Sequencing Rules and Time Requirements

Upgrade Sequence and Time Requirements

The sequence in which you perform upgrade procedures depends on your deployment, and on how you want to balance the level of user impact with the amount of time required to complete the upgrade. You must identify the sequence that you will follow before you are ready to perform the upgrade process.

The information in this section applies only if you are performing a direct upgrade using either the Unified CM OS Administration interface or the PCD Upgrade task. PCD Migrations do not require this step.

Understanding Version Switching

When you upgrade a node, the new software is installed as an inactive version. To activate the new software, you must switch the node to the new software version. There are two ways to switch to the new software version:

- Automatic switching—the system switches the version automatically as part of the upgrade process

- Manual switching—physically switch the version using the OS Administration interface after the upgrade process is complete

The method that you choose depends on the type of upgrade that you are doing. During the upgrade process, the wizard prompts you to choose whether to switch the software version automatically by rebooting to the upgraded partition, or whether to switch the version manually at a later time. The table below lists the switching method to use for each type of upgrade.

Upgrade type	Switching type	When prompted, choose . . .	Result
Standard upgrade	Automatic	**GUI:** Reboot to upgraded partition **CLI:** Switch to new version after upgrade	When you choose this option, the system reboots to the new software version.
	Manual	**GUI:** Do not reboot after upgrade **CLI:** Do not switch to new version after upgrade	When you choose this option, the system continues to run the old software version when the upgrade is complete. You can manually switch to the new software later.
Refresh upgrade	Automatic	**GUI:** Reboot to upgraded partition **CLI:** Switch to new version after upgrade	Choose this option to use the new software version immediately following the upgrade.
	Manual	**GUI:** Do not reboot after upgrade **CLI:** Do not switch to new version after upgrade	Use this option only if you are performing a refresh upgrade in stages. When you choose this option the system reboots to the old software version when the upgrade is complete, and you can manually switch to the new software later.

When you switch versions, your configuration information migrates automatically to the upgraded version on the active partition.

If for any reason you decide to back out of the upgrade, you can restart the system to the inactive partition that contains the older version of the software. However, any configuration changes that you made since you upgraded the software will be lost.

For a short period of time after you install Unified Communications Manager or switch over after upgrading to a different product version, any changes made by phone users may be lost. Examples of phone user settings include call forwarding and message waiting indication light settings. This can occur because Unified Communications Manager synchronizes the database after an installation or upgrade, which can overwrite phone user settings changes.

Sequence Rules

When you are planning to perform an upgrade using either the Unified CM OS Admin interface or the PCD upgrade task, you must ensure that your plan takes the following sequencing rules into account.

- The Unified Communications Manager publisher node must be the first node that you upgrade. The new software is installed as an inactive version.

- You can begin upgrading Unified Communications Manager subscriber nodes as soon as the publisher node has been upgraded with an inactive version of the new software.

- You must switch the Unified Communications Manager publisher node to the new software version and reboot it before you switch the version on any subscriber nodes. The publisher node must be the first node to switch to the new software version and reboot.

- If you upgrade a group of subscriber nodes, after you switch the software version and reboot, you must wait for database replication to complete on all subscriber nodes before proceeding with any COP file installs or configuration changes.

- If you are upgrading Unified Communications Manager nodes to a Maintenance Release (MR) or an Engineering Special (ES) Release and you are not upgrading IM and Presence Service nodes, you must reboot all IM and Presence nodes after the Unified Communications Manager upgrade is complete.

- If you are upgrading IM and Presence Service nodes in addition to Unified Communications Manager nodes:

  - The IM and Presence Service database publisher node must be the first IM and Presence Service node that you upgrade. The new software is installed as an inactive version.

  - You can begin upgrading IM and Presence Service subscriber nodes as soon as the publisher node has been upgraded with an inactive version of the new software.

  - You can wait until all of the Unified Communications Manager nodes are upgraded to an inactive version before you upgrade the IM and Presence Service database publisher node, or you can choose to upgrade in parallel. If you upgrade in parallel, start upgrading the IM and Presence Service database publisher node at the same time that you upgrade the Unified Communications Manager subscriber nodes.

