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What You Make Possible

TOMORROW starts here.

CISCO

Best Practices Migrating Previous Versions of CUCM to CUCM 9.X

BRKUCC-2668

Session Objectives

- To explore key new features and discuss the considerations for upgrading to Unified CM 9.1 with these

- To provide foundational knowledge for a successful upgrade or migration to Unified CM 9.1

- To provide best practice guidelines for platform conversion from MCS to Cisco Virtualised Environment

Agenda

- Unified CM 9.x Licensing

- Enhanced Location CAC migration

- Upgrade Definitions and Paths

- Installation Process and Best Practises

- Migration Types

- Migrating from Physical platforms to VMWare

- Migration Recommendations

- Q and A

 Cisco Public

Licensing

Unified CM 5.0 - 7.1(3) License Types

Type	Ordering	Description
Node	Node	Number nodes per cluster
DLU	DLU	Number of phones, type of phones, mobility feature and presence users
SW Feature	ESW/UCSS	Maintenance for minor and major version upgrade

- Node license based on the number of nodes running CM service. TFTP and MOH also requires node licenses

- DLU enforced based on provisioned phones, type of phones, mobility and presence features

- Major version upgrade requires Software Feature license

- License files are locked to MAC address of the first node or Publisher of the cluster

- License enforcement controlled by Unified CM

Unified CM 7.1(5) - 8.6 License Types

Type	Ordering	Description
Node	UCL/CUWL	Number nodes per cluster
DLU	UCL/CUWL	Number of phones, type of phones, mobility feature and presence users
SW Feature	ESW/UCSS	Maintenance for minor and major version upgrade

- Technical license enforcement is the same as before: Node, DLU and Software Feature license. Device based

- Ordering is based on User count and features required

- For bare metal servers (MCS), licenses are locked to MAC address of the first node or Publisher of the cluster

- In virtualised environment, licenses are locked to the license MAC address of the first node or Publisher of the cluster

- License enforcement controlled by Unified CM

Unified CM 9.x License Types

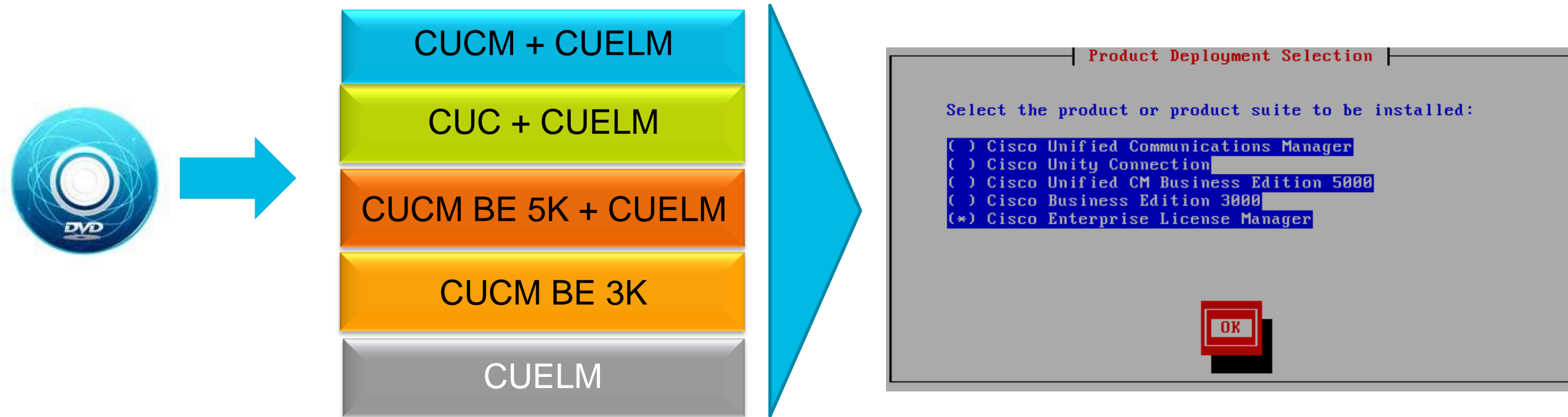| Type	Ordering	Description
Node	UCL/CUWL	Number nodes per cluster
User	UCL/CUWL	Number and type of devices, mobility, EM
User	ESW/UCSS	Maintenance for minor and major version upgrade

- Technical license enforcement is based on User count and features

- Ordering is based on User count and features

- Licenses are controlled by Cisco Unified Enterprise License Manager (CUELM) communicating with Unified CM and Unity Connection

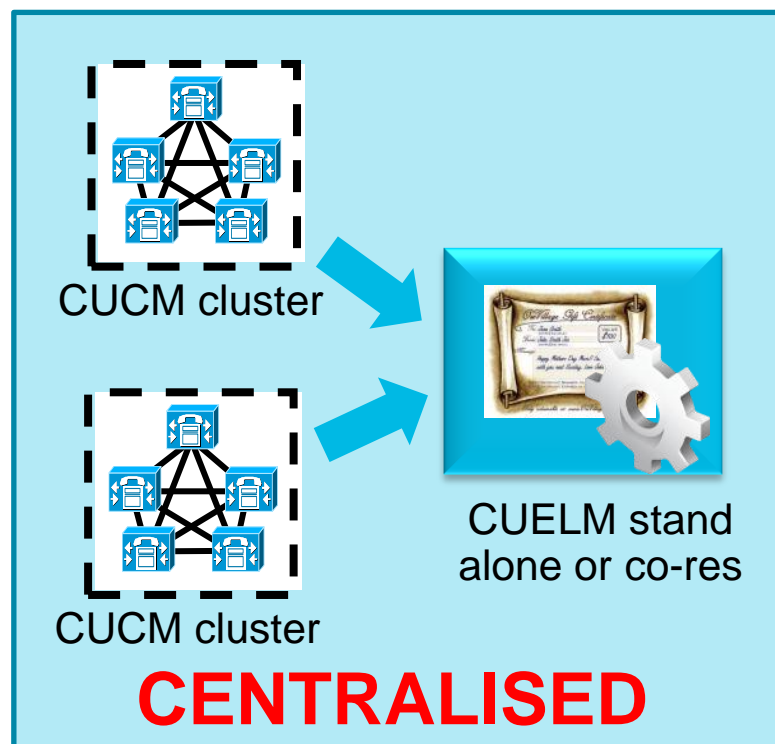Cisco Public

Cisco Unified CM 9.0 and 9.1 Licensing

Cisco Unified Enterprise License Manager

CUCM + CUELM

CUC + CUELM

CUCM BE 5K + CUELM

CUCM BE 3K

CUELM

```
Product Deployment Selection

Select the product or product suite to be installed:

( ) Cisco Unified Communications Manager
( ) Cisco Unity Connection
( ) Cisco Unified CM Business Edition 5000
( ) Cisco Business Edition 3000
(*) Cisco Enterprise License Manager

                          OK
```
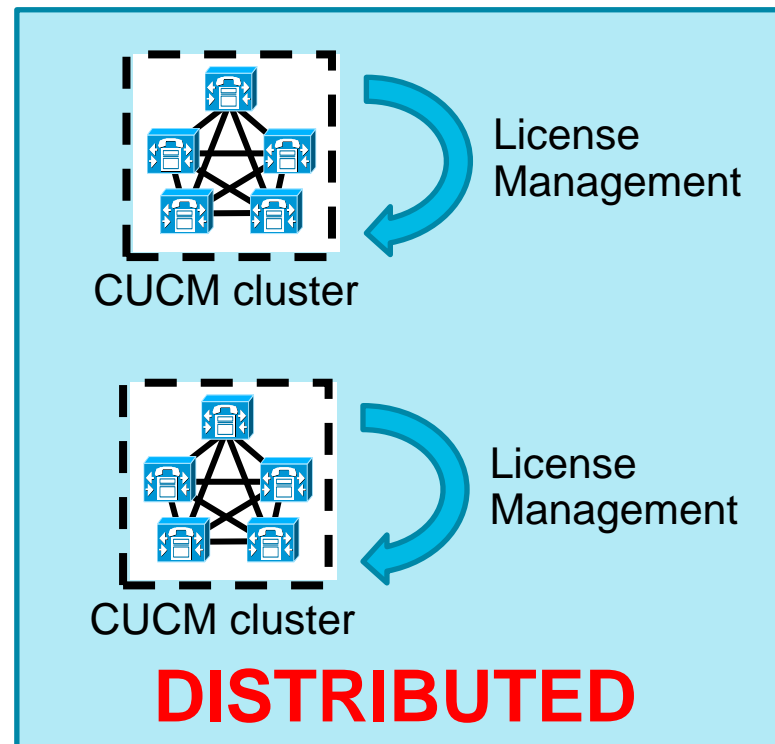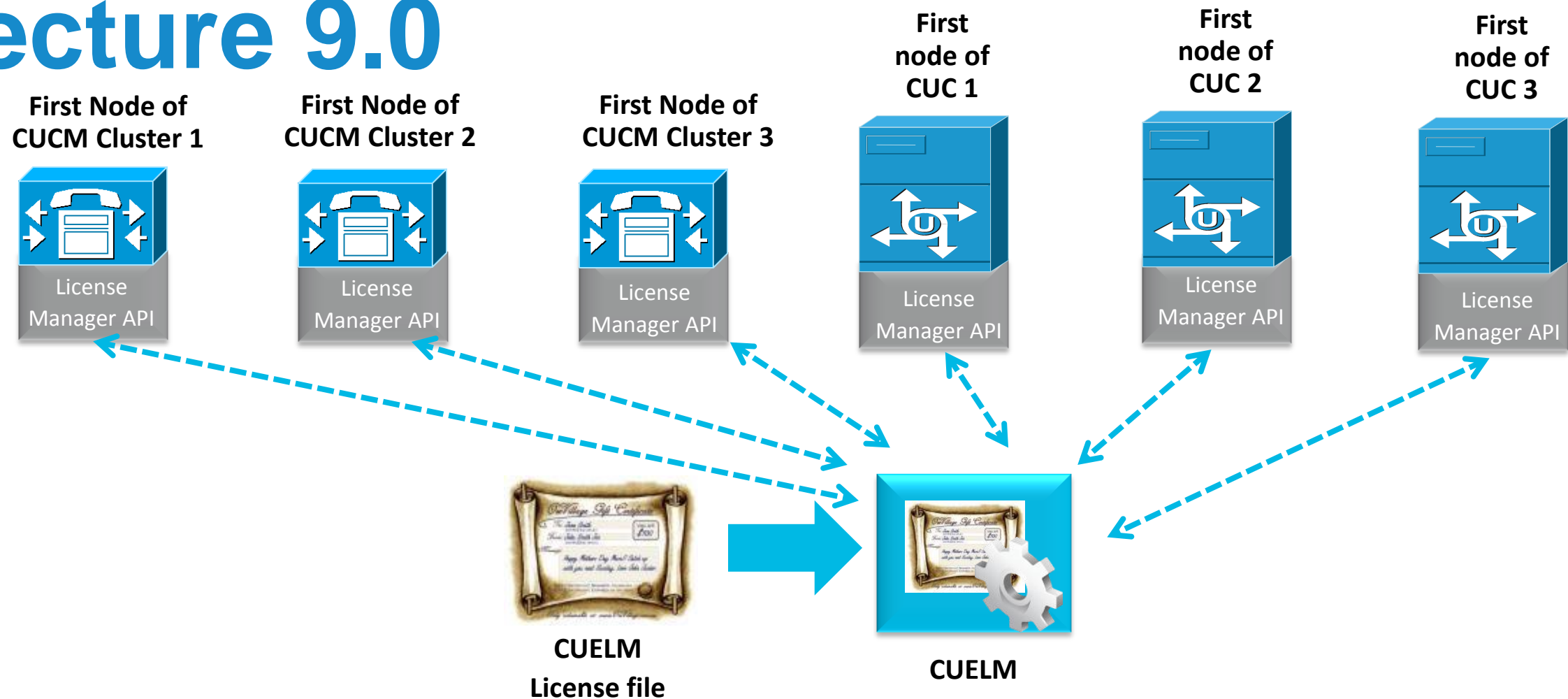
- 9.x media consists of five products including Cisco Unified Enterprise License Manager (CUELM) bundled with three CUCM products or as stand alone deployment

- Centralised licensing portal running on top of Cisco Voice OS (VOS)

- Supports Cisco UC Manager and Unity Connection (CUC)

- Cisco Unified Presence (CUP) leverages CUCM for licensing

- License file is uploaded onto CUELM instead of CUCM or CUC and is based on CUELM MAC address and host ID

- License file is cumulative and is based on products (CUCM or CUC)

License Migration Models with CUELM

CUCM cluster — License Management

CUCM cluster — License Management

DISTRIBUTED

CUCM cluster

CUCM cluster

CUELM stand alone or co-res
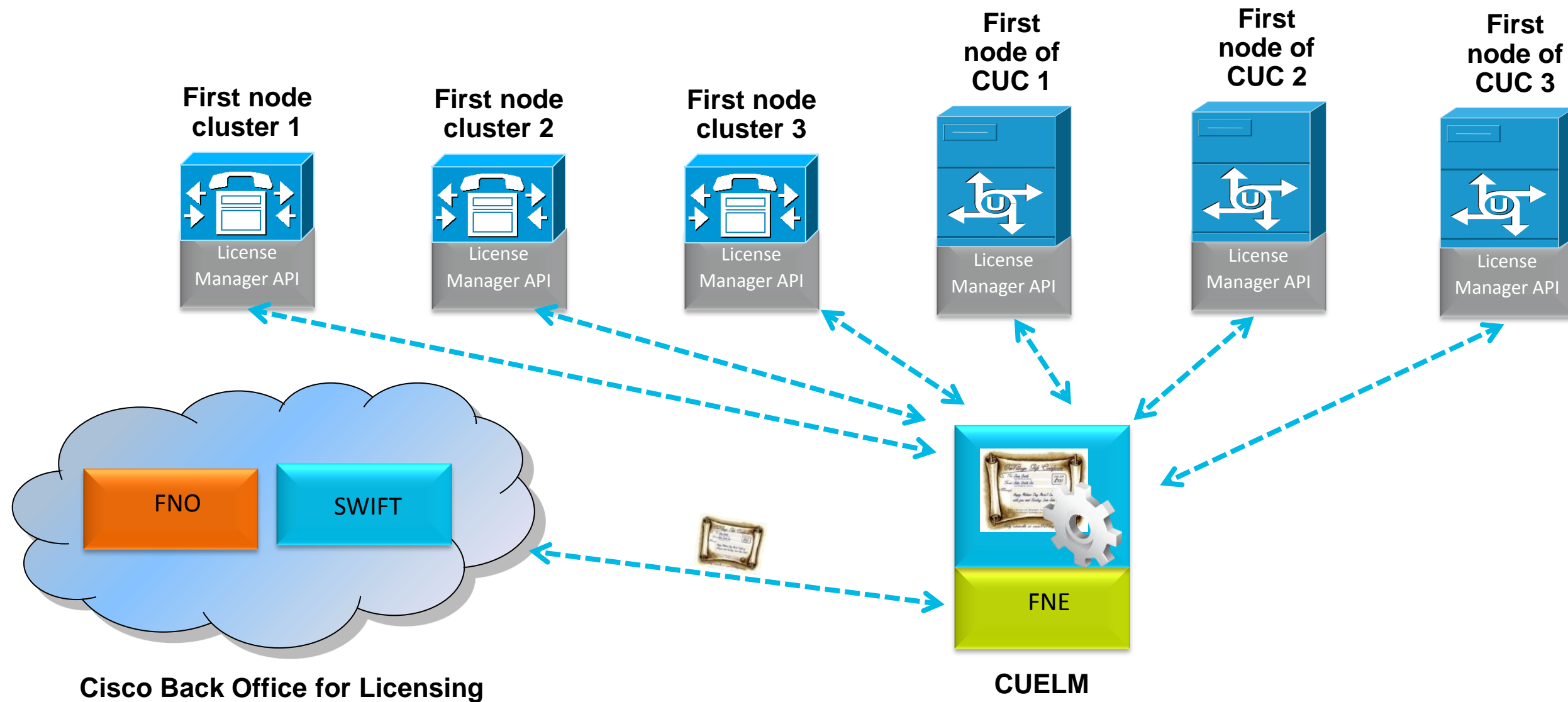
CENTRALISED

- Unified CM or 8.X or earlier is a distributed license management model

- Unified CM 9 and later provides for both distributed and centralised license management

- Centralised model provides:

  - License Pooling

  - Single Management Point for all clusters in the enterprise

- ELM Provides 60 days overage and redundancy / re-host

Cisco Unified Enterprise License Architecture 9.0

First Node of CUCM Cluster 1

First Node of CUCM Cluster 2

First Node of CUCM Cluster 3

First node of CUC 1

First node of CUC 2

First node of CUC 3

License Manager API

License Manager API

License Manager API

License Manager API

License Manager API

License Manager API
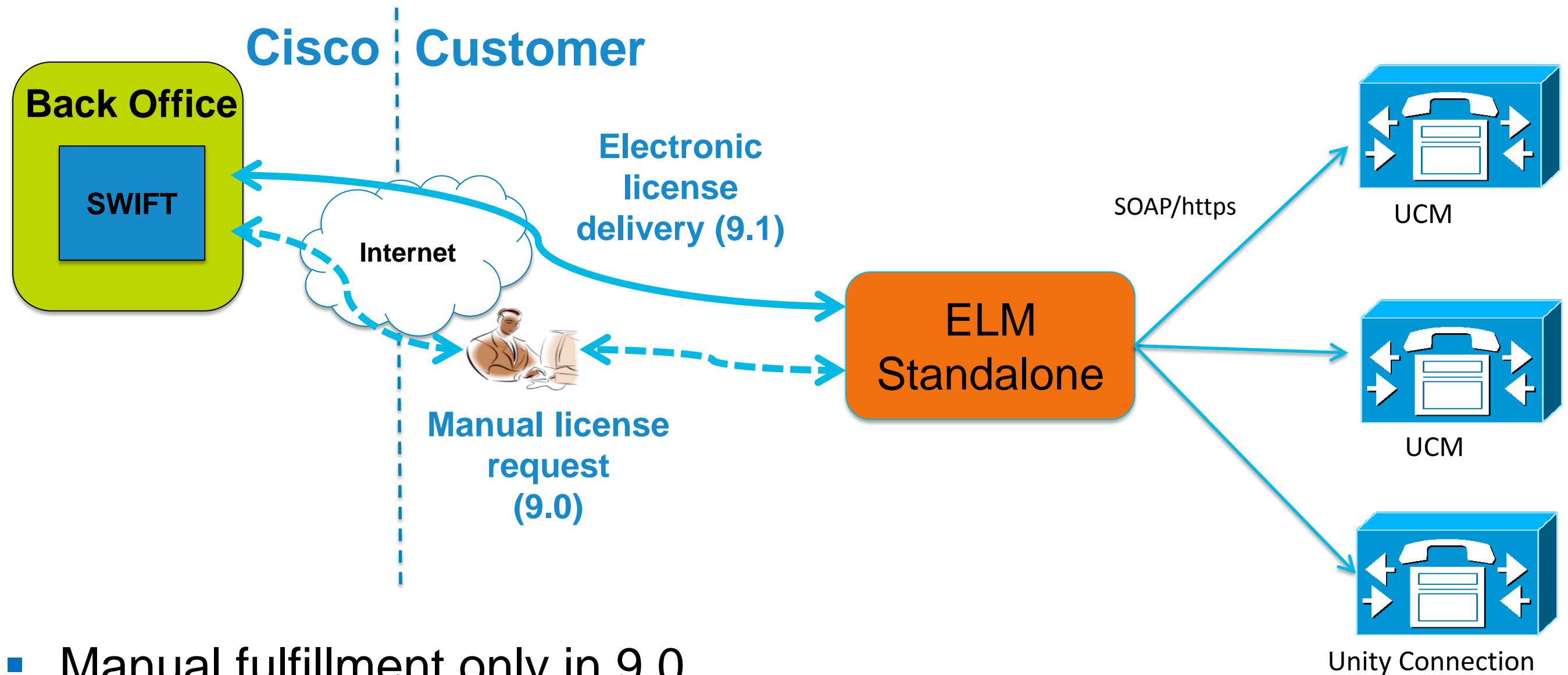
CUELM License file

CUELM

- CUELM provides for centralised license management, license pooling, minimise re-hosting of license files and eliminates dependency of license to versions of UC applications

