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# NYC Utility Core Switch Backbone upgrade Project

## Version 2.3

### Draft upgrade procedures

### 9/7/2005

## 1.0 Preface

NYC Utility currently utilizes two Cisco Catalyst 6513 switches as its Core Switching Backbone platform. The switches are located in the 4<sup>th</sup> floor and 17 floor data centers. The switches are running in Hybrid mode off dual Supervisor IIs running MSFC PFC2 daughter cards. They also are utilizing older 16 port Gigabit Ethernet GBIC line cards. These switches connect all of the department floor switches in a redundant L3 configuration running EIGRP on the MSFC and HSRP. The switches also connect to the Server Farms, WAN routers and DPT MAN ring.

The switches need to be upgraded to the Supervisor 720 platform and run in Native mode for the following reasons:

- Support for advanced line cards that provide more port density
- Position backbone for updated Server farm support
- Position backbone to run in advanced Fabric switching modes
- Position backbone to support IOS based QoS features
- Position backbone to support IOS based security features
- Enhance stability

## 2.0 Goal

Conduct a surgical upgrade of the supervisor engines. Swap out the older Hybrid based Supervisor II modules and install the Native Supervisor 720s in their place while retaining the same operational state and configurations from the Hybrid mode Supervisor IIs, with limited impact to the network and with no changes on connected downstream devices such as routers, and departmental switches. The new Supervisor 720s will operate in Native mode running IOS version 12.2(18)SXD5

### **3.0 Scope**

3.1 Combine and convert the current operating configurations from the Hybrid SET based Supervisor II and IOS commands on MSFCs to reflect one cohesive configuration on a single Supervisor 720, in Native mode per switch, that operates exactly as the Supervisor IIs currently, thus preserving the network's operational state but on a new Supervisor platform. The approach and sequence of how this upgrade is to be completed was outlined in a previous document.

3.1 Move a pair of cross switch connections from the old Supervisor modules to free ports on a line card

3.2 Move the old backbone's DC1/DC2 5500 switch connections from their respective line card ports to new ports on the same line card

3.3 Upgrade of the switches chassis FAN subsystem to support the new Supervisor 720.

3.4 Upgrade to the new Supervisor 720 by removing the old Supervisor IIs and inserting the Supervisor in a new slot

3.5 Install any new interface blades(not configured)

3.6 Have the original Supervisor IIs available for post upgrade rollback needs.

3.7 Test the failover of the new Supervisor 720s across switches.

3.8 Conduct post upgrade compliance testing of operational state

3.9 Updated Network Management system to reflect the upgrade's results

3.10 Provide updated documentation pertaining to the new configuration upgrade of the switches and any outstanding issues or caveats identified during the project

Refer to the separate document on [NYC Utility Core Backbone Switch Supervisor Upgrade Project To-Dos](#) for details on what was done to create, verify, test the final configurations and all issues discovered during the Supervisor 720 creation process.

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## 4.0 Schedule

Tentative scheduled date for upgrade is **still open**.

DC1BB1 Turn down schedule	9/22
DC1BB1 Physical upgrade commitment schedule	9/24
DC2BB1 Turn down schedule	9/24
DC1BB1 Turn up schedule	9/24
DC2BB1 Turn up schedule	9/27
DC1 and DC2 final redundancy test schedule	9/27

This schedule is dependent on weather conditions and compliance from MECC.

Rain date **still open**

## 5.0 High level view of upgrade sequence

1. Shut down one switch DC1BB1
2. Let DC2BB1 run for a day supporting the building
3. Work on DC1BB1
4. Move cables
5. Insert new fans
6. Insert new interface blades
7. Insert new supervisor module
8. Shut down DC2BB1
9. Turn up DC1BB1
10. Monitor
11. Test for connectivity
12. Let DC1BB1 run for a day
13. Work on DC2BB1 Move cables
14. Insert new fans
15. Insert new interface blades
16. Insert new supervisor module
17. Turn up DC2BB1
18. Monitor
19. Test for connectivity
20. Now both switches are in NATIVE mode
21. Shut down one switch to test/validate redundancy behavior
22. Repeat redundancy test with second switch
23. Final compliance testing if applicable
24. Clean up and documentation

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## 5.1 Upgrade Phases

The upgrade was broken into several phases to mitigate sustained outage effects to the enterprise. These phases will have their respective detailed tasks outlined in following sections.

