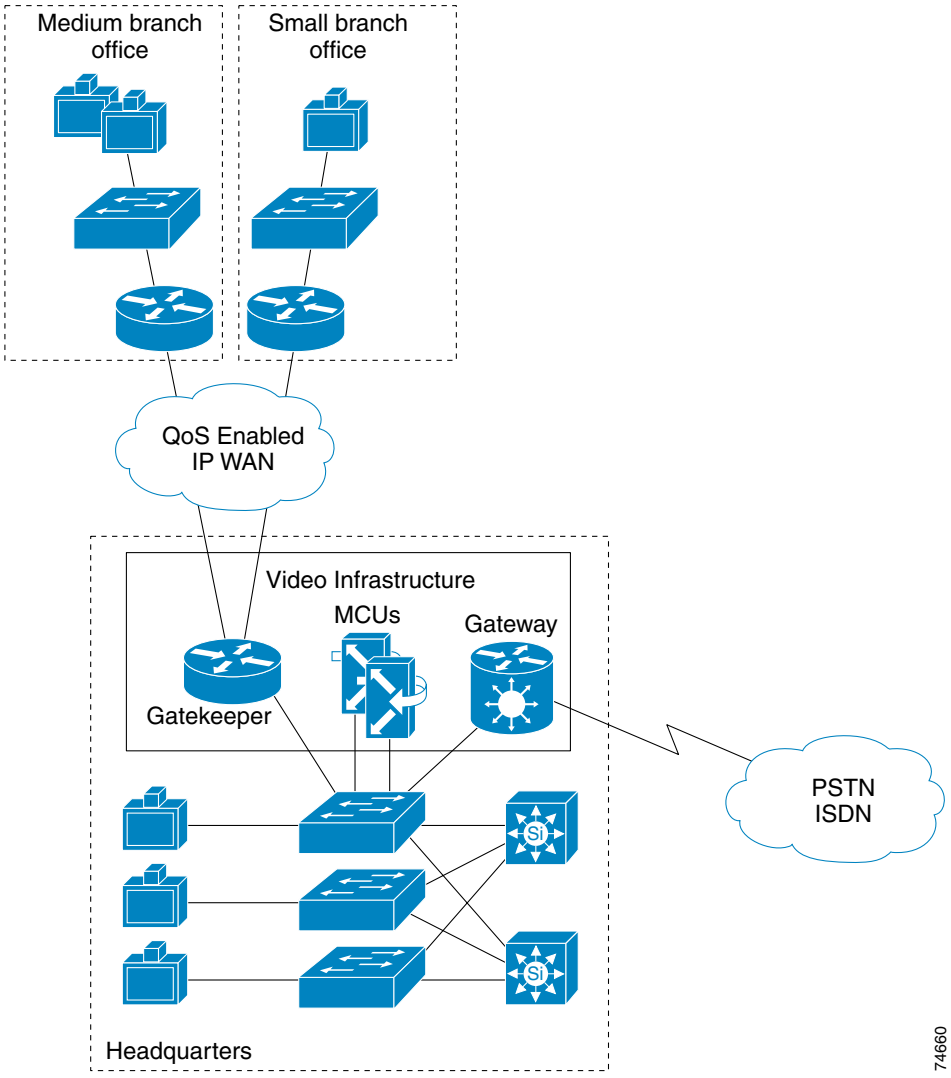
# WAN Single Zone

Figure 2-4 illustrates a single-zone H.323 video network in a WAN environment. This deployment model is used when remote sites have a small number of video endpoints, usually no more than one or two at each remote site on a T1 WAN link. From a management or economic standpoint, it might not make sense to create a zone at each remote site for one or two video terminals. Call admission control across the WAN is not usually an issue with only one or a few video terminals at each remote site, but it is an issue when the number of simultaneous calls across the WAN from remote endpoints exceeds the provisioned video bandwidth.

In the absence of a gatekeeper, implement quality of service on the WAN ports by using one of the following methods:

- Priority queuing on traffic classification IP Precedence 4, or Differentiated Services Code Point (DSCP) AF41
- Access control list (ACL) for each video terminal at the remote site, to direct the video streams to the appropriate priority queue

*Figure 2-4 WAN Single Zone*




The WAN single-zone deployment model has the following design characteristics:

