



# OpenVMS Support for c-Class Blades

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# Topics

- Features of HP c-Class Blade systems
- What makes up a c-Class Blade system
- OpenVMS Plans
- Using c-Class Blade systems
  - Configuring Hardware
  - Firmware Updates
  - Provisioning (Installation)
  - Management

# Features of HP c- Class Blade Systems?

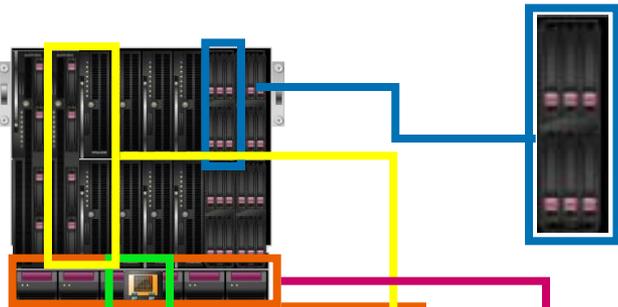
# Why c-Class Blades

- High cost of IT infrastructure
- Cost of acquisition vs. cost of ownership
- Inflexible IT infrastructure
- Speed in introducing IT change
- Space savings – more compute power in a smaller footprint compared to equivalent number of processors in racked servers
- Cable management and fewer cables to connect servers to LAN/SAN

# Why c-Class Blades (cont)

- Power/cooling efficiencies – **Reduce Cost!**
- Ease of management – more consistency across OS/architecture
- Flexibility – easy to change
- Fewer spare parts
- All of the above translate into lower cost of acquisition and cost of ownership compared to discrete servers

# A cross-HP solution platform



## HP StorageWorks storage blades

StorageWorks inside the enclosure. A new storage solution paradigms for modular storage



## HP Integrity and ProLiant server blades

Scale-Out meets Scale-Up creating new blade paradigms for modular computing solutions

## Workstation and client blades

Extending the blading impact to more of IT



## Infrastructure automation

Policy-based management solutions automate common and labor intensive tasks



## HP Onboard Administrator:

HP printer and copier LCD meet datacenter control



## HP Active Cool fans and HP Dynamic Power Saver:

HP Cool Team meets high density power/cooling problems head-on

# BL860c Server Blade

# BL860c Server Blade

- 2 Processor Sockets
  - Single or Dual-core Itanium Processor
  - 1.6GHz/6MB cache
  - 1.4GHz/12MB cache
  - 1.6GHz/18MB cache
- 12 DIMM slots
  - DDR2 in 512MB to 4GB modules
  - Configured in pairs or quads, 1GB to 48GB
- Fast Core or **Integrated IO**
  - LSI 1068 Serial Attach SCSI (SAS) controller
    - One channel for each on-board SAS drive
    - Drives are Hot Plug
  - 2 Broadcom BC5704S Gigabit Ethernet controllers
    - 2-port controller
    - Both are routed to the Interconnect Module in Row 0
- 3 PCI Express (PCIe) Mezzanine card slots
  - Slot 1 is a Type I slot (x4)
  - Slots 2 and 3 are Type II slots (x8)



