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The multinode topology consists of nodes, sites, and domains described as follows:

- Nodes-Individual Cisco Unified MeetingPlace application servers. Nodes are identified by a unique name in your system and can belong to only one site and one region. There are three types of nodes:
 - ◆ Meeting Director node-Contains the Meeting Director engine that includes a TSP proxy, Meeting Broker Director, Events Aggregator, iTSP server, and UserSync. A multinode system has one Primary Meeting Director node and one Secondary Meeting Director node for redundancy. If the Primary Meeting Director fails the Secondary Meeting Director becomes active. Cisco recommends that you configure your Meeting Directors as regional masters.
 - ◆ Conferencing node-Provides audio and video functionality. At least one conferencing node is required in order to host conferences. Additional conferencing nodes provide greater capacity assurance.
 - ◆ Combined node-Provides both Meeting Director and conferencing functionality.
- Sites-Logical groups of nodes that have similar functions and capabilities. For example, a site might contain nodes with high-definition video capabilities. Sites are identified by a unique name in your system and can belong to only one region. A site contains one to all of the nodes in a region. You can configure a preferred site to host all meetings for specific user profiles.
- Regions-Groups of one or more sites. Regions are identified by a unique name in your system. You can have up to four regions in your system.

Multinode deployments feature the Cisco WebEx user interface with Cisco Unified MeetingPlace audio and video conferencing.

- Using Cisco WebEx Node in a WebEx-scheduling deployment has certain limitations and is therefore not recommended. For a list of limitations, see the "Limitations and Restrictions" section of the Release Notes for Cisco Unified MeetingPlace Release 8.5 at http://www.cisco.com/en/US/products/sw/ps5664/ps5669/prod_release_notes_list.html.
- If you include Cisco WebEx Node as part of your deployment, you must have at least two nodes built (one as the primary and one as the secondary Meeting Director) before installing your first Cisco WebEx Node.

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About Meeting Director Nodes

Meeting Director nodes are the engines that make multinode configurations possible. Meeting Director nodes consist of several components including the following:

- TSP Proxy
- Meetings Broker Director
- Events Aggregator
- iTSP Server
- UserSync

Your multinode system must have two Meeting Director nodes. The Primary Meeting Director node is the only active Meeting Director unless a failover condition occurs. If a failure occurs, the Secondary Meeting Director, located on a separate node, assumes all Meeting Director tasks. The Primary Meeting Director node resumes performing all Meeting Director tasks when it comes back online. No user action is required.

The Primary Meeting Director node contains the primary TSP proxy. The Secondary Meeting Director node contains the secondary TSP proxy. The TSP proxy is the conduit for all WebEx traffic via the Cisco WebEx adapter. Each conferencing node on your system connects to the primary and secondary TSP proxy and all telephony-related events between WebEx and the MeetingPlace node flow through these channels. The secondary TSP Proxy is required in order to support failover of the TSP connection between MeetingPlace and WebEx.

The Meetings Broker layer distributes meetings between the nodes on your system. The Meetings Broker layer determines where each meeting is hosted and informs the other nodes on the system of the current meeting location. The Meetings Broker layer consists of two components: the Meetings Broker Agent and Meetings Broker Director (MBD).

The Events Aggregator supports system-wide events. The Events Aggregator consumes a limited set of events from each of the nodes in the system and distributes an aggregation of these events to each of the nodes in the system, providing a brief view on each node of the other nodes on the system.

The UserSync component synchronizes user profiles between WebEx and MeetingPlace.

The iTSP server component is required for cases in which there are Cisco WebEx nodes in the deployment.

Database replication allows the nodes of the system to share the same set of users and groups enabling users to attend meetings from any node in the system.

Using the components listed above, a Meeting Director node performs the following tasks:

- Connects each conferencing node to Cisco WebEx.
- Distributes meetings through your system to your sites and nodes using the Meetings Broker layer. If a node fails, all meetings on that node are moved to another node by the MBD.