**Phase I Turn down of DC1BB1 switch**

**Phase II Physical Upgrade of DC1BB1 switch**

**Phase III Turn Down DC2BB1 and Turn up DC1BB1 switches**

**Phase IV Physical Upgrade of DC2BB1 switch**

**Phase V Turn up DC2BB1 switch**

**Phase VI Final Redundancy test of DC1 and DC2 switches**

**Phase VII Clean up**

## 6.0 Core Switch Pre upgrade tasks

- Definition of upgrade window per switch - Estimated 80 minutes
- Definition of rollback window per switch - Estimated 80 minutes
- Creation of Switch Port Flip Flop documentation-
- Scheduling of LIS for cable jumper changes and upgrade day support-
- **Awaiting on LIS results of jumper analysis**
- Send Network Desk list of addresses no longer polled/pinged
- Backup of production configurations
- Submit list of interfaces and vlan interfaces that are supposed to be shut down post upgrade to the Network desk –
- Create remaining what we should see list for EIGRP neighbors and HSRP groups
- Obtain pre upgrade utilization levels of switches and HSRP/STP/Trunk states
- Execute final “write mem” of Supervisor720 blades in lab must have final configuration for power set to ***power redundancy-mode redundant*** and not combined
- Move all blades and fans from lab to their respective DC locations
- Network Systems personnel will have two laptops available for use as console units with copies of both old and new configurations files on it for reference and cut and paste needs.

Network Systems will have a third or fourth laptop for other testing needs and floor testing needs if applicable. Jeff will use his tablet for both console and testing.

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## 7.0 Upgrade days per phase personnel location and assignments

The following personnel are assigned to the locations listed below:

Phase I Turn down of DC1BB1 switch **TBD**

Phase II Physical Upgrade of DC1BB1 switch **TBD**

Phase III Turn Down DC2BB1 and Turn up DC1BB1 switches **TBD**

Phase IV Physical Upgrade of DC2BB1 switch **TBD**

Phase V Turn up DC2BB1 switch **TBD**

Phase VI Final Redundancy test of DC1 and DC2 switches test teams

**Team DC1**

**Team DC2**

Each team will have a laptop with copies of both old and new configurations files on it for reference and cut and past needs.

### Team Roles - tentative

DC1		DC2	
Console/NS		Console	
Cabling/LIS		Cabling	
Hardware /NS		Hardware /NS	
Comm/NS		Comm./NS	
Comm./ND		Comm./ND	
Floater		Floater	

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## Phase I Turn Down of DC1BB1 Switch

### Phase I Pre Turn Down steps

- 1) Status check with Network Desk to ensure no critical backups or any other operation is currently running. No server farm activities should be active(backup/transfers etc).
- 2) Send out notification to technical support groups that no backup activity should commence during the scheduled activities.
- 3) Status check with MECC(if applicable) if any activities are in progress(if applicable)
- 4) Network Desk can send a final notification from network to user population that services will be affected for defined duration of time and expected resumption of services(if applicable)
- 5) A Network Systems engineer will be deployed in DC2 with a laptop in DC2BB1 to monitor post DC2BB1 activities and for immediate troubleshooting purposes and single core switch support. Use Red Ring Down PLAR phone in DCs
- 6) A conference call/bridge between DC1, DC2 engineers and the Network desk will be setup and active during activist or cell phones/radios will be used between the floors to coordinate activities.
- 7) Network systems will check and verify that backup Wan Server farm cables for ports 3/1 and 3/2 are present.
- 8) Network Desk will run a pre phase activity Network Assurance test( So before each phase begins or major activity commences the Network Desk should run the Assurance test

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## Phase I Wan Server Farm swing over steps

Since DC1BB1 will go down the Wan Server Farm ports of 3/1 and 3/2 must be activated on DC2BB1 to support this server farm.

- 1) Remove/disable Radius capabilities from DC2BB1 Hybrid and MSFCs and test login without Radius to make sure logins still work.
- 2) Network Systems will Prepare ports 3/1 and 3/2 on DC2BB1 for WAN Server farm Vlan 159:

*set vlan 159 3/1*

*set vlan 159 3/2*

**Note:** these ports are in a “not connect” state

- 3) Network Systems/LIS will then enable the Wan server farm ports on DC2BB1 on ports 3/1 and 3/2 by inserting the cables. No need to enable for the ports are already in a “**not connect**” state. This is to ensure that the ports do come up properly.
- 4) Once the Wan server farm ports are active on DC2, Network Systems will then disable the current production DC1BB1 Wan server farm Vlan 159 ports. **This should not cause any issues for the server farm is also connected off of DC2 now. Only a STP delay should ensue.**
- 5) Network systems will then monitor the Wan Server farm ports for automatic proper port channel negotiation.
- 6) If ports 3/1 and 3/2 on DC2BB1 are not in a port channel then Network Systems shall execute the following commands on DC2BB1:  
*set port channel 3/1-2 88*

**Note:** Vlan 159 is already up on the DC2BB1 MSFCs.

**Note:** Nothing needs to be done for Vlan 62 Lan Server farm – Already active and present in DC2BB1.

- 7) Network Systems will then commence with disabling the OpenView map objects relating to DC1 being turned down.
- 8) With the map adjusted and the Wan server farm moved over to DC2 the Network can run a pre DC1 turn down **Network Assurance Test.**

### Phase I DC1BB1 Turn down steps

Once the WAN Server Farm is up on DC2BB1 only, DC1BB1 can now be shut down.

