



Guidelines and Limitations

This section discusses guidelines and limitations that apply to call admission control, Layer 3 roaming, and device mobility.

Call Admission Control

Call admission control refers to a mechanism for managing bandwidth usage to maintain a certain level of quality for voice calls. In time-division multiplexing (TDM) systems, call admission control is accomplished by limiting the number of DS0 channels. In wired Cisco IP Telephony networks, call admission control is provided by an interaction between the regions and locations configured in Cisco CallManager and the zones configured in Cisco H.323 gatekeepers. These mechanisms address call admission control only for the initial setup of IP Telephony calls, but they do not address call admission control when the underlying network is changing for the IP Phone throughout the call, as is the case when a Cisco 7920 phone roams between two APs.

Although the Cisco APs send out QoS Basis Service Set (QBSS) information about the channel utilization, and although the Cisco 7920 phones can use this information to determine the best AP to associate with, this information does not guarantee that calls will retain proper QoS during a roam between APs. For example, if seven or eight active Cisco 7920 phones all roam into an area served by a single AP, they would exceed the guidelines for calls per AP, thus causing QoS to degrade.

If the channel utilization is above the allowed threshold, the call is not set up and the phone displays a network busy message. If the channel utilization of the candidate handoff AP is above the threshold, the Cisco 7920 phone remains associated to its current AP for as long as possible. If the current AP is lost (no probe response or beacons received), the Cisco 7920 phone switches to the candidate AP regardless of channel utilization. The user hears a beep before the handoff happens so that the user can move back toward the current AP or stop roaming and finish the conversation.

Designing Around the Lack of Layer 3 Roaming

For users that require roaming support for a large area (such as between floors of a buildings), large Layer 2 VLANs (spanning across access-layer switches) can be created to eliminate the need for Cisco 7920 phones to cross a Layer 3 boundary when roaming. Consider the following guidelines before deploying such large Layer 2 VLANs:

- Cisco does *not* recommend letting data VLANs span multiple access-layer switches.
- A Layer 2 VLAN should not cross a building boundary. If this situation is unavoidable, build an additional (overlaid) Layer 2 core to avoid creating instability and excessive traffic in the traditional Layer 3 core.
- Both the voice VLAN and the native VLAN on the AP will have to be trunked across the large Layer 2 VLAN to allow for both voice traffic and Inter-Access Point Protocol (IAPP) traffic between the APs.
- Having Layer 2 VLANs span multiple access-layer switches creates the possibility of spanning-tree loops (if configured incorrectly) and overall network instability. Designs using this model should be reviewed with your Cisco Systems Engineer (SE) before deployment.
- If you plan eventually to extend the Layer 3 network down to the access-layer switches, do *not* use this model for building large Layer 2 VLANs.

Device Mobility with Cisco CallManager

When a wireless IP phone becomes a mobile device and moves from one location to another, the following potential problems could arise:

- Inaccurate bandwidth accounting by Cisco CallManager locations-based call admission control
When a wireless IP phone roams from one location to another, there is currently no dynamic mechanism in Cisco CallManager to update the phone's location for purposes of call admission control. As a result, bandwidth can be subtracted from locations that are not actually using the bandwidth, and bandwidth can be used in other locations but not be taken into account by locations-based call admission control, thus causing oversubscription of the WAN bandwidth.
- Inappropriate codec selection
When a wireless IP phone roams from one location to another, there is currently no dynamic mechanism in Cisco CallManager to update its region and/or device pool for purposes of determining codec type. As a result, the wrong codec could be used throughout the telephony network.
- Inappropriate PSTN gateway selection
When a wireless IP phone roams from one location to another, there is currently no dynamic mechanism in Cisco CallManager to update the dial plan to specify the local PSTN gateway. As a result, the wireless IP phone might use a remote PSTN gateway for PSTN access. If the wireless IP phone places an emergency 911 call through this remote PSTN gateway, the emergency services will be directed to the location of the remote PSTN gateway and not to the location of the wireless IP phone that initiated the call.



Note

If Cisco Emergency Responder is deployed, then 911 calls will be routed to the local PSTN gateway and to the appropriate public safety answering point (PSAP). However, call admission control will still be unaware of the bandwidth used by this call, and the wrong codec might be selected.

To prevent these device mobility problems, you must manually reconfigure the following parameters of the wireless IP phone in Cisco CallManager each time the phone is moved from one physical location to another:

- Call admission control location
- Device pool and region
- Calling search space

These parameters must be adjusted appropriately for each location to which the wireless IP phone moves. Other parameters might have to be reconfigured manually if advanced or non-standard features are required. For example, the media resource group list (for conferencing, transcoding, and music-on-hold resources) and the automated alternate routing (AAR) calling search space and group (if AAR is configured) must be reconfigured to ensure that local media resources are used and that automated alternate call routing is appropriate for each location.

These device mobility issues affect both centralized and distributed call processing deployments.

