



# Technical Forum & Executive Briefing

17 al 21  
Octubre  
2011

Imagine **PODER** Imagine **CAPACIDAD**

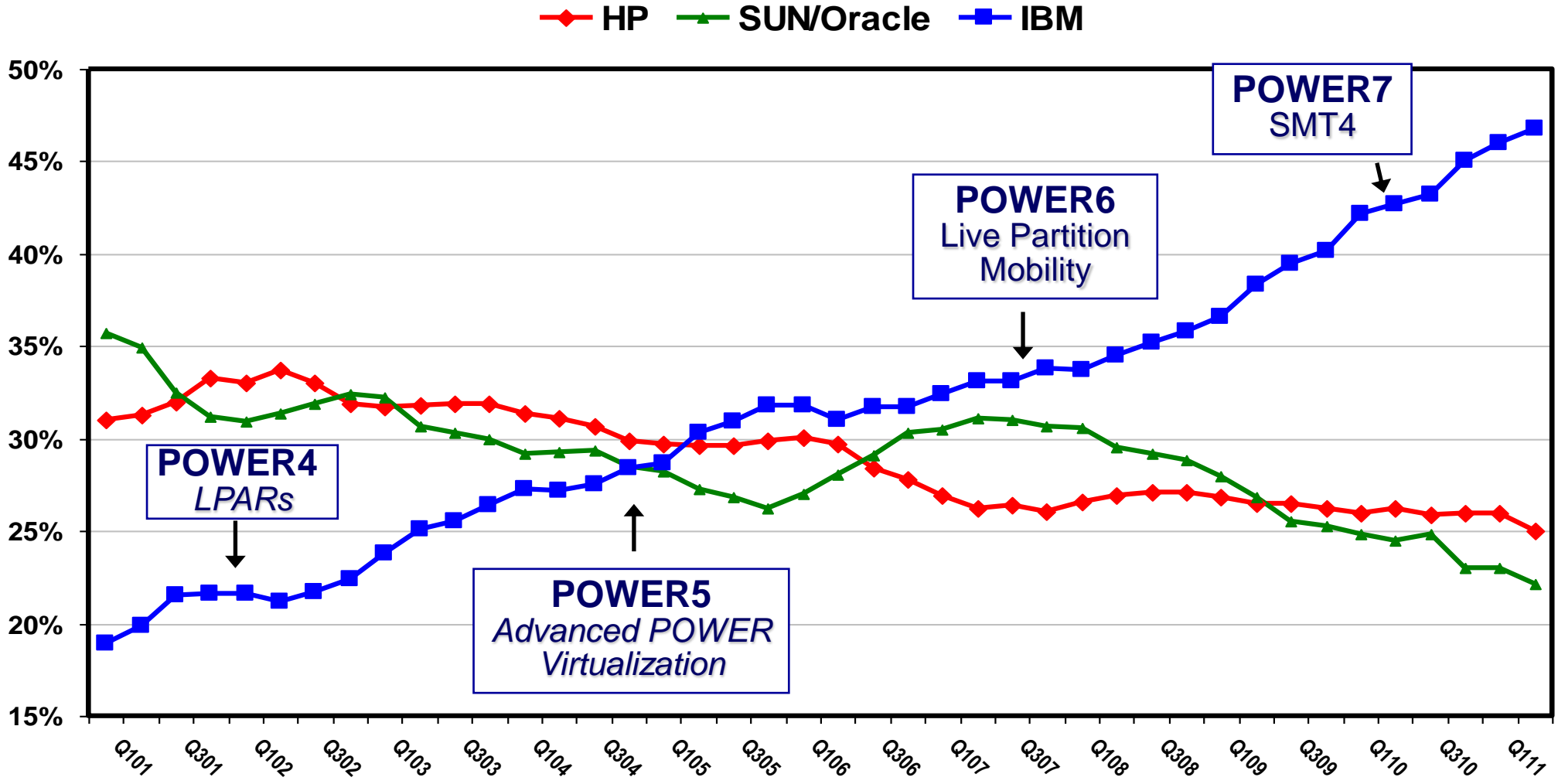
## Power Systems Entry Systems Update

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*Executive Briefing Center*



# 10Yr History Four Quarter Average Revenue Share

## UNIX Server Rolling Four Quarter Average Revenue Share According to IDC

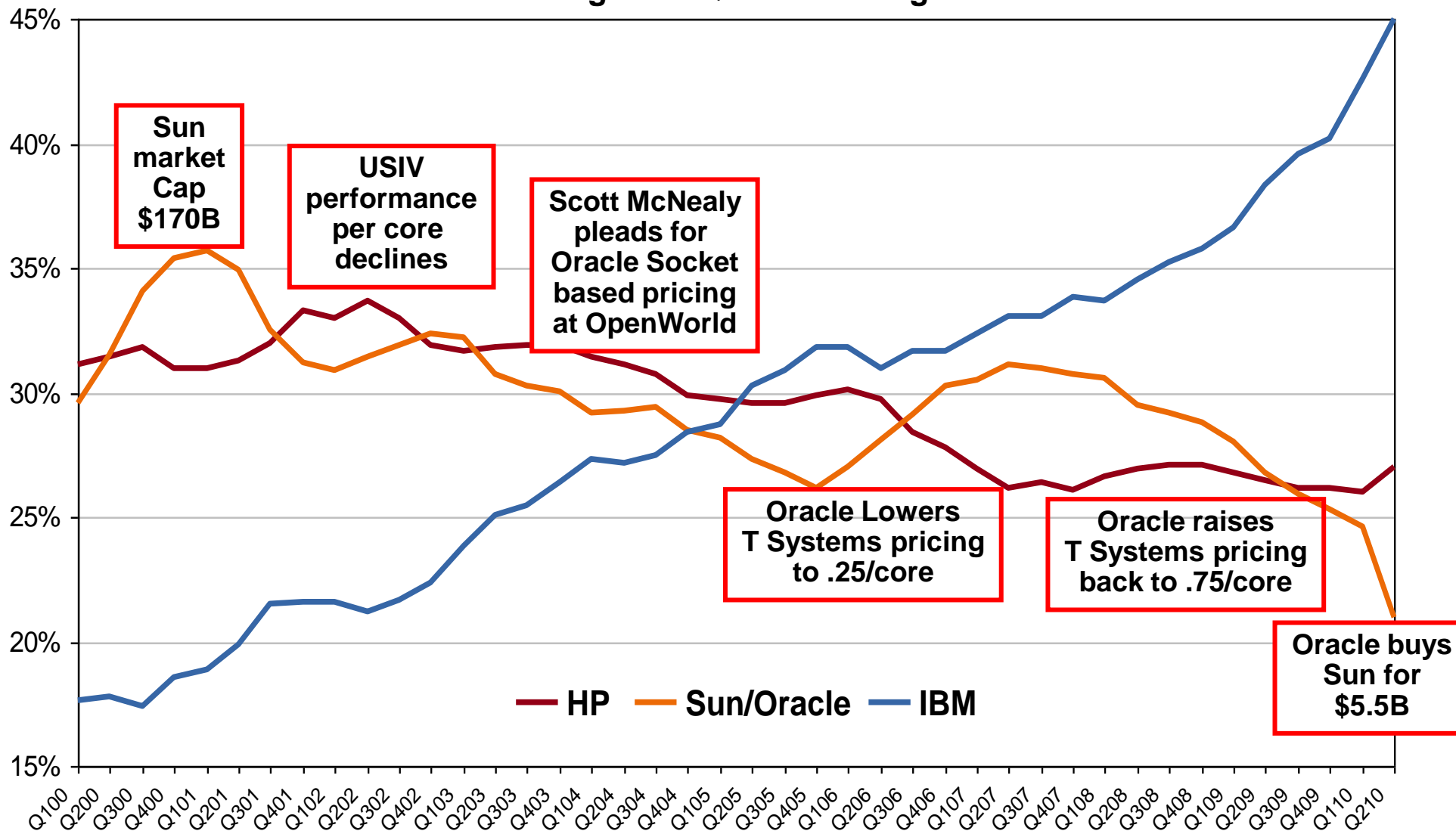


Source: IDC Quarterly Server Tracker Q310 release, May 2011

# Sun/Oracle Track Record

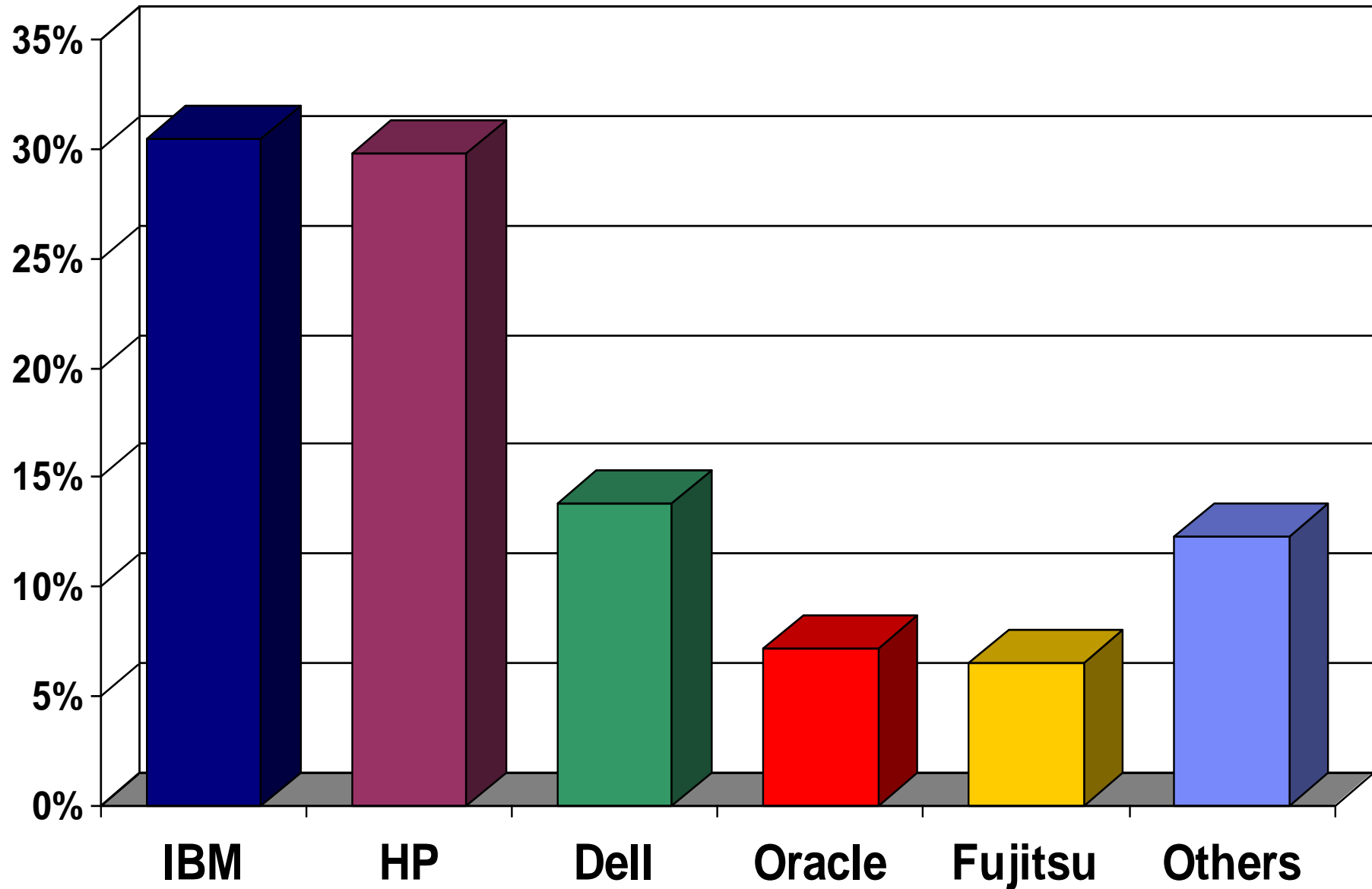
**...the largest shift of customer spending in UNIX history**

UNIX Server Rolling Four Quarter Average Revenue Share

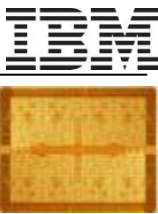


Source: IDC Server Tracker, Sept 2010

# IBM #1 in Total Server Revenue



Source: IDC Quarterly Server Tracker release, August 2011



# POWER7 Systems Portfolio

1H / 2010



Power 780  
MTM 9179-MHB

Power 770  
MTM 9117-MMB



Power 750  
MTM 8233-E8B

Power 755  
MTM 8236-E8C



PS702  
MTM 8406-71Y

PS701  
MTM 8406-71Y

PS700  
MTM 8406-70Y



2H / 2010

Power 795  
MTM 9119-FHB



Power 720 / 740  
MTM 8202-E4B  
MTM 8205-E6B



Power 710 / 730  
MTM 8231-E2B



1H / 2011

PS703  
MTM 7891-73X



PS704  
MTM 7891-74XY



2H / 2011

Power 780  
MTM 9179-MHC

Power 770  
MTM 9117-MMC



Power 720 / 740  
MTM 8202-E4C  
MTM 8205-E6C



Power 710 / 730  
MTM 8231-E1C  
MTM 8231-EC2



# Power 710 / 720 / 730 / 740 Highlights

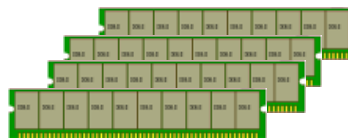
## Faster I/O performance

- PCI Gen2 doubles the bandwidth compared to PCI Gen1
- Supports up to five + one PCIe Gen2 slots



## Twice the memory

- Up to 512GB with the 740



## New Standard feature

- Integrated RAID 0,1, 10

## Added I/O Expansion capabilities for Power 730

## Upgrades: Power 520 systems to Power 720 8231-E4C



## **PCIe Gen2 IO Hub Value Proposition**

**POWER7 systems are able to take advantage of PCIe Gen2**

**Doubles the per slot bandwidth (up to 4GB/s)**

**Implements PCI-SIG standard for I/O Virtualization**

**~2X the bandwidth of it's PCIe Gen1**

**Improved the bandwidth of small transfers (< 128 Bytes).**

- Benefits both Gen1 and Gen2 network adapters.