- 1) Notify Network Desk that DC1BB1 will be shut down
- 2) **Possible STEPS for EIGRP graceful shut down on DC1 switch to mitigate EIGRP Query traffic related issues - slowly shut down Vlan interfaces before shutting down switch. Do not do wri mem on MSFC**
- 3) Shut down DC1BB1 and wait 5 minutes before proceeding to identify any stragglers, and have EIGRP settle down.
- 4) Network Systems shall monitor from DC2 and check for any connectivity issues.
- 5) Network Desk after a 10 minute period shall commence with its Network Assurance Test
- 6) Network Systems will resolve any immediate issues
- 7) Network Systems will make the appropriate OpenView map adjustments

**Rollback point:** if too many immediate issues arise running on just one Hybrid switch to redress in an hour the turn up of DC1BB1 shall commence thus restoring the network to its previous state. The Wan Server can either remain on DC2BB1 for another try on another day(They are already disabled on DC1BB1) or the Wan Server farm connections must be pulled out of DC2BB1 3/1 and 3/2 ports and ports 3/1 and 3/2 on DC1BB1 must be re-enabled.

### Phase I post turn down of DC1BB1

4IP I now running only on DC2BB1 in HYBRID mode. 4IP will stay in this condition for one business day.

- 1) Network Systems and the Network Desk will continue to monitor single core switch operation.
- 2) No Network Systems changes will be made to shut down DC1BB1
- 3) LIS can commence during this time to address cabling slack issues for DC1BB1
- 4) Pre upgrade prepping of DC1 location can commence, moving blades to DC1



**Rollback point:** if several issues manifest during the day from running on just one Hybrid switch and could not be easily isolated, resolved or understood the turn up of DC1BB1 shall commence thus restoring the network to its previous pre Phase I state and a Network Assurance test will commence.

## Phase II Physical Upgrade of DC1BB1 Switch

After a full business day of DC2BB1 running on its own the DC1BB1 switch is now available to be upgraded.

- 1) Network systems will insert the new FAN-2 module.
- 2) LIS will surgically move the cable trunk blocking the line modules using the excess slack in the cable from their pre upgrade work completed on 7/7/05. This is careful work to not damage any cables or loosen any connected ports. If ports need to be removed to accomplish the next task then additional time will be required.
- 3) Network systems will insert the new Supervisor720 in SLOT 7.
- 4) Network systems will insert any additional(non configured) interface blades in Slots 4,5,6 and 13(if applicable). Network systems **WILL NOT** install any interface blades in SLOTS 1 and 2 these must remain available for rollback. Estimated time: **10 minutes**

**Note: SLOTS 6 and 13 support the 8 X 70 pin blades for future Fabric Modes. SLOTS 1, 2,3, 4 and 5 do not.**

- 5) LIS will move over the following ports.

Switch	From SupII port	To new port	Function
DC1BB1	1/1	3/15	Trunk link to DC2BB1 3/15
DC1BB1	1/2	3/16	Trunk link to DC2BB1 3/16

- 6) Old backbone 5500 link connections

Switch	From Line card port	To new port	Function
DC1BB1	3/15 GBIC	3/10 GBIC	DC1BB1-5500 To 2/1 Vlan 270
DC1BB1	3/16 GBIC	3/11 GBIC	DC2BB1-5500 To 2/1 Vlan 272

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- 7) Remaining cables from second supervisor's 1/1 and 1/2 ports shall be left inserted in Supervisor and available for complete rollback
  - 8) Confirm with other DC personnel that all steps up to this point have been completed.
  - 9) For DC1BB1 Network Systems will remove the Supervisor II modules in Slot 1 and 2 and leave the blades in the slots but not inserted

**DC1BB1 is now upgraded to Supervisor720 NATIVE mode**

**Phase III Turn Down of DC2BB1(Hybrid)and Turn up of  
DC1BB1(Native)**

**Phase III Pre Turn down steps**

- 1) Inform Network desk that DC1BB1 is ready to be turned up and DC2BB1 is ready to be shut down.
- 2) Status check with Network Desk to ensure no critical backups or any other operation is currently running over the single DC2BB1 Hybrid switch. No server farm activities should be active(backup/transfers etc)
- 3) Status check with MECC(if applicable) if any activities are in progress(if applicable)
- 4) Final notification from network to user population that services will be affected for defined duration of time and expected resumption of services.
- 5) A Network Systems engineer will be deployed in DC1 with a laptop in DC1BB1 to monitor post DC1BB1 NATIVE activities and for immediate troubleshooting purposes and single core switch support.
- 6) A conference call/bridge between DC1, DC2 engineers and the Network desk will be setup and active during activist or cell phones/radios will be used between the floors to coordinate activities.
- 7) Network systems will check and verify that backup LAN Server farm cables for ports 3/3 and 3/4 are present.