Note: If a node fails, any meetings hosted on that node end. All meeting participants must manually rejoin the meeting when this occurs.

- Provides system wide meeting event notification.
- Provides support for Cisco WebEx nodes.
- Performs user synchronization between Cisco Unified MeetingPlace and Cisco WebEx.

When you configure your Meeting Director nodes ensure that

- You locate your Meeting Director nodes in your deployment where the majority of your conference traffic is.
- Network connectivity to your Meeting Director nodes is optimal.
- You configure your Meeting Director nodes on your most optimal systems if you are using different types of application servers in your deployment.

Combined nodes provide Meeting Director services in deployments with four or fewer nodes. Combined nodes also provide conferencing functionality that is described in the following section.

Cisco recommends that all nodes in a site should be either all configured as Express Media Server (EMS) or all Hardware Media Server (HMS). By using only one type of media server, you ensure a more consistent video quality regardless of which node a conference is hosted on. If a site contains a combination of EMS and HMS servers, the video quality will be based on the node that hosts the meeting.

About Conferencing Nodes

Conferencing nodes host meetings on your system. Multinode systems provide resiliency by allowing conferences to be hosted on other nodes in the system when an overflow condition occurs.

If your system has four or fewer nodes, your Meeting Director nodes are combined nodes that provide both Meeting Director and conferencing functionality. If your system has five or more nodes, you have a dedicated Primary and Secondary Meeting Director that only provide Meeting Director functionality. The remainder of the nodes on your system are conferencing nodes.

When you add a node to a system that has a Primary and Secondary Meeting Director, that node is automatically configured as a conferencing node.

The following are multinode Cisco Unified MeetingPlace audio system capacity restrictions:

- 14,400 G.711 audio ports
- 16 Cisco Unified MeetingPlace application server nodes consisting of two Meeting Director nodes and 14 conferencing nodes
- 1,200 ports per conferencing node (G.711) until the 14,400 limit is reached
- Maximum of four nodes per region
- Maximum of two sites per region (two sites with up to two nodes each or one site with up to four nodes)
- Maximum of four regions
- Up to 30 Dial-in numbers are supported, configured in Cisco Unified MeetingPlace that are sent to Cisco WebEx for email notifications and in session "Info" tab dial-in information. The Email template may be customized to add additional global numbers with a web link or linked document.

Note: Video and other audio codecs or SRTP will affect overall system capacity per node depending on what features are enabled.

The following are multinode Cisco WebEx system capacity restrictions:

- 14,400 web sessions (cloud and/or nodes)
- 2,000 internal web sessions (using Cisco WebEx Node for MCS)
 - ◆ Four Cisco WebEx nodes (500 sessions each)
- Cisco WebEx Node for ASR
 - ◆ Web conferencing per SPA (500 sessions each)
 - ◆ HQ Video/VoIP per SPA (capacity based on usage)

About Capacity

Your hardware platform determines the total capacity for your system. For example, two UCS B series blades can accommodate 1,200 G.711 ports (with G.729 less capacity). Licensing is based on the number of users (hosts) and not on the number of ports as it was in previous releases. If you install two UCS B series blades, you have the capacity for 2,400 non-redundant ports or 1,200 redundant ports.

Planning Your Call Manager Configuration

Configuring Cisco Unified Communications Manager for a multinode topology is a multi-task procedure. You must configure Cisco Unified Call Manager clusters for each region in your multinode deployment. For more information, refer to the "How to Configure Call Control on WebEx-Scheduled Deployments" section of the "Configuring Call Control" module in the Compiled Administration Documentation for Cisco Unified MeetingPlace Release 8.5.

Network Requirements

Following are network requirements for a multinode deployment.

The following network requirements do not include the media bandwidth:

- Audio RTP normal VoIP codec sizing is applicable.
- Video RTP normal video bandwidth sizing is applicable.