- Manual license file upload onto CUELM is available with CUCM 9.0

- License Manager API added to CUCM 9.0 and CUC 9.0 to interact with CUELM for license request and approval

Cisco Unified Enterprise License Architecture 9.1

First node cluster 1 — License Manager API

First node cluster 2 — License Manager API

First node cluster 3 — License Manager API

First node of CUC 1 — License Manager API

First node of CUC 2 — License Manager API

First node of CUC 3 — License Manager API

FNO

SWIFT

Cisco Back Office for Licensing

FNE

CUELM

- Electronic license fulfillment with CUELM is available with CUCM 9.1

- FNE (Flexnet) toolkit added to CUELM 9.1 to interact with Cisco Back Office

License Fulfillment

Cisco | Customer

Back Office

SWIFT

Internet

Electronic license delivery (9.1)

Manual license request (9.0)

ELM Standalone

SOAP/https

UCM

UCM

Unity Connection

- Manual fulfillment only in 9.0

- Choice of manual or automatic fulfillment in 9.1

- ELM server requires HTTPS access to cisco.com for electronic fulfillment

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Cisco Unified Enterprise License Manager

Add CUCM or CUC systems

CUELM

1

2 Register

Success/Fail

3 Get License Usage – 24 hours

Usage X,Y,Z

Analyse

4 Set License Status ✓ ✗

Get License Capability

6 Grant ✓ ✗

UC Manager, CUC and CUELM communication

5 **CUC**

5 **First node of CUCM**

License Request

CUP

CUC Enforcement
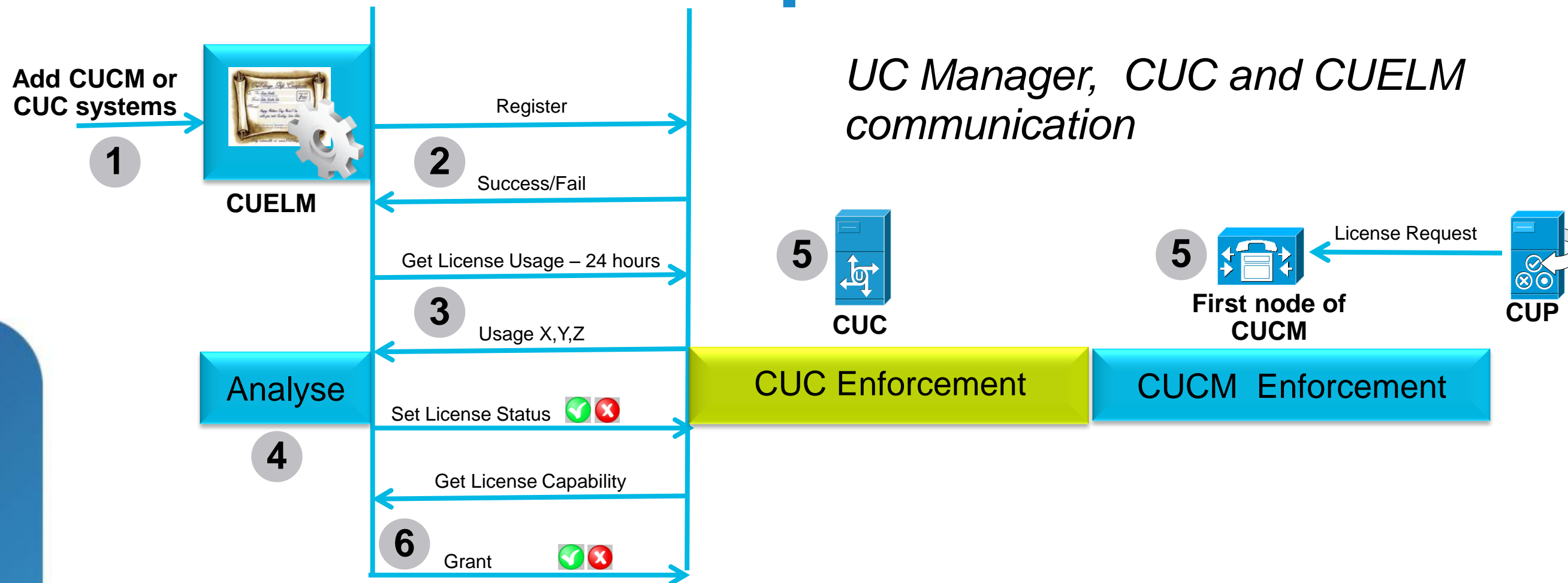
CUCM Enforcement

- CUELM can be stand alone or co-res with CUCM or CUC.

- CUCM and CUC sends license usage to CUELM

- CUELM handles the license grant or revoke based licensing logic

- CUCM and CUC perform license enforcement based CUELM response

- CUCM and CUC enforcement rules are different

Process of CUCM and CUELM Communications

1

| CUCM License Evaluation |

2

3

| CUELM License Evaluation |

4
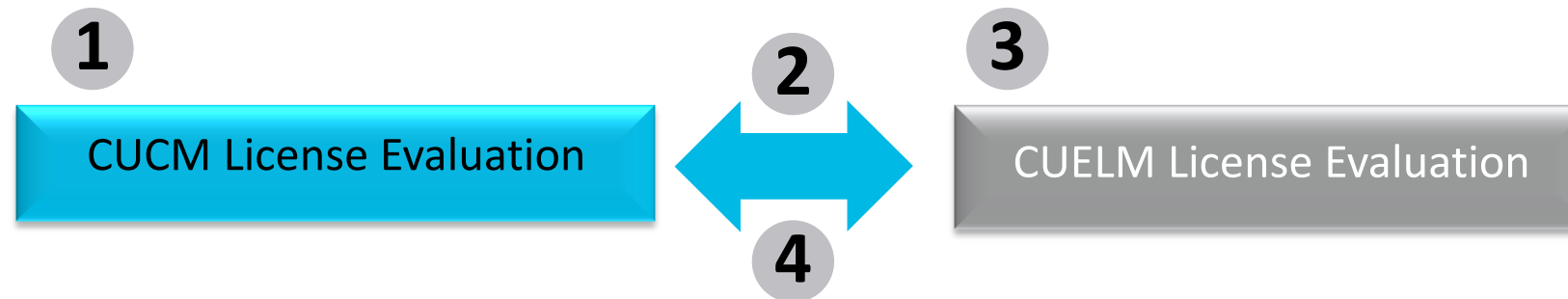
[VALID or INVALID]

How does CUC, CUCM and CUELM know what to communicate?

- 1. CUCM evaluates users to phones usage and feature usage to derives at UCL/CUWL usage

- 2. CUCM sends UCL/CUWL usage to CUELM

- 3. CUELM evaluates license request, perform evaluation and license substitution before sending a respond to CUCM (VALID or INVALID)

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Unified CM 9.0 Phone Models and Phone Types

Phone Type	Phone Model
Tin	Analog, 3905, 6901, VGC Phone
Copper	6911, 6921
Bronze	12S, 12SP, 12SP+, 30SP+, 30VIP, 3911, 3951, 6941, 6945, 6961, 7902, 7905, 7906, 7910, 7911, 7912, 7920, 7921, 7925, 7926, 7931, 7935, 7936, 7937, 7940, 7941, 7941G-GE, 7942, 7945, 7960, 7961, 7961G-GE, 7962, 7965, 7970, 7971, 7975, 7985, 8941, 8945, 8961, 9951, 9971, Cius, E20, ISDN BRI Phone, Third-party SIP Device
Silver	CIPC, CUPC, Jabber Windows/MAC, EX60, EX90
Gold	Jabber for Mobile (Android/iPhone/iPad), CUMC
TelePresence Room	CTS 500/1000/1100/1300/1310/3000/3200, C20/40/60/90, MX200/300

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Unified CM 9.0 Phone Types and Licensing

License	Phone Type	# of Devices	Features
Essential UCL	Tin	1	EM
Basic UCL	Tin, Copper	1	EM, SNR
Enhance UCL	Tin, Copper, Bronze	1	EM, SNR
Advance UCL	Tin, Copper, Bronze, Silver	2	EM, SNR
CUWL Standard	Tin, Copper, Bronze, Silver	2	EM, SNR
CUWL Premium	Tin, Copper, Bronze, Silver, Gold	6	EM, SNR
CUWL Professional	Tin, Copper, Bronze, Silver, Gold	10	EM, SNR
TelePresence	TelePresence	1	

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Unified CM 9.1 Phone Models and Phone Types

Phone Type	Phone Model
Tin	Analog, 3905, 6901, VGC Phone, ATA186, ATA187
Copper	6911, 6921, CUC-RTX
Bronze	12S, 12SP, 12SP+, 30SP+, 30VIP, 3911, 3951, 6941, 6945, 6961, 7902, 7905, 7906, 7910, 7911, 7912, 7920, 7921, 7925, 7926, 7931, 7935, 7936, 7937, 7940, 7941, 7941G-GE, 7942, 7945, 7960, 7961, 7961G-GE, 7962, 7965, 7970, 7971, 7975, 7985, 8941, 8945, 8961, 9951, 9971, Cius, E20, ISDN BRI Phone, Third-party SIP Device, CIPC, CUPC, CIM, CSF, EX60, EX90, Jabber (Android/iPhone/iPpad), CUMC, IIM, Nokia S60, H.323 Client, VXC 6215
TelePresence Room	CTS 500/1000/1100/1300/1310/3000/3200, C20/40/60/90, MX200/300, Generic Single/Multi-screen, TX9000/9200, SX20, Profile 42 (C40)

In CUCM version 9.1, Silver and Gold Phone Type moves to Bronze

Unified CM 9.1 Phone Types and Licensing

License	Phone Type	# of Devices	Features
Essential UCL	Tin	1	EM
Basic UCL	Tin, Copper	1	EM, SNR
Enhanced UCL	Tin, Copper, Bronze	1	EM, SNR
Enhanced UCL Plus	Tin, Copper, Bronze	2	EM, SNR
CUWL Standard	Tin, Copper, Bronze	10	EM, SNR
CUWL Professional	Tin, Copper, Bronze	10	EM, SNR
TelePresence	TelePresence	1	

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Licensing Migration

DLU to UCL / CUWL Conversion Tools for Upgrade

DLU

- UCL – Essential (0)
- UCL Basic (3)
- UCL Enhanced (6)
- UCL Enhanced + (9)
- CUWL Standard (11)
- CUWL Pro (17)
- TelePresence room (11)

User Count Tool

CUELM
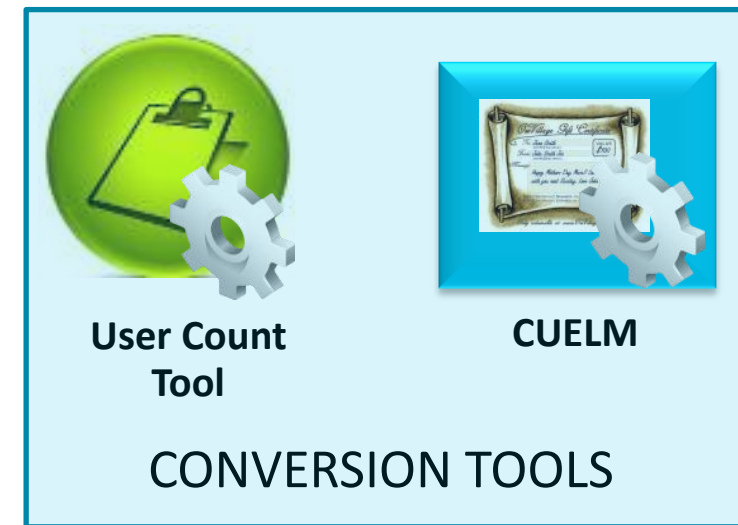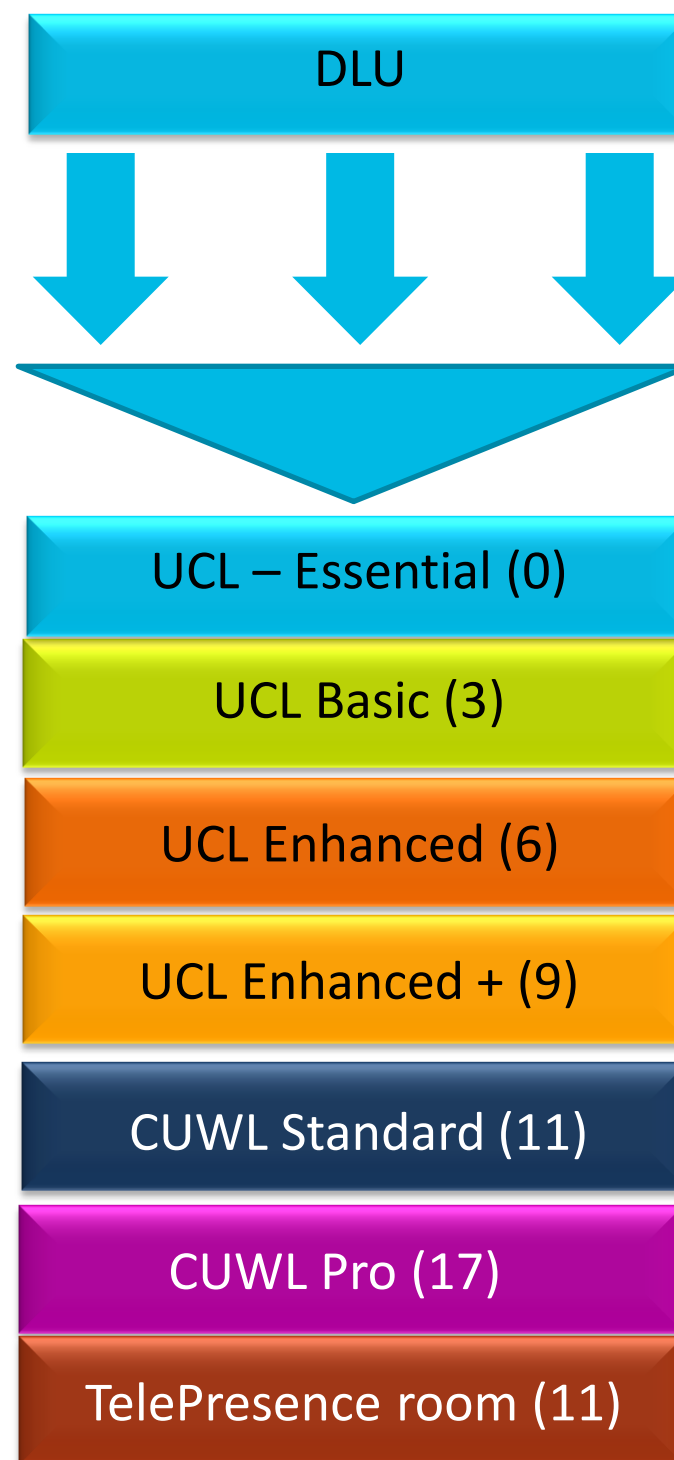
CONVERSION TOOLS

- User Count Tool (UCT): Planning tool to convert from DLU to UCL/CUWL license

- CUELM: Actual conversion tool to convert and generate UCL/CUWL license request based on an upgraded cluster

- Recommends UCL or CUWL equivalence based on devices and allows for manual adjustments

- Conversion from DLU to UCL/CUWL should match what is licensed and might not use up all of the available DLU in the older systems

- Resulting UCL/CUWL quantities for conversion will result in ESW and UCSS changes

User Count Tool for Migration Planning

Clusters | License Report

Welcome to the Cisco License Count Utility. This utility will connect to the Cisco Unified CM servers you define below and generate a report of license usage that can be viewed, printed or saved. Begin by adding servers-- if you have clusters, only add the publishers-- and then press Generate Report.