**Maximize slot density**

**Reduced latencies**

**Implements POWER Arch. for Enhances Error Handling (EEH)**

# POWER7 Portfolio

## Major Features:

- Modular systems with linear scalability
- PowerVM Virtualization
- Physical and Virtual Management
- Roadmap to Continuous Availability
- Binary Compatibility
- Energy / Thermal Management



**Power 720 / 740**

**Power 750**

**Power 710 / 730**

**BladeCenter PS700 / PS701 / PS702 PS703 / PS704**



**Power 770**

**Power 780**

Dual Socket

Quad Socket

**Power 795**



**Power 775**



**Power 755**







**PS700 / 701 / 702**  
**PS703 / 704**

# POWER7 Single Wide Blades: PS700/PS701/PS703



**PS700 4 Core**

**PS701 8 Core**

**PS703 16 Core**

	<b>PS700 4 Core</b>	<b>PS701 8 Core</b>	<b>PS703 16 Core</b>
<b>Architecture</b>	One 4 Core Socket	One 8 Core Socket	Two 8 Core Sockets
<b>Processor</b>	POWER7 @ 3.0 GHz	POWER7 3.0 GHz	POWER7 2.4 GHz
<b>DDR3 Memory</b>	Up to 64 GB	Up to 128 GB	Up to 256 GB
<b>DASD / Bays</b>	0 - 1 SAS ( 300/600 GB )	0 - 1 SAS ( 300/600 GB )	0 - 1 SAS (300/600 GB) 0 - 2 SSD ( 177 GB)
<b>Daughter Card Options</b>	CIOv & CFFh PCIe Gen1 support	CIOv & CFFh PCIe Gen1 support	CIOv & CFFh PCIe Gen2 support
<b>Integrated Options</b>	Dual Port Gbt Ethernet IVE, SAS, USB	Dual Port Gbt Ethernet IVE, SAS, USB	Dual Port Gbt Ethernet No IVE, SAS, USB

# POWER7 Double Wide Blades: PS702 & PS704



**PS702**  
**16 Core**

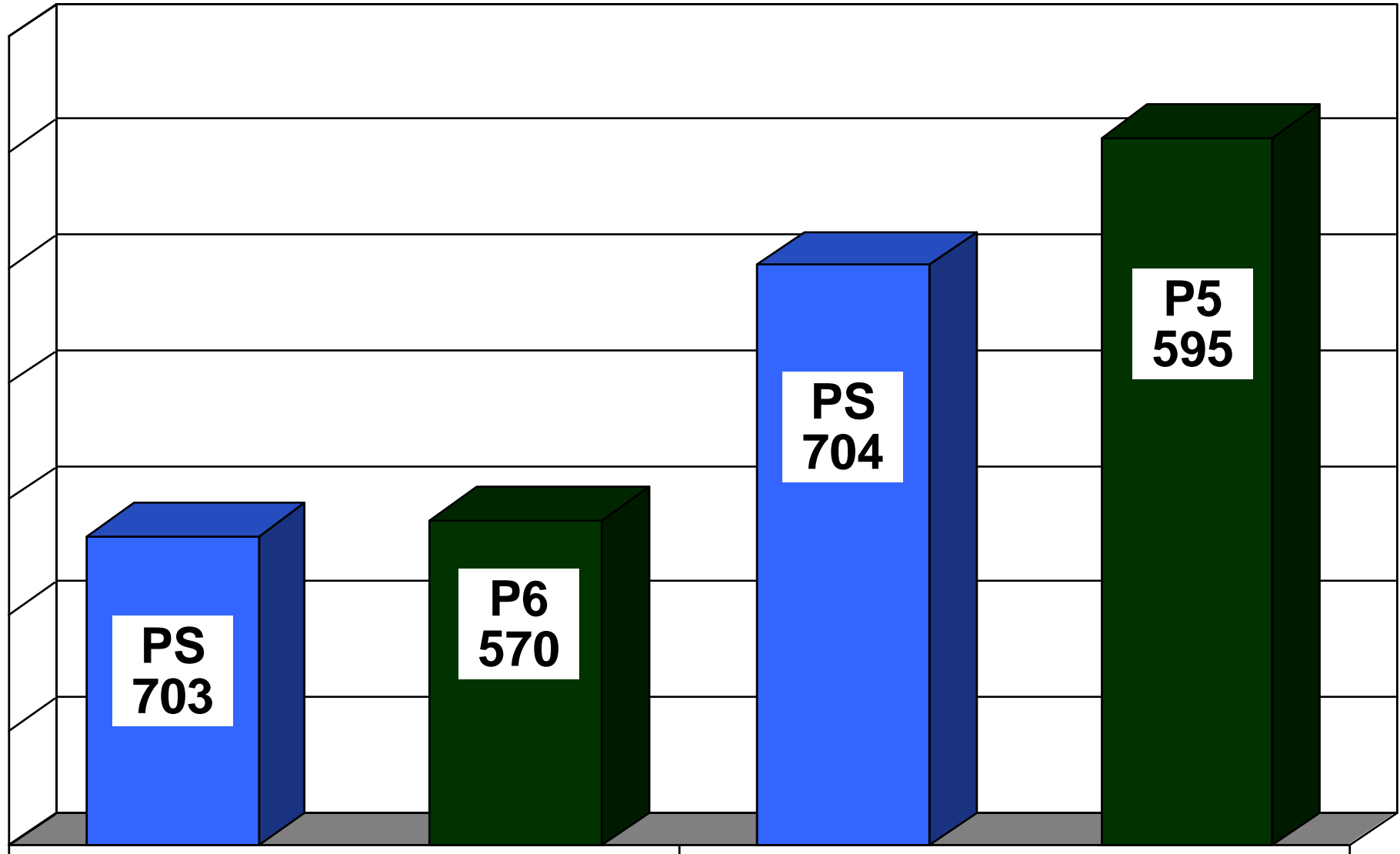


**PS704**  
**32 Core**

<b>Architecture</b>	<b>8 Cores/Socket Two Sockets</b>
<b>Processor</b>	<b>POWER7 8-Core @ 3.0 GHz</b>
<b>DDR3 Memory</b>	<b>Up to 256 GB</b>
<b>DASD / Bays</b>	<b>0 - 2 SAS ( 300/600 GB )</b>
<b>Daughter Card Options</b>	<b>CIOv &amp; CFFh PCIe Gen1 support</b>
<b>Integrated Options</b>	<b>Quad Port Gbt Ethernet IVE, SAS, USB</b>

<b>Architecture</b>	<b>8 Cores/Socket Four Sockets</b>
<b>Processor</b>	<b>POWER7 8-Core @ 2.4 GHz</b>
<b>DDR3 Memory</b>	<b>Up to 512 GB</b>
<b>DASD / Bays</b>	<b>0 - 2 SAS ( 300/600 GB ) 0 – 4 SSD ( 177 GB )</b>
<b>Daughter Card Options</b>	<b>CIOv &amp; CFFh PCIe Gen2 support</b>
<b>Integrated Options</b>	<b>Quad Port Gbt Ethernet No IVE, SAS, USB</b>

# PS Blade Performance Comparison (rPerf)



# New PS703 / PS704 Blade SSD Option

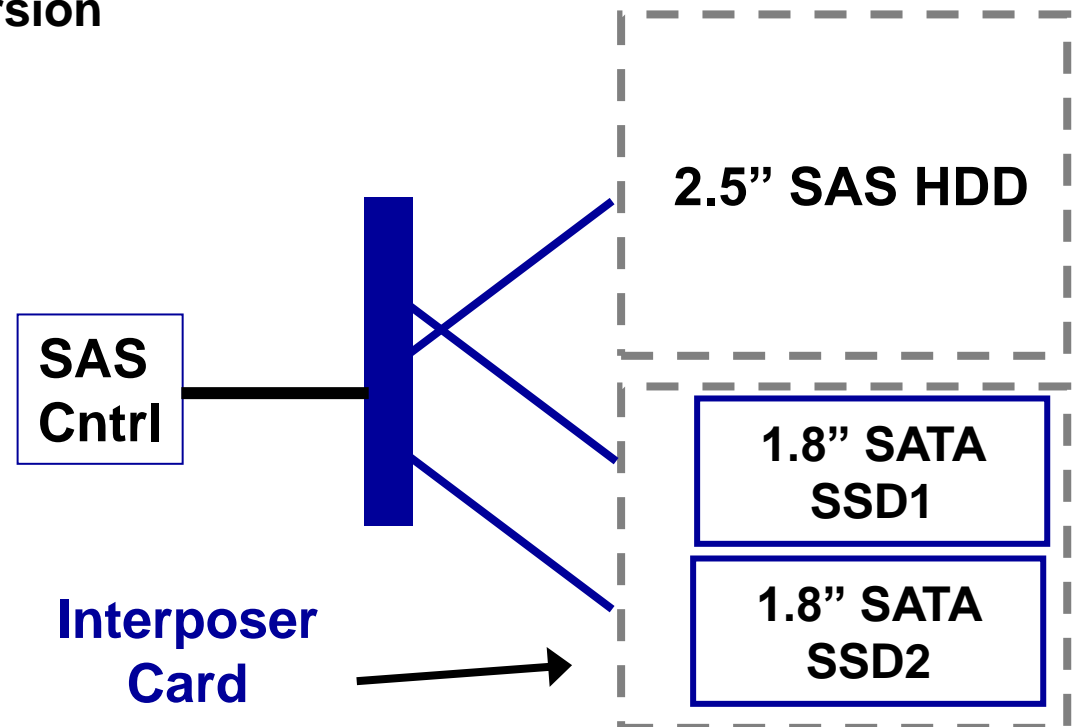
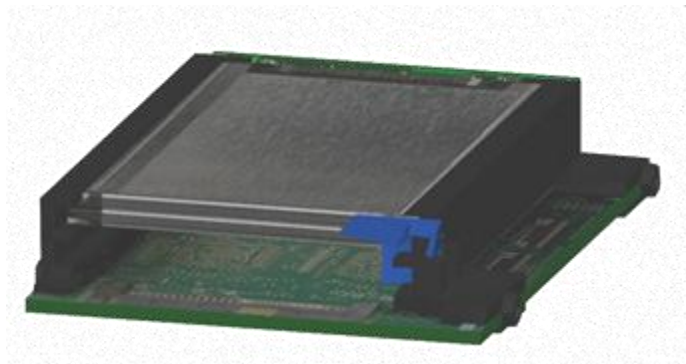
PS703 (1 SAS bay) & PS704 (2 SAS bays)