# BL860c

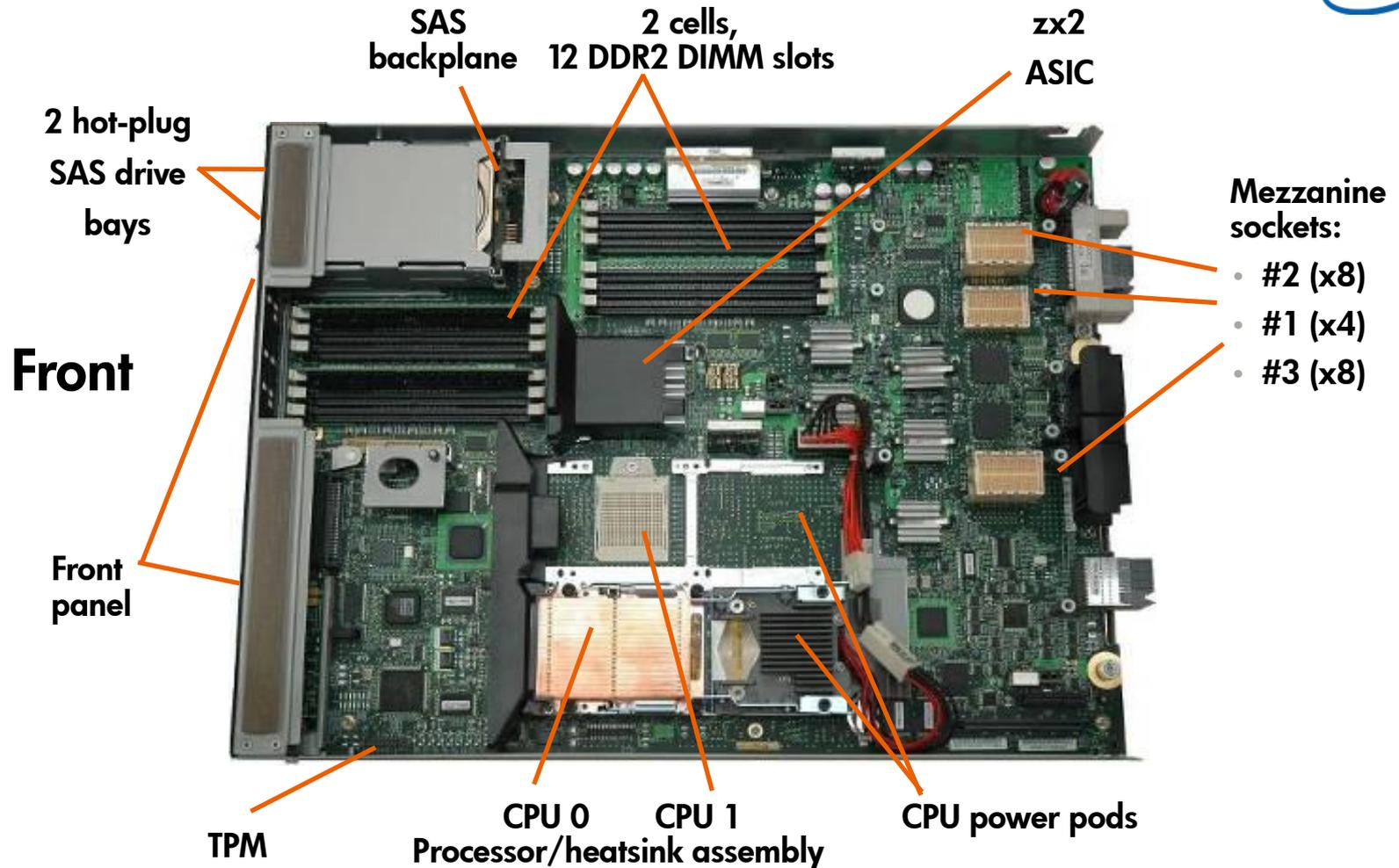
- Management Logic
  - Management Processor (MP)
  - USB 2.0 controller
  - ATI RN50 Graphics chip
  - 10/100MB “internal” LAN connection
  - Serial/USB/Video (SUV) connector
  - iLO2 interface
  - vMedia
  - Virtual keyboard/video/mouse (vKVM) support
    - Windows today
    - Other OS support in future FW releases

# BL860c Mezzanine Cards

- Type I cards
  - 15W max power
  - x4 or x8 data lanes
  - Can go in Type I or Type II slots
- Type II cards
  - 25W max power
  - x8 Type II slots only
- 4GB Fibre Channel
  - Compatible with Integrity server FC
- PCIe pass-thru
  - Supports Storage Blade SB40c
- Expect to see others...NIC, Raid, FC ...