[Add...] [Edit] [Delete...] [Generate Report]

Hostname/IP address	Description	Version (Last Known)	Last Connection Status	Include in Report
10.83.113.231	Cluster 1	8.6.2	Successful	☑
10.83.113.232	Cliuster 2	9.0.0	Successful	☑
10.83.113.233	Cluster 3	7.1.5	Successful	☑
10.83.113.234	Cluster 4	6.1.5	Successful	☑

- Add system in User Count Tool (UCT) using IP/hostname of system and AXL credential

- Check versions of CUCM that the tool detects

User Count Tool for Migration Planning

- Can Select UCL and CUWL mode

- CUWL mode has Public Space Phones

- Adjust to reflect the migrated systems' entitled licenses

- Remaining DLUs do not need to be zero

- Resulting UCL and CUWL will be basis for ESW and UCSS for next renewal cycle

- UCT provides proactive license resolution prior to the actual upgrade

- Save the report(s) in csv format for use in the actual conversion in CUELM during upgrade

9.1 License Type and DLU Deduction

License	Phone Type	# of Devices	DLU Usage
Essential UCL	Tin	1	0
Basic UCL	Tin, Copper	1	4
Enhanced UCL	Tin, Copper, Bronze	1	6
Enhanced Plus UCL	Tin, Copper, Bronze	2	9
CUWL Standard	Tin, Copper, Bronze	10	11
CUWL Professional	Tin, Copper, Bronze	10	17
TelePresence	TelePresence	1	11

DLU to UCL / CUWL Migration Assessment

- Users with number of associated phones, phone model and features are basis for UCL/CUWL assessment

- Phone not assigned to a user will be deemed as a UCL user license with single phone based on the phone type

- Users with more than 10 phones will consume multiple CUWL Standard licenses

- Recommend assessing phone associations in current system prior to conversion

Extension Mobility and UCL

- Basic UCL provides Extension Mobility (EM) feature

- Number of EM users less than or equal to the number of phones, then the number of UCL licenses required is based on the Phone Type

- Number of EM users greater than the number of phones, then additional UCL Basic licenses are required for these users
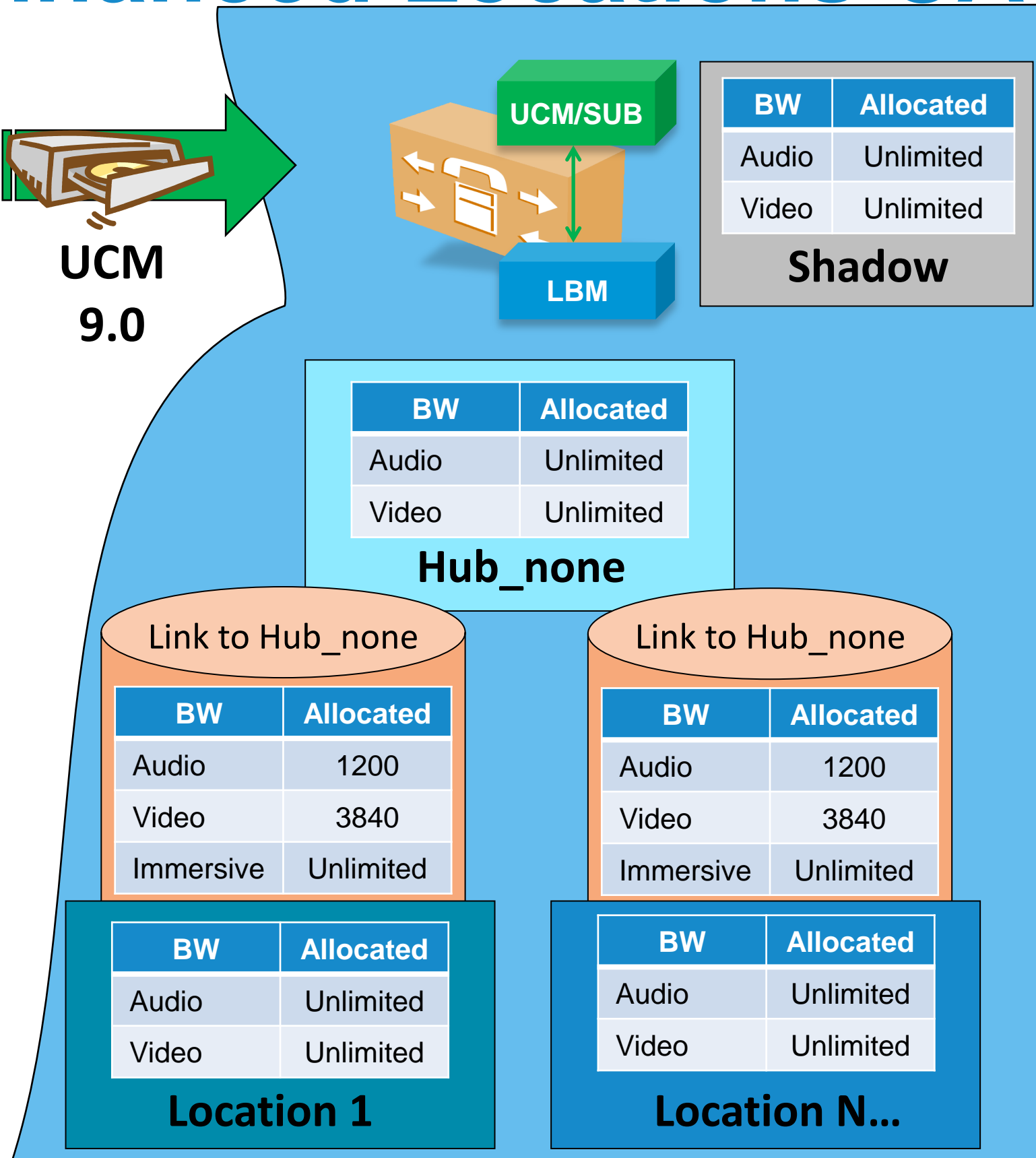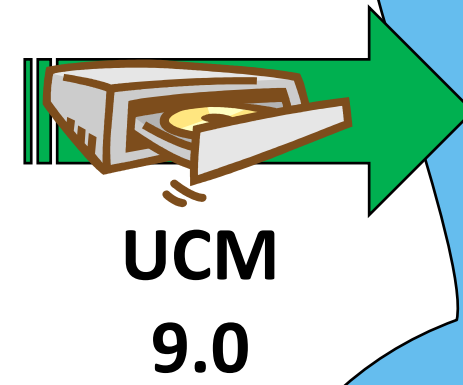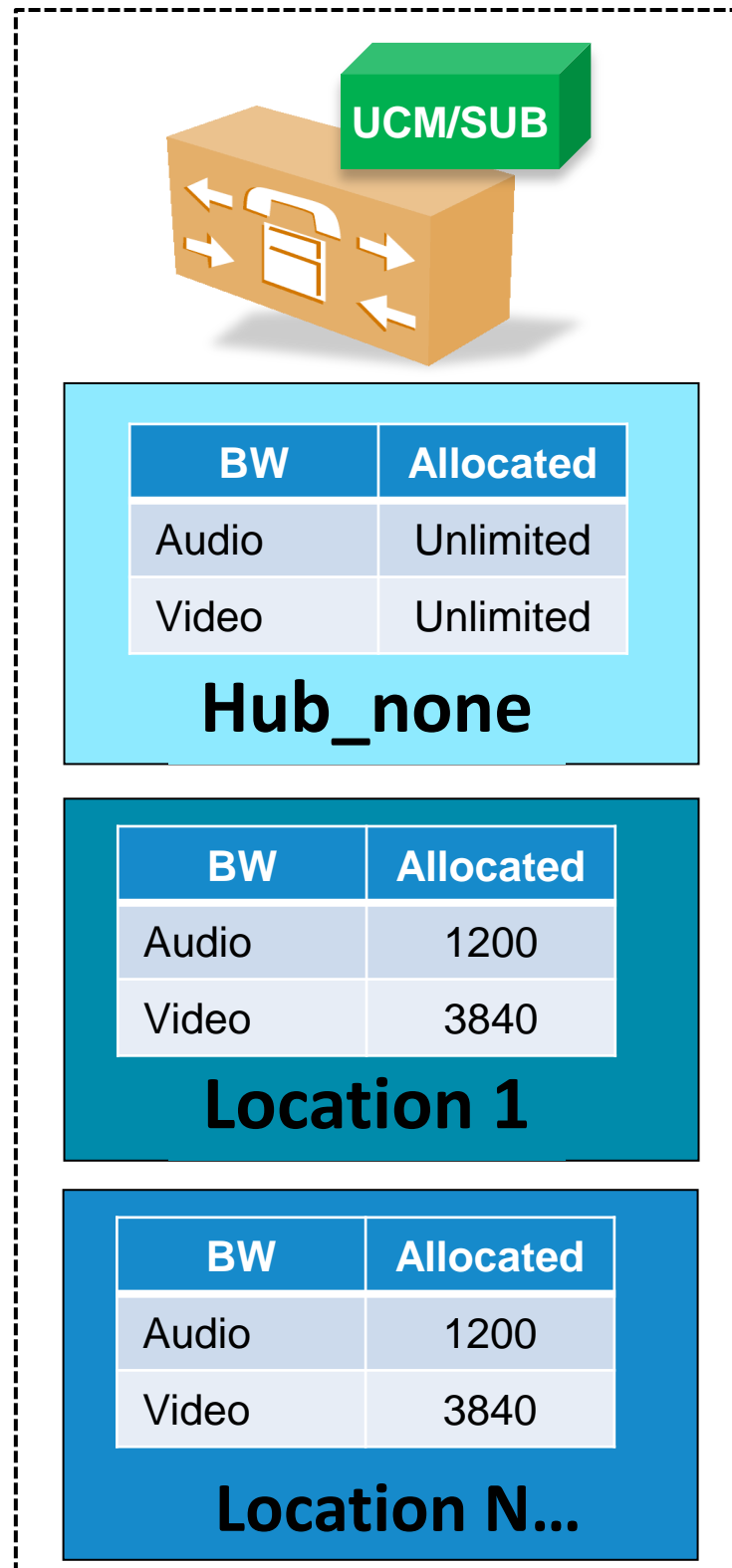
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Enhanced Locations CAC Migration

Enhanced Locations Call Admission Control
Overview

- Intra-location CAC

- Inter-cluster CAC

- Desktop Video and TelePresence Bandwidth allocations

- Dedicated Service to manage bandwidth on Unified CM

- Multi-hop WAN Topologies

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Migration to Enhanced Locations CAC

UCM/SUB

BW	Allocated
Audio	Unlimited
Video	Unlimited

Hub_none

BW	Allocated
Audio	1200
Video	3840

Location 1

BW	Allocated
Audio	1200
Video	3840

Location N...

UCM
9.0

UCM/SUB

LBM

BW	Allocated
Audio	Unlimited
Video	Unlimited

Shadow

BW	Allocated
Audio	Unlimited
Video	Unlimited

Hub_none

Link to Hub_none

BW	Allocated
Audio	1200
Video	3840
Immersive	Unlimited

Link to Hub_none

BW	Allocated
Audio	1200
Video	3840
Immersive	Unlimited

BW	Allocated
Audio	Unlimited
Video	Unlimited

Location 1

BW	Allocated
Audio	Unlimited
Video	Unlimited

Location N...

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Migration to Enhanced Locations CAC

Settings After Upgrading to 9.0

- Locations Bandwidth Manager Service is activated on each UCM call processing server

- No LBM Group or LBM Hub Group are created

- Call Manager service communicates with the local LBM

- Fully meshed LBM services by default

- Inter-Cluster E-LCAC is disabled by default

- Intra-location bandwidth values are set to "Unlimited"

- Bandwidth values assigned to locations are migrated to a link connecting any user-defined location and Hub_None

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For Further Detail on Enhanced Locations Call Admission Control:

- See breakout session BRKUCC-2667
  - Unified CM Enhanced Locations CAC Design and Deployment
  - www.ciscolive365.com

- Strongly recommended if you have:
  - TelePresence and Desktop video devices
  - Muliple Unified CM clusters
  - Multi-hop WAN topologies!

Upgrade Definitions and Paths

Upgrades Covered in this Session

Unified CM 6.1(X)

Unified CM 7.1(x)

Unified CM 8.X

Unified CM 9(X)

→ **Unified CM 9.1(1)**

- 6.1, 7.1 and 8.X) version of Unified CM to upgrade to 9.1
- Platform conversion from MCS to Cisco virtualised environment

vmware

TRC   Specs-Based

C260 M2

C220 M3   B200 M2

CISCO

C200 M2   B230 M2

hp invent

B440 M2

IBM

Platform Conversion →

MCS, HP or IBM Servers

Cisco Unified Communications Manager Software Compatibility Matrix
http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/compat/ccmcompmatr.html#wp278167

Unified CM Version Numbering

Major Releases   ➡   6.0, 7.0, 8.0   ➡   9.0

Minor Releases   ➡   6.1, 7.1, 8.5, 8.6   ➡   9.1

- Version 9 will have a single minor release – 9.1
- 9.0(1) is the only 9.0 release

Unified CM Versions and Builds

| Version	Build
9.1(1)	9.1.1.10000-11
9.0(1)	9.0.1.10000-37
8.6(2a)su1	8.6.2.21900-5
8.6(2a)	8.6.2.20000-2
8.6(1a)	8.6.1.20000-1
8.6(1)	8.6.1.10000-43
8.5(1)su3	8.5.1.13900-5
8.5(1)su2	8.5.1.12900-7
8.5(1)su1	8.5.1.11900-21
8.5(1)	8.5.1.10000-26
7.1(5b)su4	7.1.5.33900-10
6.1(5)su3	6.1.5.13900-4

- Numbering convention:
1. Major version
2. Minor version
3. Maintenance release
4. Build
5. Non SU = 000
- FCS build always has three zeros
- SU posted on CCO

Upgrade Process
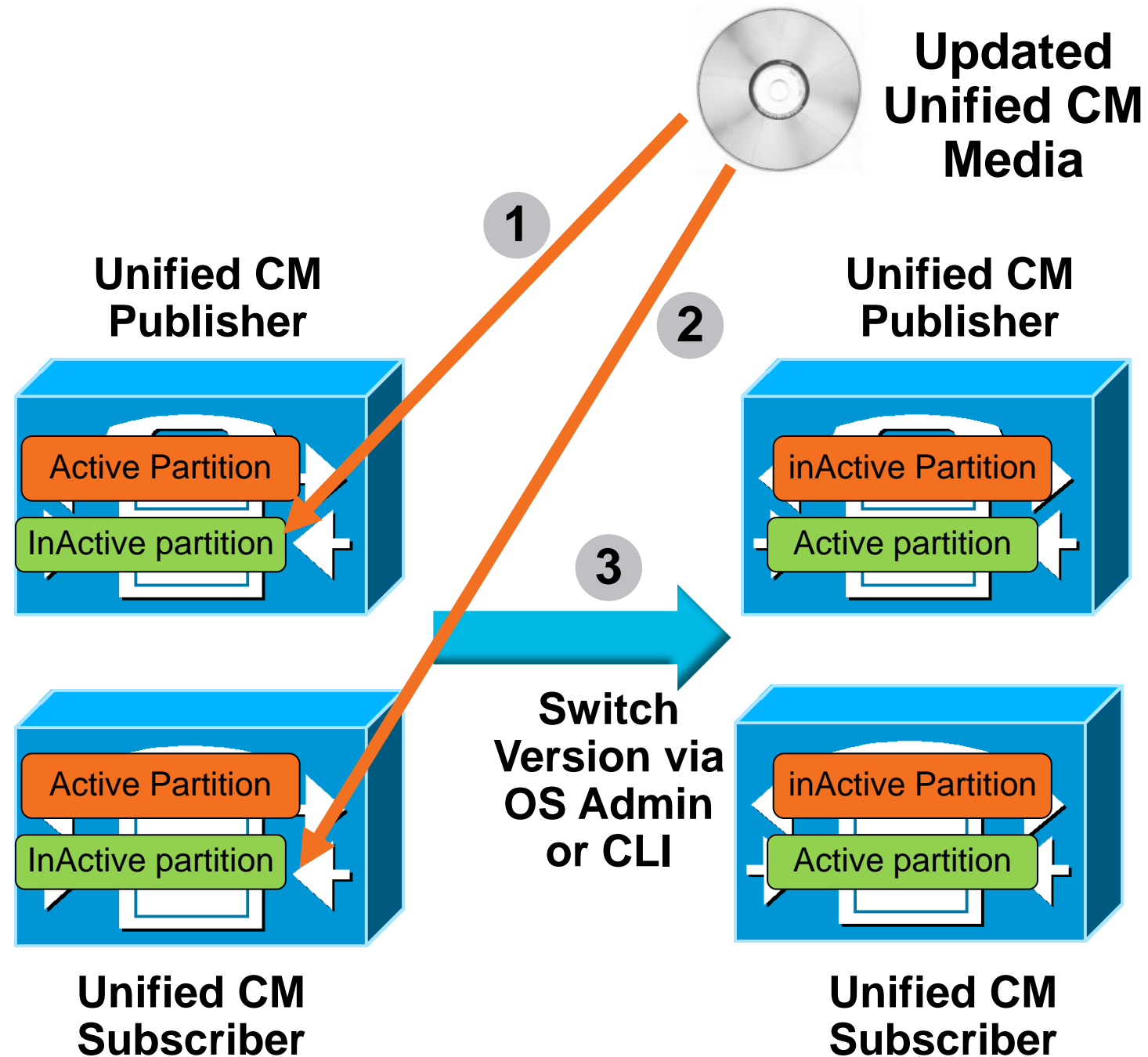
- Each Unified CM node has two separate partitions holding a CUCM installation
- Active version is copied to the InActive partition and the upgrade is applied
- Once installed, the system boots to the previously inactive partition and becomes active.