- FC # 8207
- 177 GB

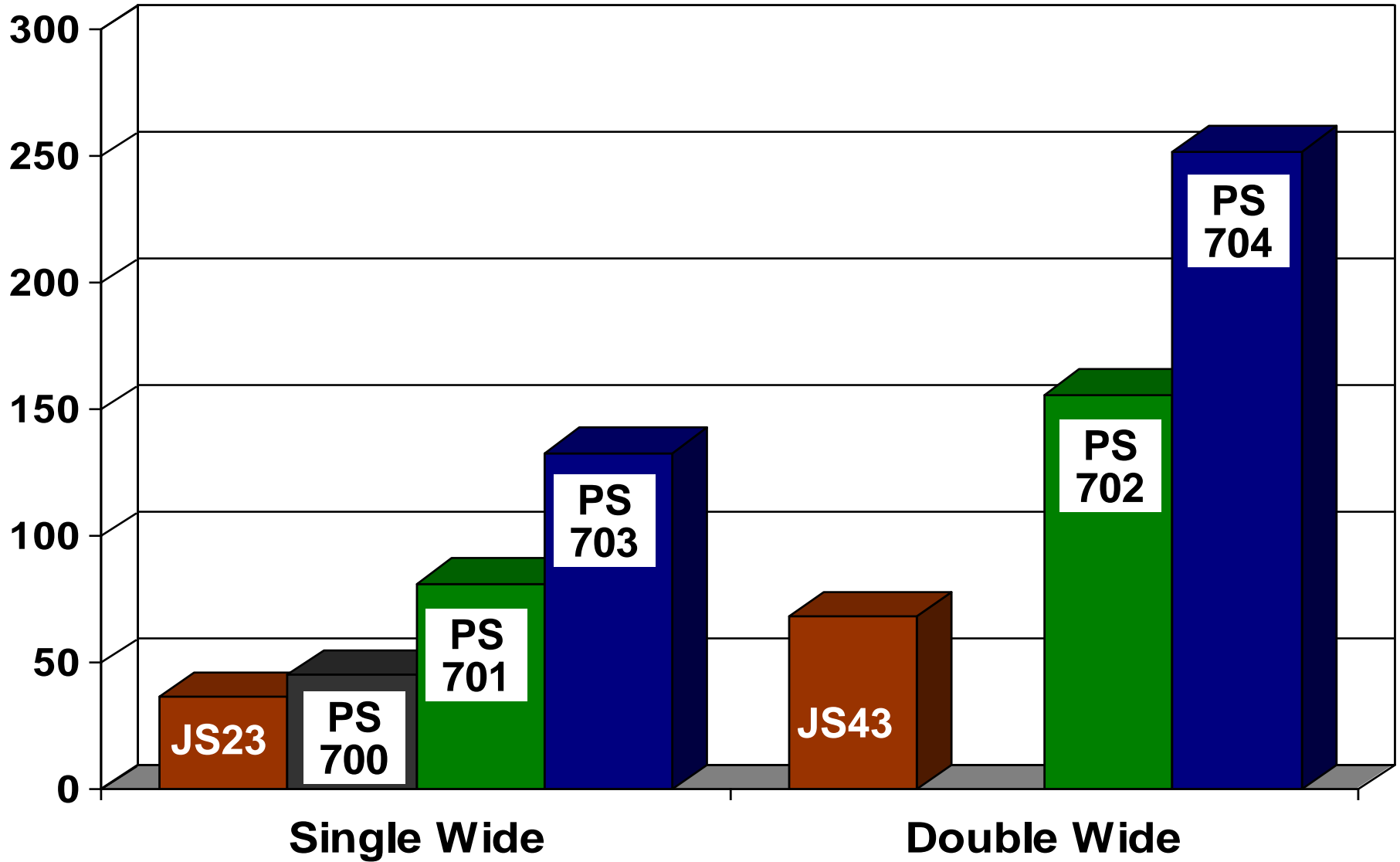
SFF Bay can have either HDD or SSD

Interposer is required

- FC #4539
- Supports 1 or 2 SSD modules
- Provides the SAS to SATA conversion

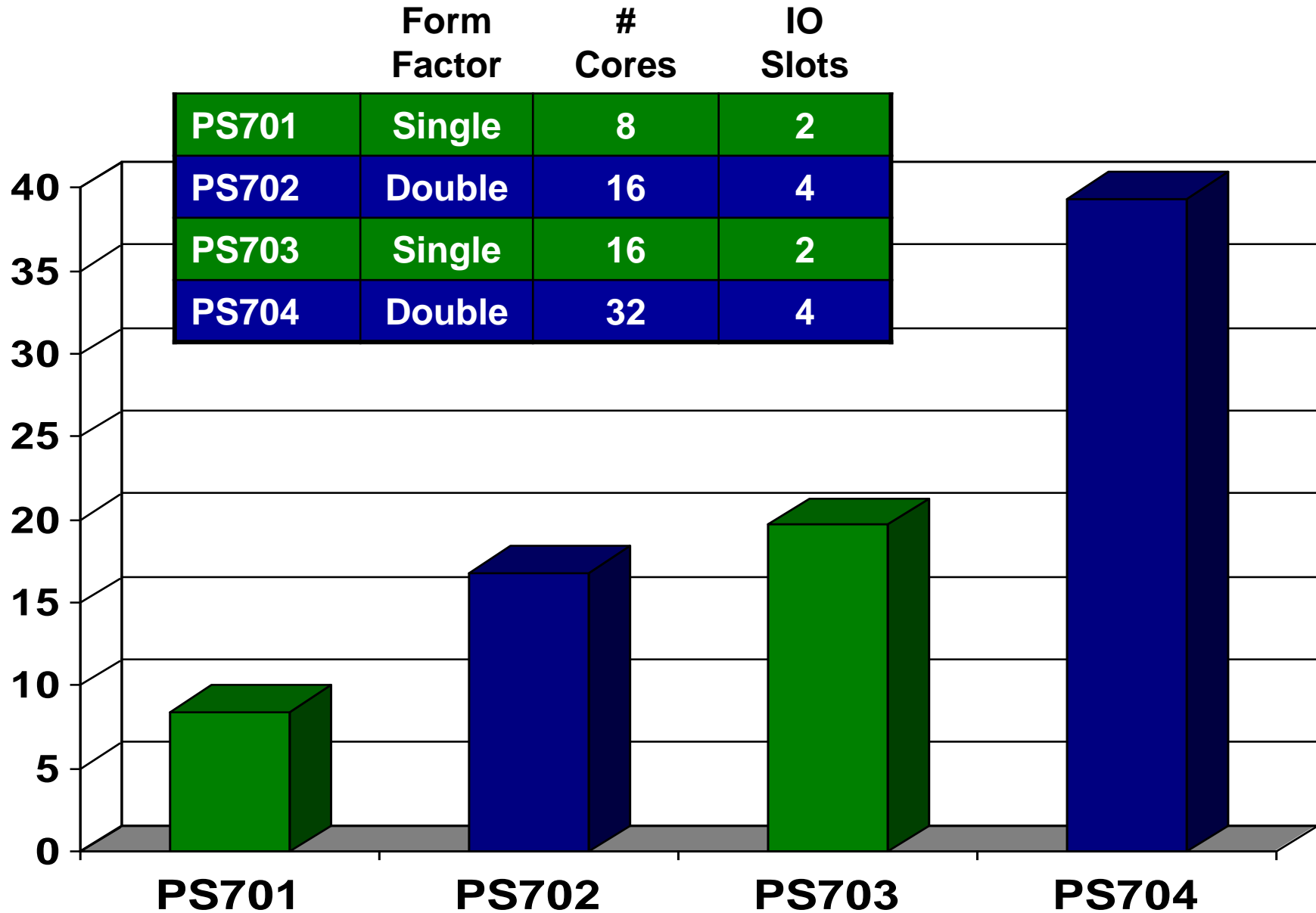


# PS Blade Performance Comparison

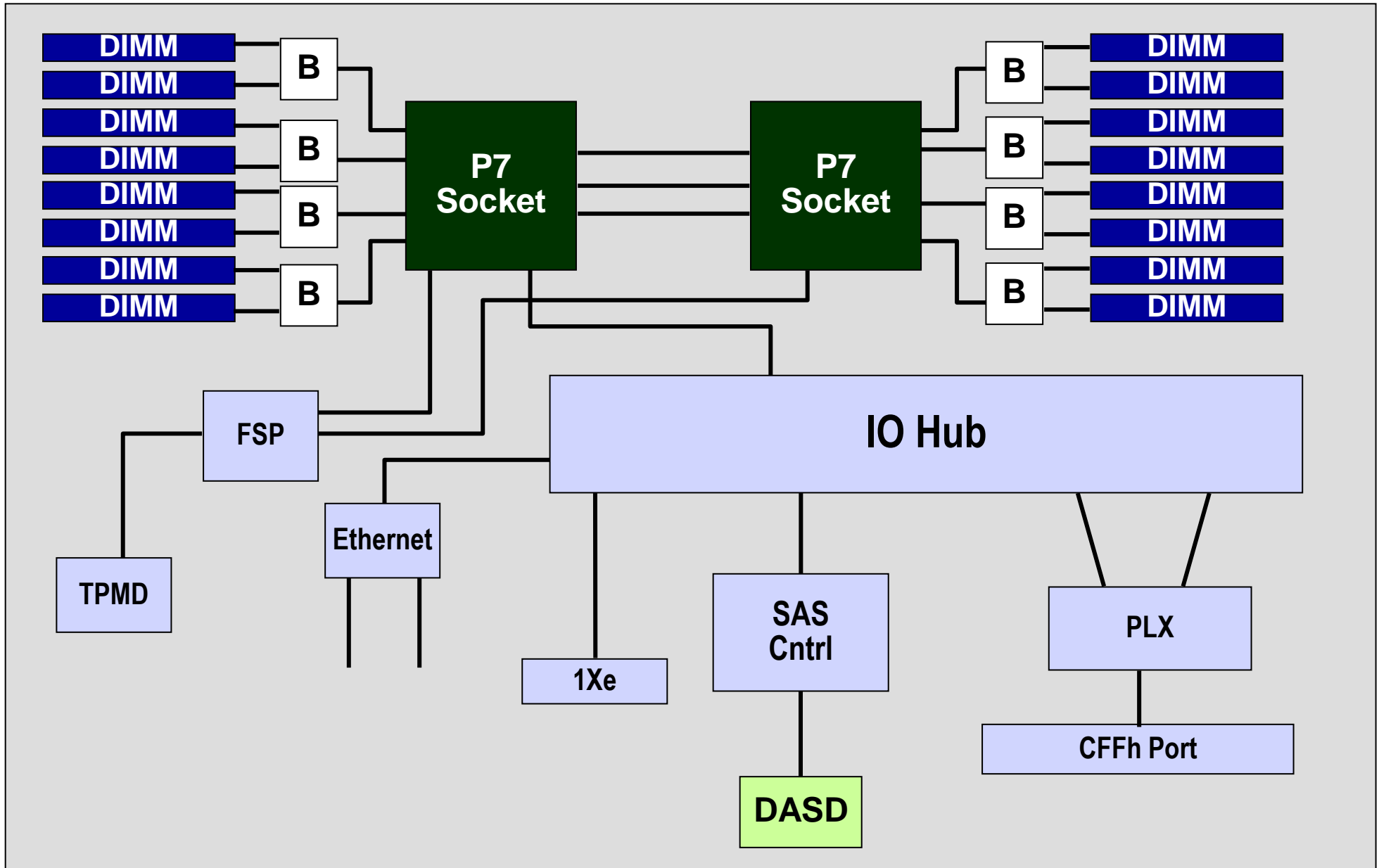


rPerf shown, CPW would be similar

# POWER7 Blade IO Bandwidth



# Power 703 Layout





# PS703 and PS704 Options

## Memory

- FC # 8196            8 GB (2x4GB RDIMMs) Memory
- FC # 8199            16 GB (2x8GB RDIMMs) Memory
- **FC #EM34**            **32GB (2x16GB RDIMMs) Memory**

## Adapters / CIOv

- FC # 8240            Emulex 8 Gbt Fibre Channel Exp
- FC # 8241            QLogic 4 Gbt Fibre Channel Exp
- FC # 8242            QLogic 8 Gbt Fibre Channel Exp
- FC # 8243            Broadcom 2-Port Gbt Ethernet Exp
- FC # 8246            3 Gbt SAS Passthrough Expansion

## Adapters / CFFh

- FC # 8252            QLogic Eth 4Gbt Fibre Exp. Card
- FC # 8271            QLogic 8 Gbt Fibre Chan / **Dual 1Gbt ENET** Exp Card
- **FC # 8272**            **2-Port QDR 40 Gbt/s InfiniBand**
- FC # 8275            QLogic 2 port 10 Gb Converged
- FC # 8291            4-Port 1Gb Eth Expansion Card

## Storage

- **FC # 8207**            **177 GB Solid State Drive**
- FC # 8274            IBM 300GB SAS 10K RPM SAS HDD
- FC # 8276            IBM 600GB SAS 10K RPM SFF

**POWER7**  
**Entry Rack / Tower**

## Overview

**Single or Dual socket POWER7 planars**

**Memory Riser cards**

- **DDR3 @ 1066 GHz**

**Primary IO Planar: 4 PCIe slots**

- **710 / 730: Low profile adapters**
- **720 / 740 Full height and/or optional Low profile adapters**

**Integrated Virtual Ethernet: Two 1 Gbt ports**

**Optional RAID support**

**PowerVM Support**

**Warranty: 3 Years**



## Power 710 / 730

# Power 710 and 730



**Power 710: 1S2U**

**Power 730: 2S2U**

**FC  
2319**

**IO Drawers**



# Power 710 and 730



**Power 710: 1S2U**  
**Power 730: 2S2U**

	<b>Power 710 8231-E1C</b>	<b>Power 730 8231-E2C</b>
<b>Architecture</b>	4-core 3.0 GHz 6-core 3.7 GHz 8-core 3.55 GHz	4-core 3.0 GHz 4-core 3.7 GHz 6-core 3.7 GHz 8-core 3.55 GHz
<b>Planar</b>	Single Socket	Dual Socket
<b>DDR3 Memory</b>	4 / 8 / 16 GB DIMMs 8GB to 128GB	4 / 8 / 16 GB DIMMs 8GB to 256GB
<b>DASD / Bays</b>	Up to 6 SFF or SSD	
<b>PCIe Gen2 Expansion Slots</b>	Five x8 LP One x4 LP (Ethernet)	
<b>Integrated SAS/SATA Cntrl</b>	Standard: RAID 0, 1, & 10 Optional: RAID 5 & 6	
<b>GX++ Slots</b>	One	Two / Shared
<b>Ethernet</b>	Dual 10/100/1000	
<b>FC # 2319 Support</b>	Yes	
<b>Media Bays</b>	1 Slim-line & 1 Half Height ( Optional )	
<b>IO Drawers</b>	No	Yes / Max: 2
<b>Virt Management</b>	IVM / HMC / SDMC	
<b>Redundant Power &amp; Cooling</b>	Optional	Standard
<b>EnergyScale</b>	TPMD	
<b>Warranty</b>	3 Years	



# Power 710 / 730 Packaging Options

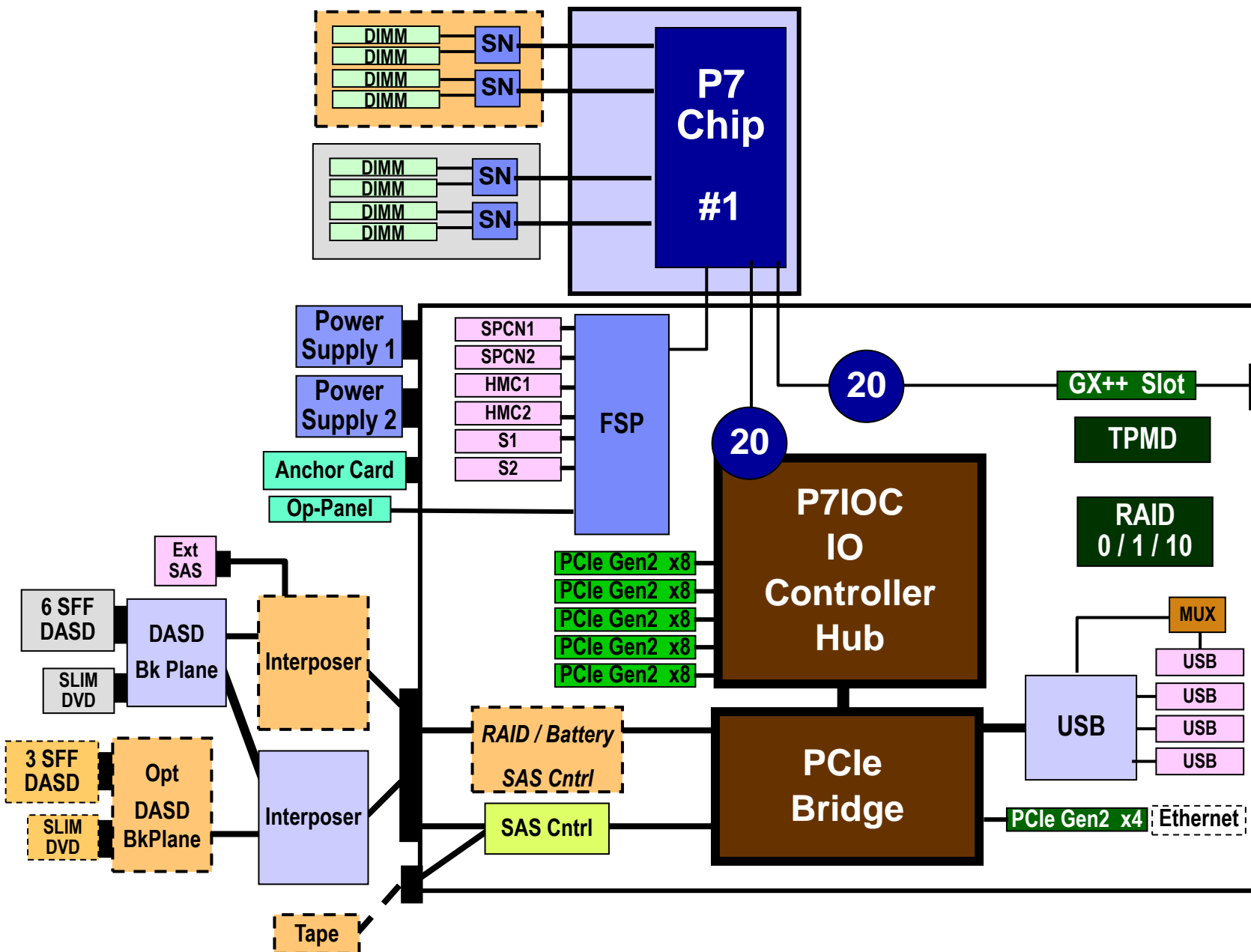


**Six SFF bays  
with Media**



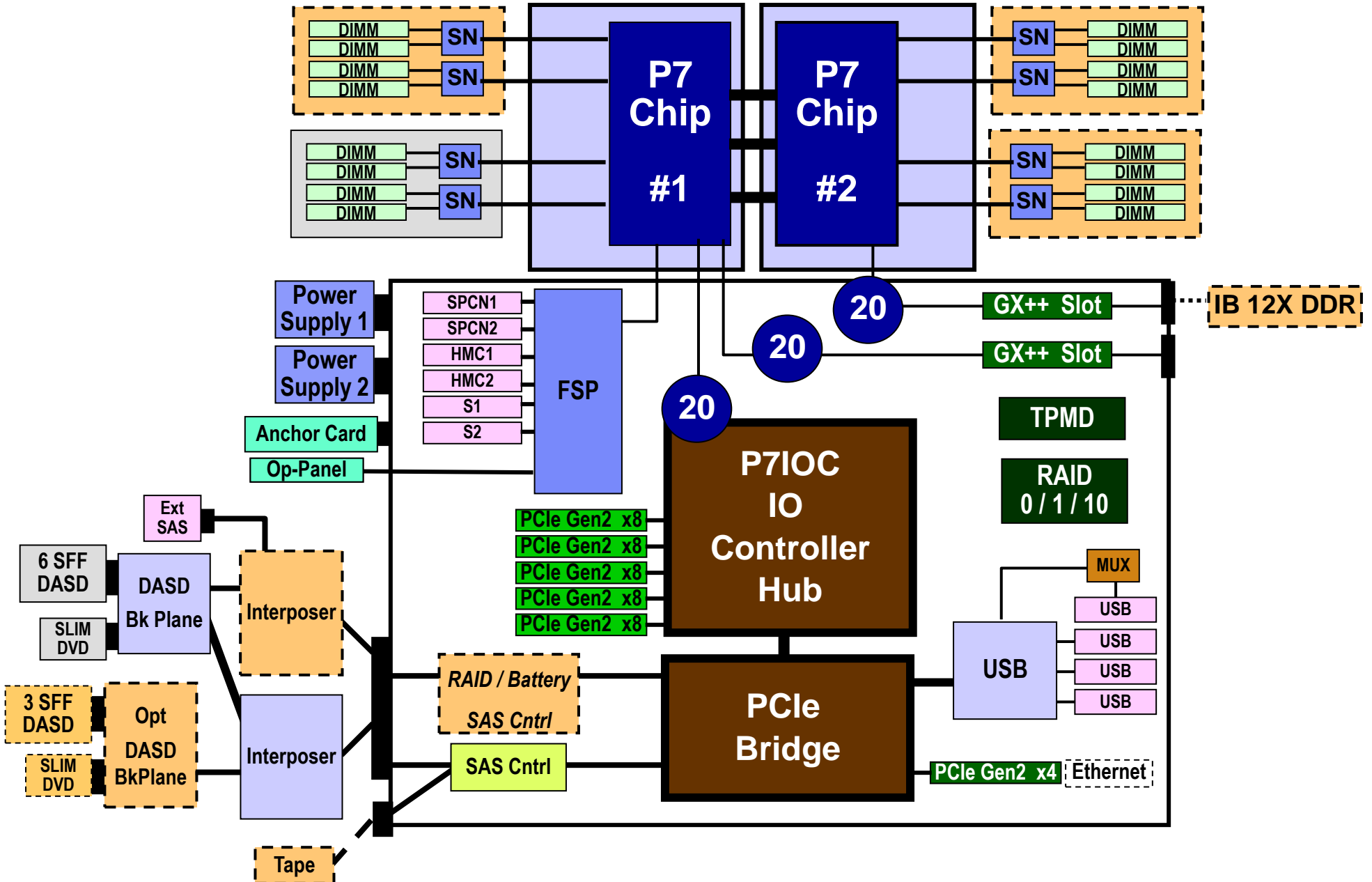
**Three SFF bays  
with Tape and Media**

