Prerequisites for the Cisco NCS 4000 Single Chassis to Multi Chassis Migration

This chapter details the prerequisites required for the migration of a single chassis system to a multi chassis system.

Prerequisite: General Setup

The complex multi chassis upgrade requires setting the necessary environment at the customer location prior to the migration window. These are critical for the overall preparation of the upgrade and should be completed at every site that will required deployment topology upgrade.

Following are the pre-requisites that should be completed before the migration activity can begin:

- **Environment Variables**

  There are environmental factors that should be considered prior to the deployment of the NCS4K Multi-Chassis. This includes completion of the Site Survey for power, cooling and floor space requirements needed to deploy the additional NCS chassis as this is the first step to be completed prior to the chassis being installed into the specific location(s).

- **Chassis Setup and Installation**

  The additional chassis will be installed as per the Cisco space and power specifications. The FCC chassis should have the required LCC and FCC fabric cards inserted and use MPO fabric cables.

  This design requires that (4) fabric cards serve as a single plane. Each LCC fabric card (plane) connects to (4) FCC fabric cards.

  Example:

  For a 2+2 upgrade, one LCC and two FCC to an existing production LCC running a current release.

Table 1: Fabric Plane FCC Distribution(Horizontal Plane Mode)

Plane	FCC0 FC	Plane	FCC1 FC
Plane 0	0	Plane 2	0
	1		1
	2		2
	3		3
Plane 1	4	Plane 3	4
	5		5
	6		6
	7		7

Table 2: Fabric Plane FCC Distribution(Vertical Plane Mode)

Plane	FCC0 FC	Plane	FCC1 FC
Plane 0	0	Plane 2	0
	1		1
	4		4
	5		5
Plane 1	2	Plane 3	2
	3		3
	6		6
	7		7

Table 3: RP Cards to SC-SW Card Connections (2+2 Configuration)

From Line Card Chassis	LCC RP Port	To SC-SW cards in Fabric Card Chassis
LCC0	RP0 EXP0	FCC0, SC0 any switch port
	RP1 EXP0	FCC0, SC0 any switch port
	RP0 EXP1	FCC1, SC0 any switch port
	RP1 EXP1	FCC1, SC0 any switch port

From Line Card Chassis	LCC RP Port	To SC-SW cards in Fabric Card Chassis
LCC1	RP0 EXP0	FCC0, SC0 any switch port
	RP1 EXP0	FCC0, SC0 any switch port
	RP0 EXP1	FCC1, SC0 any switch port
	RP1 EXP1	FCC1, SC0 any switch port

Table 4: SC-SW and SC Card Connections (2+2 Configuration)

From SC-SW Card	To SC-SW Card
FCC0, SC0 EXP0	FCC0, SC0 any switch port
FCC0, SC0 EXP1	FCC1, SC0 any switch port
FCC1, SC0 EXP0	FCC0, SC0 any switch port
FCC1, SC0 EXP1	FCC1, SC0 any switch port
FCC0, SC0 HS0 (40 GE)	FCC1, SC0 HS0 (40 GE)
FCC0, SC0 HS1 (40 GE)	FCC1, SC0 HS1 (40 GE)

From SC Card	From SC-SW Card
FCC0, SC1 EXP0	FCC0, SC0 any switch port
FCC0, SC1 EXP1	FCC1, SC0 any switch port
FCC1, SC1 EXP0	FCC0, SC0 any switch port
FCC1, SC1 EXP1	FCC1, SC0 any switch port

Prerequisite: Updating the Software Image

This task enables the user to update the LCC and the FCC to the latest image with MC support. These are the supported number of LCCs and FCCs for the various MC configurations.

- 1+1 MC configuration - 1 LCC and 1 FCC

- 2+1 MC configuration - 2 LCCs (LCC0, LCC1) and 1 FCC

- 3+1 MC configuration - 3 LCCs (LCC0, LCC1, LCC2) and 1 FCC

- 4+1 MC configuration - 4 LCCs (LCC0, LCC1, LCC2, LCC3) and 1 FCC

- 1+2 MC configuration - 1 LCC (LCC0) and 2 FCCs (FCC0, FCC1)

- 2+2 MC configuration - 2 LCCs (LCC0, LCC1) and 2 FCCs (FCC0, FCC1)

- 3+2 MC configuration - 3 LCCs (LCC0, LCC1, LCC2) and 2 FCCs (FCC0, FCC1)