WAN bandwidth requirements:

- 4 Mbps minimum bandwidth for the WAN link between any two nodes. Nodes can be standalone Meeting Directors, root nodes, or leaf nodes.

Two data centers with WAN and two servers in each DC requires 4 Mbps.

RTT latency requirements:

- 200 ms or less RTT maximum if you expect approximately one minute for Primary Meeting Director to Secondary Meeting Director failover to occur.
- Adding new nodes requires maximum latency of 200 ms RTT or less (there is a timeout after 30 minutes).

DNS requirements:

- All Meeting Director nodes, conferencing nodes, and Cisco WebEx node FQDNs are required for DNS resolution between all servers.
- Make sure you do not have multiple names to IP addresses.
- Reverse IP lookup is required.
- Classless DNS is not supported.

Customer Network to WebEx Cloud Requirements

- Meeting Director to WebEx cloud must be able to establish connections outbound TCP 443 only to the internet (only SOCKS proxy is supported).
 - ◆ Bandwidth for TSP API and user profile synchronization is minimal.
- WebEx Node for ASR or MCS must be able to establish connections outbound TCP 443 only to the internet (no web proxy supported).
 - ◆ Bandwidth is dependent on the total number of ?external? meetings with data sharing in progress and what is being shared affects bandwidth used. Internal Meetings do not have any bandwidth impact to the WebEx Collaboration cloud.

Determining Your Multinode Topology

When you configure your multinode system, you must configure two Meeting Directors or combined nodes to ensure that you have a Secondary Meeting Director in the event a failure occurs on the Primary Meeting Director.

You must have one or more nodes that can host conferences. These nodes will either be combined nodes or conferencing nodes depending on the number of nodes in your deployment. In any deployment the first two nodes you configure are your Primary and Secondary Meeting Director nodes. Any additional nodes you add to your system will automatically be configured as conferencing nodes unless the Primary or Secondary Meeting Director nodes are not present.

Your multinode topology depends on your conferencing needs and the locations of your nodes. If you need more capacity for conferences, you must configure more conferencing nodes.

Table 1: Recommended System Node Compositions

Number of Nodes	System Composition
1	One application server in combined mode
2	Two application servers in combined mode
3-4	Two application servers in combined mode and the remaining servers in conferencing mode
5 or more	Two application servers in Meeting Director mode and the remaining servers in conferencing mode

These configurations represent typical multinode topologies and are described in the following sections:

- [One Region with Two Nodes](#)
- [One Region with Two Nodes with WebEx Node for ASR](#)
- [One Region with Three Nodes](#)
- [Two Regions with Two Nodes Each](#)

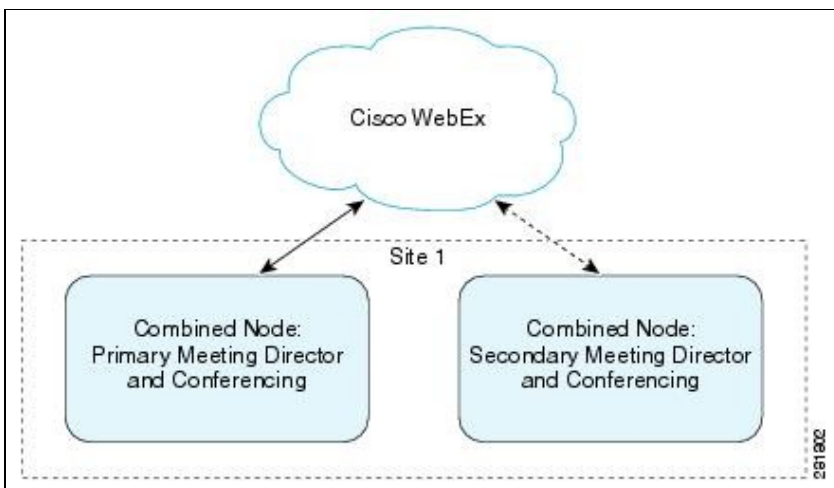
- Two Regions with Three Nodes Each
- Large-Scale System with Multiple Regions

One Region with Two Nodes

You install two Cisco Unified MeetingPlace nodes in one site located in one region. Configure your two nodes as combined nodes. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the Secondary Meeting Director occurs.