# Integrity BL860c

## Internal View

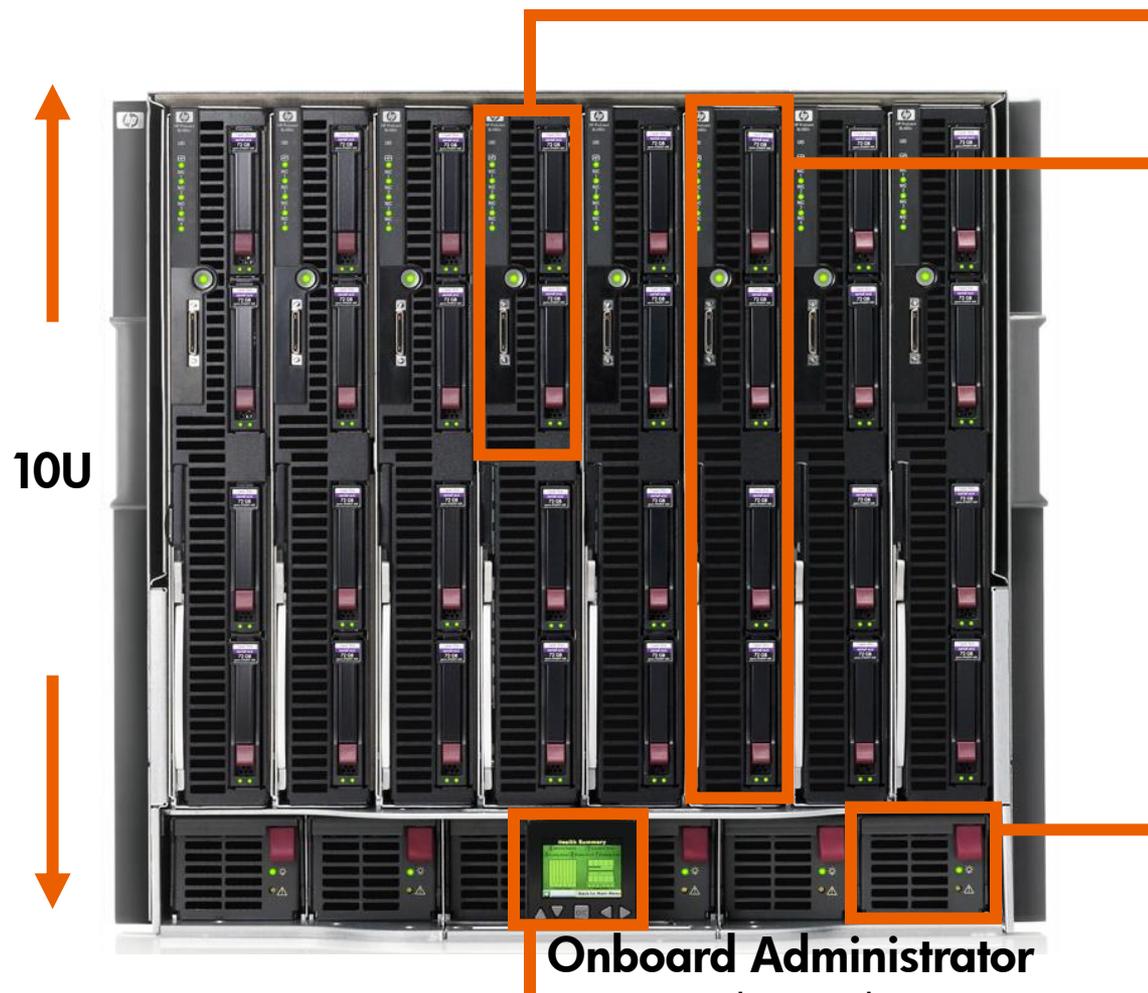


# The Enclosure

# c7000 Enclosure

- 10U form factor
- Fits in a standard 19" rack, 32" deep
- Capacity
  - 8 full-height or 16 half-height Blade slots
  - 8 Switch Module (SWM) slots
  - 2 On-board Administrator (OA) slots
  - 6 Hot pluggable power supplies
  - 10 Hyperjet Coolers

# c7000 Enclosure



## Half-Height Blade Server

- Up to 16 per enclosure

## Full-Height Blade Server

- Up to 8 per enclosure

## Integrated power

- Simplified configuration and greater efficiency
- Same flexibility, capacity and redundancy

## Onboard Administrator

- HP Insight Display, set-up simplification

# c7000 Enclosure – fully redundant



Active Cool fans

Interconnect bays

Onboard Administrator

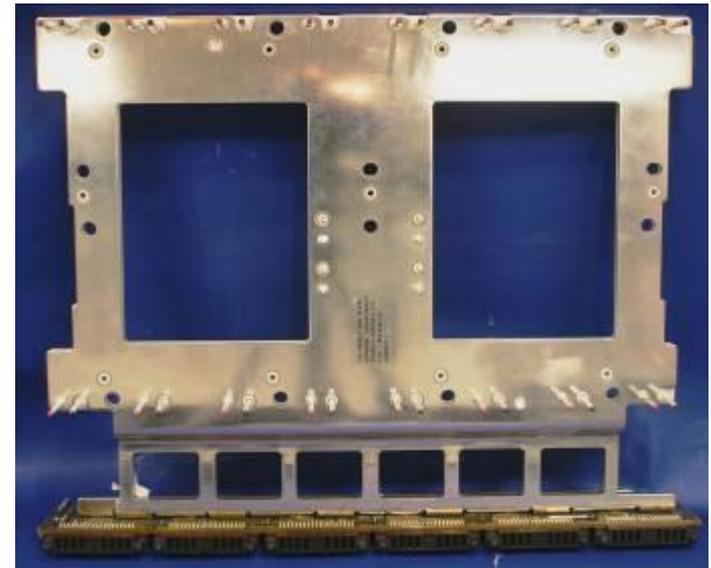
Power management



# c7000



**C-Class Signal midplane**



**C-Class Power backplane**

## HP c-Class

- Separate signal and power midplanes
- Passive signal midplane with 1 active component that is not in the signal path
- Solid copper plates make up power backplane
- 24-layer PCB which provides over 1600 high quality copper traces

# Interconnect/Switch Modules

- Rear of the enclosure contains 8 slots for SWMs
- Configured as 4 rows of 2 slots or **bays** (R0-R3)
- Row 0 dedicated to integrated Network connections
  - 2 NICs per Blade, 2 ports each, 32 max ports
  - Each SWM handles 16 ports
- Three types today
  - Pass-thru
  - Vendor switch
  - Virtual Connect

# c7000 Interconnect Routing

<b>Server IO</b>	<b>Interconnect Bay</b>	<b>Comments</b>
NIC1 and NIC2	1 and 2	Integrated Ports
Mezz Slot 1	3 and 4	Type I slot
Mezz Slot 2	5 and 6 (Primary) 7 and 8 (Secondary)	Type II slot
Mezz Slot 3	7 and 8 (Primary) 5 and 6 (Secondary)	Type II slot