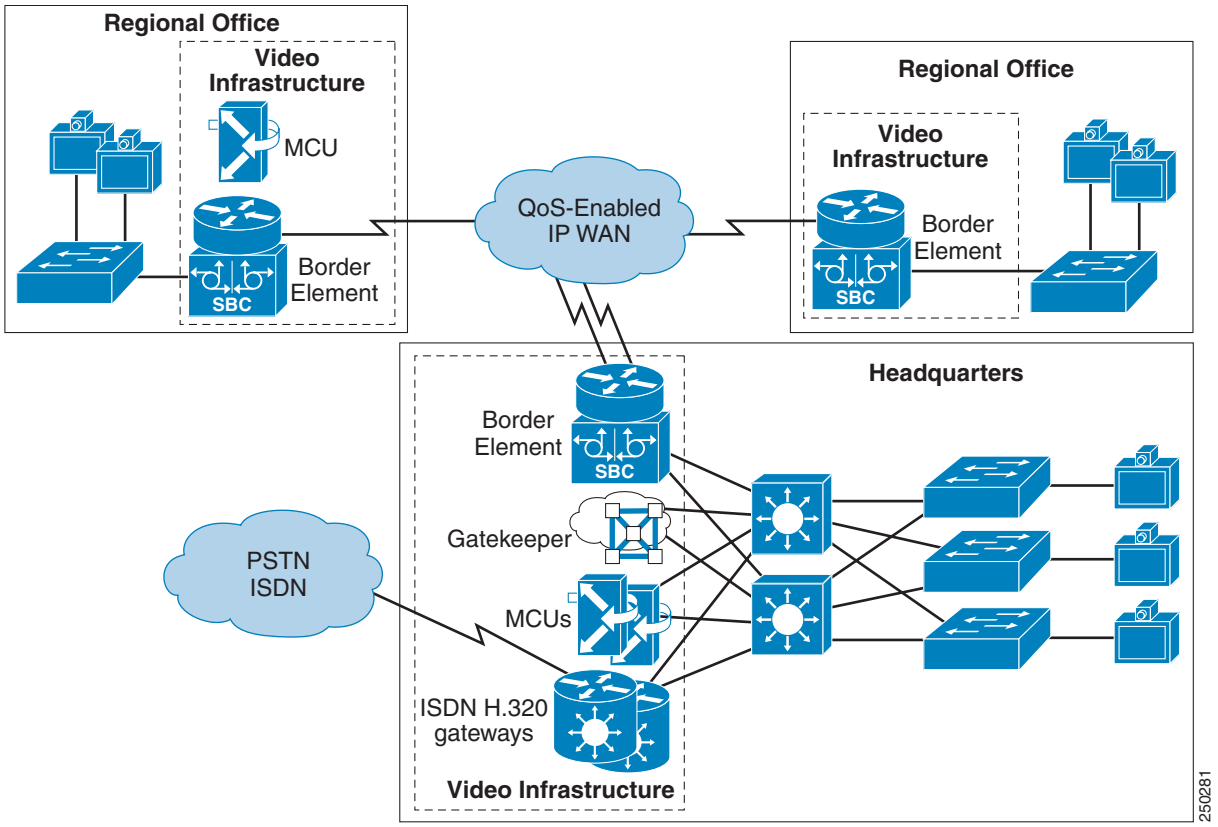
- A single gatekeeper supporting a single zone for H.323 video.
- All H.323 video users registered with the single gatekeeper. (For additional scalability details, refer to the Cisco IOS Gatekeeper information at www.cisco.com/go/cube.)
- Optional PSTN access available through Cisco Unified Videoconferencing 3500 Series gateways.
- Optional multipoint conferencing available through the Cisco Unified Videoconferencing 3500 Series MCU.
- H.323 video bandwidth managed by a single gatekeeper.
- All gateway and MCU services registered and managed by a single gatekeeper.
- WAN QoS, with priority queuing by means of traffic classification or ACL entries.
- Call routing between endpoints using fully qualified E.164 addresses or H.323-ID.

# WAN Multi Zone

Figure 2-5 illustrates a multi-zone H.323 network in a WAN environment. This deployment model is used in large enterprise, government, and educational networks. QoS can be implemented using either the border element and priority queuing (PQ) features in Cisco IOS software, traffic classification by the video terminals, or Layer 3 switches in conjunction with priority queuing on the WAN ports of the routers.

Creating multiple zones in a WAN environment allows administrators to manage network resources and assure video quality across low-speed WAN links. Call admission control is very important in a large WAN environment. With multiple zones enabled, the gatekeeper can manage the total amount of H.323 video bandwidth allowed across a particular network link. For example, you could limit the total H.323 video bandwidth across a T1 WAN link to 768 kbps, and the gatekeeper would then reject any call request that exceeds this limit of 768 kbps.

***Figure 2-5 WAN Multi Zone***




The WAN multi-zone deployment model has the following design characteristics:

- Multiple gatekeepers supporting multiple zones for H.323 video.
- H.323 endpoints and services registered with the assigned gatekeeper, usually at the local site.
- Optional PSTN access available through Cisco video gateways.
- Bandwidth management available in each zone and across the WAN, using the gatekeeper at each site.

- Distributed services available at larger branch sites to conserve bandwidth.
- Inter-zone and intra-zone call routing using fully qualified E.164 addresses or H.323-ID.
- Priority queuing (PQ) based on traffic classification implemented on the WAN ports, or a border element at each site with PQ on the WAN.