**Phase III LAN Server Farm swing over steps**

The LAN server farm ports originated on DC2BB1, so its manual redundancy connection shall be brought up when DC1BB1 is turned up in the following steps after DC2BB1 is shut down. There is no swing over of ports here. Since DC2BB1 will be down when

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DC1BB1 comes up ports 3/1 and 3/2 for the Wan server farm will be activated and ports 3/3 and 3/4 for the LAN server farm will be activated.

Network Systems will then enable the LAN server farm ports on DC1BB1 on ports 3/3 and 3/4 by inserting the cables. No need to enable for the ports are already in a **shutdown**” state and will be enabled when DC1BB1 comes up.

### Phase III Turn Down of DC2BB1

- 1) Network Systems will notify the Network Desk that DC2BB1 can now be shut down
- 2) Network Systems will now shut down DC2BB1

**The hard outage of 4IP will now commence**

### Phase III Turn up of DC1BB1 in NATIVE mode

#### Turn up Procedures for DC1BB1

- 1) Notify Network Desk that DC1BB1 is ready for turn up
- 2) Turn up DC1BB1 switch only and monitor output
- 3) All physical interfaces will be in shut down mode
- 4) All Vlan interfaces will not be in shutdown mode unless on post upgrade shutdown list outlined later in this procedure.
- 5) Upon turning up DC1BB1 the WS-X6516 blades in slot 10 and 11 that have HW version 5.3 will receive the following message on the console:

```
Jun 10 14:19:25: %DIAG-SP-6-DIAG_OK: Module 10: Passed Online Diagnostics
*Jun 10 14:19:26: %OIR-SP-6-DOWNGRADE: Fabric capable module 10 not at an appropriate
hardware revision level, and can only run in flowthrough mode
*Jun 10 14:19:26: %OIR-SP-6-INSCARD: Card inserted in slot 10, interfaces are now
online
```

- 6) The same will be seen when DC2BB1 is turned up and its WS-X6516 blades in slots 10. and 11, having HW version 5.1 are activated.
- 7) When DC1BB1 is up and the following prompt is available **4IP-DC1-BB1-6513>** Network Systems can commence with turning up the individual line card ports.
- 8) Check for power redundancy mode of switch by executing a “show power”. The default power redundancy mode should be **REDUNDANT**

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If you see “**system power redundancy mode = combined**” then execute a “**power redundancy-mode redundant**” to convert the mode back to redundant.

- 9) Check that all modules powered up by executing a “**sh module**” command

Verification of links and CDP neighbors can commence after each line card has been turned up or when all cards have been turned up.

If a module does not power up attempt to power it up manually. Go into configuration mode and execute the “**power enable module [mod num]**” command.

You can manually reset it by issuing an “**hw-module module [mod num] reset**” at the exec prompt.

### **Turn up sequence of individual line card ports**

#### **New interface blades will not be turned up**

- 10) Start with Slot 3 ports for LAN and WAN Server farm and DPT router connections to ensure Server Farm Port Channel works properly and initial EIGRP neighbors establish.

**Possible issue point with native core TRUNK/PC negotiating with Hybrid Serve Farm 6500.**

- 11) On Slot 3 –turn up the Old Backbone 5500 links on Gigabit 3/10 and Gigabit 3/11

- 12) Move to Slot 8 and turn up all ports EXCEPT 8/4 and 8/6**

- 13) Move to Slot 9 and turn up all ports on the blade – Use Interface Range command

- 14) Move to Slot 10 and turn up all ports on the blade – Use Interface Range command

- 15) Move to Slot 11 and turn up all ports on the blade – Use Interface Range command

- 16) Move to Slot 12 and turn up all ports EXCEPT 12/8**

- 17) Execute the “**clear counters**” command for all modules

- 18) At this point all floor switches should be connected to DC1BB1 NATIVE only, and the following EIGRP neighbors should be present:  
execute a “*sh ip eigrp neighbors*” command