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Unified CM Upgrade Definitions

L2 L2 Upgrade: Appliance to Appliance model

- Between Unified CM versions with the same Major RHEL versions
- Low complexity with possible shortest downtime
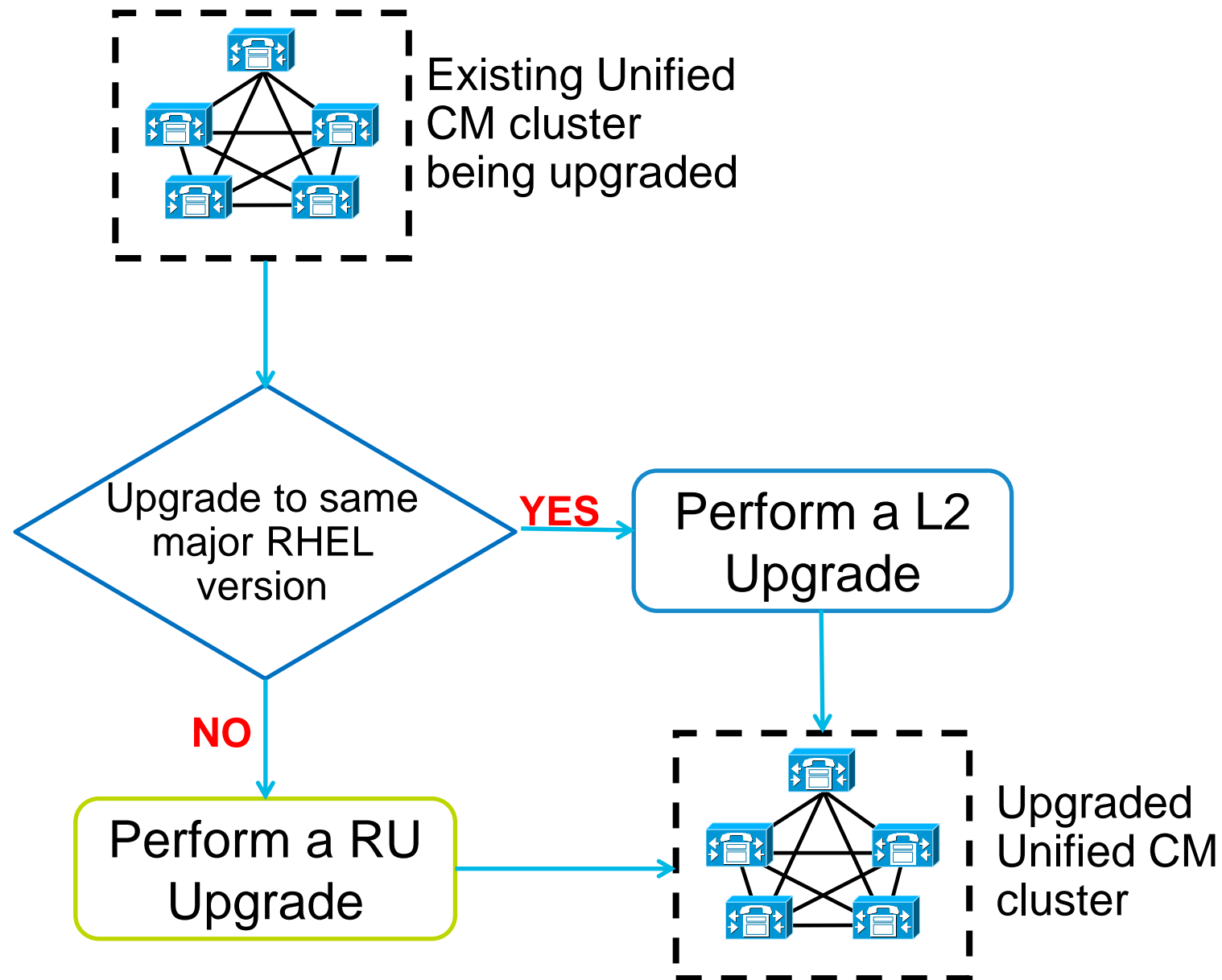- Used for version 8.6 to version 9.0 or 9.1

RU RU (Refresh Upgrade): Appliance to Appliance model with major RHEL version change (starting with RHEL 5)

- Medium complexity with possible longer downtime
- From Unified CM versions 6.X, 7.X, 8.0 or 8.5 to 9.X

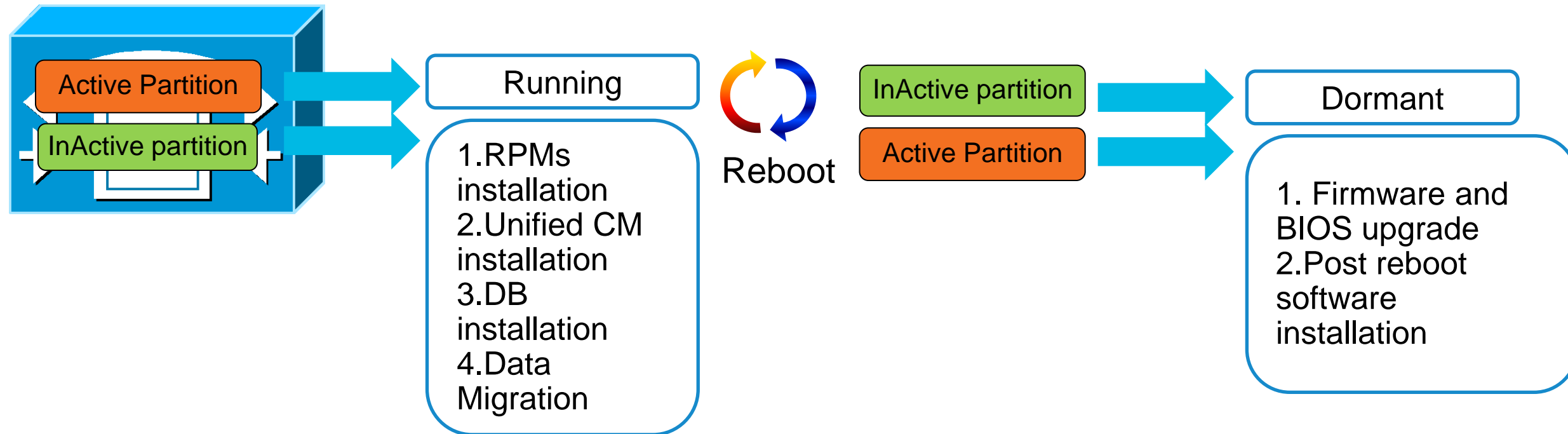Cisco Public

L2 and RU Upgrade

What type of upgrade is required?

Existing Unified CM cluster being upgraded

Upgrade to same major RHEL version

YES → Perform a L2 Upgrade

NO → Perform a RU Upgrade

Upgraded Unified CM cluster

Unified CM	RHEL Release
6.X	RHEL 3 Update 8
7.0(1)	RHEL 4 Update 4
7.1(2)	RHEL 4 Update 6
7.1(3) & 8.0(1)	RHEL 4 Update 7
8.5	RHEL 4 Update 8
8.6	RHEL 5 Update 5
9.0	RHEL 5 Update 7

Starting with Unified CM 8.6 or RHEL 5

RED HAT ENTERPRISE LINUX 5

L2 Upgrade Process

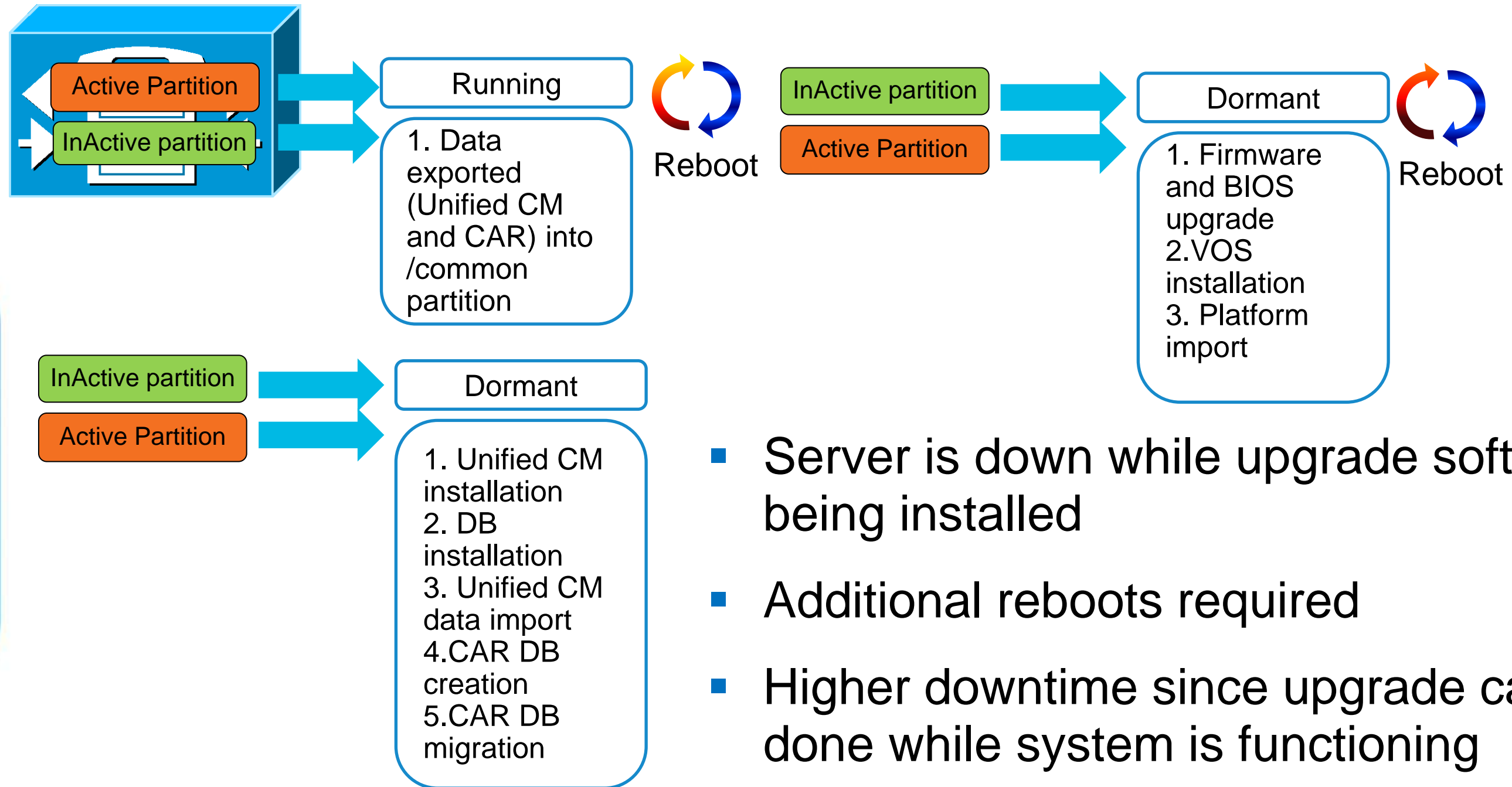| Active Partition	→ Running		InActive partition	→ Dormant
InActive partition	1.RPMs installation 2.Unified CM installation 3.DB installation 4.Data Migration	Reboot	Active Partition	1. Firmware and BIOS upgrade 2.Post reboot software installation

- Active partition is running while upgrade software is being installed on the inactive partition

- Low downtime since upgrade can be done while system is functioning

Refresh Upgrade (RU) Process

Active Partition
InActive partition

Running

1. Data exported (Unified CM and CAR) into /common partition

Reboot

InActive partition
Active Partition

Dormant

1. Firmware and BIOS upgrade
2. VOS installation
3. Platform import

Reboot

InActive partition
Active Partition

Dormant

1. Unified CM installation
2. DB installation
3. Unified CM data import
4. CAR DB creation
5. CAR DB migration

- Server is down while upgrade software is being installed

- Additional reboots required

- Higher downtime since upgrade cannot be done while system is functioning

- Upgrade is equivalent to a complete installation of Unified CM

Refresh Upgrade (RU) Recommendations

- Perform a DRS back up before upgrade

- Track console of server to monitor progress of upgrade – IP KVM, HP ILO, or IBM RSA

- Install the latest COP (ciscocm.refresh_upgrade_v1.1.cop.sgn) file to allow for successful upgrade and limit switch version after upgrade

- To minimise downtime, upgrade Publisher until completion and then upgrade first set of Subscribers while leaving some nodes performing call processing

Refresh Upgrade (RU) for MCS 7825 and MCS 7828

MCS-7825 H3/H4
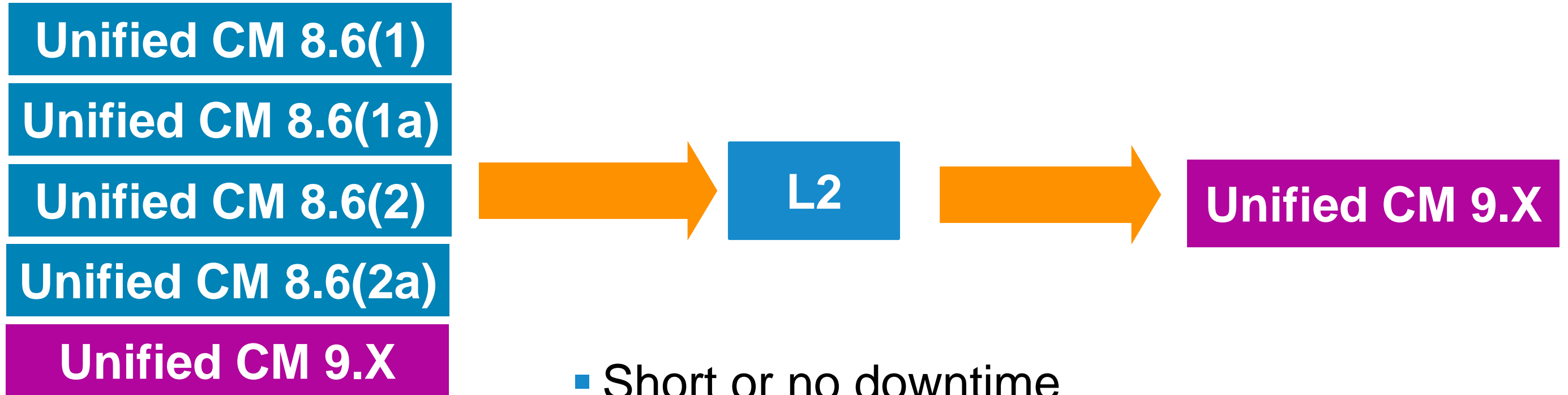MCS-7825-I3/I4/I5
MCS-7828-H3
MCS-7828-I3/I4/I5
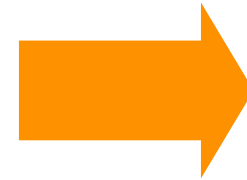
RU

MCS-7825 H3/H4
MCS-7825-I3/I4/I5
MCS-7828-H3
MCS-7828-I3/I4/I5

- Software raid and OS reinstallation by RHEL 5 requires USB key

  - CUCM- 16 GB USB drive. CUC and CUCM BE 5000 – 128 GB USB drive

  - External power USB drive. One per server. Do not remove until upgrade completes

- DRS back up before upgrade. USB data cannot be restored from new installation

- Reinstallation and DRS restore as the only reversion method

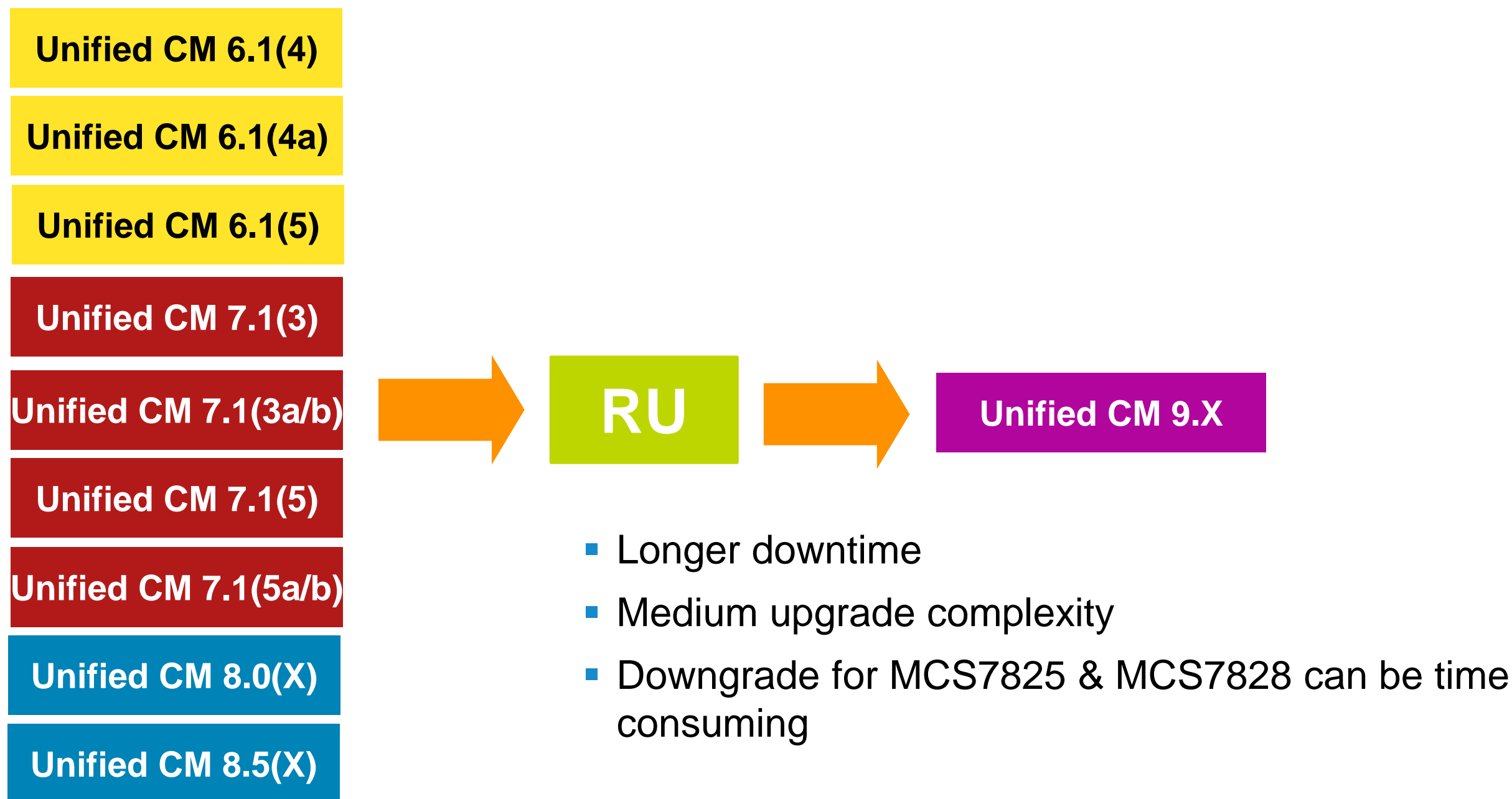- Check memory required per server (MCS7825 – 4GB, MCS7828 – 6GB) before upgrade
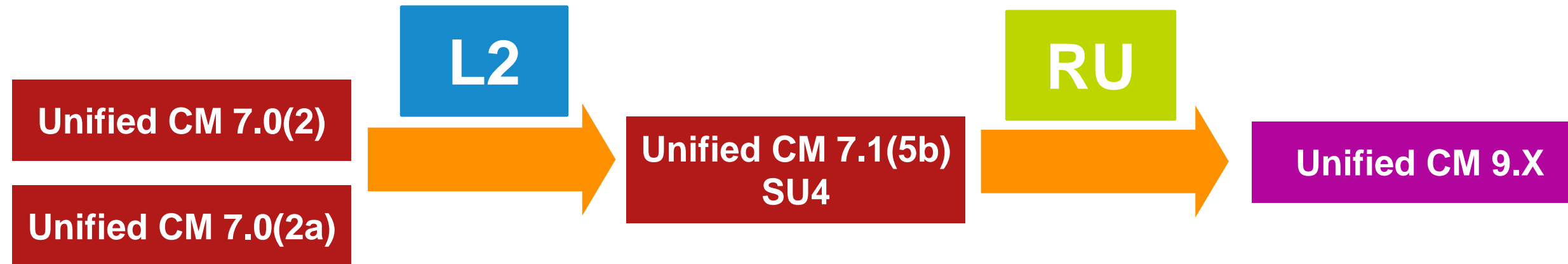
 Cisco Public

One-Step L2 Upgrades

Unified CM 8.6(1)

Unified CM 8.6(1a)

Unified CM 8.6(2) → **L2** → **Unified CM 9.X**

Unified CM 8.6(2a)

Unified CM 9.X

- Short or no downtime
- Same set of servers for Unified CM version 8.6 are supported
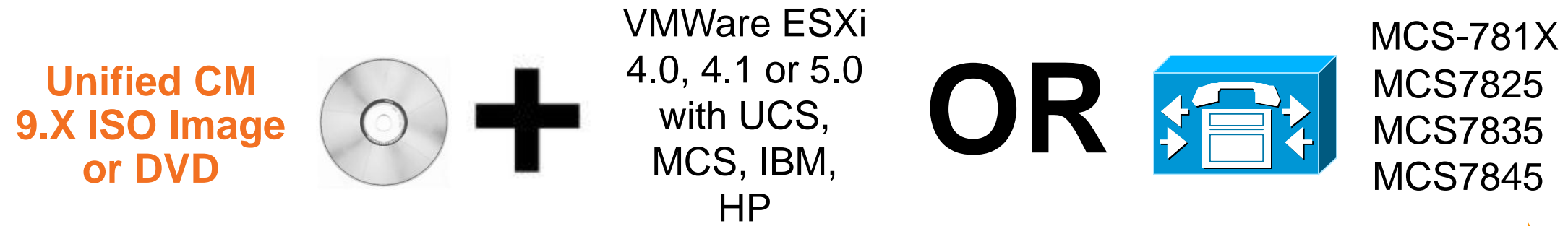
One-Step Refresh Upgrades

Unified CM 6.1(4)

Unified CM 6.1(4a)

Unified CM 6.1(5)

Unified CM 7.1(3)

Unified CM 7.1(3a/b)

Unified CM 7.1(5)

Unified CM 7.1(5a/b)

Unified CM 8.0(X)

Unified CM 8.5(X)

→ **RU** → Unified CM 9.X

- Longer downtime
- Medium upgrade complexity
- Downgrade for MCS7825 & MCS7828 can be time consuming

Two-Step Upgrades

| Unified CM 7.0(2) | **L2** → | Unified CM 7.1(5b) SU4 | **RU** → | Unified CM 9.X |
| Unified CM 7.0(2a) | | | | |

- For end of support and appliance versions of Unified CM

- Focus on the 7.1 key versions that can be upgraded to 9.X

- Can upgrade directly to an SU

Installation Process and Best Practices

Overview of Unified CM 9.X Installation

Unified CM 9.X ISO Image or DVD

+

VMWare ESXi 4.0, 4.1 or 5.0 with UCS, MCS, IBM, HP

OR

MCS-781X
MCS7825
MCS7835
MCS7845

INSTALLATION PROCESS (PROCEED) →

1

Apply SR, ES or SU

2

Basic Install

Upgrade During Installation i.e., 9.1(x)

New Installation, New Server—Flash Cut or New Server—Migration

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Unified CM 9.X Upgrade Considerations

- Cisco Attendant Console no longer included with UC Manager. Look to migrate to Cisco Unified Attendant Console – Business or Enterprise

- Media size of some version of 8.6 onwards and later will not fit on a single layer DVD. Check to ensure that servers supports dual layer DVD

- Clear out logs in common partition for upgrade

- Minimise CAR to reduce upgrade time

- CCMUser pages is revamped for users with 9.X

- Personal Address Book is not migrated for Unified CM 9.X

End-of-Sale and End-of-Life Announcement for the Cisco Unified Attendant Console::
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6789/ps7046/ps7282/end_of_life_notice_c51-499091.html

Unified CM 9.X Upgrade Considerations
(cont.)