# Power 710 PCIe Gen2 with PCIe Gen2 Support

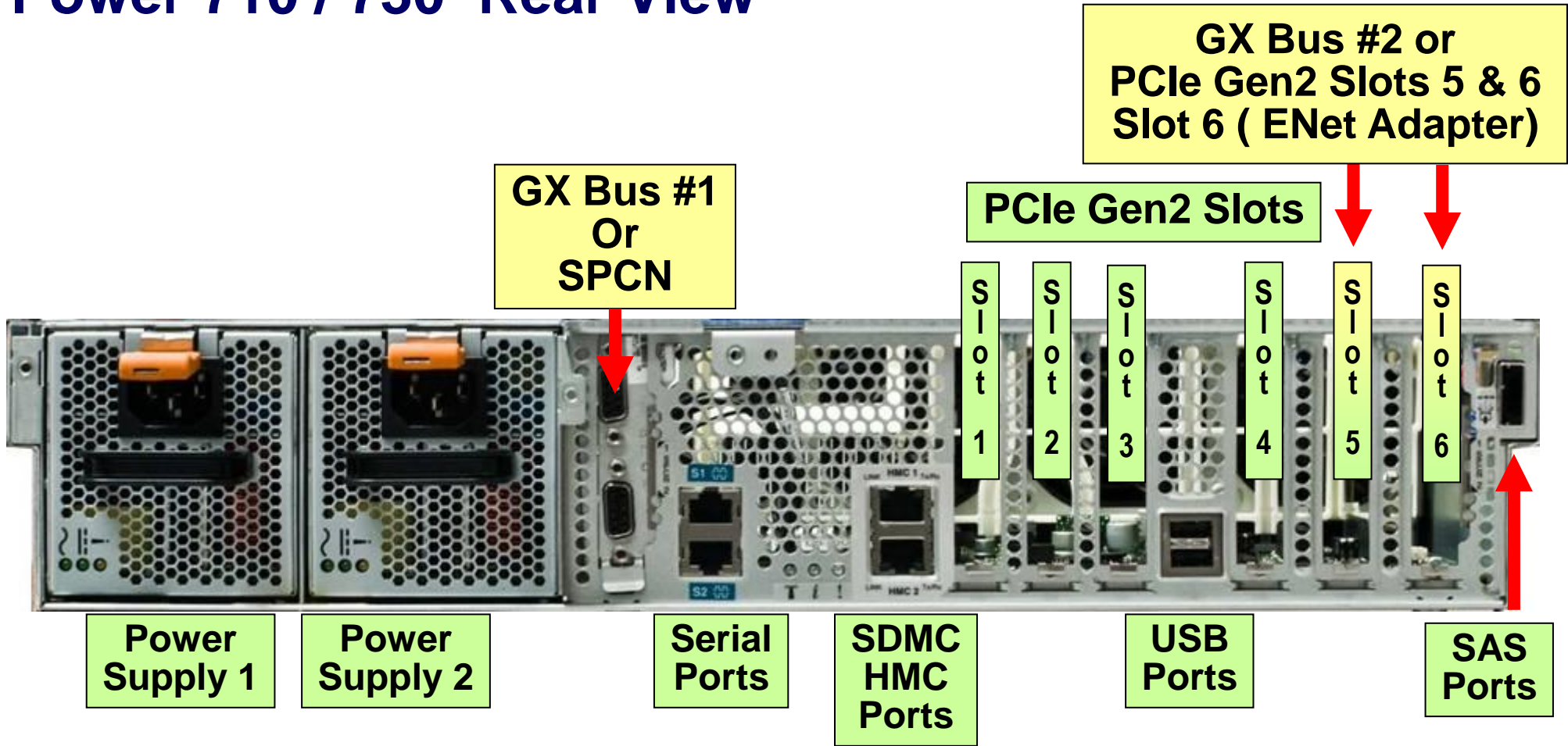




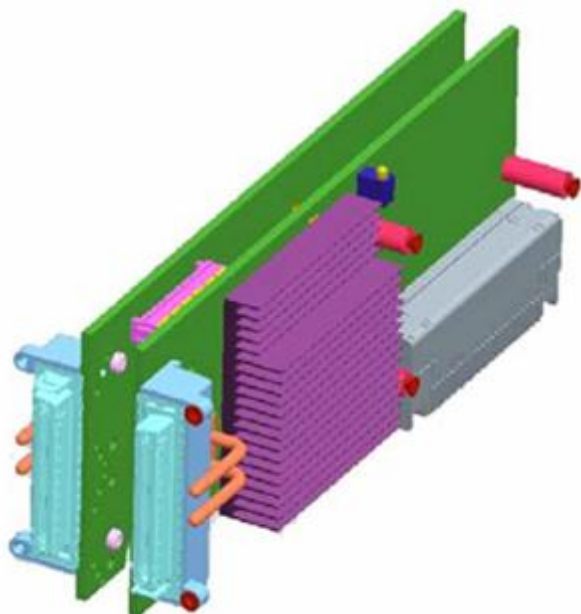
# Power 730 with PCIe Gen2 Support



# Power 710 / 730 Rear View



# Power 730 GX++ Expansion adapter



**12X InfiniBand Adapter**

**Dual Ports**

**Double width adapter**

- **Uses GX++ Slot 2 and PCIe slot 5**
- **Slots 5 and 6 are covered**

**Supports Two remote IO Drawers**

- **FC 5802 / 5877**

# Power 730 Remote IO Drawer option



**Model E2C**

**FC 5802 or 5877**

## Single IB 12x Loop

- Requires FC # EJOG

## Support for Two Remote IO Drawers

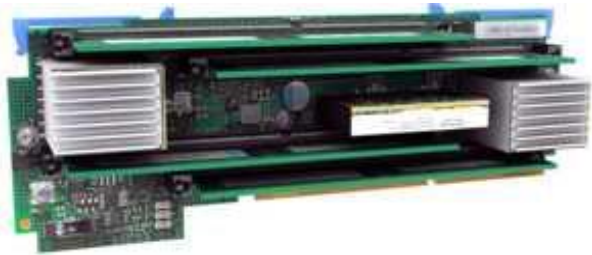
- FC # 5802 or FC # 5877

## Total IO Adapter Slots: 24

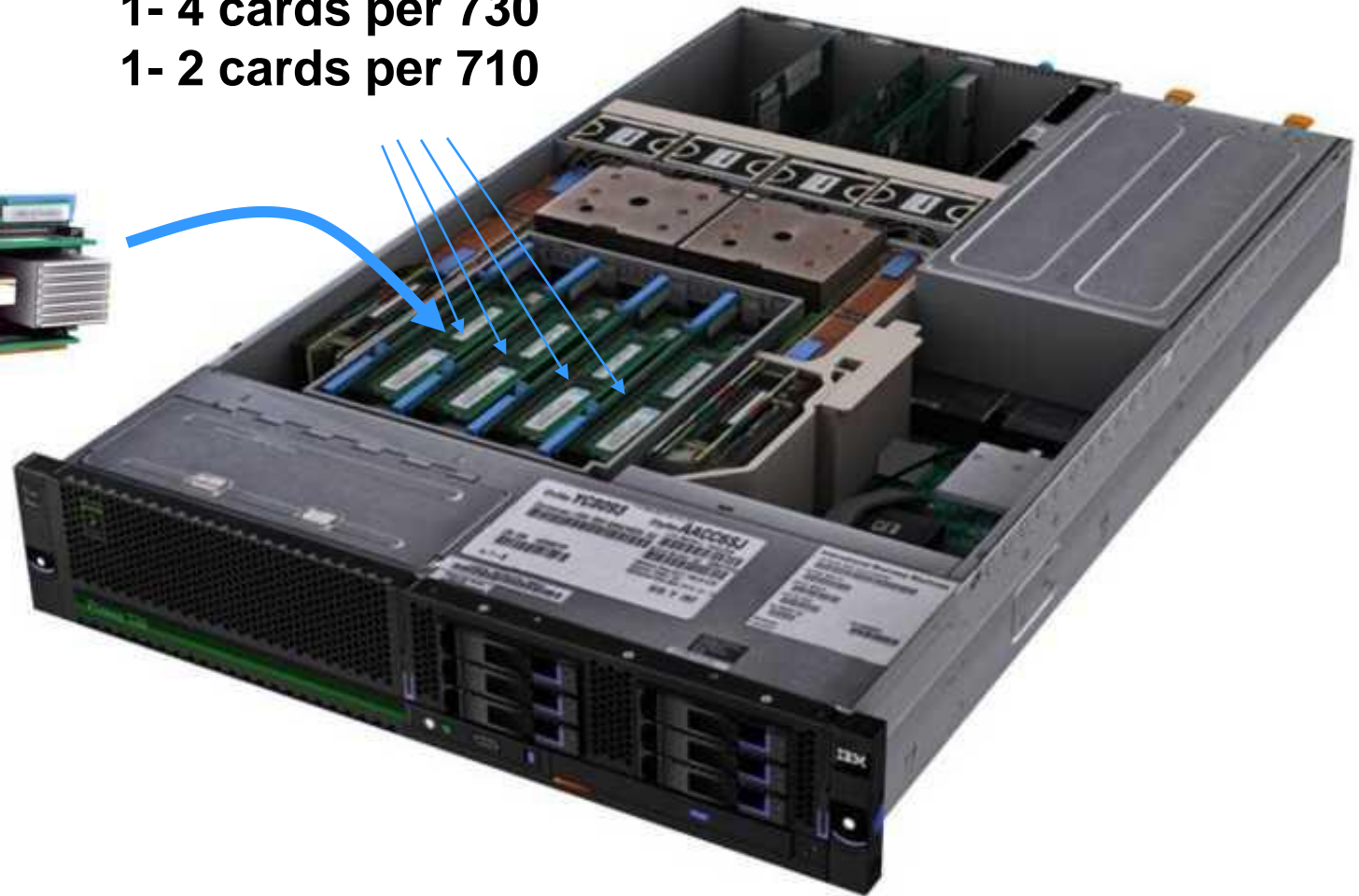
- Four internal LP PCIe Gen2 slots
  - ❖ One internal LP PCIe Gen2 slot ( Ethernet Adapter )
- Up to Twenty external PCIe Gen1 slots

# Power 710 / 730 – Memory Riser Cards

1- 4 cards per 730  
1- 2 cards per 710

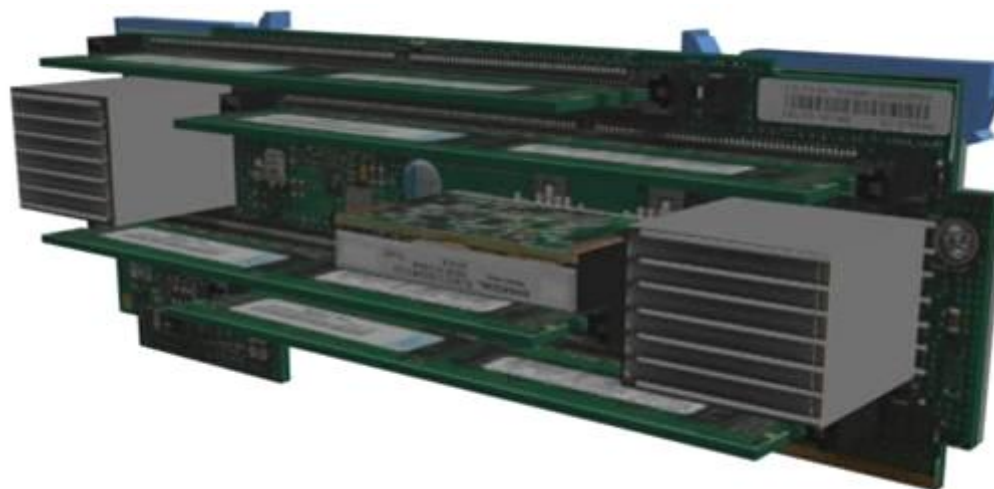


**Memory Riser Card**



# Power 710 / 730 Memory Riser Layout

**4 DIMMs  
Slots**



**DIMM Sizes: 4 GB / 8 GB / 16 GB @ 1066 GHz**

**Max Memory per Card: 64 GB**

**DIMM Options:**

- **Power 710: Max of 8 DIMM / 128GB ( Two memory cards )**
- **Power 730: Max of 16 DIMM / 256 GB ( Four memory cards )**

**Plugged rules: 1st card in pairs / Additional cards in quads**

**Mixing different size DIMMs on same riser not supported.**

**Different risers can have different size DIMMs**

# Power 710 / 730 Physical Specifications

## Dimensions:

- Width: 440 mm (19.0 in)
- Depth: 706 mm (27.8 in)
- Height: 89 mm (3.5 in)
- Weight Power 710: 28.2 kg (62 lbs)    Power 730: 29.5 kg (65 lbs)

## Operating voltage:

- Power 710: 100 to 127 or 200 to 240 V AC
- Power 730: 200 to 240 V AC

## Maximum measured power consumption (Maximum):

- Power 710: 650 watts
- Power 730: 1100 watts

## Maximum measured BTU (Maximum):

- Power 710: 2218
- Power 730: 3754

## Power-source loading ( Maximum )

- Power 710: 0.663 kVa
- Power 730: 1.122 kVa
- To obtain a heat output estimate based on a specific configuration.