# Virtual Connect

- Network and Fibre Channel SWMs *plus* Virtual Connect Manager (VCM)
  - VCM runs on Network SWM in bay 1 or bay 2 (at least one Network VC switch is required for VC support)
  - With 2 network switches you get redundant network paths and VCM failover—highly recommended
  - Create VCM domain that describes your VC environment
    - Blade profiles
    - Networks
    - SANs
- Virtual Connect provides a **“wire once”** infrastructure
- **VCM adds no overhead to Network and FC transfers!**

# HP Virtual Connect Ethernet Module

## MidPlane



16x 1Gb Ethernet—Connects to one NIC in each HH blade server bay  
1x 10Gb—Cross-link between adjacent VC-Enet modules  
Mgmt Interfaces to Onboard Administrator (Enet & I2C)



2x 10Gb Ethernet (CX4)  
Usable as data center links or  
as stacking links.

Recessed module  
reset button

8x 1Gb Ethernet (RJ45)  
Usable as data center links  
or as stacking links.

Port Number & Status Indicators  
Indicates whether a data center link (green),  
stacking link (amber), or highlighted port (blue).

'Next' button (unused in  
initial release firmware)

# On-board Administrator (OA)

- Manages all enclosure related items – thermal, power, Switch Modules, Blades
- 2 Slots in the rear of the enclosure
- Interfaces
  - HTML-based GUI via HTTPS
  - CLI interface via RS-232 (Local connector), SSH, or Telnet
- Management Protocols
  - SNMP today

# OA

- IPMI via iLO on local 10/100 link
- eKey to link Mezzanine card with SWM
- Power on control for Blade
- Dynamic Power and Cooling control
  - Enclosure Profile – setup once
  - Real time monitoring data
- Firmware updates
- SWM console interface

# c3000 Enclosure

- 6U Form Factor
- New Midplane and Power Supply
- Capacity
  - 4 full height/8 half-height slots
  - 6 Power Supplies
  - 6 Fans
  - 4 Interconnect bays
  - 1 OA
  - **DVD**

# C3000



# c3000 Midplane Routing

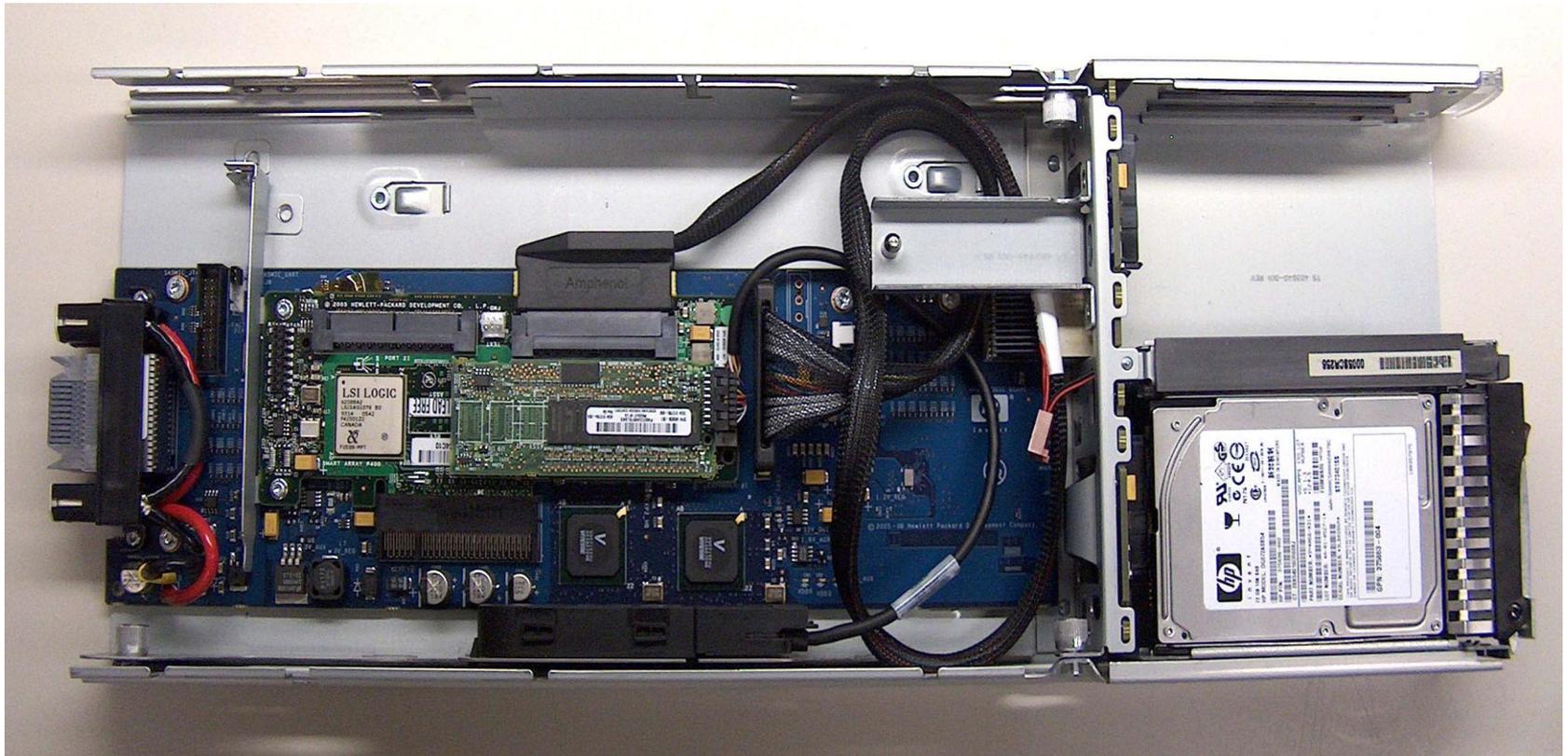
<b>Server IO</b>	<b>Interconnect Bay</b>	<b>Comments</b>
NIC1 and NIC2	<b>1</b>	Integrated Ports
Mezz Slot 1	2	Type I slot
Mezz Slot 2	3 and 4	Type II slot
Mezz Slot 3	3 and 4	Type II slot