- From version 9, Cisco Unified Presence is changed to Cisco Unified CM IM and Presence Service

- Unified CM and Unified CM IM & Presence Service major and minor software version must match.   Eg. CUCM 9.0 and IM & Presence 9.0

- Unified CM must be at the correct software level prior to the upgrade / installation of IM & Presence Service.

- Upgrades of Unified CM and Unified CM Presence and IM Service must be completed in the same maintenance window.

End-of-Sale and End-of-Life Announcement for the Cisco Unified Attendant Console::
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6789/ps7046/ps7282/end_of_life_notice_c51-499091.html

Migration Types

Server Upgrade/Migration
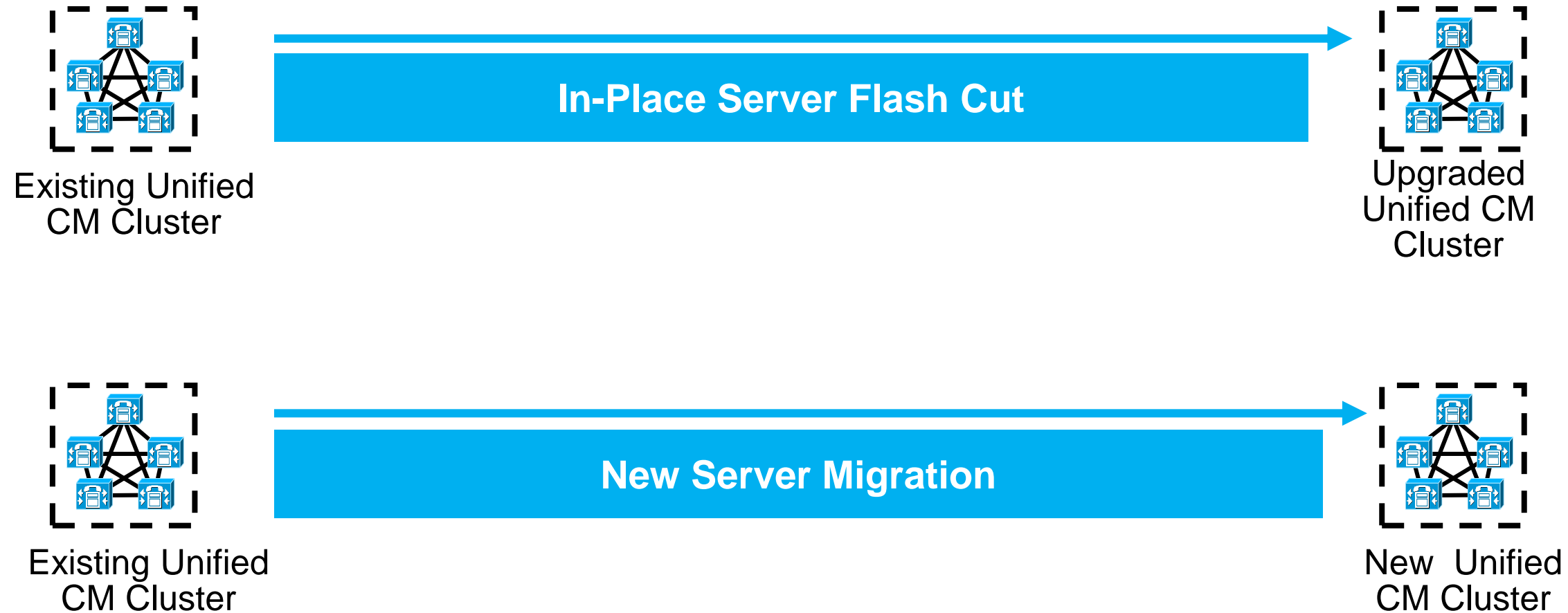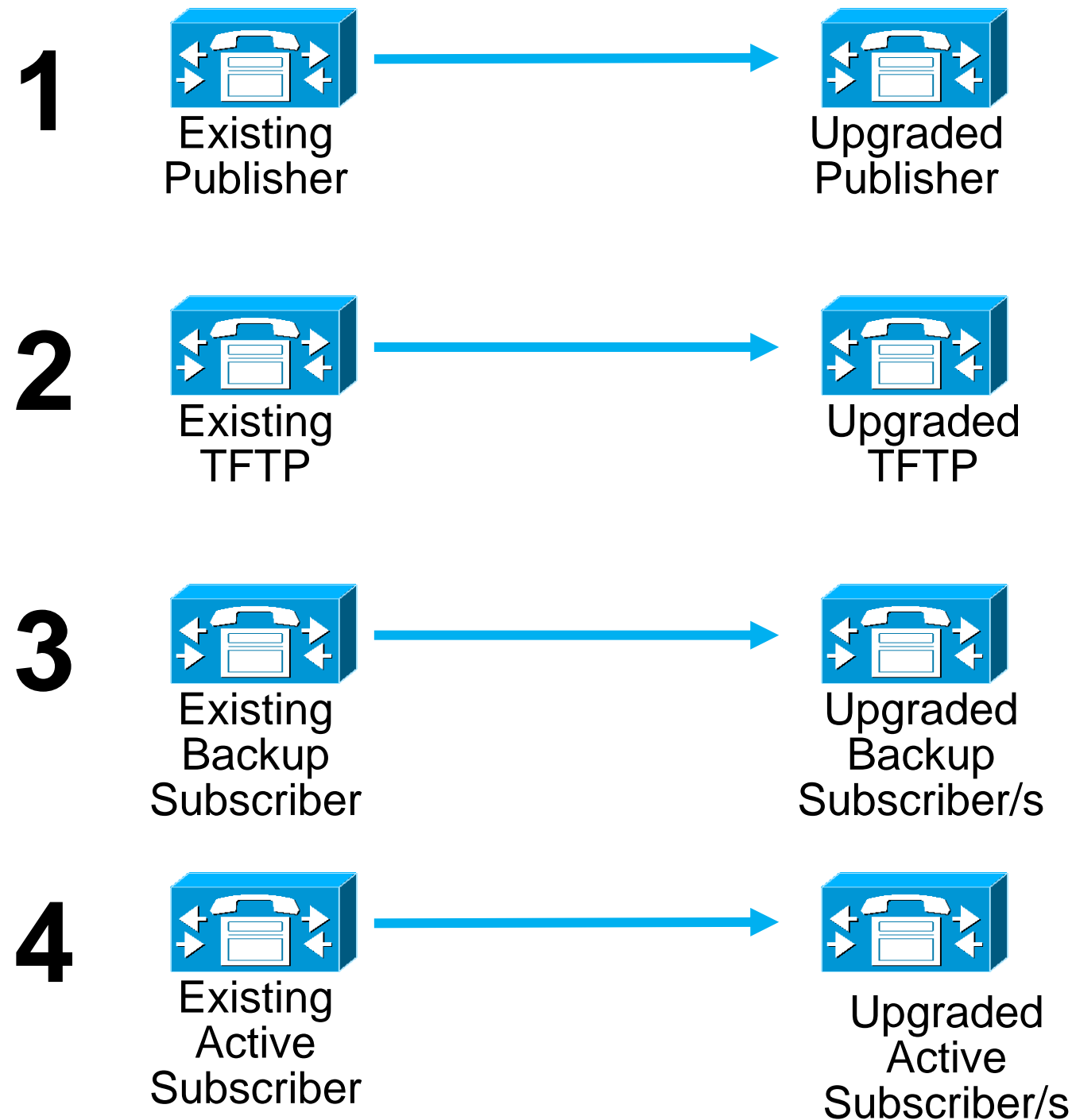
Migration Definitions

Existing Unified CM Servers in Cluster

Upgraded Unified CM Servers in Cluster

New Server Upgrade

Older Server supporting previous Version

New Server supporting previous and 9.x

In-Place Server Upgrade

Server supporting previous CCM version and 9.x
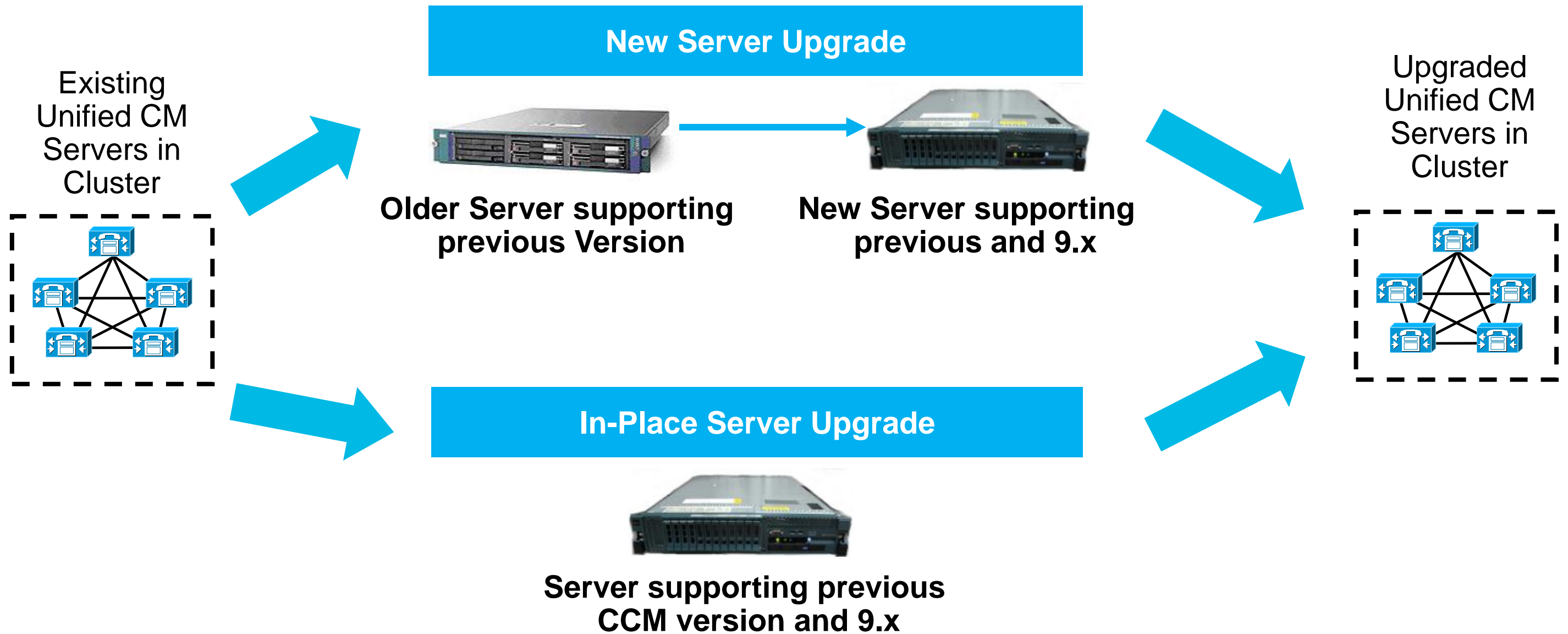
Cluster Upgrade / Migration

Migration Definitions

In-Place Server Flash Cut

Existing Unified CM Cluster → Upgraded Unified CM Cluster

New Server Migration

Existing Unified CM Cluster → New Unified CM Cluster

Cluster Upgrade

In-Place Server Flash Cut

1 Existing Publisher → Upgraded Publisher

2 Existing TFTP → Upgraded TFTP

3 Existing Backup Subscriber → Upgraded Backup Subscriber/s

4 Existing Active Subscriber → Upgraded Active Subscriber/s

- Existing server running Unified CM Version is upgraded to 9.x
- Same Hardware, same cluster
- Upgrade Publisher first, then TFTP then Subscribers
- Upgrade should be done during low utilisation
- Complete all server upgrades before switching versions

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Cluster Upgrade: New Server Migration

1 Existing Publisher → New Publisher

2 Existing TFTP → New TFTP

3 Existing Backup Subscriber → New Backup Subscriber

4 Existing Active Subscriber → New Active Subscriber
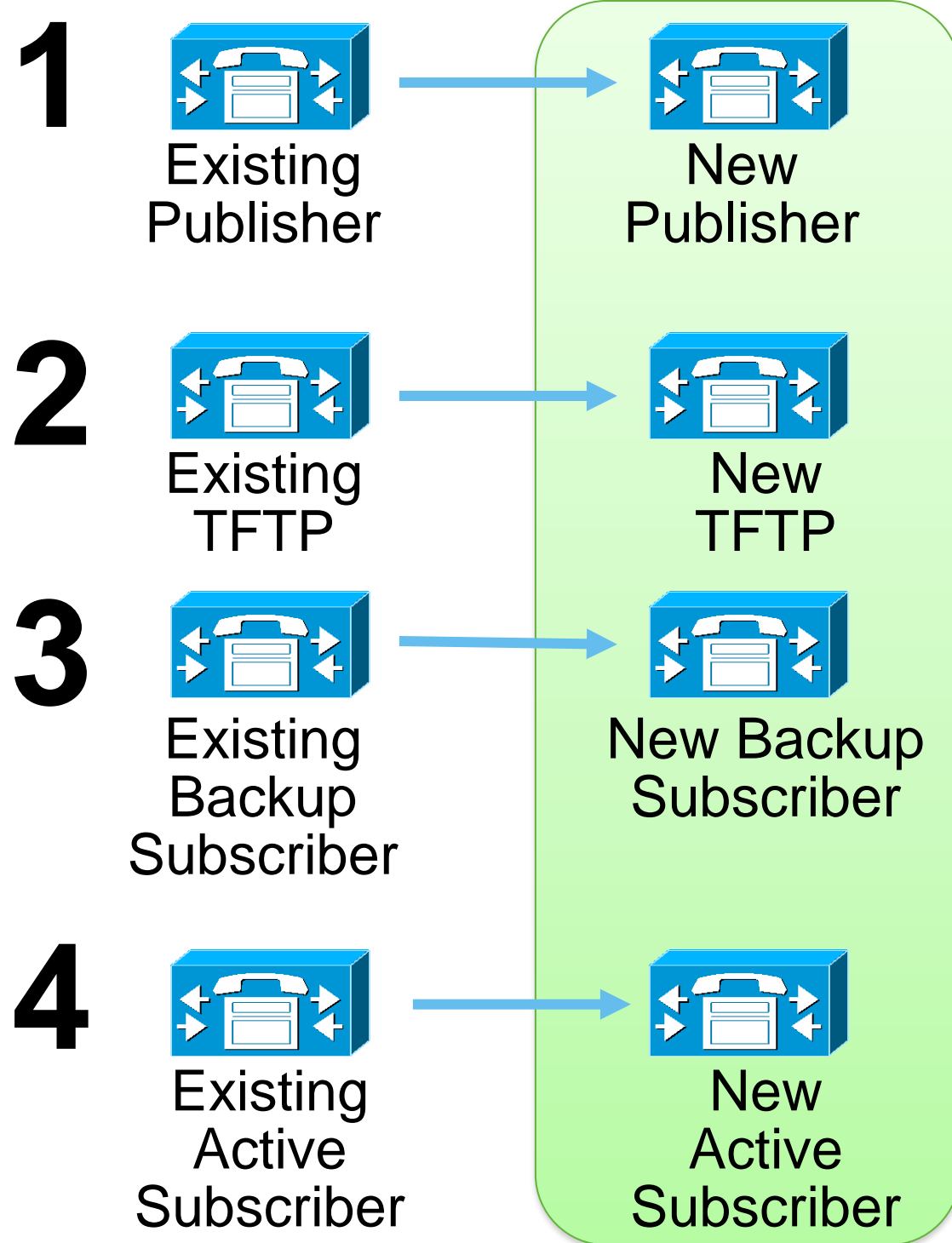
- New Cluster with new IP addressing
- Build Inter-cluster trunk between the existing and new cluster to allow partial migration
- Recommended where there are many UC applications and phases of migration is important, i.e., CUCCX
- Recommended for medium to large network especially where there are many sites and departments where migration is important
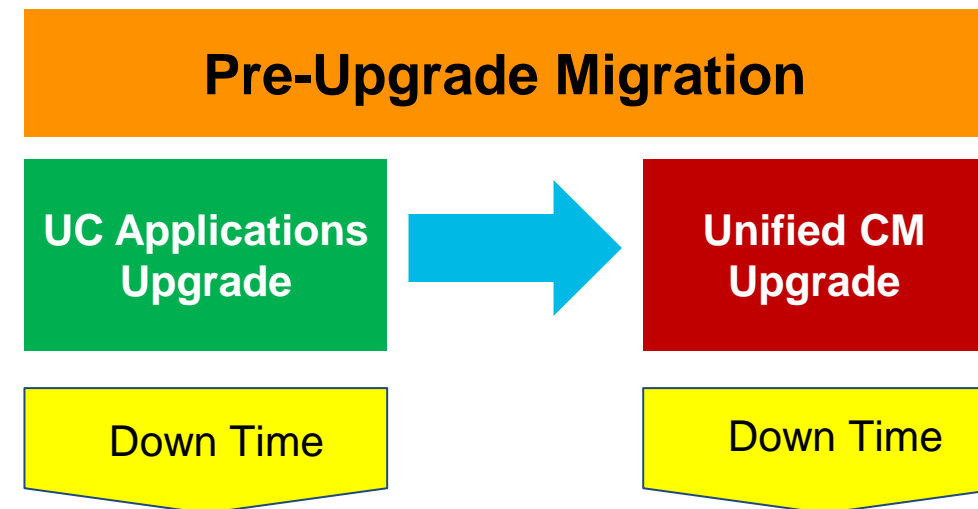- Recommended to minimise outage
- Consider network environment