<http://www-912.ibm.com/see/EnergyEstimator>



# Power 720 / 740



# Power 720 / 740



**Power 720: 1S4U**  
**Power 740: 2S4U**

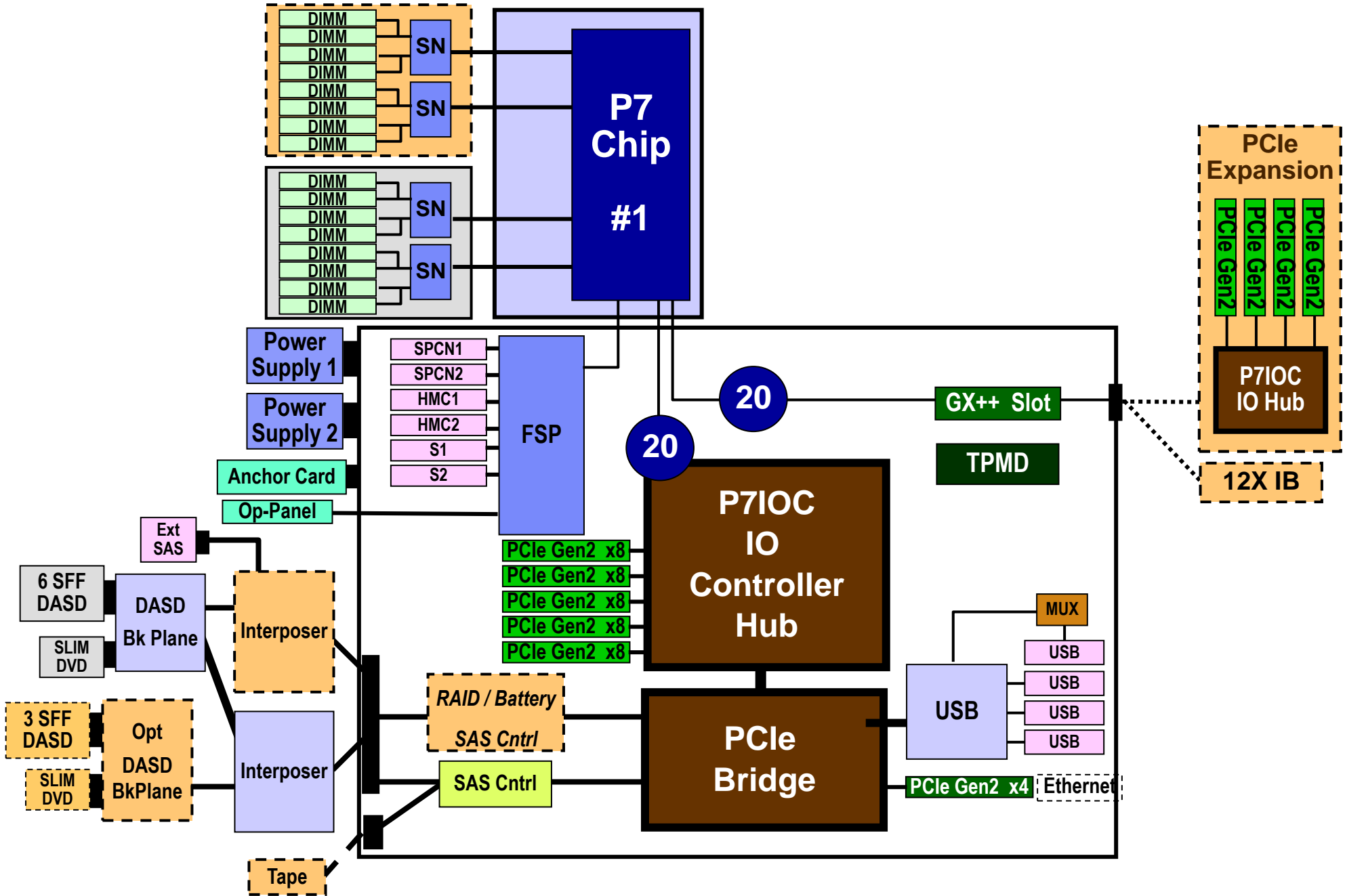


**Power 720: 1S4U**  
**Tower**

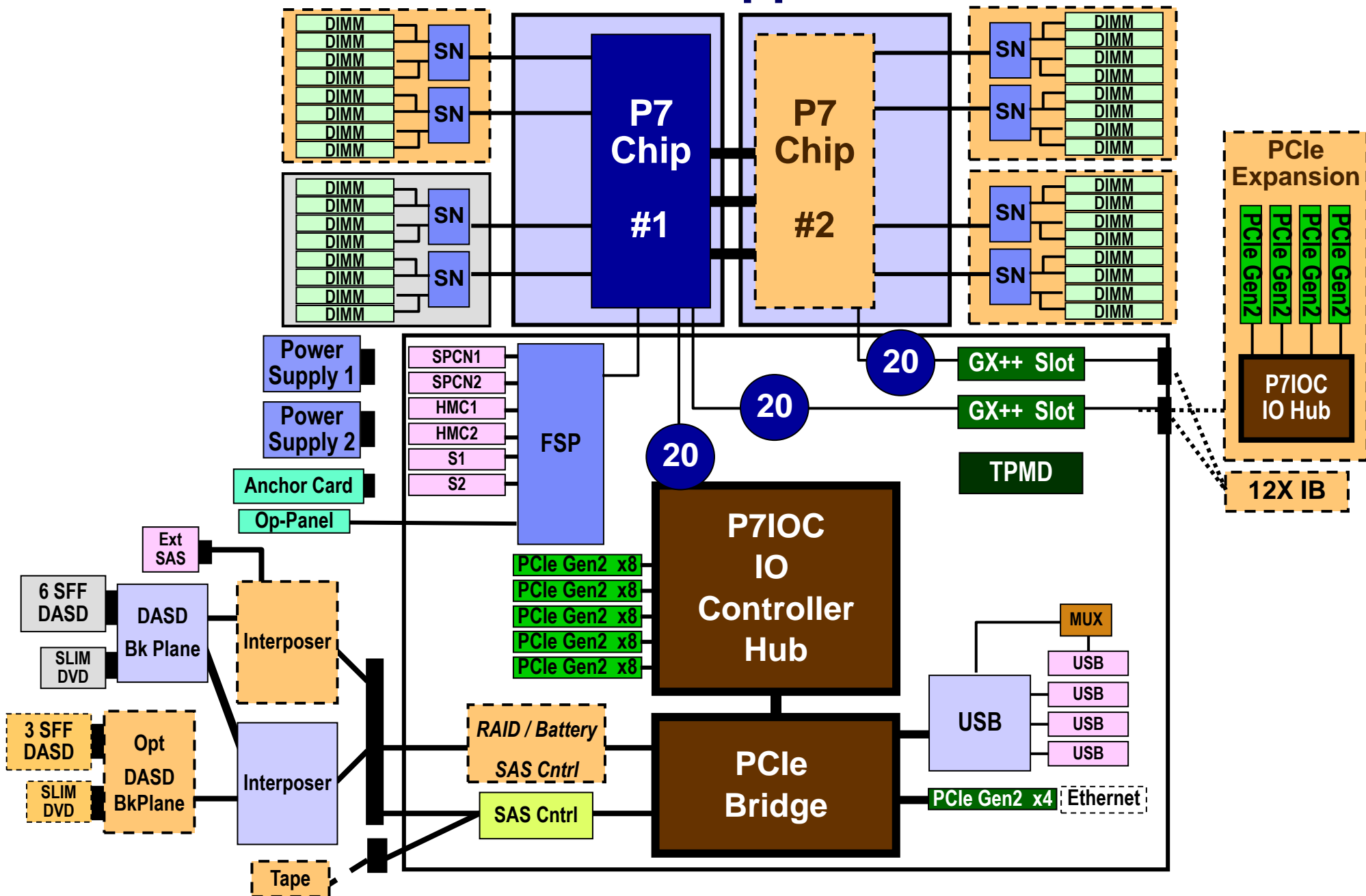


	<b>Power 720 8202-E4C</b>	<b>Power 740 8205-E6C</b>
<b>Architecture</b>	4-core 3.0 GHz 6-core 3.0 GHz 8 core 3.0 GHz	1 or 2 x 4-core 3.3 GHz 1 or 2 x 4-core 3.7 GHz 1 or 2 x 6-core 3.7 GHz 1 or 2 x 8-core 3.55 GHz
<b>Planar</b>	Single Socket	Dual Socket Single Socket option
<b>DDR3 Memory DIMMs</b>	2 / 4 / 8 / 16GB 4GB to 256GB	2 / 4 / 8 / 16GB 4GB to 512GB
<b>DASD Bays</b>	Up to 6 or 8 SFF or SSD	
<b>PCIe Gen2 Expansion Slots</b>	Five x8 FH (Base) One x4 FH (Base) / Ethernet Four x8 LP (Optional)	
<b>Integrated SAS</b>	Standard: RAID 0, 1, & 10 Optional: RAID 5 & 6	
<b>Integrated Ports</b>	3 USB, 2 Serial, 2 HMC	
<b>Ethernet</b>	Dual 10/100/1000	
<b>Media Bays</b>	1 Slim-line & 1 Half Height	
<b>IO Drawers</b>	Yes / T19 = 4 / 2 Max	
<b>Virt Management</b>	IVM & HMC & SDMC	
<b>Redundant Power and Cooling</b>	Optional	Standard
<b>EnergyScale</b>	TPMD	
<b>Warranty</b>	3 Years	