2.2.222.9	VI270	DC1RSM1
2.2.222.25	VI272	DC2RSM1
2.2.159.173	VI159	DC2CORE1(Until DC2BB1)
2.2.215.9	VI280	DC1DPT1
2.2.215.25	VI282	DC2DPT1
2.2.151.249	VI451	MECC-CE-3750-2
2.3.215.201	VI480	DC1DPT2
2.2.155.249	VI455	ECC-LAB-WAN-3750-L3-1
2.2.159.174	VI159	DC2CORE2(Until DC2BB1)
2.2.159.171	VI159	DC1CORE1
2.2.159.172	VI159	DC1CORE2
2.2.34.245	VI34	irvcc1
2.2.12.175	VI12	DC2GATE1

- 19) Verify interfaces and department switches are up according to Diagram map, pre-upgrade CDP output from switch. **Check for 55k uplink errors on Gi3/10 and Gi3/11**
- 20) Verify Vlan instances are up according to diagram map and pre-upgrade Vlan list
- 21) Run pings to test for connectivity from a Network Desk workstation to simulate typical floor access
- 22) Run Internet access test from a Network Desk workstation to simulate typical floor access
- 23) Network Desk will run the Network Assurance test for servers off of DC1BB1 or any other location outside of 4IP
- 24) LIS will return cable trunk in front of blades thus leaving the Fan open for rollback pullback.
- 25) Network Systems will make any adjustments to the OpenView map

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- 26) Execute a “*write mem*” on DC1BB1
  - 27) Network systems will update the online documentation on any configuration changes encountered in this phase that are applicable to DC2’s upgrade configuration on subsequent phases.
  - 28) Backup production Native mode configuration to laptop or server.

**At this point DC1BB1 should be up in NATIVE mode with all floors connected via their respective Gi0/1 or Gi0/9 interfaces(depending on switch), with access to the internet and any corporate wide servers not connected thru DC2BB1.**

**Rollback point:** If immediate issues arise that are difficult to redress quickly DC1BB1 NATIVE will be shut down and DC2BB1 HYBRID will be turned up thus returning the network to its operational state from Phase I.

**4IP is now running only on DC1BB1 in NATIVE mode. 4IP will stay in this condition for one business day.**

- 1) Network Systems and the Network Desk will continue to monitor single core switch operation.
- 2) No Network Systems changes will be made to shut down DC2BB1 for a day.
- 3) Pre upgrade prepping of DC2 location can commence, moving blades to DC1
- 4) If all is well with DC1BB1 Network Systems will bring the spare Supervisor 720 and spare FAN-2 to DC2 for availability for turn up.

**Rollback point:** if several issues manifest during the first operational day from running on just one Native mode switch and could not be easily isolated, resolved or understood the turn up of DC2BB1 HYBRID and turn down of DC1BB1 NATIVE shall commence thus restoring the network to its previous Phase I state of running 4IP off of just DC2BB1 HYBRID. For the Sunday following Phase III no activity is to commence, Network Systems is on call for this day so no on location personnel is required.

**Phase IV Physical Upgrade of DC2BB1 switch**  
**Point of no return for rollback to DC2BB1 HYBRID**

After a full business day of DC1BB1 NATIVE mode switch running on its own the DC2BB1 switch is now available to be upgraded.

- 1) Network systems will insert the new FAN-2 module.
- 2) LIS will surgically move the cable trunk blocking the line modules using the excess slack in the cable from their pre upgrade work completed on 7/7/05. This is careful work to not damage any cables or loosen any connected ports. If ports need to be removed to accomplish the next task then additional time will be required.
- 3) Network systems will insert the new Supervisor720 in SLOT 7.
- 4) Network systems will insert any additional(non configured) interface blades in Slots 4,5,6 and 13(if applicable). Network systems WILL NOT install any interface blades in SLOTS 1 and 2 these must remain available for rollback.  
Estimated time:

**Note: SLOTS 6 and 13 support the 8 X 70 pin blades for future Fabric Modes. SLOTS 1, 2,3, 4 and 5 do not.**

- 1) LIS will move over the following ports

Switch	From SupII port	To new port	Function
DC2BB1	1/1	3/15	Trunk link to DC1BB1 3/15
DC2BB1	1/2	3/16	Trunk link to DC1BB1 3/16

- 2) Old backbone 5500 link connections

Switch	From Line card port	To new port	Function
DC2BB1	3/15 GBIC	3/10 GBIC	DC2BB1-5500 To 2/2 Vlan 271 NOT connected
DC2BB1	3/16 GBIC	3/11 GBIC	DC2BB1-5500 To 2/2 Vlan 273

- 3) Remaining cables from second supervisor's 1/1 and 1/2 ports shall be left inserted in Supervisor and available for complete rollback

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- 4) Confirm with other DC personnel that all steps up to this point have been completed.
  - 5) For DC2BB1 Network Systems will remove the Supervisor II modules in Slot 1 and 2 and leave the blades in their slots but not inserted.