  - You must switch to the new software version and reboot all Unified Communications Manager nodes, starting with the publisher node, before you can switch versions on the IM and Presence Service nodes.

  - You must switch the IM and Presence Service database publisher node to the new software version and reboot it before you switch the software version on any IM and Presence Service subscriber nodes.

  - If you upgrade a group of IM and Presence Service subscriber nodes, after you switch the software version and reboot, you must wait for database replication to complete on all subscriber nodes before proceeding.

- If you are upgrading IM and Presence Service nodes to a Maintenance Release (MR) or an Engineering Special (ES) Release and you are not upgrading Unified Communications Manager nodes, the following additional sequencing rules apply:

  - For upgrades using the Unified CM OS Admin interface, you must upgrade the Unified Communications Manager publisher node and then upgrade the IM and Presence Service nodes to the Maintenance Release (MR) or an Engineering Special (ES) Release.

  - If you are using the Prime Collaboration Deployment migration task, you must select the Unified Communications Manager publisher node in addition to the IM and Presence Service nodes.

• If you are using the Prime Collaboration Deployment upgrade task, you do not need to select the Unified Communications Manager publisher node as long as the first 3 digits of new version of IM and Presence Service match the first 3 digits of the currently installed version of Unified Communications Manager.

Upgrade time requirements

The time required to upgrade the software is variable and depends on a number of factors. Use the information in the following sections to understand the steps you can take to optimize the upgrade process. The following sections also provide information and examples to help you to estimate the time requirements for an upgrade.

Factors that Affect Upgrade Time Requirements

The table below lists the factors that impact the amount of time that an upgrade requires. You can reduce the amount of time needed for an upgrade by ensuring that your system meets these conditions.

Table 1: Factors that Affect Time Requirements

Item	Description
External Services and Tools	Time requirements are reduced when external services and tools, such as NTP servers, DNS servers, LDAP directories, and other network services are reachable with response times as short as possible with no dropped packets.
	We recommend that you configure the ESXi server and the Unified Communications Manager publisher node to point to the same NTP server.
	Note To avoid upgrade failures due to time sync issues with VM, disable the VM's NTP sync with the ESXi host using the workaround mentioned in the following link: http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1189
Accessibility of upgrade images	Save time by ensuring that ISO images are on DVD, or are already downloaded and staged on the same LAN as the Unified Communications Manager and IM and Presence Service virtual machines (VM).

Item	Description
System health	The virtual machine configuration impacts the time requirement for an upgrade. Use the virtual machine specifications that are correct for your deployment size. If your database exceeds the virtual machine's configuration limits, the upgrade process will take longer to complete or fail. For example, having too many devices for the VM configuration will impact the upgrade.
	Low memory or memory leaks will impact the upgrade.
	Round Trip Times (RTT) between nodes will extend the time required.
	Ensure that there are no OutOfSynch (OOS) tables in the database.
	Ensure that there are no SD link out-of -service events on the Unified Communications Manager node. These events typically indicate a network problem, which you address before you begin the upgrade process.
	System errors can impact upgrade time. In the Real Time Monitoring Tool (RTMT) interface, double-click Alert Central in the left navigation pane and ensure that there are no errors.
Physical and virtual hardware infrastructure	Upgrade time is reduced when your infrastructure is configured for high-capacity and low-latency, and when there is low contention from other traffic. For example, you can optimize the upgrade process by ensuring that: • There are no infrastructure bottlenecks from VMs sharing same ESXi host, the same Direct Attached Storage (DAS) volume, the same Logical Unit Number (LUN), or the same congested network link. • Storage latencies meet the requirements specified at .. www.cisco.com go virtualized-collaboration. • The physical CPU cores and the virtualization design comply with virtualization requirements of Unified Communications Manager and IM and Presence Service. Do not oversubscribe CPUs by having VMs share the host resources; use logical cores or resource reservations • Unified Communications Manager and IM and Presence Service virtual machines are on same hosts, or on hosts wtih 1GbE LAN between them with low contention from other traffic. • If the cluster is over a WAN, ensure that you follow all bandwidth and latency rules listed in the *Cisco Collaboration Systems Solution Reference Network Designs (SRND)* for at http://www.cisco.com/c/en/us/support/unified-communications/unified-communications-system/products-implementation-design-guides-list.html.
System capacity	Reduce the upgrade time by purging unnecessary files, such as: • Call Detail Recording (CDR) records • Outdated files, such as TFTP files, firmware, and log files