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UC Application Upgrade / Migration Definition
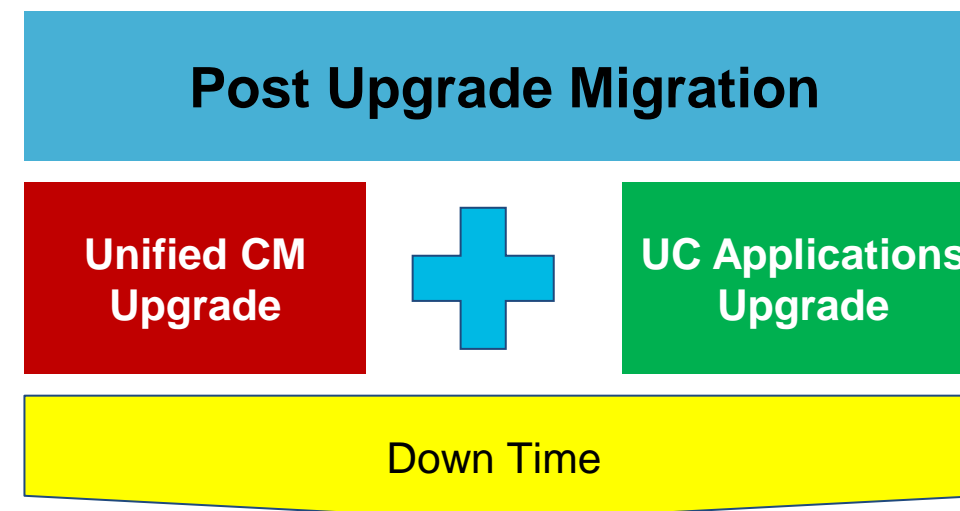
Upgrade Time Increases with Various Dependencies

UC Applications	Migration Strategy

CUxAC	CUCCE
CUCCX	CUP
MP	MPE
Unity Connection	Unity

1

Pre-Upgrade Migration

UC Applications Upgrade	→	Unified CM Upgrade

Down Time   Down Time

2

Post Upgrade Migration

Unified CM Upgrade ✚ UC Applications Upgrade

Down Time

Replacing a Cisco Unified Communications Manager Software Compatibility Matrix:
http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/compat/ccmcompmatr.html

Overall Upgrade Strategy for One-step Upgrade to Minimise Down Time

1

Phase I:

IP Phone Firmware Upgrade

2

Phase II:

UC Applications Pre-Upgrade Migration

3

Phase III:

Unified CM and UC Applications Post Upgrade Migration

4

Phase IV:

License acquisition within 60 days phase III

IP Phone Firmware → **UC Applications Upgrade** → **Unified CM Upgrade**

+

UC Applications Upgrade
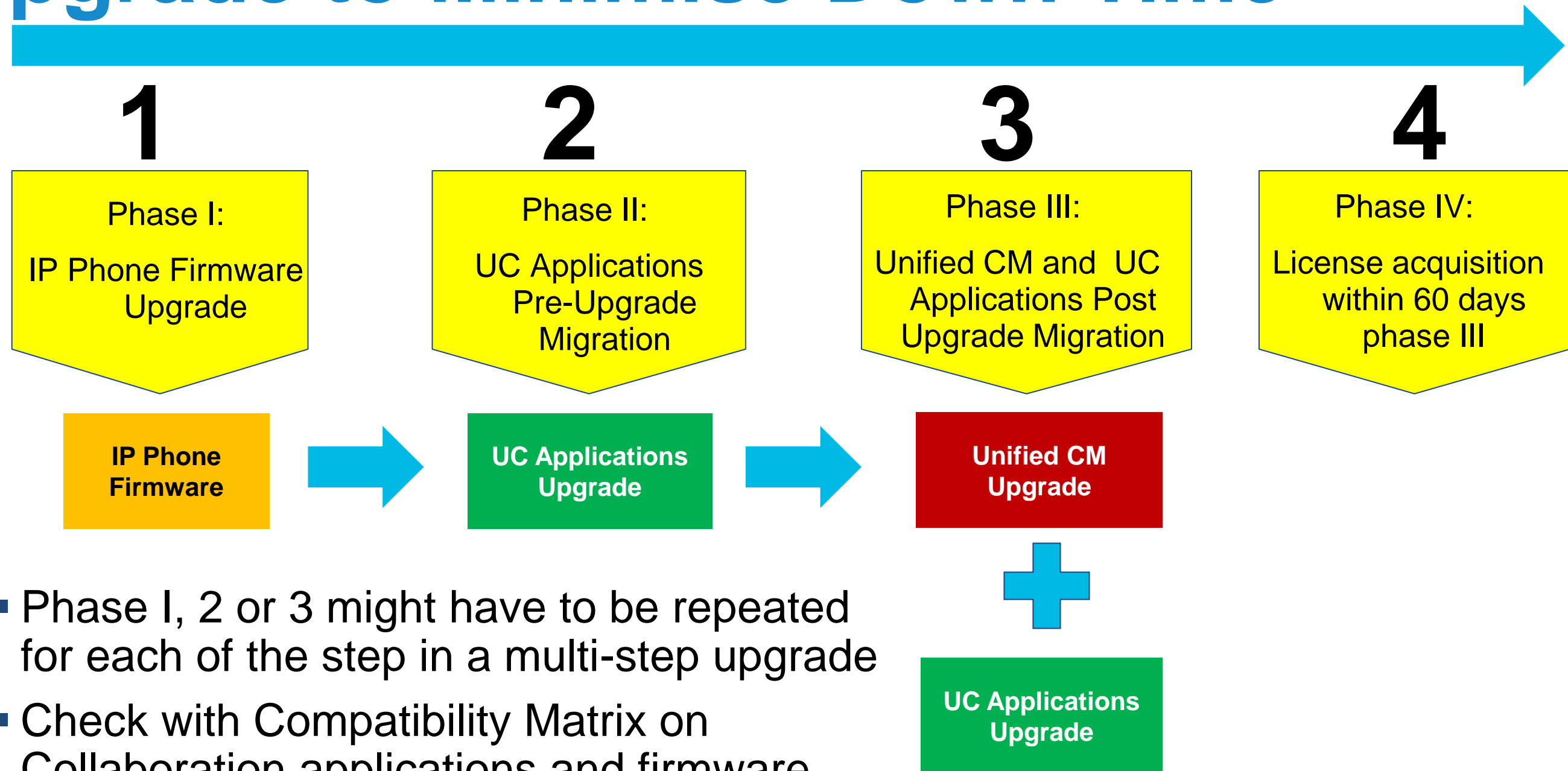
- Phase I, 2 or 3 might have to be repeated for each of the step in a multi-step upgrade
- Check with Compatibility Matrix on Collaboration applications and firmware compatibility

Cisco IP Phone Firmware by Unified CM Releases:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/compat/ccmcompmatr.html

Phase I: Phone Firmware Distribution
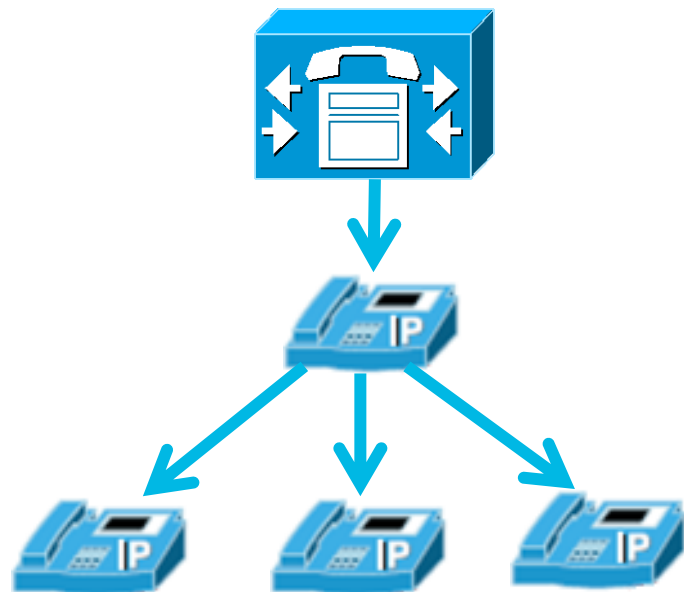
- Peer-to-Peer Image Distribution (PPID):

- Configurable via Unified CM Administration or BAT

- PPID is disabled by default on all phones models
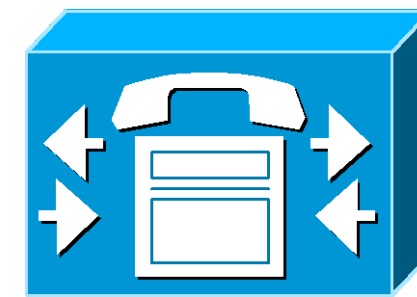
- Change TFTP service parameter for dedicated TFTP server

- System > Service Parameter > Cisco TFTP (Advanced)

- Maximum Serving Count (default is 500 for appliance)

- 1,500 for single processor dedicated TFTP server and 3,000 for dual processors dedicated TFTP server

Peer-to-Peer Image Distribution (PPID):
http://www.cisco.com/en/US/docs/voice_ip_comm/cucmbe/admin/8_5_1/ccmsys/a08ipph.html#wp1141991

Phase I: Phone Firmware Upgrade Consideration
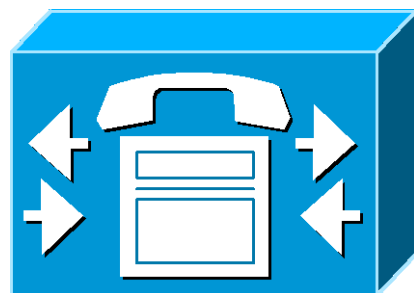
Default Firmware varies per phone model

- All third-generation IP phones:
  - Firmware release 8.3(2)SR1 or earlier must upgrade to 8.5(2) before upgrading to 8.5(2)SR1 or later
  - Consider older phones taken off another Unified CM cluster

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Phase III: Unified CM Upgrade Consideration

Install/Upgrade time for 80msec RTT Delay

DB Replication Reset Time
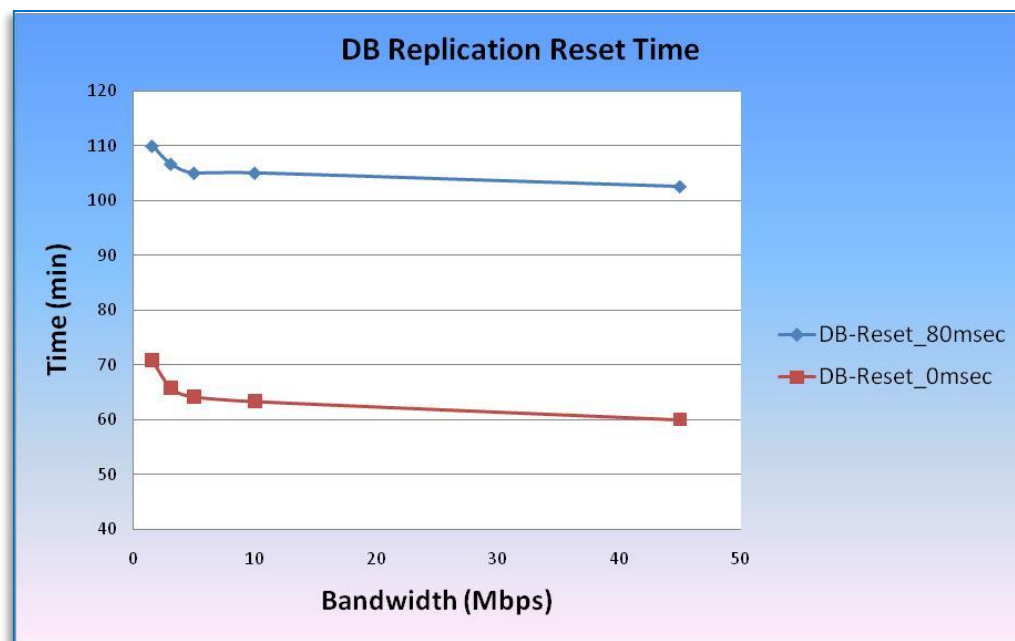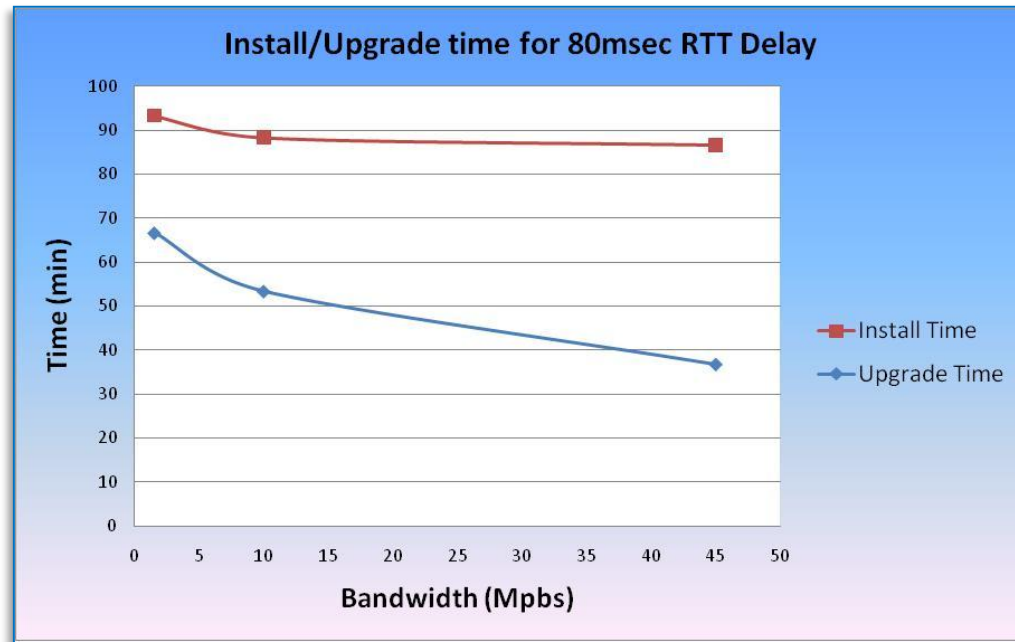
- Clustering over the WAN (COW) can increase time for installation, upgrade and database (DB) replication by 40%–50%

- Firewall between Unified CM servers can interrupt upgrade

- After upgrade, check for the following using CLI, RTMT and Unified Reporting (details in notes section)