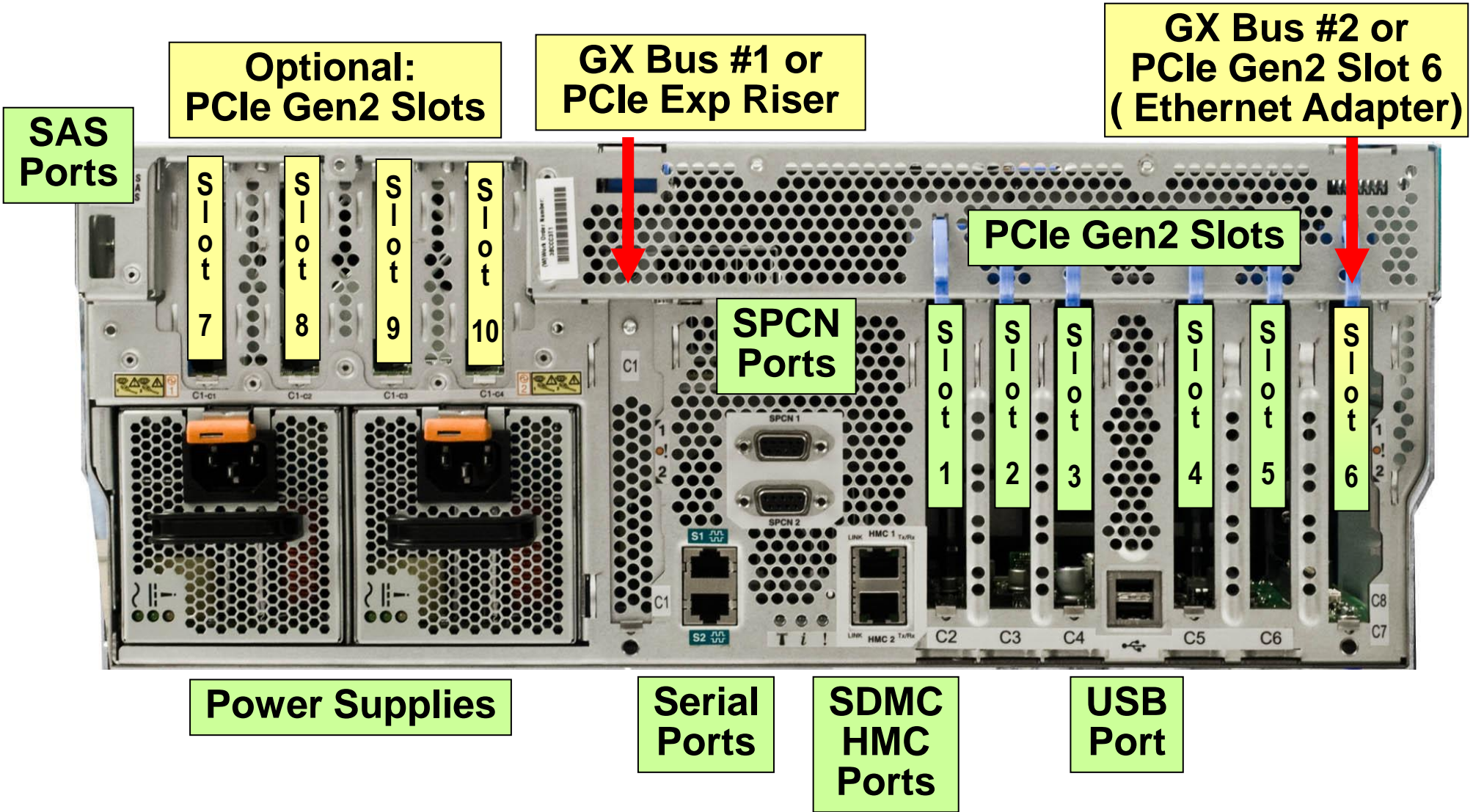
# Power 720 with PCIe Gen2 Support



# Power 740 with PCIe Gen2 Support



# Power 720 / 740 Rear View



# Power 740 Expansion Options

## Processor Expansion:

- Add 2nd POWER7 Module

## Memory Expansion:

- Add up to 3 additional memory cards

## IO Controller Expansion

Second SAS Controller

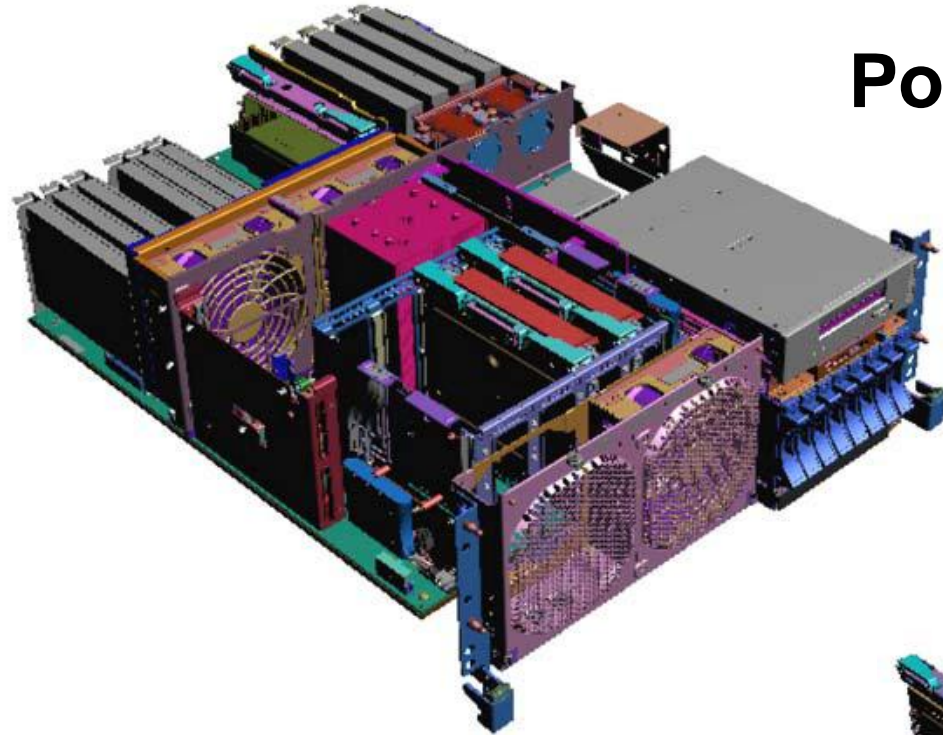
## IO Expansion

- Internal PCIe expansion: Four additional PCIe slots

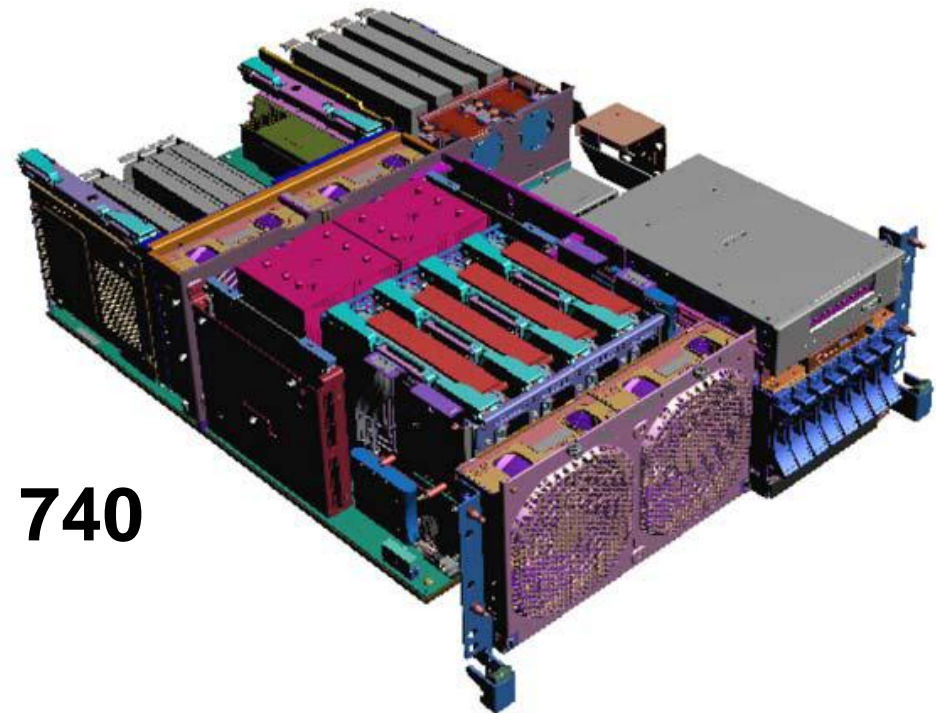
## Remote IO Expansion

- Up to four PCIe Express drawers
- Up to eight PCI-X drawers

# Front views



**Power 720**

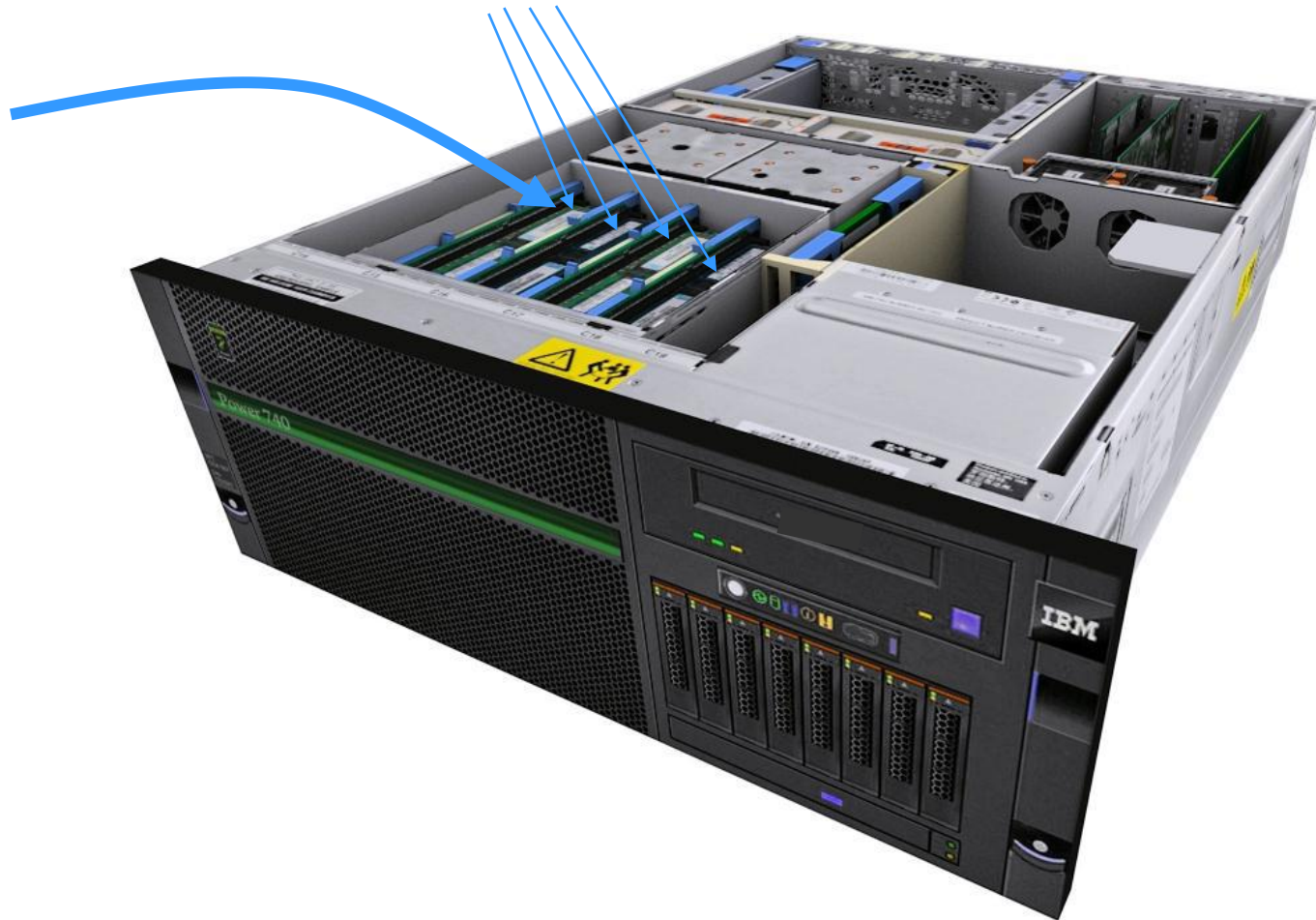


**Power 740**

# Power 720 / 740 – Memory Riser Cards



1- 2 cards per 720  
1- 4 cards per 740



# Power 720 / 740 Memory Riser Card Layout



**DIMM Sizes: 4 GB / 8 GB / 16GB @ 1066 GHz**

**Max Memory per Card: 128 GB**

**DIMM Options:**

- **Power 720: Max of 16 DIMM / 256GB ( Two memory cards )**
- **Power 740: Max of 32 DIMM / 512 GB ( Four memory cards )**

**Mixing different size DIMMs on same riser not supported.**

**Different risers can have different size DIMMs**



## Power 740 Bandwidth @ 3.55 GHz

Resource	Bandwidth
L1 ( Data )	= <b>170.4</b> GB/sec
L2	= <b>170.4</b> GB/sec
L3	= <b>113.6</b> GB/sec
Memory	= <b>68.224</b> GB/sec per Socket = <b>136.448</b> GB/sec per System
GX++ Bus	= <b>20</b> GB/sec
GX++ Bus	= <b>20</b> GB/sec
Internal IO Bus	= <b>20</b> GB/sec
GX Bus Slot 1	= <b>20</b> GB/sec
GX Bus Slot 2	= <b>20</b> GB/sec
Internal IO Slots	= <b>20</b> GB/sec
Total IO Bandwidth	= <b>60</b> GB/sec

# Power 720 / 740 Physical Specifications

## Dimensions:

- Width: 440 mm (19.0 in)
- Depth: 610 mm (24.0 in)
- Height: 177 mm (6.81 in)
- Weight: 48.7 kg (107.4 lb)

## Operating voltage:

- Power 720: 100 to 127 or 200 to 240 V AC
- Power 740: 200 to 240 V AC

## Maximum measured power consumption (Maximum):

- Power 720: 750 watts
- Power 740: 1400 watts

## Maximum measured BTU (Maximum):

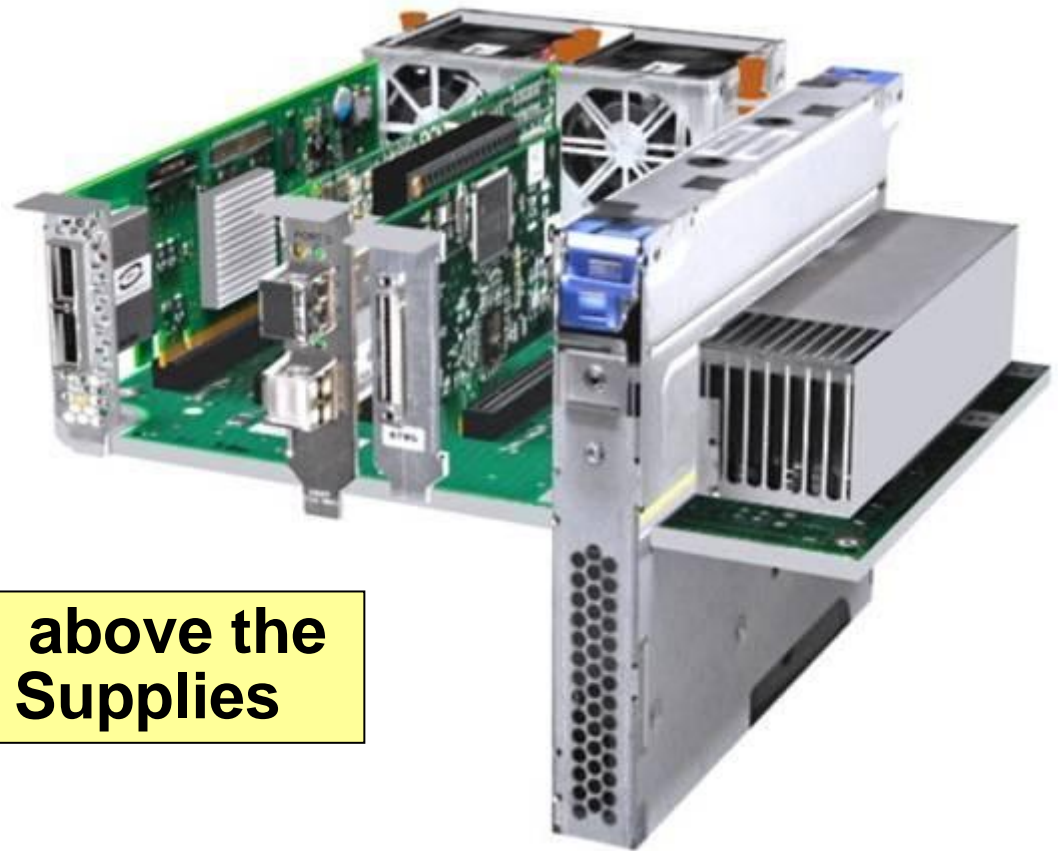
- Power 720: 2560
- Power 740: 4778

## Power-source loading ( Maximum )

- Power 720: 0.765kVa
- Power 740: 1.428 kVa
- To obtain a heat output estimate based on a specific configuration:  
<http://www-912.ibm.com/see/EnergyEstimator>

# Power 720 / 740 PCIe Expansion Option

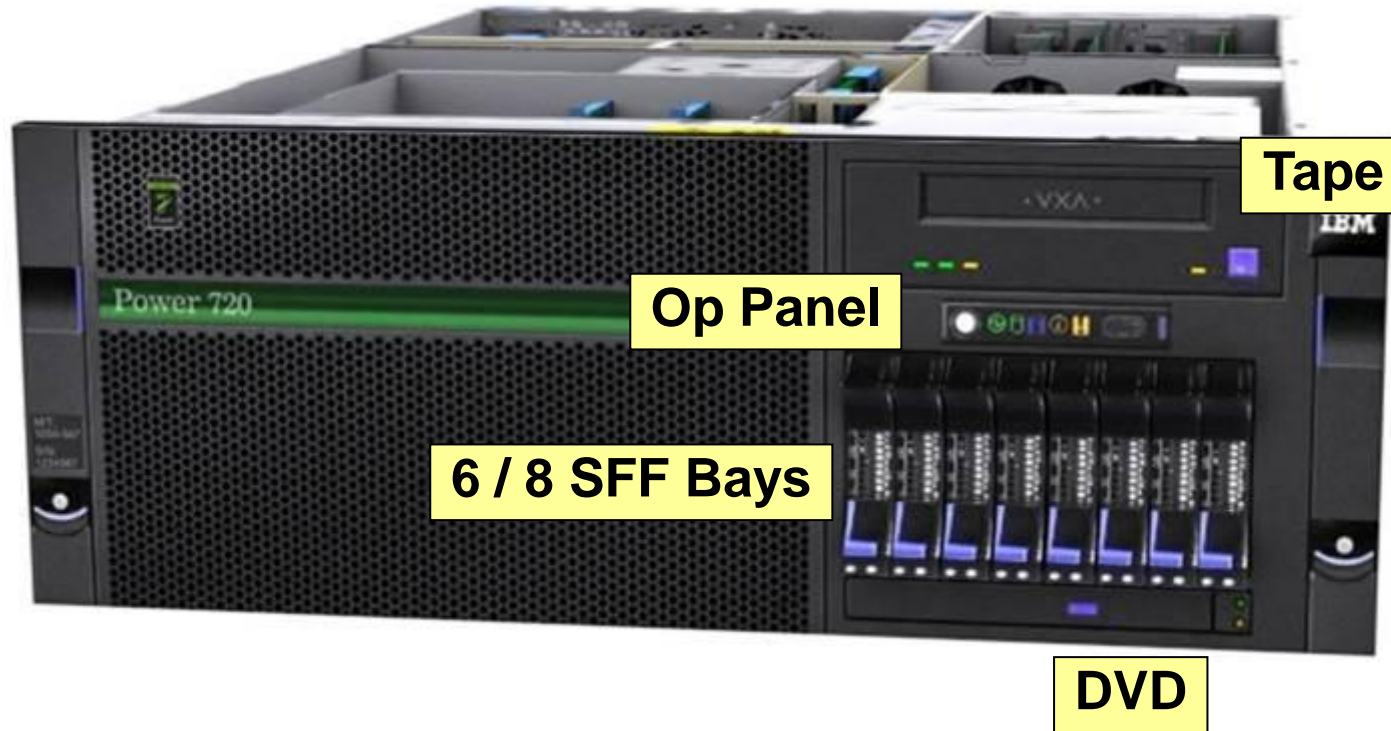
**PCIe Expansion Option**  
**Four Low Profile Slots**  
**FC #5610: Gen1**  
**FC #5685: Gen2**