# Other Blades

# SB40c Storage Blade

- Direct Attach storage
- Smart Array raid controller
- Support for up to 6 SAS drives
- Connects to adjacent Processor Blade with PCIe pass-thru mezzanine card
  - Half-height Blades put module in mezz slot 2
  - Full height Blades put module in mezz slot 3
  - Can go in either slot of a partition (left or right of the pair)





# Ultrium 448c Tape Blade

- LTO Ultrium 2
- 400GB capacity
- Requires PCIe Pass-thru module in mezzanine slot 3 of adjacent Server Blade
- Supported on Proliant today, Integrity around the end of the year

# PCI Sidecar

- IO Blade for PCIx or PCIe stand up modules
  - Comes with a “backplane” for each
  - Install the desired flavor
  - Each has 2 available slots
- Support for 3<sup>rd</sup> party modules only—no HP modules are supported
- Released for Proliant Blades today, Integrity end of the year

# OpenVMS Plan

# OpenVMS Plan

- Base c-Class support June 1, 2007
  - V8.3 with update/patch kits
  - SB40c (added support in July)
  - Virtual Connect (added support in Sept)
- Additional features in release V8.3-1H1 Nov 2007
  - Provisioning
  - Web Based Enterprise Management (WBEM Providers)
  - vMedia
  - Montvale
  - c3000 Enclosure

# Using c-Class Blade Systems

# Configuring the c-Class Blade System

- Questions
  - Mixed Integrity and Proliant Server Blades?
  - Storage Blades?
  - Redundant Network connections?
  - Redundant FC connections?
  - Redundant airflow?
  - Redundant power?
  - Virtual Connect?