  - DB replication state

  - Connectivity
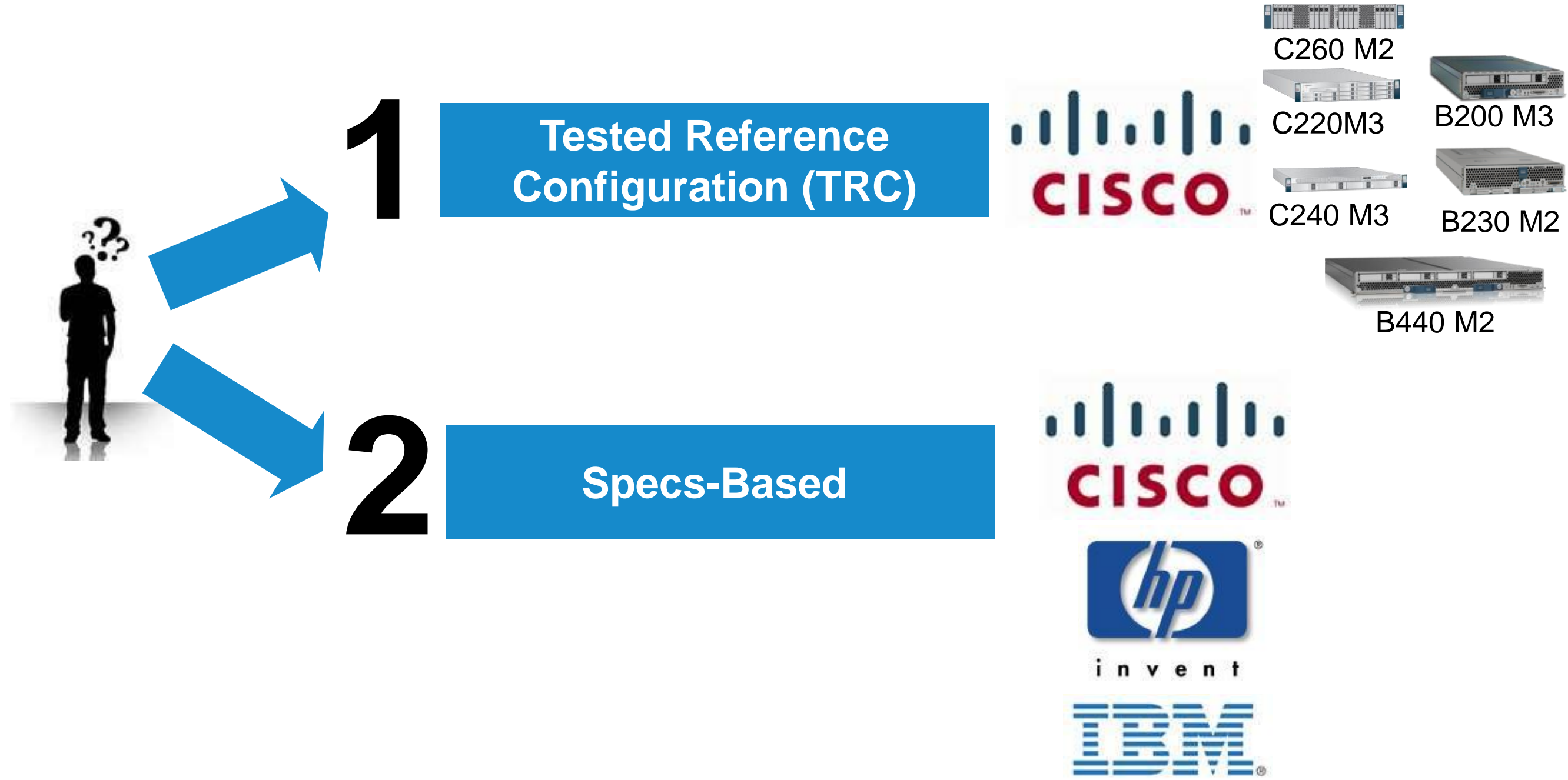
Migrating from Physical Platforms to VMWare
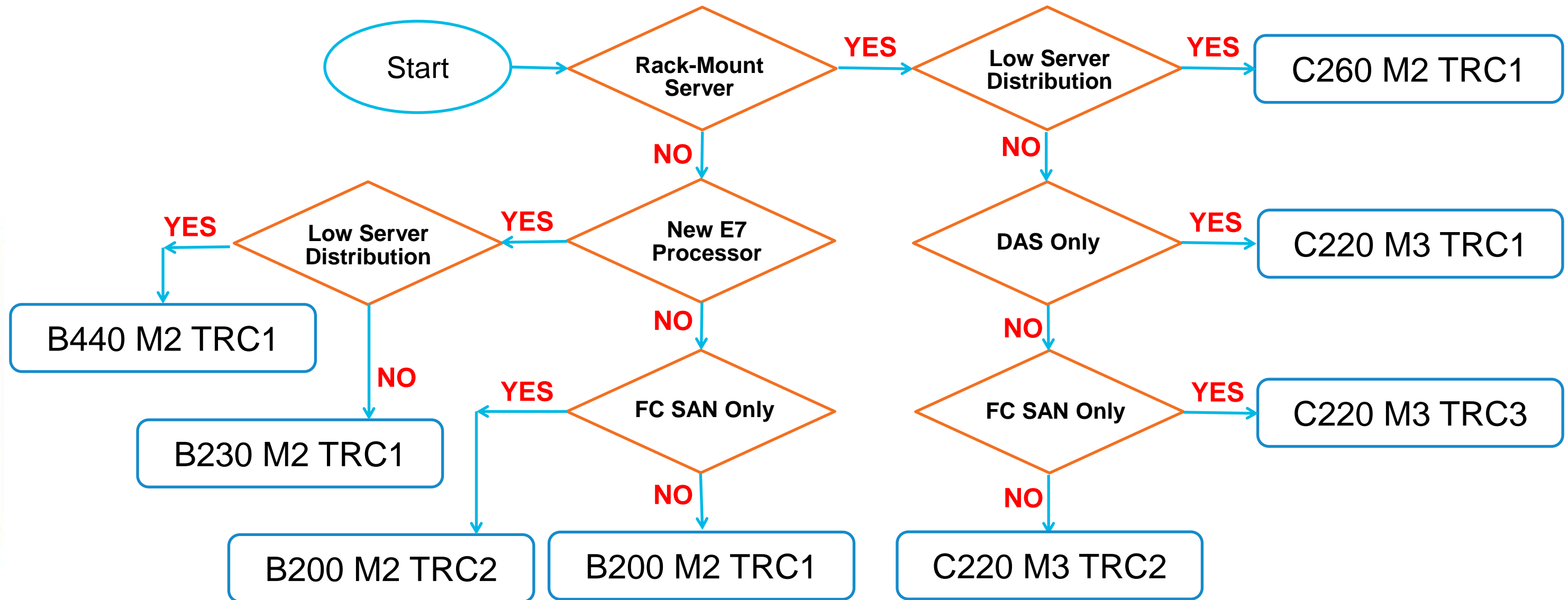
Platform Support

Tested Reference Configurations (TRC)

- Cisco prescribed hardware specifications

- Performance guarantee for UC applications

- Chassis based:

  - B440 M2, B230 M2 and B200 M3 / M2 / M1

  - DAS & FC SAN or FC SAN only

  - Full width versus half width blade

- Rack-Mount:

  - C260 M2, C240 M3, C220 M3, C210M1 / M2 / M3

- DAS only, DAS & FC SAN or FC SAN only

Tested Reference Configurations (TRC):

http://docwiki.cisco.com/wiki/Tested_Reference_Configurations_(TRC)

TRC Based Platform Decision Tree

Start → Rack-Mount Server

Rack-Mount Server — YES → Low Server Distribution — YES → C260 M2 TRC1

Rack-Mount Server — NO → New E7 Processor

New E7 Processor — YES → Low Server Distribution — YES → B440 M2 TRC1

Low Server Distribution — NO → B230 M2 TRC1

New E7 Processor — NO → FC SAN Only

FC SAN Only — YES → B200 M2 TRC2

FC SAN Only — NO → B200 M2 TRC1

Low Server Distribution — NO → DAS Only — YES → C220 M3 TRC1

DAS Only — NO → FC SAN Only — YES → C220 M3 TRC3

FC SAN Only — NO → C220 M3 TRC2

Unified Communications Virtualisation Supported Applications:

http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Supported_Applications

Specs-Based Hardware

- Customers with extensive virtualisation proficiency

- Maximum hardware choices including Cisco, HP and IBM servers that are on the VMware Hardware Compatibility list

- Use Tested Reference Configurations (TRC) for guidance

- Cisco is cannot guarantee UC VM performance

Specification-Based Hardware Support

http://docwiki.cisco.com/wiki/Specification-Based_Hardware_Support
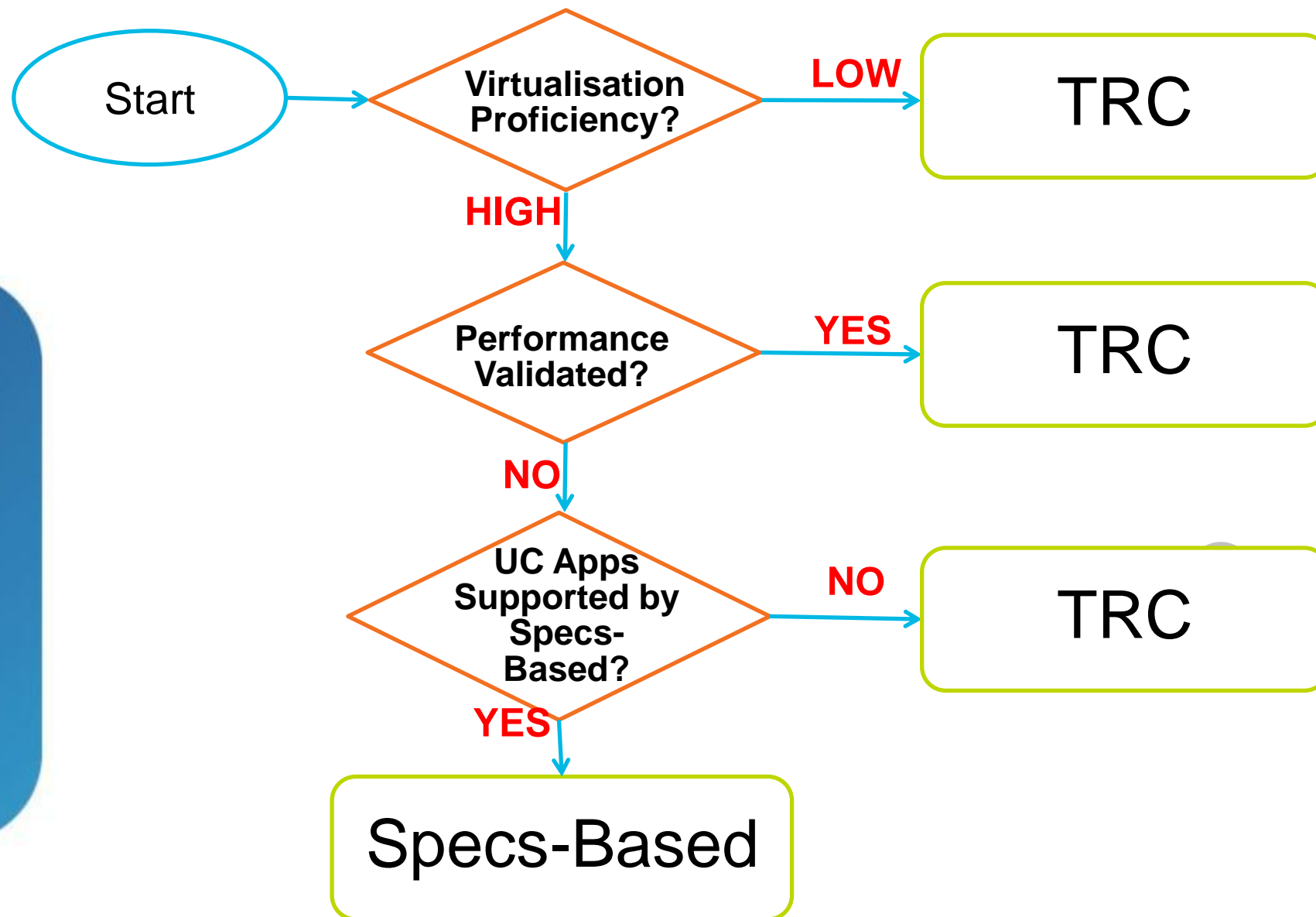
Specs-Based Hardware

Minimum Server Characteristics

- VMware vCenter is required

- CPU requirements

  - Intel Xeon 5600 family with minimum physical core speed of 2.53 GHz

  - Intel Xeon 7500 family with minimum physical core speed of 2.53 GHz

  - Intel Xeon E7-2800, E7-4800, E7-8800 family with minimum physical core speed of 2.4 GHz

  - Intel Xeon E5-2600 and E5-4600 family with minimum physical core speed of 2.5 GHz

  - C260 M2 and C210 M2

  - DAS only, DAS & FC SAN or FC SAN only

Specification-Based Hardware Support

http://docwiki.cisco.com/wiki/Specification-Based_Hardware_Support

TRC or Specs-Based Decision Tree

Start → Virtualisation Proficiency? — LOW → **TRC**

Virtualisation Proficiency? — HIGH ↓

Performance Validated? — YES → **TRC**

Performance Validated? — NO ↓

UC Apps Supported by Specs-Based? — NO → **TRC**

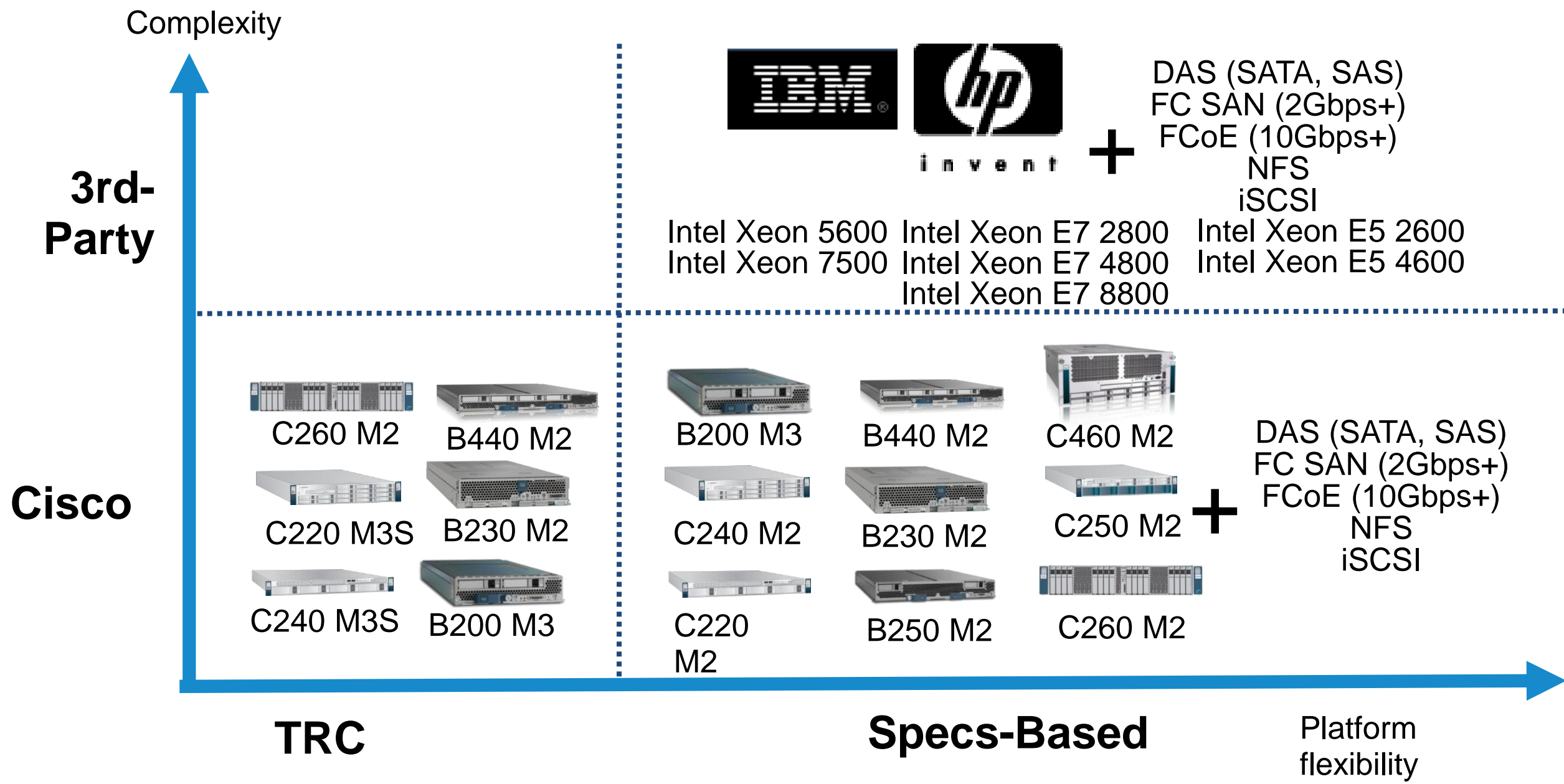UC Apps Supported by Specs-Based? — YES ↓

Specs-Based

- Evaluation criteria for platform decision varies based on organisation priorities
  - Virtualisation proficiency
  - Performance guarantee
  - Supported applications
  - Platform and vendor choices
- Solution should be consistent, but can be hybrid

Unified Communications Virtualisation Supported Applications:

http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Supported_Applications

Platform Options

Complexity

3rd-Party

DAS (SATA, SAS)
FC SAN (2Gbps+)
FCoE (10Gbps+)
NFS
iSCSI

Intel Xeon 5600	Intel Xeon E7 2800	Intel Xeon E5 2600
Intel Xeon 7500	Intel Xeon E7 4800	Intel Xeon E5 4600
	Intel Xeon E7 8800	

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C260 M2   B440 M2   B200 M3   B440 M2   C460 M2   DAS (SATA, SAS)
                                                                   FC SAN (2Gbps+)
C220 M3S   B230 M2   C240 M2   B230 M2   C250 M2 **+**   FCoE (10Gbps+)
                                                                   NFS
C240 M3S   B200 M3   C220   B250 M2   C260 M2   iSCSI
                            M2

TRC   **Specs-Based**   Platform flexibility

* Design tip: Ensure that all UC applications are supported on selected platform

Tested Reference Configurations (TRC):

http://docwiki.cisco.com/wiki/Unified_Computing_System_Hardware

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VMware Support

VMware vSphere Support
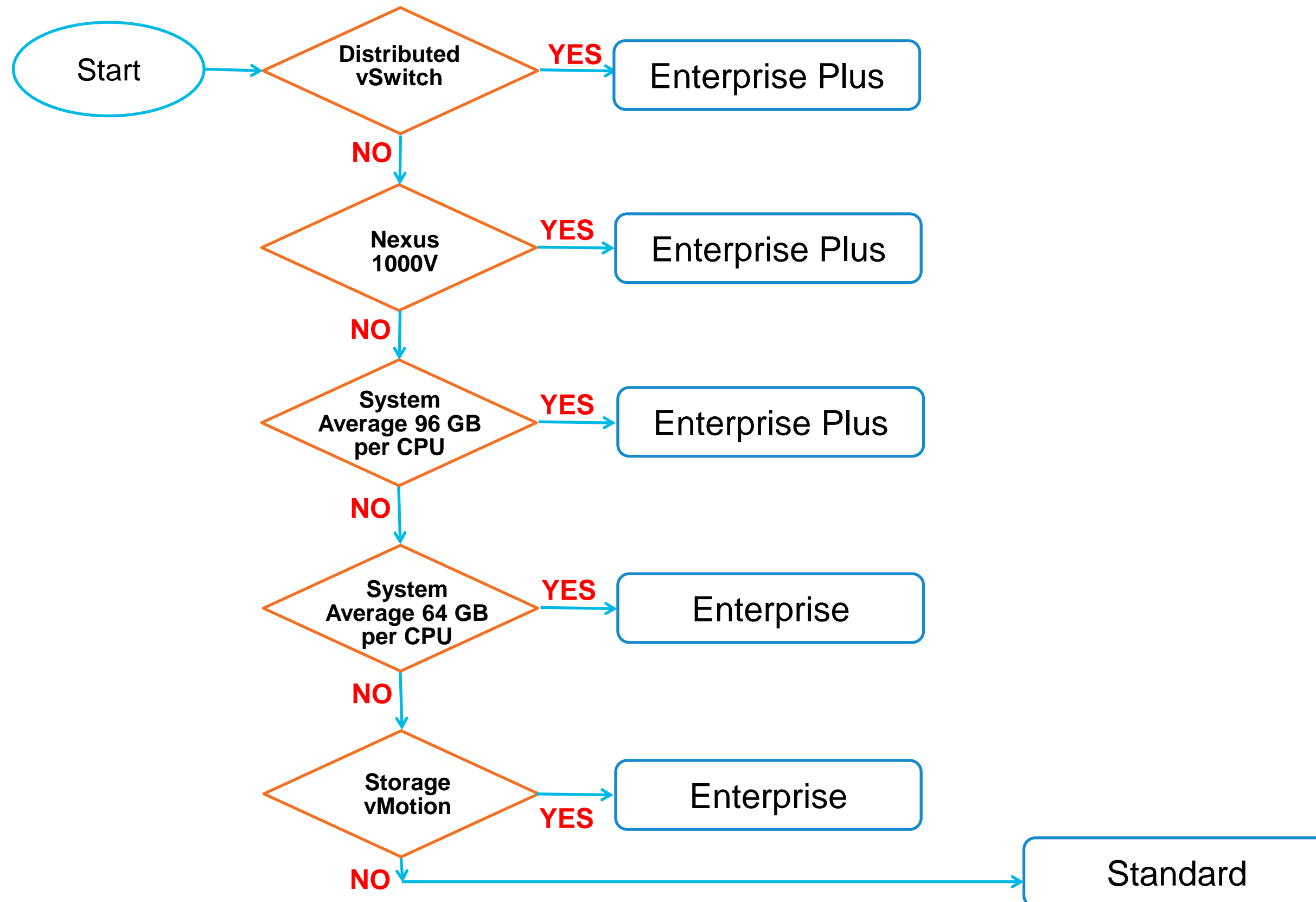
- ESXi 4.0, 4.1 and 5.0 (No ESX)

    - VMware vSphere Hypervisor, Essential, Essential Plus, Acceleration Kit, Standard, Enterprise or Enterprise Plus

    - ISO for Cisco UCS for appropriate driver support is at:

    - http://downloads.vmware.com/d/details/esxi41_cisco_oem_iso/ZHcqYnRkdHdiZCVodw

    - http://downloads.vmware.com/d/details/rollupiso_50_2/dHRAYndlZEBiZHAIJQ

- VMware vCenter (Essential, Foundation or Standard)

    - Recommended for large deployment. centralise management, vRAM pooling, license management, etc.