- 4+2 MC configuration - 4 LCCs (LCC0, LCC1, LCC2, LCC3) and 2 FCCs (FCC0, FCC1)

- 1+3 MC configuration - 1 LCC (LCC0) and 3 FCCs (FCC0, FCC1, FCC2)

- 8+3 MC configuration - 8 LCCs (LCC0, LCC1, LCC2, LCC3, LCC4, LCC5, LCC6, LCC7) and 3 FCCs (FCC0, FCC1, FCC2)

- 12+3 MC configuration - 12 LCCs (LCC0, LCC1, LCC2, LCC3, LCC4, LCC5, LCC6, LCC7, LCC8, LCC9, LCC10, LCC11) and 3 FCCs (FCC0, FCC1, FCC2)

Procedure

Step 1   Power up the LCC and FCC (see the list above to check the number of supported LCCs and FCCs for the multi chassis configurations).

Step 2   Connect to console port 1 and verify the current software version and hardware function in the XR VM and sysadmin modes.

Use the following commands:

```
SysAdmin
term le 0
term width 400
show clock
sh chassis (capture Serial Number for Admin config)
sh inventory
sh alarm br (please check alarms light on the front display and the RPs also).  If there
are PMs that are not terminated with DC power unseat these PMs and run "sh inventory" again
sh run
sh hw-module fpd
sh platform
sh platform slices
sh install active (shows SMUs for SysAdmin, PIEs shown in XR-VM see command below)
sh install inactive
sh install commit
sh install repository all

XR-VM
term le 0
term width 400
show clock
term exec prompt timestamp
sh install active
sh install inactive
sh install commit
sh platform
sh platform vm
sh inventory
sh redundancy summary
```

Step 3   Install the latest image using USB boot. Connect to the console port 0 on both the RPs. The RP that is not going through the USB boot is referred to as the *other* RP. Disengage or suspend boot via Boot Manager, so that the other RP is not booting. Confirm that only one RP per LCC/FCC is booting. The boot process is restarted later to allow software sync. More USB drives with usb-boot software can be run simultaneously in more than one chassis. This will save time but error logs are not captured consistently. The USB can be inserted into any of the RPs.

Step 4   Prepare the RP for USB boot. For the RP boot disk to be baked by the USB, it has to be reloaded with the USB inserted. Only LCC1 is up. Pull out RP1 from LCC1 midway out to prevent it from booting.

Step 5   RP booting through USB boot. When the RP with the USB reloads, it will by default choose the bootable USB as its boot media and automatically start the disk baking process.

```
Booting from USB..
Loading Kernel..
Loading initrd..
Starting udev: [  OK  ]
Setting hostname host:  [  OK  ]
Checking filesystems:[  OK  ]
Remounting root filesystem in read-write mode:  [  OK  ]
Entering non-interactive startup
Bringing up loopback interface:  [  OK  ]
Starting system logger: [  OK  ]
Starting kernel logger: [  OK  ]
Starting kdump:[  OK  ]
Starting system message bus: [  OK  ]
Starting smartd: [  OK  ]
Generating SSH1 RSA host key: [  OK  ]
Generating SSH2 RSA host key: [  OK  ]
Generating SSH2 DSA host key: [  OK  ]
Starting sshd: [  OK  ]
Starting xinetd: [  OK  ]
Running in  Data LV support model
Running in LVM support model
Installer will install image on sda
Partition creation on /dev/sda took 0 seconds
File system creation on /dev/sda1 took 1 seconds
Install host image on /dev/sda1
Installing host image size of 199M took 3 seconds
File system creation on /dev/sda2 took 5 seconds
Copying XR iso to repository took 17 seconds
Partitioning PCI block device /dev/sdb
Copying Pxeboot files from USB took 38 seconds
File system creation on /dev/panini_vol_grp/calvados_lv0 took 7 seconds
Install calvados image on /dev/panini_vol_grp/calvados_lv0
Calvados: RP based installation
Installing calvados image size of 392M took 31 seconds
Install EFI on /dev/sda4
Install finished on sda
Usb booted system: Running install image, reboot required ...
Running install image: Please remove the USB and reboot the system
Starting crond: [  OK  ]
getaddrinfo failed for 'host': Bad value for ai_flags [  OK  ]
Spirit programs are not started for install image: [  OK  ]
serial (/dev/ttyserial (/dev/ttyS1) start/running, process 6592

host login:
Running install image: Please remove the USB and reboot the system
Running install image: Please remove the USB and reboot the system
Running install image: Please remove the USB and reboot the system
```

After the process is complete, at the host login prompt, remove the USB. the efault username and password for at the host login prompt is root and lab. When *Remove the USB and reboot system* message is displayed, remove the USB and run the **reboot** command.