Since you configured your nodes as combined nodes, they also provide conferencing features. In a system with only two nodes, one of the two nodes must be configured as a combined node in order for the system to host conferences.

Figure 1: One Region with Two Nodes



One Region with Two Nodes with WebEx Node for ASR

Multinode configurations with Webex Node for ASR provide bandwidth aggregation for two media types: WebEx meetings and high-quality video.

Configure ASR nodes with Cisco WebEx node software in your network close to your conferencing nodes. This provides bandwidth aggregation for both web conferencing and video conferencing. The example shown in this section is a two-node system but you can configure WebEx node for ASR on larger deployments as well. Cisco WebEx Node is deployed as a shared port adapter for the Cisco ASR 1000 series router.

Cisco WebEx node for ASR supports the following:

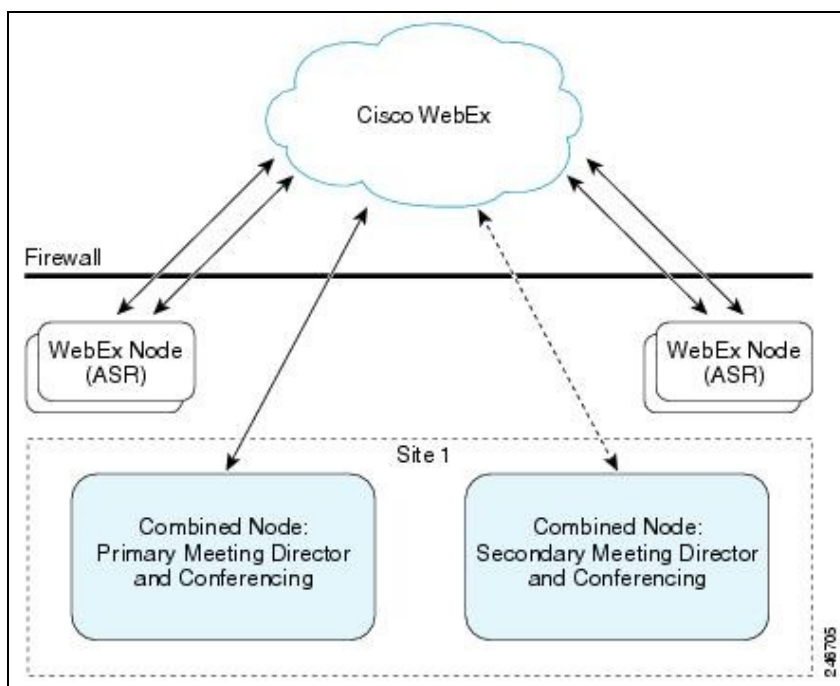
- Cisco WebEx web meetings mixed for internal network users
- Cisco WebEx high-quality webcam video for internal network users
- Cisco Unified MeetingPlace Release 8.5 supports an unlimited number of ASR 1000 routers for

capacity.

You install two Cisco Unified MeetingPlace nodes in one site located in one region. Configure your two nodes as combined nodes. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the Secondary Meeting Director occurs.

Since you configured your nodes as combined nodes, they also provide conferencing features. In a system with only two nodes, one of the two nodes must be configured as a combined node in order for the system to host conferences.