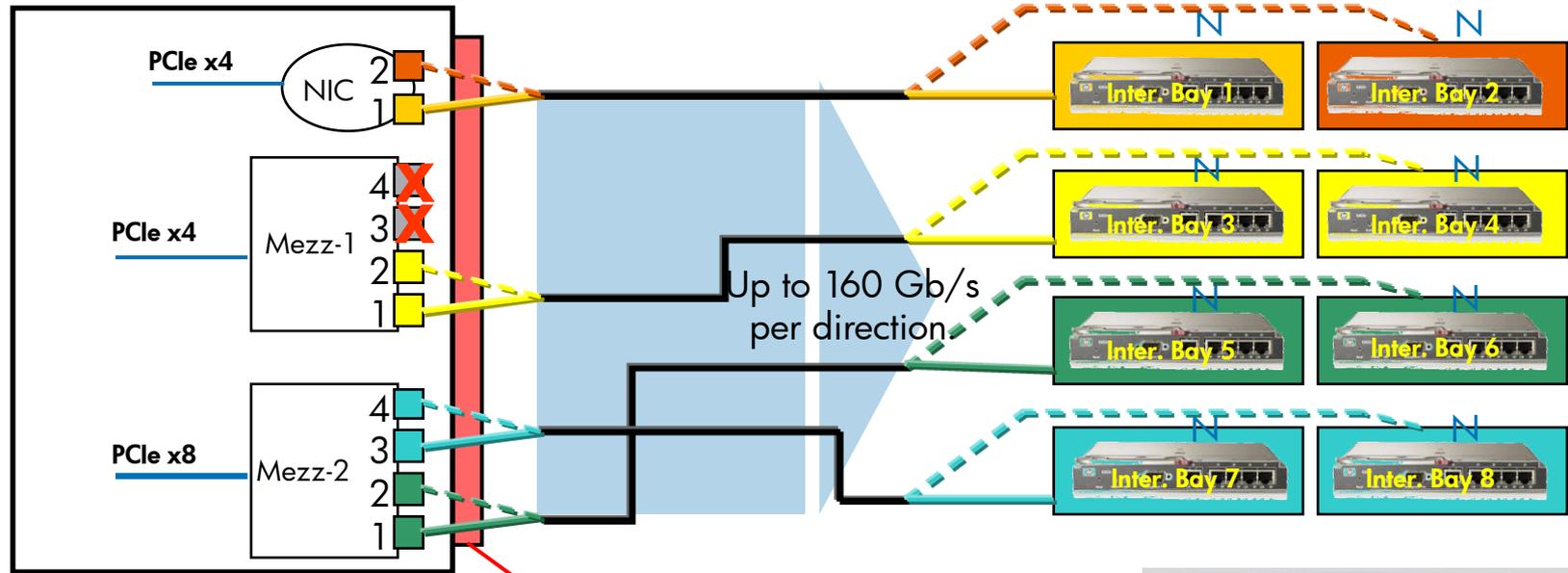
# Adding c-Class Blades

- General rule is left to right installation
- Half-height Blades can be stacked, as well as half-height Blades on top of Storage Blades
- There is no requirement that empty slots are to be avoided
- Blades can be added or removed without powering off anything
- Remember, all server slots are routed to each interconnect slot
- Mezzanine cards must be configured based on Interconnect module requirements

# Adding Interconnect Modules

- Network modules must be placed in Bay 1 and/or Bay 2
  - Both for redundancy
  - For VC, both for VCM failover
- Bays 3-8 depend on mezzanine cards
  - Bays 3 and 4 relate to mezz slot 1
  - Bays 5 and 6 (7 and 8) to mezz slot 2
  - Bays 7 and 8 (5 and 6) to mezz slot 3

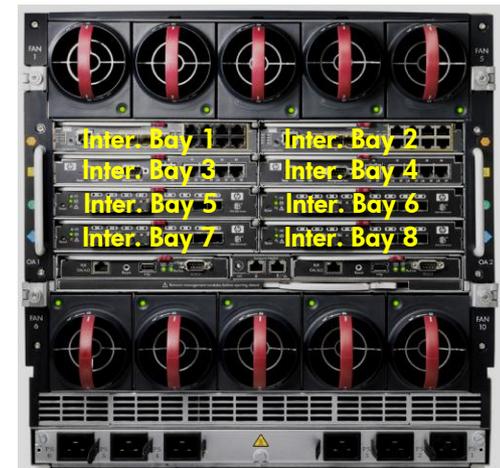
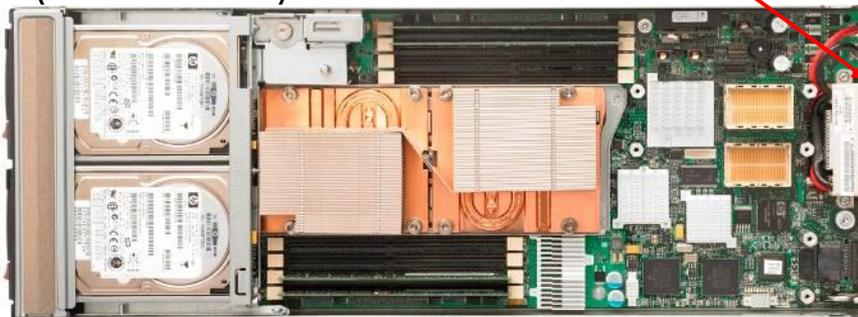
# c7000 Interconnect Model (Half-Height Server Blade)