Step 6   Bring up RP0 with the new version.

After reload, the RP comes up with the new version of OS from the local disk. Once the Host OS comes up, it brings up the Admin VM, which in turn prepares the XR VM partition and brings up the XR VM. Since

the original configuration was erased as part of the process, the RP XR VM console will prompt to define a new username and password: root/lab

Step 7 Bring up RP1 and check for redundancy.

Step 8 Verify chassis stability.

Use the following commands:

```
XR-VM:
show redundancy
show platform

Admin VM:
show platform
show platform slice
show vm
show version
show install commit
show install active
show install inactive
```

Step 9 Verify and upgrade FPD version.

Step 10 Power down LCC.

Step 11 USB boot for SC0.

In the FCC - FCC0, SC0 and SC1 are USB-Booted. Insert USB drive to SC0, and pull out SC1 half way. Power up FCC0. Follow the procedure to upgrade the chassis RP using USB boot for all the nodes that require an upgrade.

Step 12 Verify FCC stability using the **show platform** command in the XR and sysadmin VM.

Step 13 Power down FCC0 and pull out SC0 and inser the USB in SC1. Power up the FCC0. After the USB boot for the SC1 is complete, power down FCC0, insert both the SCs and power up FCC0.

Step 14 Verify FCC stability after reboot, using the **show platform** command in the XR and sysadmin VM.

Step 15 Power down FCC0 and follow the USB boot procedure for FCC1.

Step 16 Power down FCC1.

Step 17 Follow ISSU to upgrade the software image.

Step 18 Check the system stability.

Use the following commands:

```
Admin
term len 0
term width 400
show clock
show chassis (note LCC0 Serial number for use in MC admin config)
show platform
show platform slice
show vm
show version
show install commit
show install active
show install inactive
sh vm

XR VM
term len 0
term width 400
```

```
show clock
term exec prompt timestamp
show redundancy
show platform
show platform vm
```

Step 19 Verify the SDR memory for the line card. The VM memory should be 17G.

Use the **show running-config sdr** command.

```
sysadmin-vm:F0_SC0# sh running-config sdr
Tue Jul  21 15:36:52.732 UTC
sdr default-sdr
 resources card-type RP
  vm-memory 9
  vm-cpu    3
 !
 resources card-type LC
  vm-memory 17
  vm-cpu    5
!
location all
```

Step 20 Back-up the configurations.

a) Copy configurations to the hard disk using these commands.

```
Mkdir harddisk:/configs
cd harddisk:/configs
dir
copy running-config harddisk:/configs/<filename_admin.notraffic.cfg>


dir harddisk:/configs/ | i <filename_admin.notraffic.cfg>

XR:
mkdir harddisk:/configs
cd harddisk:/configs
dir
copy running-config harddisk:/configs/<filename_XR.notraffic.cfg>
```

b) Copy running configurations from the harddisk to the USB.

```
sh vm location <rp>
run
cd /harddisk:/configs
chvrf 0 bash
scp <filename_admin.notraffic.cfg> <XRvm_ip>:/disk2:/


XR
copy harddisk:/configs/<filename_XR.notraffic.cfg> disk2:
```

c) Save the router database.

Use the **save configuration database** command.

```
save configuration database <database_filename.tgz>
Configuration database successfully backed up at: /harddisk:/ <database_filename.tgz>
```

d) Copy the database from harddisk to the USB.

```
cd /harddisk:
ls -lrt <database_filename.tgz>
copy <database_filename.tgz> disk2:
```

Prerequisite: Validating the System

The system validation is done for the system in the SC mode.

Procedure

Step 1 Login to the chassis in SC mode using the root-system username and password in the admin-VM.

Step 2 Verify the status of LCC0.

Use the following commands:

```
XR-VM:
show redundancy
show platform
show platform vm

Admin VM:
show platform
show vm
show chassis
```

Step 3 Verify the software image.

Use the following commands:

```
show version
show install commit (in XR and sysadmin verify sw/pkg/SMUs on each card)
show install active (in XR and sysadmin verify sw/pkg/SMUs on each card)
show install inactive (in XR and sysadmin)
```

Step 4 Verify FPD using the **show hw-module fpd** command. Perform FPD upgrade, if required.