### **DC2BB1 is now upgraded to Supervisor720 NATIVE mode**

#### **Phase V Turn up of DC2BB1 in NATIVE mode**

- 1) Notify Network Desk that DC2BB1 is ready for turn up.
- 2) Turn up DC2BB1 switch and only and monitor output
- 3) All physical interfaces will be in shut down mode
- 4) All Vlan interfaces will not be in shutdown mode unless on post upgrade shutdown list outlined later in this procedure.
- 5) Upon turning up DC2BB1 the WS-X6516 blades in slot 10 and 11 that have HW version 5.3 will receive the following message on the console:

```
Jun 10 14:19:25: %DIAG-SP-6-DIAG_OK: Module 10: Passed Online Diagnostics
*Jun 10 14:19:26: %OIR-SP-6-DOWNGRADE: Fabric capable module 10 not at an appropriate
hardware revision level, and can only run in flowthrough mode
*Jun 10 14:19:26: %OIR-SP-6-INSCARD: Card inserted in slot 10, interfaces are now
online
```

- 6) The same was seen when DC1BB1 is turned up and its WS-X6516 blades in slots 10. and 11, having HW version 5.1 are activated.
- 7) When DC1BB1 is up and the following prompt is available 4IP-DC2-BB1-6513> Network Systems can commence with turning up the individual line card ports.
- 8) Check for power redundancy mode of switch by executing a “show power”. The default power redundancy mode should be **REDUNDANT** If you see “**system power redundancy mode = combined**” then execute a “**power redundancy-mode redundant**” to convert the mode back to redundant.
- 9) Check that all modules powered up by executing a “**sh module**” command Verification of links and CDP neighbors can commence after each line card has been turned up or when all cards have been turned up.

If a module does not power up attempt to power it up manually. Go into configuration mode and execute the “**power enable module [mod num]**” command.



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You can manually reset it by issuing an “*hw-module module [mod num] reset*” at the exec prompt.

**Turn up sequence of individual line card ports**  
**New interface blades will not be turned up**

**Turn up ports 3/1-3/2 3/5-3/6, 3/8, 3/9, 3/12-3/14**

**DO NOT TURN UP the inter-switch Trunk ports of 3/15 and 3/16 at this point**

**Do NOT TURN UP LAN Server Farm ports of 3/3 and 3/4 yet since they are already active on DC1BB1 ports 3/3 and 3/4.**

- 10) Start with Slot 3 ports for Server farm and DPT router connections to ensure Server Farm Port Channel works properly and initial EIGRP neighbors establish.  
**Possible issue point with native core TRUNK/PC negotiating with Hybrid Serve Farm 6500.**
- 11) On Slot 3 –turn up the Old Backbone 5500 links on Gigabit 3/11. Note 3/10 was in a notconnect state.
- 12) Move to Slot 8 and turn up all ports **EXCEPT 8/4 and 8/6**
- 13) Move to Slot 9 and turn up all ports on the blade – Use Interface Range command
- 14) Move to Slot 10 and turn up all ports on the blade – Use Interface Range command
- 15) Move to Slot 11 and turn up all ports **EXCEPT 11/10 if already up on DC1BB1 or shut down DC1BB1 11/10 and turn up 11/10 here.**
- 16) Move to Slot 12 and turn up all ports **EXCEPT 12/8**
- 17) Execute the “*clear counters*” command for all modules

- 18) At this point all floor switches should also be connected to DC2BB1 NATIVE, and the following EIGRP neighbors should be present:  
execute a “*sh ip eigrp neighbors*” command

2.2.222.33	VI273	DC2RSM1
2.2.215.33	VI283	DC2DPT1
2.2.215.17	VI281	DC1DPT1
2.2.159.173	VI159	DC2CORE1
2.2.150.249	VI450	MECC-CE-3750-1
2.2.156.249	VI456	ECC-LAB-WAN-3750-L3-2
2.2.34.245	VI34	irvcc1
2.2.159.174	VI159	DC2CORE2
2.2.159.171	VI159	DC1CORE1
2.2.159.172	VI159	DC1CORE2
2.2.12.175	VI12	DC2GATE1

- 19) Verify interfaces and department switches are up according to diagram map, pre-upgrade CDP output from switch. **Check for 55k uplink errors on Gi3/10 and Gi3/11**
- 20) Run pings to test for connectivity from a Network Desk workstation to simulate typical floor access

**At this point DC2BB1 should be up in NATIVE mode with all floors connected via their respective Gi0/2 or Gi0/10 interfaces(depending on switch), with access to the internet and any corporate wide servers not connected thru DC1BB1.**