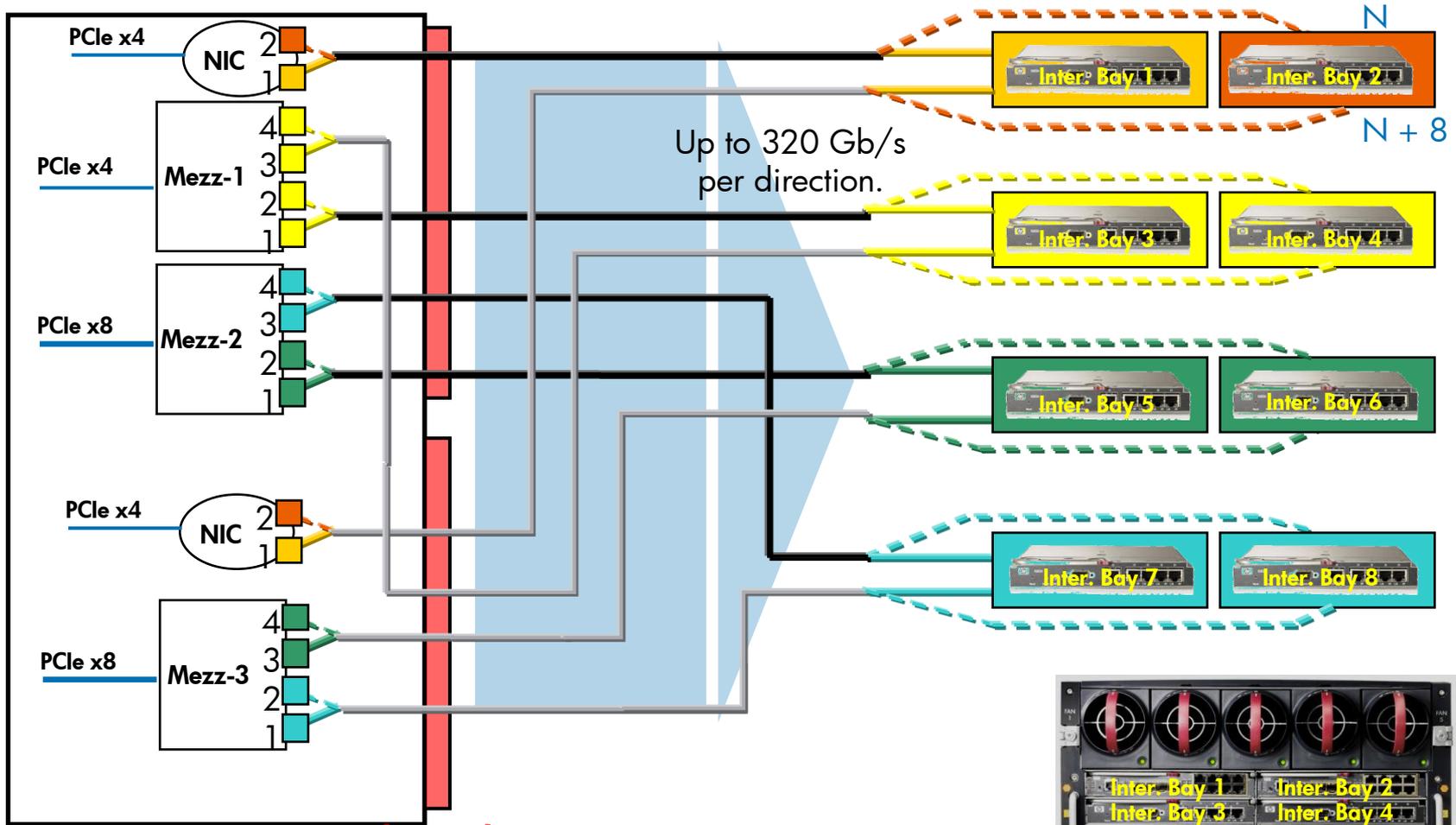
Half-Height Server Blade N  
(N= 1 .... 16)

16 Lanes per connector

Up to up to 10Gb/s per lane

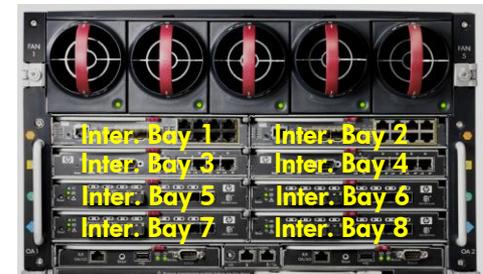


# c7000 Interconnect Model (Full-Height Server Blade)



Full-Height Server Blade  
N (N= 1 .... 8)

32 Lanes per FH



# c-Class Power and Airflow

- Power Supplies
  - Minimum Slot 1 and Slot 4
  - 4 to 6 supplies provide redundancy—select AC or DC
- Fans
  - Minimum of 4 Fans—2 left and 2 right
  - 8-10 for redundancy (middle empty with 8)
- Install everything and turn on standby power, the OA will go through its startup script
  - OA will ask for power redundancy scheme
  - If the fan quantity and/or power supply number is inadequate the OA will let you know
-