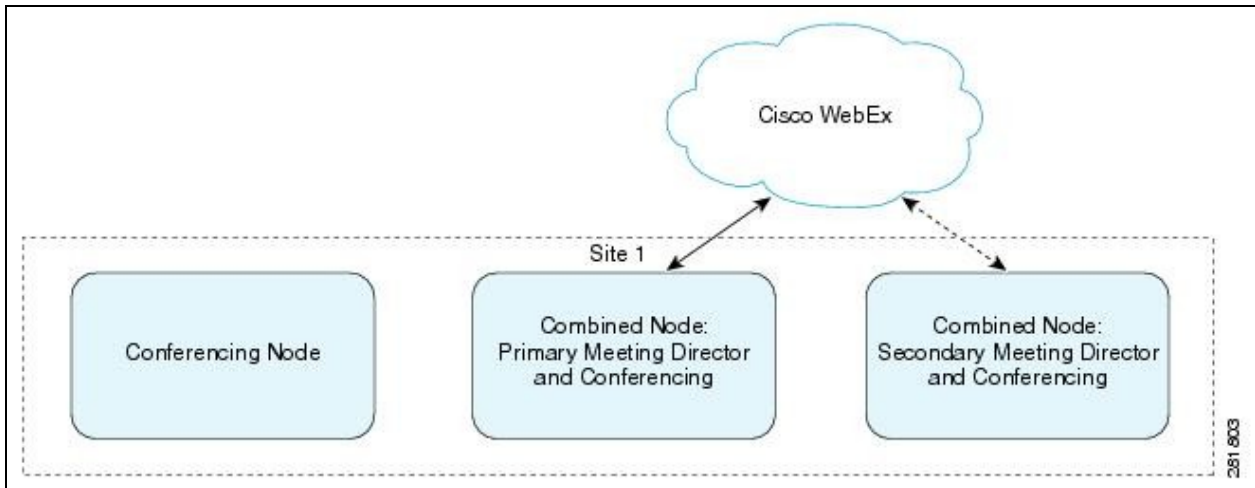
Figure 2: One Region with Two Nodes Configured for WebEx Node for ASR



One Region with Three Nodes

Use this configuration if your system is located in one region and you want additional conferencing ports.

You install three Cisco Unified MeetingPlace nodes in one site located in one region. Configure two of your nodes as combined nodes. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the secondary Meeting Director occurs. Since you configured your Meeting Director nodes as combined nodes, they also provide conferencing features. Configure your third node as a conferencing node to provide more conferencing ports.

Figure 3: One Region with Three Nodes

Two Regions with Two Nodes Each

Use this configuration if your system is located in two time zones or different regions.

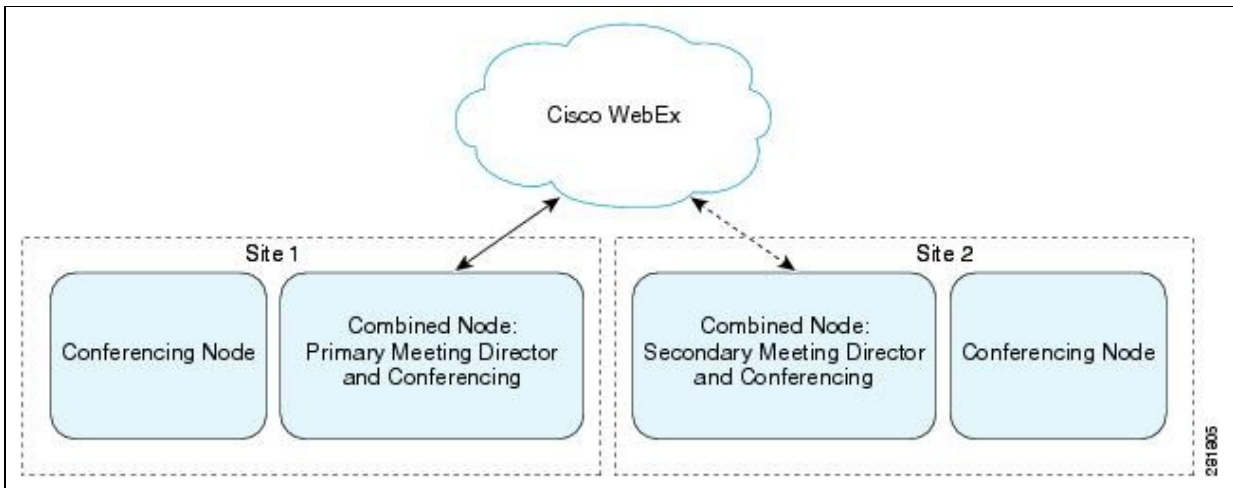
You install two Cisco Unified MeetingPlace nodes each located in its own site and region. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the Secondary Meeting Director occurs.