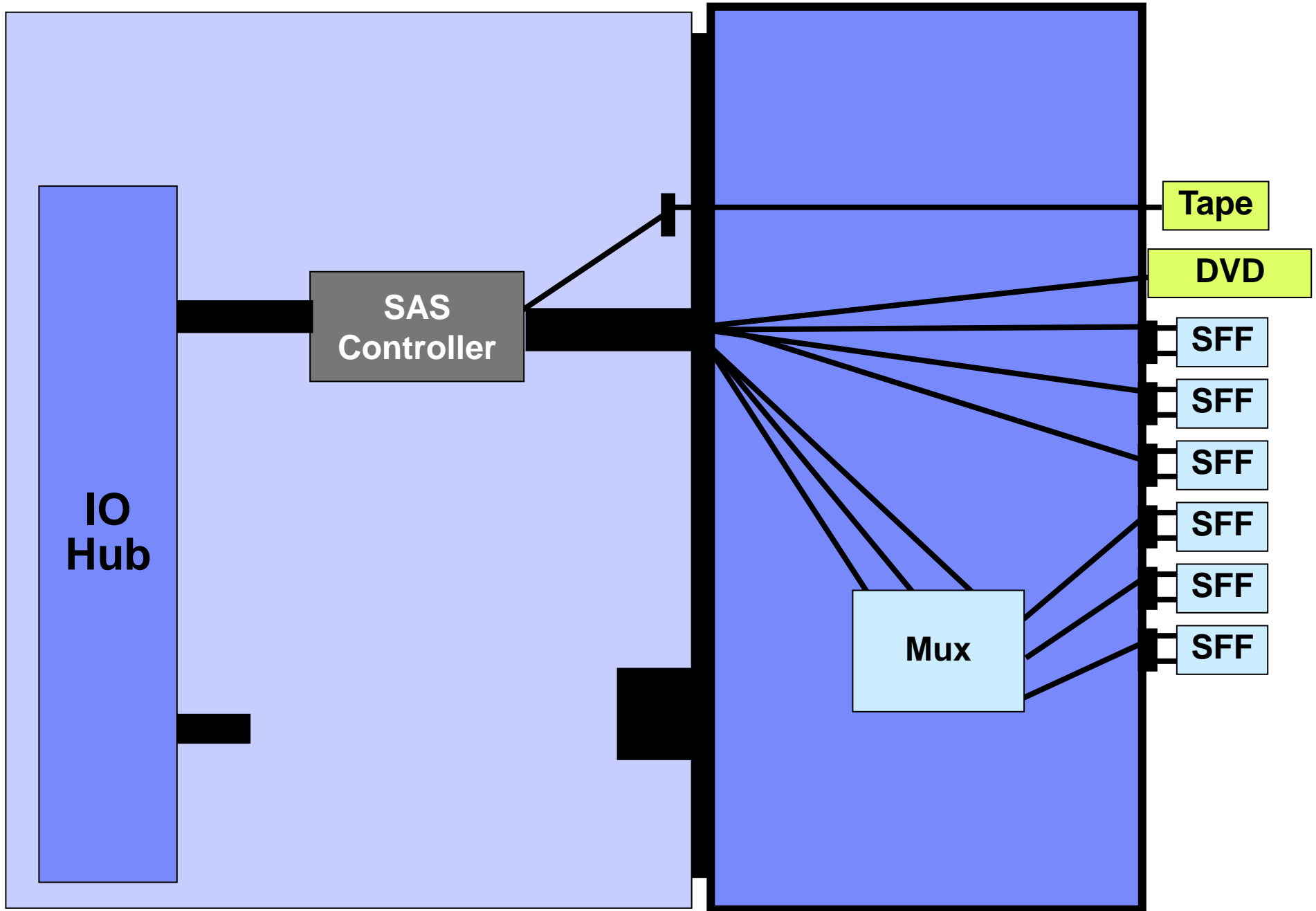
**Located above the  
Power Supplies**

**GX++ Connection  
Slot #1**

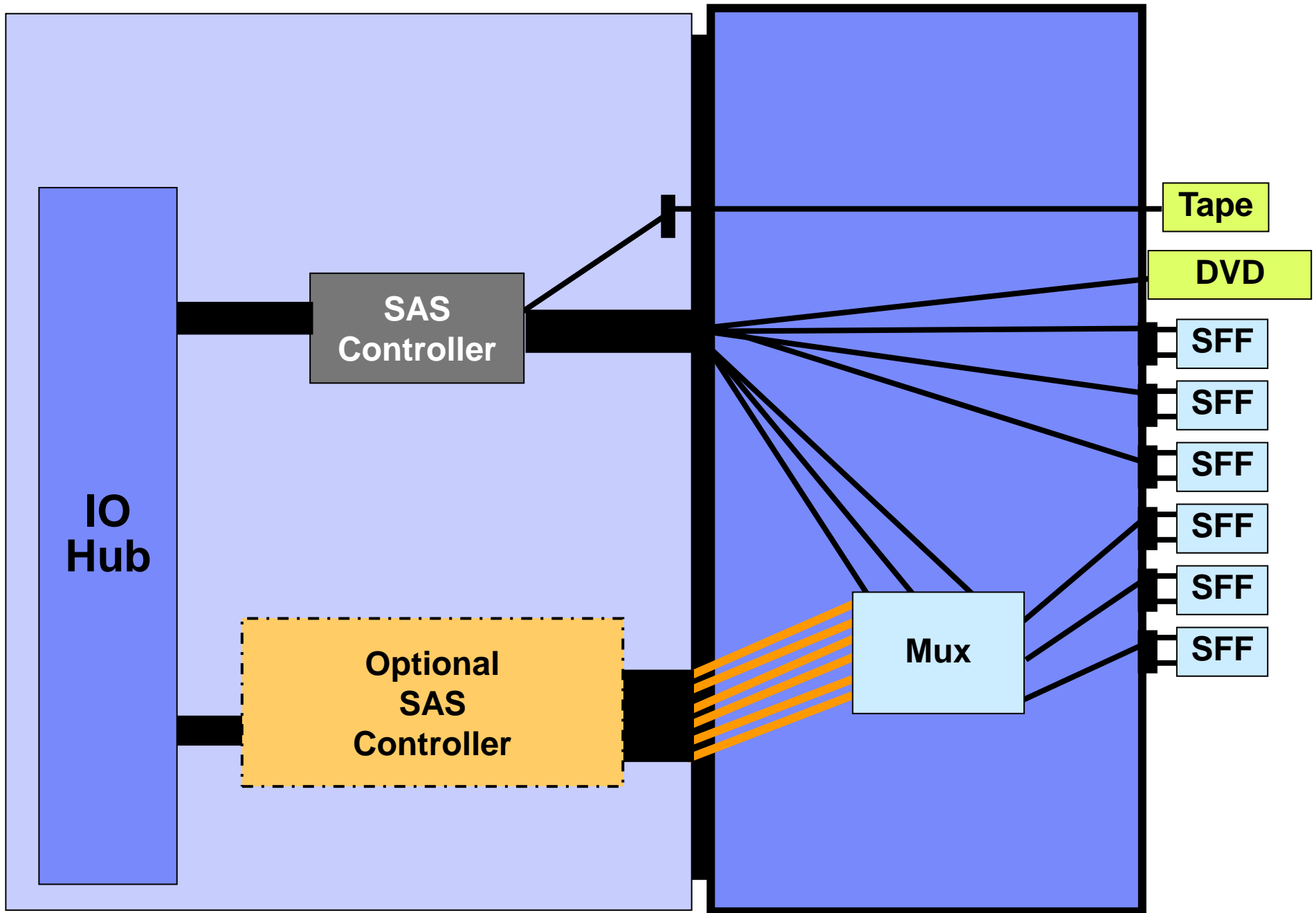
# Power 720 / 740 Front View



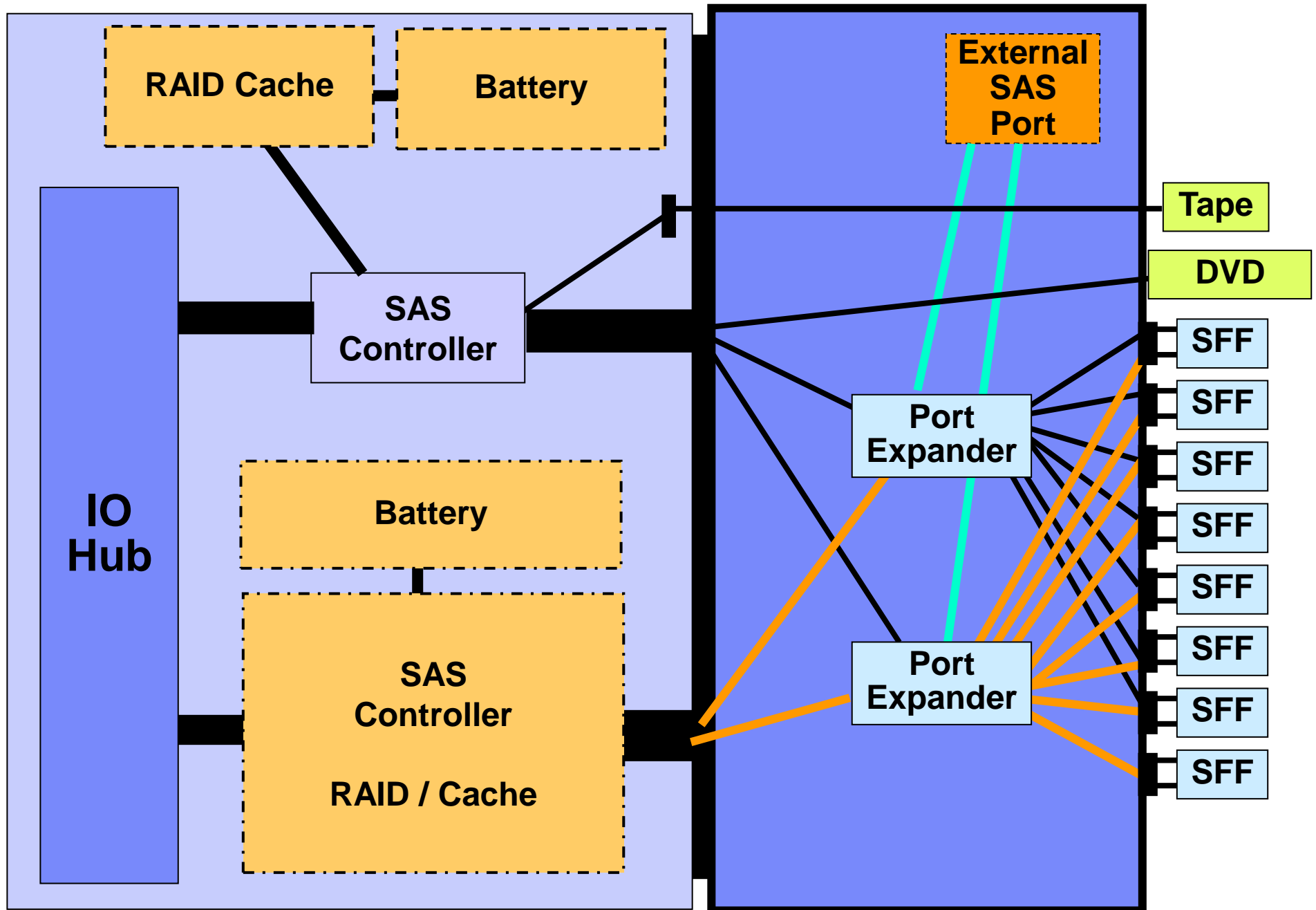
# Standard SAS Controller Option: JBOD



# Optional SAS Controller Option / Split Backplane: JBOD



# Optional SAS Controller Option with RAID & 8 Bays



# Power Systems Express Rack/Tower Positioning

	<b>Power 710</b>	<b>Power 720</b>	<b>Power 730</b>	<b>Power 740</b>
Packaging	2U rack	4U Rack Tower	2U rack	4U Rack Tower
Processor sockets	1	1	2	1 or 2
Number of cores	4, 6, 8	4, 6, 8	8, 12, 16	4, 6, 8, 12, 16
GHz clock	3.0, 3.7, 3.55	3.0	3.0, 3.7, 3.55	3.3, 3.7, 3.55
Max Memory	128GB	128 (4-core) 256 (6 / 8-core)	256	512
Max Internal storage	1.8TB	2.4TB	1.8TB	2.4TB
PCIe slots	PCIe: 4 LP	PCIe: 4+ 4LP	PCIe: 4 LP	PCIe: 4+ 4LP
LPARs	80	80	160	160
12X I/O Drawers	No	4-core No 6 / 8-core Yes	No	Yes
Power Options	100-240 VAC	100-240 VAC	200-240 VAC	200-240 VAC
Warranty	3 year	3 year	3 year	3 year