**HSRP Standby states should be active for all Vlan interfaces as per the diagram map and HSRP list**

- 21) LIS will return cable trunk in front of blades thus leaving the Fan open for rollback pullback.
- 22) Perform a “*write mem*” on DC2BB1

**At this point DC2BB1 should be up with all floors connected via their respective Gi0/2 or Gi0/10 interfaces(depending on switch), with access to the internet and any corporate wide servers not connected thru DC1BB1.**

## Phase V Inter-switch Trunk turn up

This task is separate so as to isolate any trunk and port channel related issues. By having both switches running without the trunk in place ensures that all required departmental and old backbone vlans are working properly and no STP issues are present. When the trunk is activated Network Systems can quickly identify which vlans are supposed to be present or not on the trunk. Such an issue can be caused by a mis configuration. By bringing up the trunk links last limits exposure for such errors.

- 1) Turn up ports 3/15 and 3/16 on DC2BB1.
- 2) Verify connectivity between switches by checking CDP neighbor, port channel and interface trunk commands. Check both switches DC1BB1 and DC2BB1
- 3) Verify EIGRP neighbor establishment across the trunk from both switches. The following table shows what EIGRP neighbors between the switches should be established:

		Cross switch EIGRP Neighbors					
2.2.32.250	V132	DC2BB1 New	<----->	2.2.32.251	V132	DC1BB1 New	
2.2.34.250	V134	DC2BB1 New	<----->	2.2.34.251	V134	DC1BB1 New	
2.2.54.250	V154	DC2BB1 New	<----->	2.2.54.251	V154	DC1BB1 New	
2.2.159.250	V1159	DC2BB1 New	<----->	2.2.159.251	V1159	DC1BB1 New	
2.2.12.172	V112	DC2BB1 New	<----->	2.2.12.171	V112	DC1BB1 New	
			Possible neighbor	2.2.125.25??	V825	any other 825 router inte	

- 4) Turning up Interface Vlan 1 on both switches
- 5) The interface Vlan was active on both switches MSFC2s. This Vlan interface is shut down and is needed for the trunks between the switches and to complete the STP domain between the switches for trunked Vlans. This interface was as the last turn up task to isolate any loop, trunking or STP issues.
- 6) Run Internet access test from a Network Desk workstation to simulate typical floor access
- 7) Network Desk will run the Network Assurance test for servers off of DC1BB1 or any other location outside of 4IP
- 8) Run any available application test for servers off of DC2BB1 or any other location outside of 4IP
- 9) Perform a “*write mem*” on DC1BB1 and DC2BB1
- 10) Execute the “*clear counters*” command for all modules on DC1BB1 and DC2BB1.

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- 11) Network systems will update the online documentation on any configuration changes encountered in this phase that are applicable to DC2's upgrade configuration on subsequent phases.
  - 12) Network Systems will make any adjustments to the OpenView map
  - 13) Backup production Native mode configuration to laptop or server.

**4IP is now running on DC1BB1 and DC2BB1 in NATIVE mode.**

**Rollback point:** If major issue arise immediately or manifest during the week that cannot isolate the problem to one switch or does not facilitate a partial NATIVE rollback of a single switch(back to Phase III DC1BB1 NATIVE) then a full rollback of both switches to HYBRID mode shall commence thus bringing the network back to its original pre-upgrade state of Phase I.

**Phase VI Final Redundancy test of DC1BB1 and DC2BB1 NATIVE mode switches**

The following testing procedures will be executed

- Network Desk Network Assurance Test
- Network Systems testing procedures

**Phase VI Final redundancy test procedures**

Once all testing is completed and configurations are backed up remotely and written to the switches NVRAM, Network Systems can commence with a redundancy test of the Core operating on the new Supervisor 720s.

**DC1BB1**

1. Notify Network desk that DC1BB1 is going down
2. Shut down DC1BB1
3. Network Desk and Network systems monitor state and run compliance tests listed in this section
4. If all is in compliance Network Systems will notify the Network Desk that DC1BB1 is going to be powered up.
5. Network systems will power up DC1BB1 and monitor
6. Network Desk can commence with its testing procedures
7. Network Systems and Network Desk document operational behavior noted during test.
8. Network Systems shall document and stopwatch the recovery time
9. Network Systems and the Network Desk shall monitor the Map for any issues and check for its proper illustration of the state of the network in redundancy mode.

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## DC2BB1

1. Notify Network desk that DC2BB1 is going down
2. Shut down DC2BB1
3. Network Desk and Network systems monitor state and run compliance tests listed in this section
4. If all is in compliance Network Systems will notify the Network Desk that DC2BB1 is going to be powered up.
5. Network systems will power up DC1BB1 and monitor
6. Network Desk can commence with its testing procedures
7. Network Systems and Network Desk document operational behavior noted during test.
8. Network Systems shall document and stopwatch the recovery time
9. Network Systems and the Network Desk shall monitor the Map for any issues and check for its proper illustration of the state of the network in redundancy mode.