Optionally configure your nodes as combined nodes, which provide Meeting Director and conferencing features, or as Meeting Director nodes which provide dedicated Meeting Director services. Configure each node as the regional master of its region.

If you configure your two regional masters as combined nodes, each node provides both Meeting Director and conferencing features. Configure a second node in each region as a conferencing node to provide more conferencing ports. You can optionally place each conferencing node in the same site as the regional master or in its own site.

If you place the Meeting Director and conferencing node in each region in separate sites, by default each site is configured to host overflow meetings for the other site. Therefore, if a node in one site exceeds its conference capacity an overflow condition occurs and the node in your other site hosts the overflow conferences. You can optionally configure each node to disallow overflow conferencing by selecting **Topology Management > Sites** and changing the **Allow overflow meetings from other sites** setting to **No**.

Figure 4: Two Regions with Two Nodes Each



Two Regions with Three Nodes Each

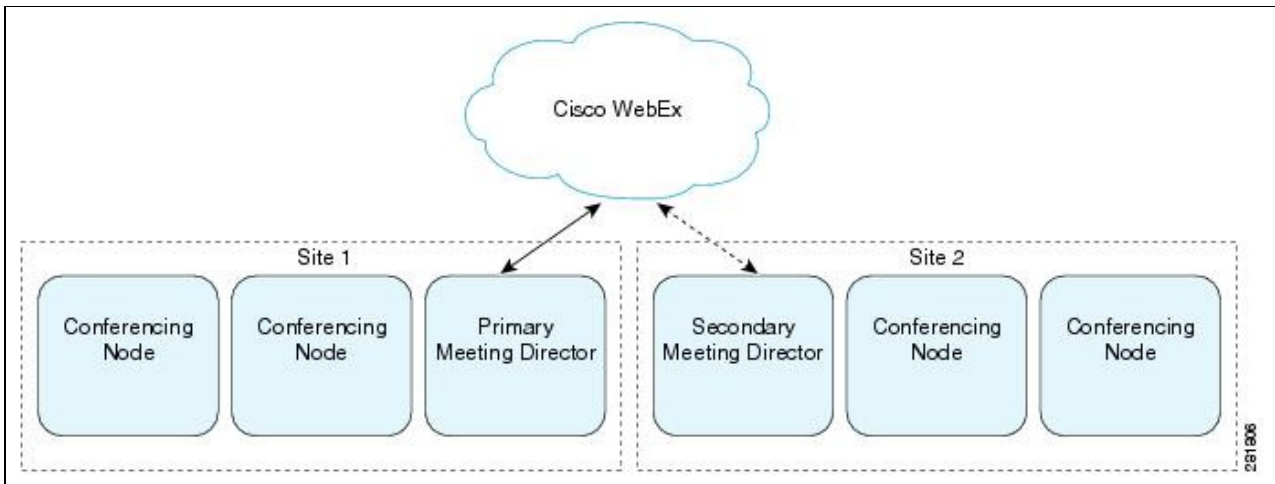
Use this configuration if your system is located in two time zones or different regions and you need greater conferencing capacity.

You install two Cisco Unified MeetingPlace nodes each located in its own site and region. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the Secondary Meeting Director occurs. Configure each node as the regional master of its region.

Configure two additional nodes in each region as conferencing nodes to provide more conferencing ports. You can optionally place your conferencing nodes in the same site as their regional master or in another site.