Item	Description
Throttling	On IM and Presence Service nodes, the system throttles the upgrade process to preserve system stability during upgrades. Throttling may increase the time required to complete the upgrade. Although you can disable throttling to decrease the time it takes to perform the upgrade, doing so may degrade system performance.

Estimating the Minimum Time Requirements

The table below lists the minimum amount of elapsed time to expect for each task in the upgrade process under ideal conditions. Your upgrade may take longer than the times listed in this table, depending on your network conditions and on the upgrade sequence that you follow.

Note Once you begin the upgrade process, you cannot make configuration changes until the upgrade is complete and you have performed all of the post-upgrade tasks. Configuration changes include:

- changes made through any of the Unified Communications Manager or IM and Presence Service graphical user interfaces (GUI), the command line interface (CLI), or the AXL API

- LDAP synchronizations, including incremental synchronizations that are pushed to Unified Communications Manager from an Oracle LDAP

- automated jobs

- devices attempting to autoregister

Note Refresh Upgrades from Pre-12.5.x source to Release 15 is not supported.

Table 2: Minimum Time Required for Upgrade Tasks

Task	Minimum Time	Service Impact
Upgrade the Unified Communications Manager publisher node to an inactive version	2 to 4 hours Add 1 hour if a refresh upgrade	Refresh upgrades: no access to the UI
Upgrade the Unified Communications Manager subscriber nodes to an inactive version	1 to 2 hours	Refresh upgrades: phones are unavailable if no backup subscribers are configured
Switch the Unified Communications Manager publisher node to the new software version and reboot	30 minutes	—

Task	Minimum Time	Service Impact
Switch the Unified Communications Manager subscriber nodes to the new software version and reboot	30 minutes	Standard upgrades: phones are unavailable if no backup subscribers are configured
Unified Communications Manager database replication	30 minutes for deployments with small clusters or small databases 2 hours for megaclusters or large databases **Note** WAN latency of 80ms or more can significantly lengthen these times	Phones are available with dial tone but end-user features are unavailable until upgrade is complete
Upgrade the IM and Presence Service database publisher node to an inactive version	2 to 4 hours Add 1 hour if a refresh upgrade	At the time of L2 upgrade neither phone services nor IM and Presence should be impacted IM and Presence should be impacted only in the case of Refresh Upgrade
Upgrade the IM and Presence Service subscriber nodes to an inactive version	1 to 2 hours	During the switch version , irrespective of L2 or Refresh Upgrade phone services should continue to work while IM and Presence is impacted
Switch the IM and Presence Service publisher node to the new software version and reboot	30 minutes	IM and Presence high availability is disabled Jabber is unavailable
Switch the IM and Presence Service subscriber nodes to the new software version and reboot	30 minutes	IM and Presence high availability is disabled Jabber is unavailable

Task	Minimum Time	Service Impact
IM and Presence Service database replication	30 minutes for deployments with small clusters or small databases 2 hours for megaclusters or large databases **Note** WAN latency can significantly lengthen these times. The maximum WAN latency accepted is 80m.	IM and Presence high availability is disabled Jabber is unavailable

Examples

The examples in this section are based on the following upgrade scenario:

- a megacluster that includes Unified Communications Manager nodes as well as Instant Messaging and Presence nodes

- 75,000 users

- a system that is healthy and that has been optimized for the upgrade, as described in