    - Mandatory for Specs-Based deployment

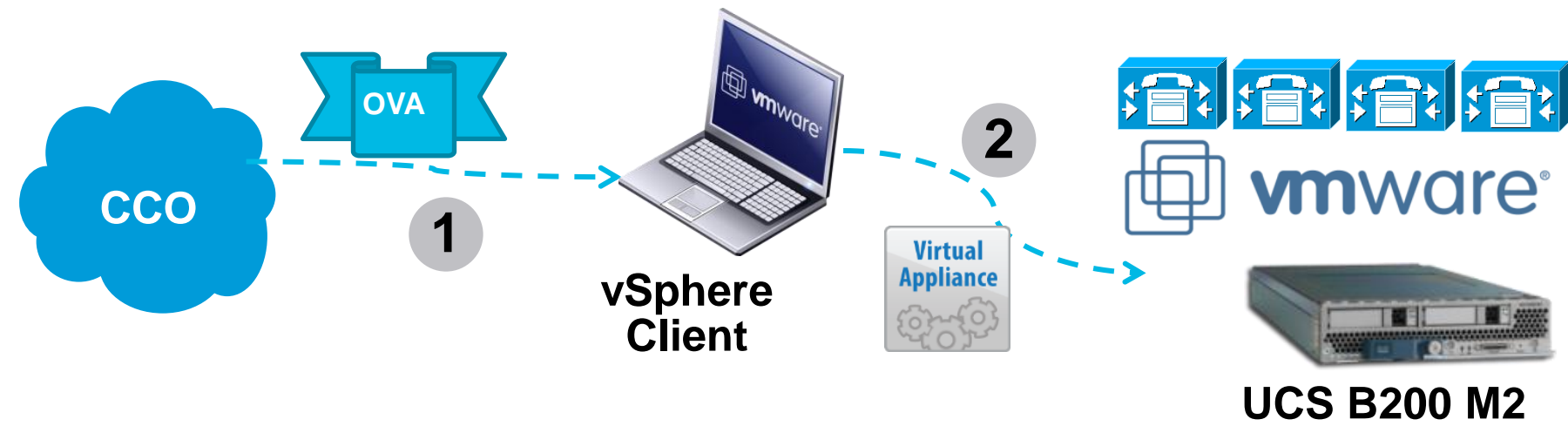- VMware acquisition: Cisco, Partner or VMware

Hypervisor Support for Virtualised UC:

http://docwiki.cisco.com/wiki/Unified_Communications_VMWare_Requirements

ESXi 5.0 Edition Decision Tree for Cisco UC

Start → **Distributed vSwitch** — **YES** → Enterprise Plus

NO ↓

Nexus 1000V — **YES** → Enterprise Plus

NO ↓

System Average 96 GB per CPU — **YES** → Enterprise Plus

NO ↓

System Average 64 GB per CPU — **YES** → Enterprise

NO ↓

Storage vMotion — **YES** → Enterprise

NO → Standard

# Cisco Virtual Template (OVA) File

- Open Virtual Format (OVF) is a collection of files (workload states, meta files, description file, etc.) describing virtual machines.

- Open Virtual Archive (OVA): Portable virtual appliance that defines configuration (memory, storage space, etc.) for a virtual machine and is a compressed version of OVF

- Cisco will provide OVA files on CCO for UC applications deployment

- VMware virtual machine hardware version (VMV)

    - VMV 7 = ESXi 4.0, 4.1 or 5.0

    - VMV 8 = ESXi 5.0 (To upgrade, right click and select upgrade virtual hardware). Cannot be downgraded to 7

OVA Files for UC on UCS Deployments:

http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Downloads_%28including_OVA/OVF_Templates%29

CUCM and VMware Guest OS Type

RHEL 4

CUCM
8.0 or 8.5

Upgrade
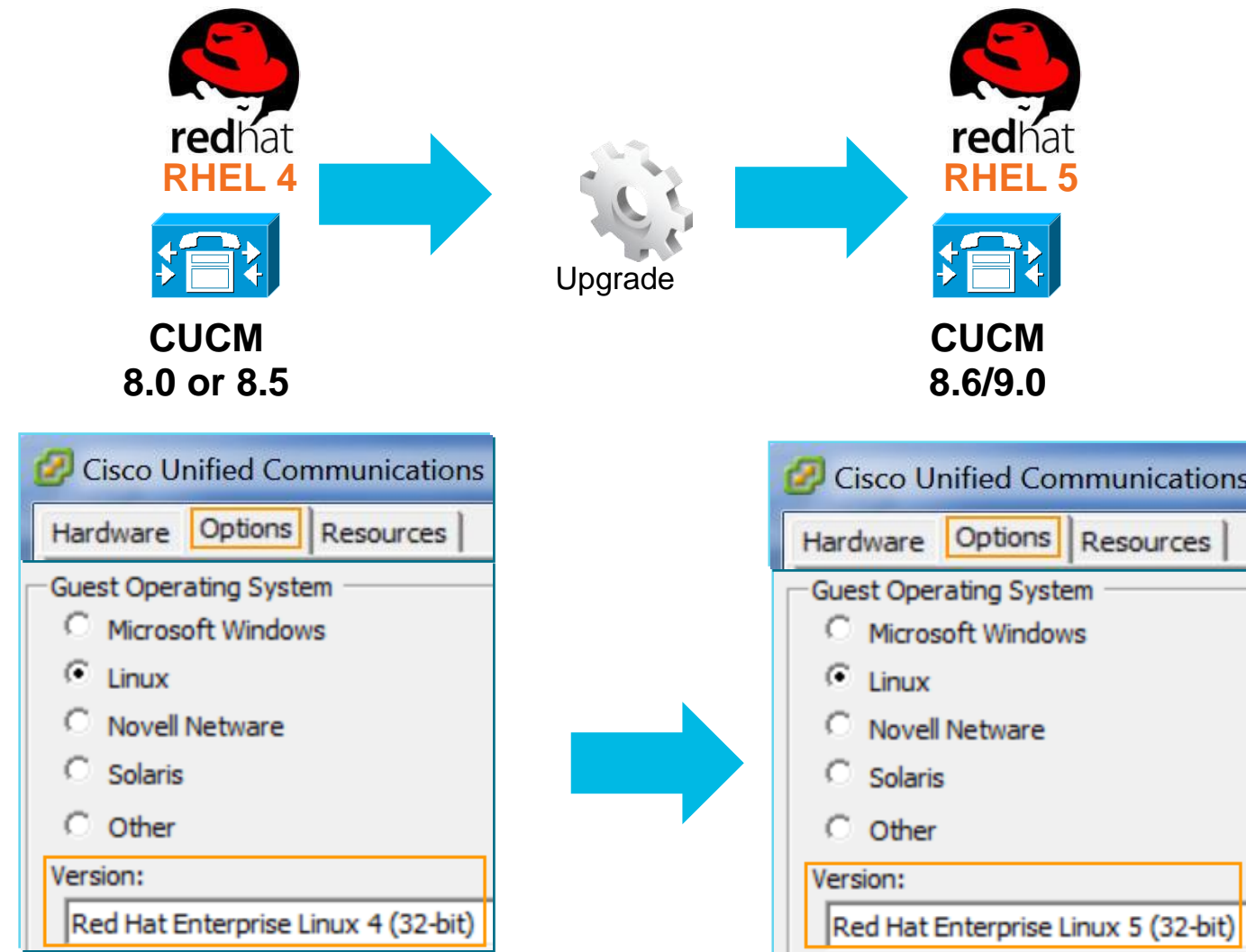
RHEL 5

CUCM
8.6/9.0

Unified CM	RHEL Release
5.0(4)	RHEL 3 Update 6
5.1(x) & 6.X	RHEL 3 Update 8
7.0(1)	RHEL 4 Update 4
7.1(2)	RHEL 4 Update 6
7.1(3) & 8.0(1)	RHEL 4 Update 7
8.5	RHEL 4 Update 8
8.6	RHEL 5 Update 5
9.0	RHEL 5 Update 7

* Upgrade to CUCM 9.x from previous appliance other than 8.6 is a "Refresh Upgrade" with more downtime

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For Further Detail on Designing UC on Virtualised Platforms:

- BRKUCC-2225: Planning and Designing Virtualised Unified Communications Solutions
- 2:30pm – 4:00pm today
- www.ciscolive365.com

UC Application Migration

Servers Supporting Unified CM 9.X

Mode	Server Model
Production	MCS-7816-H3, MCS-7816-I3, MCS-7816-I4, MCS-7816-I5, MCS-7825-H3, MCS-7825-H4, MCS-7825-I3, MCS-7825-I4, MCS-7825-I5, MCS-7828-H3, MCS-7828-I3, MCS-7828-I4, MCS-7828-I5, MCS-7835-H2 V02, MCS-7835-I2 V02, MCS-7835-I3 V01-V04, MCS-7835-I3 V05, MCS-7845-H2 V02, MCS-7845-I2 V02, MCS-7845-I3 V01-V04, MCS-7845-I3 V05
Bridge Mode	MCS-7815I-3.0, MCS-7815-I1, MCS-7815-I2, MCS-7825H-3.0 MCS-7825I-3.0, MCS-7835H-3.0, MCS-7835-H1 , MCS-7835-H2, MCS-7835I-3.0, MCS-7835-I1, MCS-7835-I2, MCS-7845H-3.0, MCS-7845-H1, MCS-7845-H2, MCS-7845I-3.0, MCS-7845-I1, MCS-7845-I2

Production Upgrade / Platform Conversion

Supports 9.x

Refresh Upgrade

Unified CM 9.x on MCS in Production
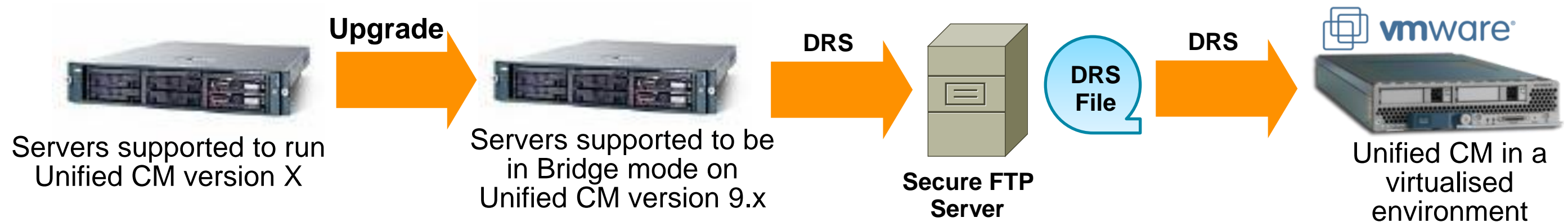
Platform Conversion with DRS

Unified CM 9.x Virtualised in Production

- For servers that can run 9.x

- Upgrade to CUCM 9.1 and run in production

- Upgrade and align all of the other UC applications Unified CM 9.1

- Migrate to UCS as required

  - Co-exist with other MCS servers for SMDI or USB MOH

Bridge Upgrade for Platform Conversion

Upgrade

Servers supported to run Unified CM version X

Servers supported to be in Bridge mode on Unified CM version 9.x

DRS

Secure FTP Server

DRS File

DRS

Unified CM in a virtualised environment

- Bridge Upgrade is available starting with 8.0(2)
  - Allows for a successful upgrade with CM service in shutdown state
  - Extended upgrade for older platforms to enable platform changes using DRS
  - Use case for MCS and UCS platform change or older servers that need a platform change

- Requires rehost of license file due to MAC or License MAC change caused by server change
  - For a virtualised environment, use Answer File Generator to proactively obtain license file

Replacing a Single Server or Cluster for Cisco Unified Communications Manager:

http://www.cisco.com/en/US/partner/docs/voice_ip_comm/cucm/install/8_0_2/cluster/clstr802.html

Interim Upgrade to 8.0/8.5 for Platform Conversion
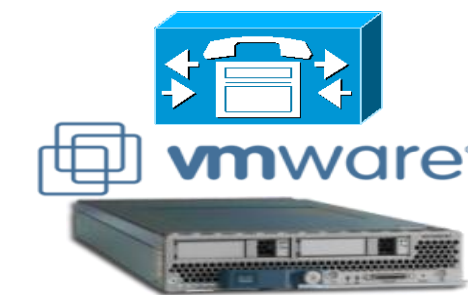
Supports 8.0 /8.5 but not 8.6 / 9.x

L2 Upgrade

CUCM 8.0 / 8.5 on MCS in Production or Bridge

Platform Conversion with DRS

CUCM 8.0 or 8.5 on UCS in Production

Refresh Upgrade

CUCM 9.x on UCS in Production

- For Servers that do not support Unified CM9.x, but can run 8.0 or 8.5
- Upgrade to CUCM 8.x and run in production where possible
- Align all of the other UC applications to latest supported version of Unified CM 8.x if running 8.x in prod.
- Requires re-host of license when moving to virtualised due to license MAC change
- Migrate to Virtualised Platform as required

Step Platform Conversion

Unsupported Servers	→	Supported Servers

Platform Conversion with DRS

- Servers that can not be upgraded to Unified CM 8.0(2) or later

- Use DRS to swap appliance to a supported server (bridge hardware)

- Use the appropriate conversion option to get to virtualised

- Using VMware in-lieu of bridge hardware is **not** supported

UC on UCS Platform Conversion with BAT

Current Unified CM Server → BAT Export → **BAT Data** → BAT Import → vmware

CUCM 9.x virtualised in Production

- Leverage CUCM 7.1 or later Bulk Administration Tool (BAT) and export all data
- Use BAT to import all data in to the newly installed virtualised Unified CM system
- Normalise services in each CUCM node
- Migration can be done with dual clusters

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Migration Recommendations

Planning Phase

Survey

- Applications, Versions, OS / Firmware
- Services
- User Facing Features

Documentation

- Current environment
- Proposed Environment
- Interim versions

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Design Phase

Design

- New version Design
- Check docwiki for frequent changes

Migration Plan

- Migration Process
- Feature Deployment Schedule

Rollback Process

- Determine Rollback

Implementation Phase

Build

- Phase 1 - Phone Firmware
- Phase 2 – Pre-Upgrade Apps
- Phase 3 – Perform Upgrade

Cutover

- Benchmark verification
- Functionality testing

References

- www.google.com :-)
- Cisco UC Virtualisation Docwiki:
  – http://docwiki.cisco.com/wiki/Unified_Communications_in_a_Virtualized_Environment
- Cisco UC 9.0(1) System Release Documentation
  – http://www.cisco.com/cisco/web/docs/iam/unified/ipt901/index.html
- Cisco UC Manager Documentation Guide
  – http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/docguide/9_1_1/CUCM_BK_CBABE0BB_00_cucm-documentation-guide-91.pdf
- Cisco UC Manager supported releases by server
  – http://www.cisco.com/en/US/partner/prod/collateral/voicesw/ps6790/ps5748/ps378/prod_brochure0900aecd8062a4f9.html

Q & A

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APPENDIX

CUCM 9.x License States

- **Demo:** Warning displayed : The system is operating on demo licenses that will expire in <X> days. Add this system to an Enterprise License Manager and install sufficient licenses to cover its usage before expiration in order to avoid losing the ability to provision users and devices.

- **No Provisioning: Warning displayed:** The system is operating without any valid licenses. Configure licenses on the system in order to restore the ability to provision users and devices.

- **Overage: Warning displayed:** The system is operating with an insufficient number of licenses. If additional licenses to cover the shortage are not configured in your Enterprise License Manager within <X> days, you will no longer be able to provision users and devices.

- **Lost connection to ELM:** Warning displayed: The system has not synchronised successfully with Enterprise License Manager for <X> days. If successful synchronisation does not occur within the next <60-X> days, you will no longer be able to provision users and devices.

- **Security mismatch with ELM:** Warning displayed: Due to a certificate mismatch, the system has not synchronised successfully with Enterprise License Manager for <X> days. If successful synchronisation does not occur within the next <60-X> days, you will no longer be unable to provision users and devices.

- **Grace: Warning displayed:** The system is operating under a licensing grace period that will expire in 1 day. Install sufficient licenses in the Enterprise License Manager for this system to cover its usage in order to avoid losing the ability to provision users and devices.

CUCM 9.x License State Change Notes

- To change from No-Provisioning state to Grace state, a reboot of the Publisher is required. One more day of MAC.

- 60 days grace period in non-compliant modes (Overage, Lost Connection to ELM and Security Mismatch) will not reset until in Compliant mode.

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Enterprise License Manager
License Structure and Substitution

UCL - Essential

UCL Basic

UCL Enhanced / Enhanced Plus

CUWL Standard

CUWL Professional

User License Substitution

- Two license types: User license and Feature license

- Licenses are based on hierarchical model where lower feature license can be covered by a higher one

  - I.E. UCL Basic can be covered by UCL Enhanced

  - I.E. CUWL Standard can be covered by CUWL Professional

  - Refer back to Phone Model and Phone Type slide for UCL/CUWL correlation

- CUELM evaluates ALL systems license requirements on a per product (CUCM and CUC) basis and responds with one consistent response to ALL registered systems

  - VALID: adequate license

  - INVALID: inadequate license

- Centralised and system level licensing view

Example of License State

1. CUCM new installation will be in CUCM demo mode for 60 days with unlimited users, phones and nodes capability

2. After 60 days, CUCM will be in no-provisioning mode - No MACs

3. When CUCM is added to ELM, CUCM will go off demo mode or no-provisioning mode and depends on CUELM for licensing

4. CUELM without license will be in CUELM demo mode for 60 days.

5. CUELM responds to CUCM with INVALID

6. CUCM will be in no-provisioning mode until CUELM is licensed

7. License evaluation is on a per product (CUCM or CUC) basis

Non-Compliant mode are product specific

1. CUCM will be in Overage mode, works for 60 days and change to no-provisioning mode

2. CUC works for 60 days and then shutdown with no voice messaging services

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