If you place any of your nodes in separate sites, by default each site is configured to host overflow meetings for the other sites. Therefore, if a node in one site exceeds its conference capacity an overflow condition occurs and the node in your other site hosts the overflow conferences. You can optionally configure each node to disallow overflow conference hosting by selecting **Topology Management > Sites** and changing the **Allow overflow meetings from other sites** setting to **No**.

Figure 5: Two Regions with Three Nodes Each



Large-Scale System with Multiple Regions

Use this configuration for large-scale systems with nodes located in multiple time zones or different regions.

You install two Cisco Unified MeetingPlace nodes each located in its own site and region. The first node in your system is automatically configured as the root leaf node and Primary Meeting Director. The second node in your system is automatically configured as the Secondary Meeting Director. If there is a failure in the Primary Meeting Director, failover to the Secondary Meeting Director occurs. Configure each node as the regional master of its region.

Configure additional nodes in each region as conferencing nodes to provide more conferencing ports. You can optionally place your conferencing nodes in the same site as their regional master or in another site. You can configure additional regions that do not have a Meeting Director. The Meeting Directors located in your other regions can provide the same services for these nodes as they do for their own nodes.

By default each site is configured to host overflow meetings for the other sites. Therefore, if a node in one site exceeds its conference capacity an overflow condition occurs and the node in your other site hosts the overflow conferences. You can optionally configure each node to disallow overflow conference hosting by selecting **Topology Management > Sites** and changing the **Allow overflow meetings from other sites** setting to **No**.

Figure 6: Large-Scale System with Multiple Regions

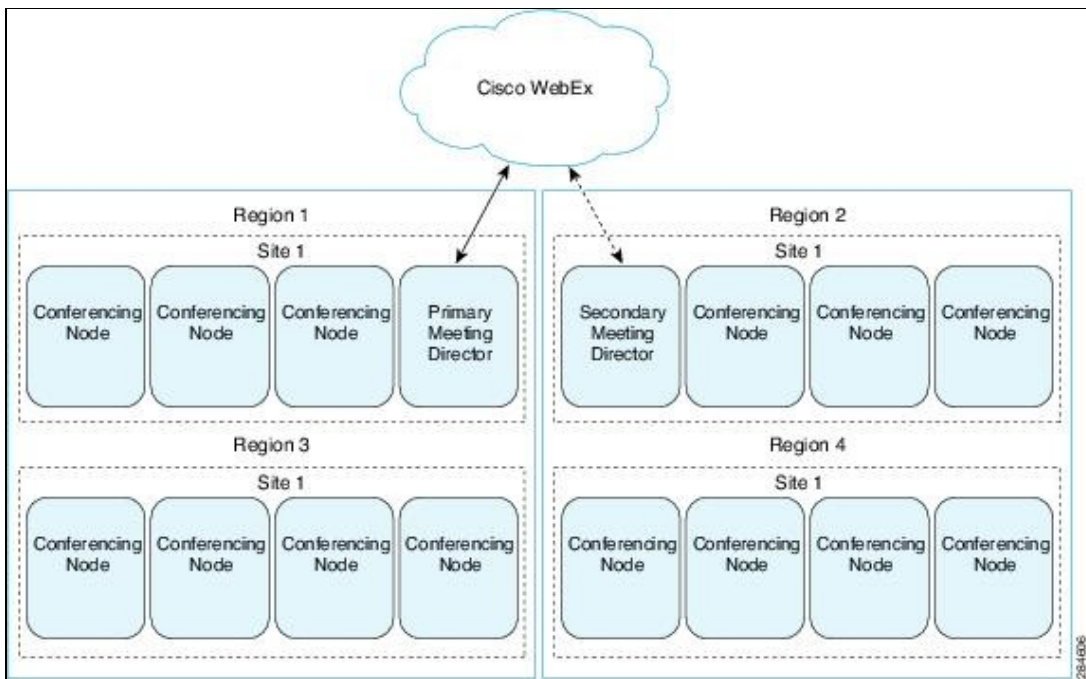


Figure 6: Large-Scale System with Multiple Regions