## Phase VII Clean up tasks

- 1) Affix any plate covers to any empty slots, except for Slots 1 and 2
- 2) Old supervisors shall remain resting in the slots 1 and 2 but not inserted into the backplane.
- 3) Original chassis fans shall remain near the switches or accessible in each data center
- 4) Add final Radius, enable passwords and Line VTY commands
- 5) Each switch has a copy of the full configuration with commented out commands for RADIUS, and passwords. Just execute a more of the configuration files listed in the sup-bootflash directory to cut and past the RADIUS commands into the running configuration. The files are as follows **DC1BB1config.cfg** and **DC2BB1config.cfg**
- 6) Configurations – after all troubleshooting and adjustments are completed a final “*write mem*” will be executed and the configurations will be backed up
- 7) Cabling – any remaining cabling routing and tray cleanup will be performed by LIS
- 8) SNMP and management issues – Network Systems along with the Network desk will work together to clean up any HP Openview Map discrepancies and identify if any pings and snmp polls are pointing to IP addresses no longer in use.
- 9) Documentation – Network systems will provide updated documentation to reflect the post upgrade state of both core switches.

- 10) Post mortem – Network systems will provide any “lessons learned” information from this upgrade that could be applied to future SupII to Sup720 upgrades in other sites.
- 11) Backup new Core production configurations
- 12) Execute a final “clear counters” on both switches

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## 8.0 Complete Hybrid Rollback procedures

In the event that there are a multitude of difficulties during the upgrade and too much time is spent trying to get the upgrade completed, Network Systems can roll back the upgrade to the full HYBRID operational state that the DC1BB1 and DC2BB1 switches were before the upgrade commenced.

### Rollback definitions:

Rollback in the context of this project means that BOTH switches upgrade tasks shall be rolled back even if only one switch is experiencing an issue during its upgrade.

### Rollback indicators

If any or a combination of the following events arise can constitute a rollback:

- Supervisor 720 on any switch does not load properly
- Spare Supervisor 720 does not load properly
- Fan-2 related issues
- Any or multiple interface blade(s) not loading or being recognized
- Any major trunking issue between switches or STP looping problem
- Ports not negotiating properly for trunks even if forced
- Major routing issues resulting from change
- Major configuration errors resulting in too many to “clean up” in upgrade window

### Rollback notification

Network Systems will notify the Network Desk that the upgrade changes will be backed out and all original equipment and port connections will be restored.

### Rollback tasks

- 1) Shut down DC1BB1 and DC2BB1
- 2) Move cabling blocking line card blades
- 3) Replace FAN-2s with original Fans
- 4) Re-insert Supervisor IIs into Slots 1 and 2
- 5) Move Supervisor II ports back to original locations see matrix below

From	Back To	Function
DC1BB1 3/15	DC1BB1 1/1	Trunk/PC links between DC1 and DC2
DC1BB1 3/16	DC1BB1 1/2	Trunk/PC links between DC1 and DC2
DC2BB1 3/15	DC2BB1 1/1	Trunk/PC links between DC1 and DC2
DC2BB1 3/16	DC2BB1 1/2	Trunk/PC links between DC1 and DC2

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6) Move Old backbone 5500 link connections see matrix below.

Switch	From Sup720 ports	Back to port	Function
DC1BB1	3/10 GBIC	3/15 GBIC	DC1BB1-5500 To 2/1 Vlan 270
DC1BB1	3/11 GBIC	3/16 GBIC	DC2BB1-5500 To 2/1 Vlan 272
DC2BB1	3/10 GBIC	3/15 GBIC	DC2BB1-5500 To 2/2 Vlan 271 NOT connected
DC2BB1	3/11 GBIC	3/16 GBIC	DC2BB1-5500 To 2/2 Vlan 273

- 7) Unseat Supervisor 720 from Slot 7 on both switches
- 8) Unseat new but unsupported in Hybrid mode blades in slots 6 and 13
- 9) Turn up DC2BB1
- 10) Network Desk and Network Systems confirms all is good with DC2BB1 running in hybrid mode (we are back to the state of operation in Phase I where 4IP is running on one Hybrid DC2BB1 switch)
- 11) Turn up of DC1BB1
- 12) Network Desk and Network Systems confirms all is good with DC1BB1 running in hybrid mode (we are back to the full operational Hybrid stat of pre Phase I activities where 4IP is running both backbone switches in Hybrid mode.
- 13) Network Desk commences with Network assurance test
- 14) Network Systems monitors entire core in Hybrid mode
- 15) Network Systems drafts Post Mortem