# Enclosure Module Access

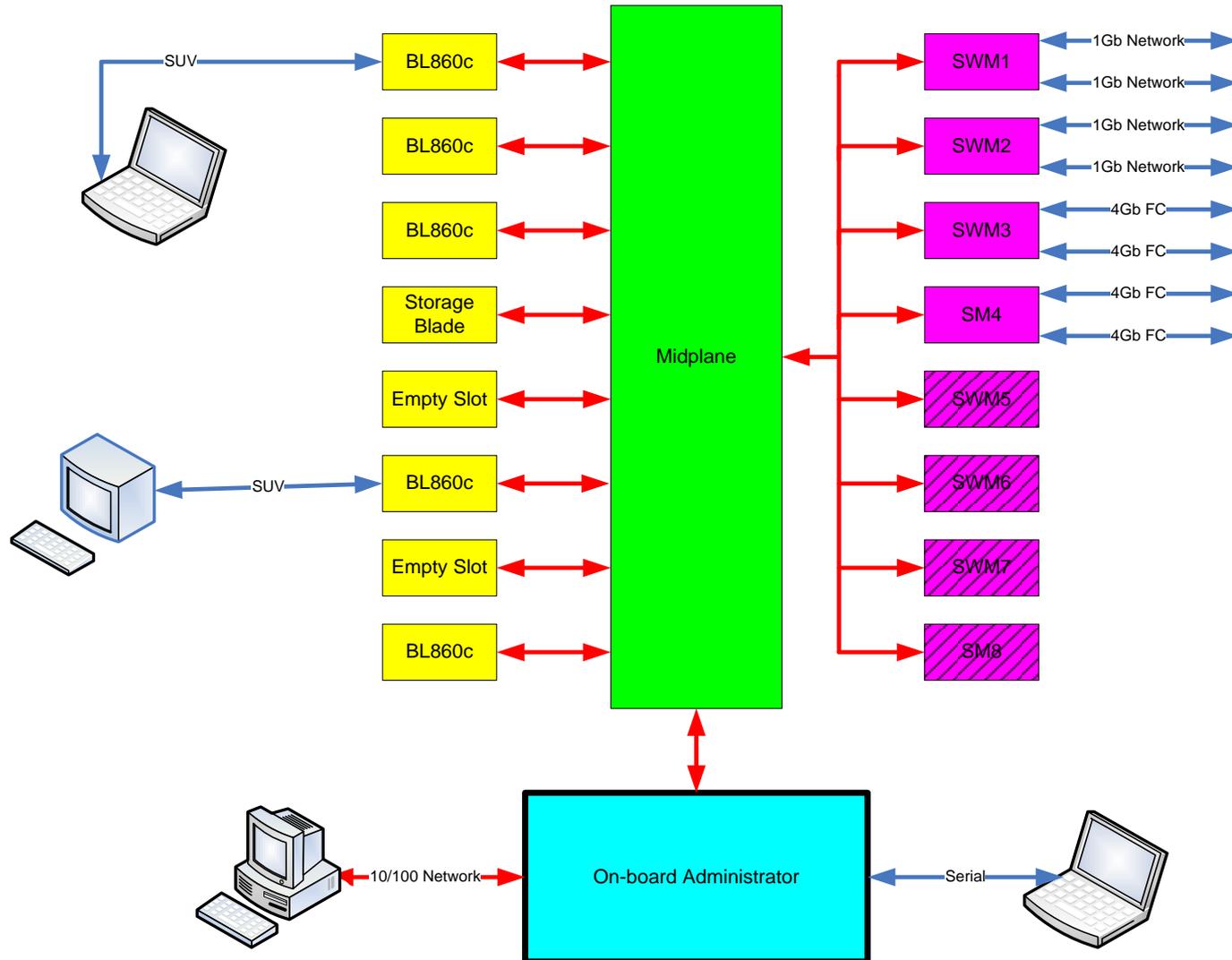
- On-board Administrator
  - Get IP address from OA display
  - Browse to the iLO
  - TELNET to the CLI
  - Serial Connection
  - Use tag for OA name and password
  - Configure IP, name, password, etc.
- Interconnect Modules
  - Local CLI
  - Browse via OA
  - Look for tag



# Management Processor Access

- TELNET to the Management Processor on each individual Blade
  - Traditional method of console access
- Browse to the MP (iLO2)
- “SUV” cable for serial/USB/VGA connection to each Blade
- Use Tag for login information
- Future support for Virtual KVM (vKVM)

# Management Console Access



# Check Firmware

- Update OA first
- Interconnect Modules
- Server Blade
  - Baseboard Management Controller (BMC)
  - Management Processor (MP)
  - System Firmware (SFW)
  - Integrated IO (FRU EEPROMs for example)
  - Mezzanine Cards
- Storage Blades

# HP BladeSystem usage scenarios



## End-to-end provisioning



Provision solutions across compute, network, and storage in minutes

## Automated server recovery



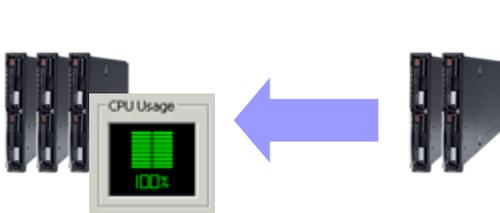
Deliver economical high availability via resource pooling and auto-recovery

## Scheduled re-provisioning



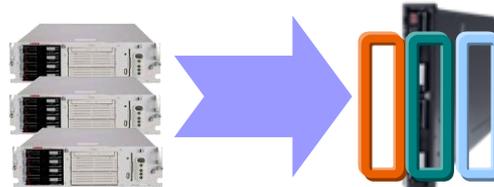
Improve system utilization through scheduled re-provisioning

## Dynamic scaling



Dynamically scale infrastructure based on performance needs

## Rapid IT consolidation



Consolidate legacy compute nodes on high performance platforms

## Patch and vulnerability



Quickly assess and respond to potential security vulnerabilities



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