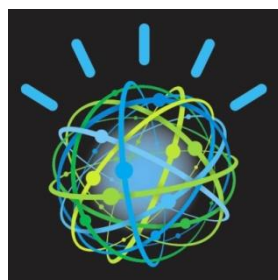


# Power 750

# Power 750 System

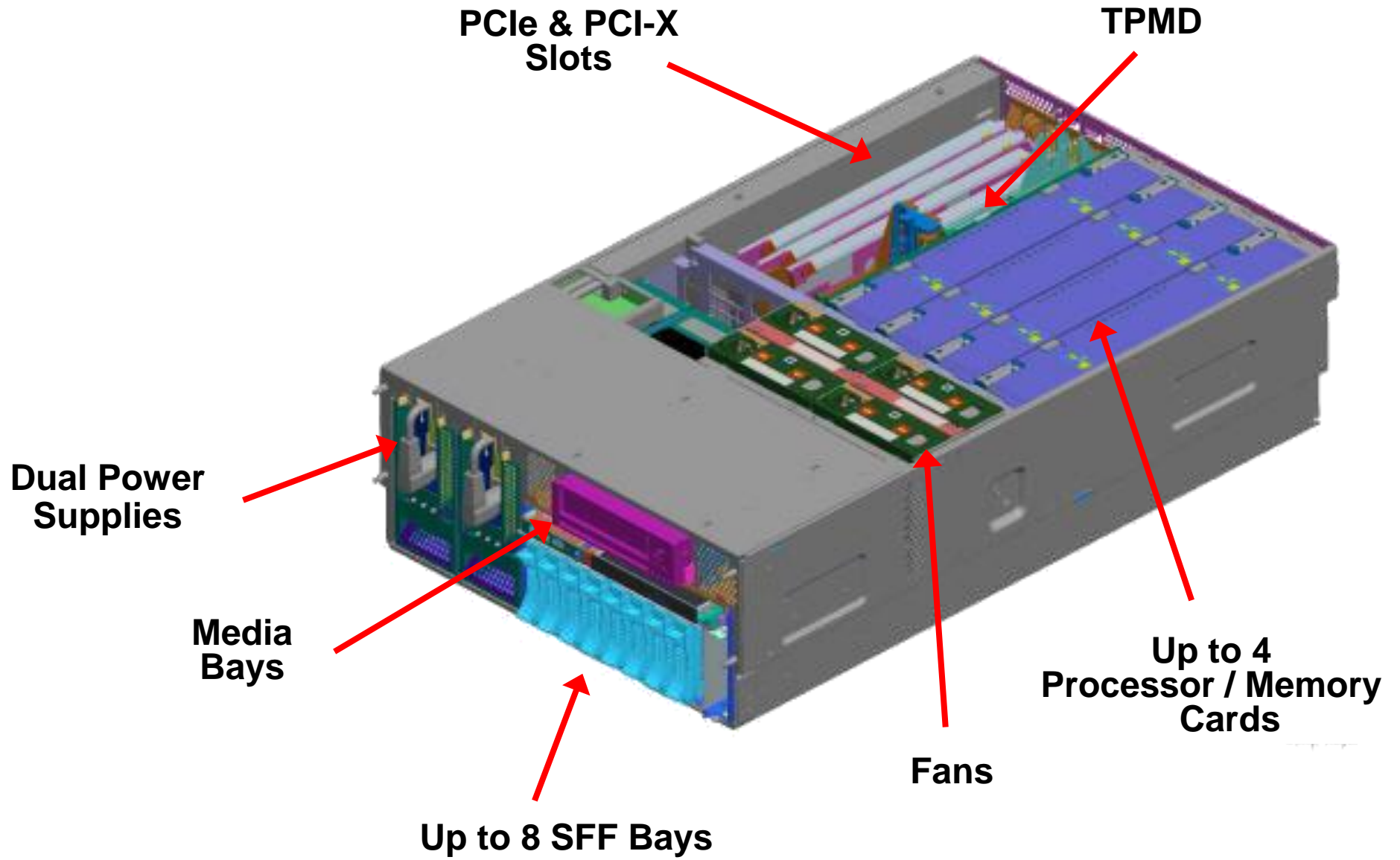


**Power 750: 4S4U**

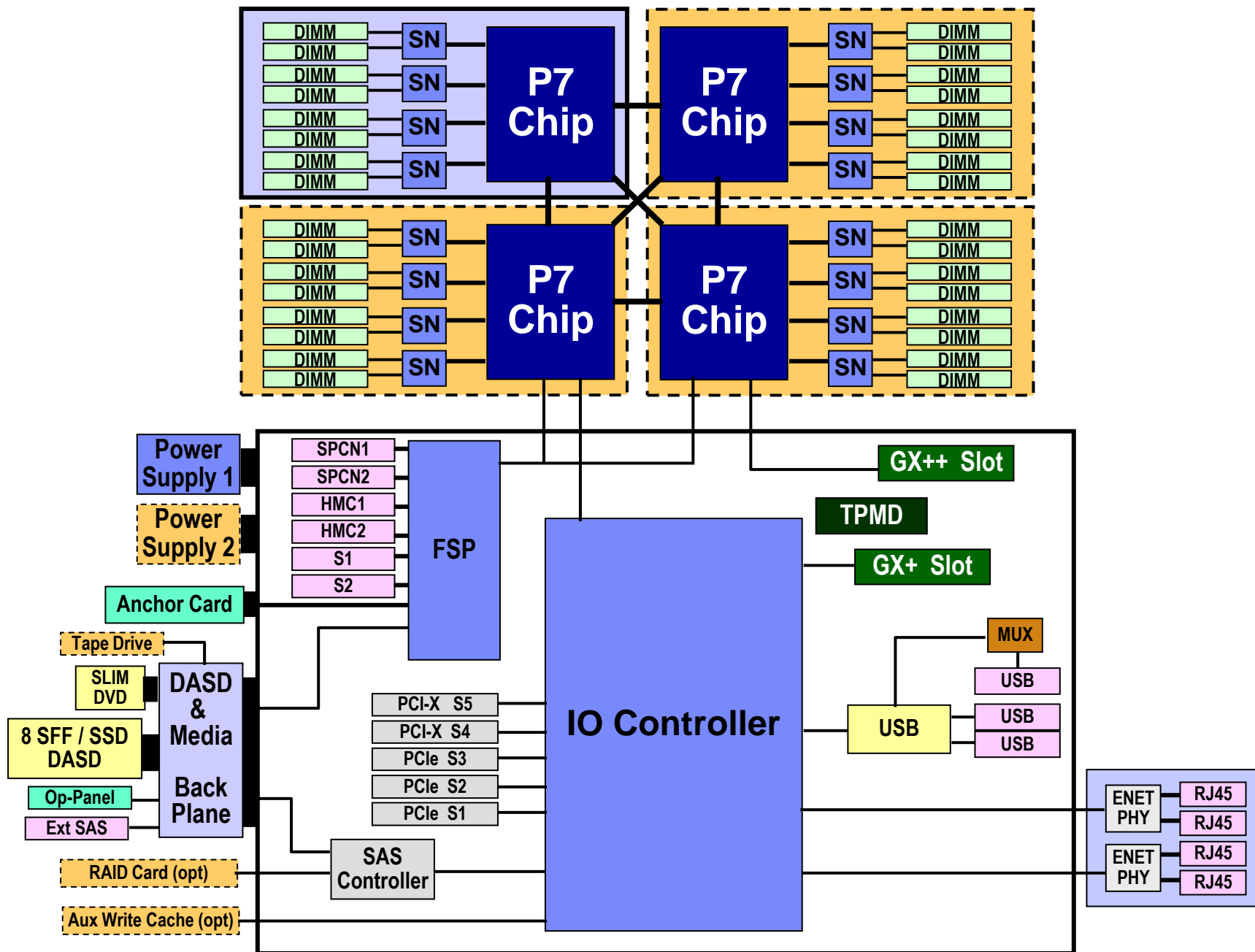


<b>8233-E8B</b>	
<b>POWER7 Architecture</b>	4 Cores @ 3.7 GHz 6 Cores @ 3.7 GHz 8 Cores @ 3.2 & 3.61 GHz Max: 4 Sockets
<b>DDR3 Memory</b>	Up to 512GB
<b>DASD / Bays</b>	Up to 8 SFF SAS DASD (2.4TB) 73 / 146 / 300GB @ 15K (Opt: RAID)
<b>IO Expansion Slots</b>	PCIe x8: 3 Slots (2 shared) PCI-X DDR: 2 Slots GX+ & GX++ Bus
<b>Integrated SAS / SATA</b>	Yes
<b>Integrated Ports</b>	3 USB, 2 Serial, 2 HMC
<b>Integrated Virtual Ethernet</b>	Quad 10/100/1000 Optional: Dual 10Gbt
<b>Media Bays</b>	1 Slim-line & 1 Half Height
<b>Max IO Drawers</b>	PCIe: 4    PCI-X: 8
<b>Cluster</b>	IB 12X    SDR / DDR
<b>Redundant Power and Cooling</b>	Yes (AC or DC Power) Single phase 240vac or -48 VDC
<b>Certification (SoD)</b>	NEBS / ETSI for harsh environments
<b>EnergyScale</b>	Active Thermal Power Management Dynamic Energy Save & Capping

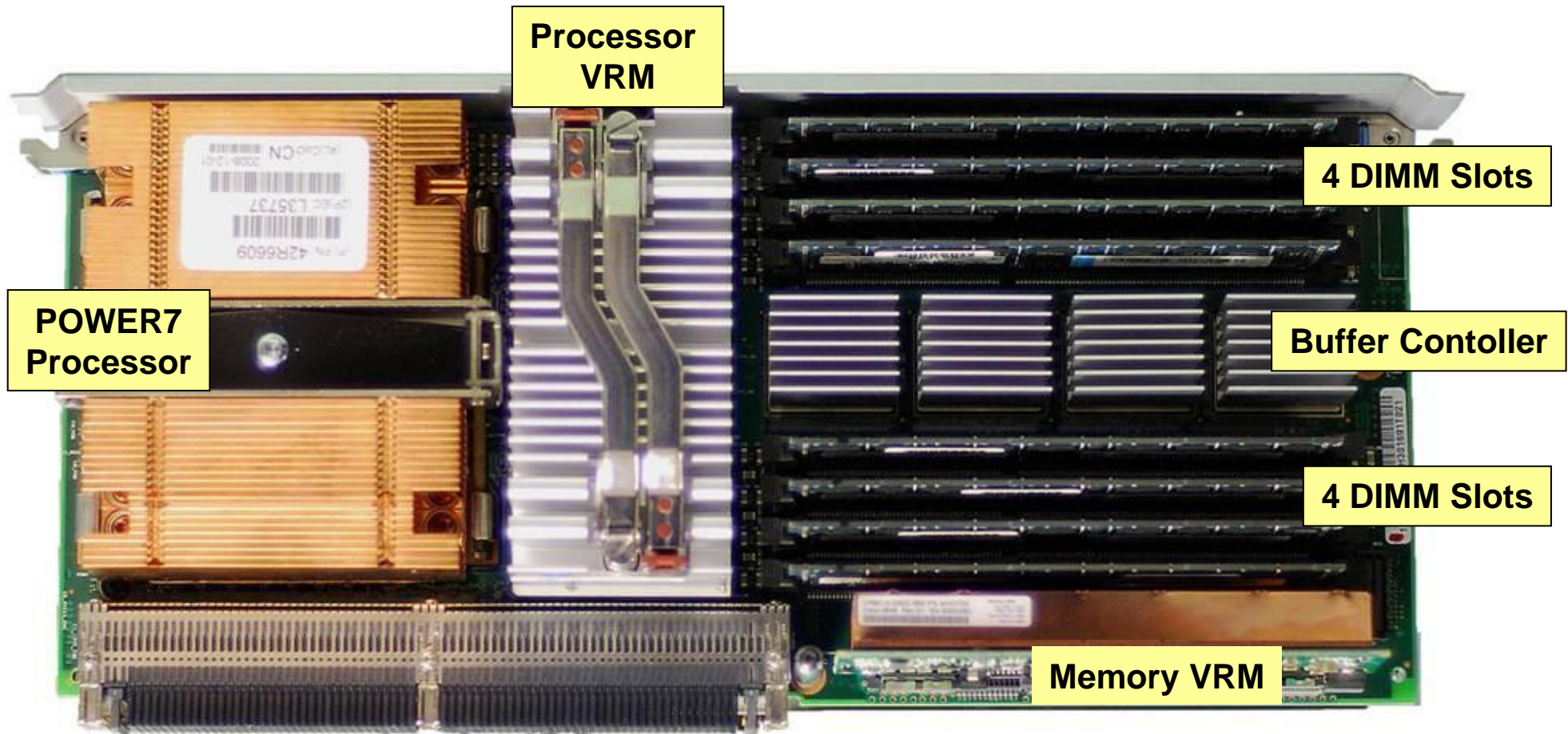
# Power 750 System Overview



# Power 750 System Layout

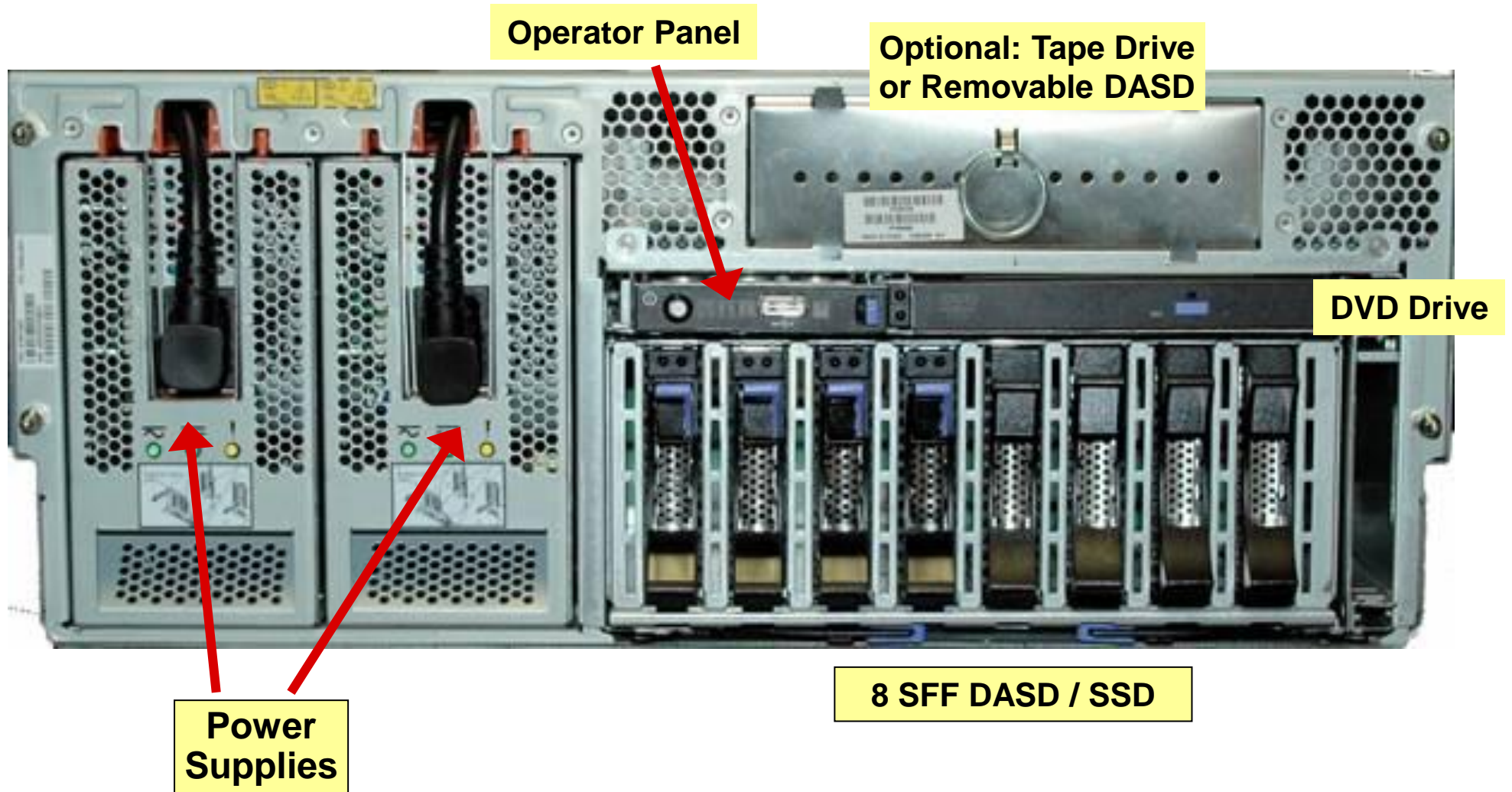


# Processor Card

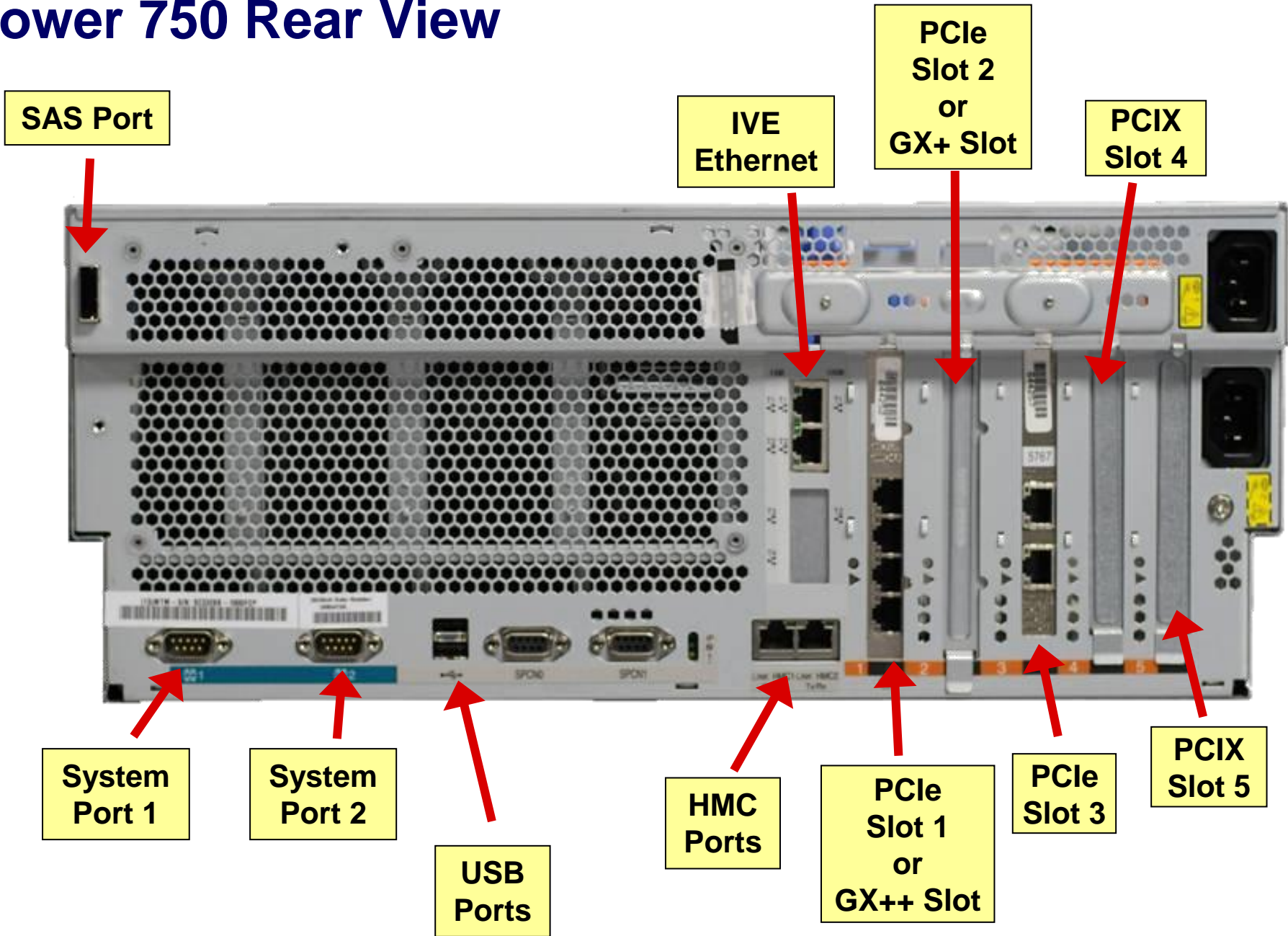


Processor Cards ( 1 to 4 )			
▪ 4-Core	3.7 GHz	8-core	3.2 GHz
▪ 6-Core	3.7 GHz	8-core	3.6 GHz

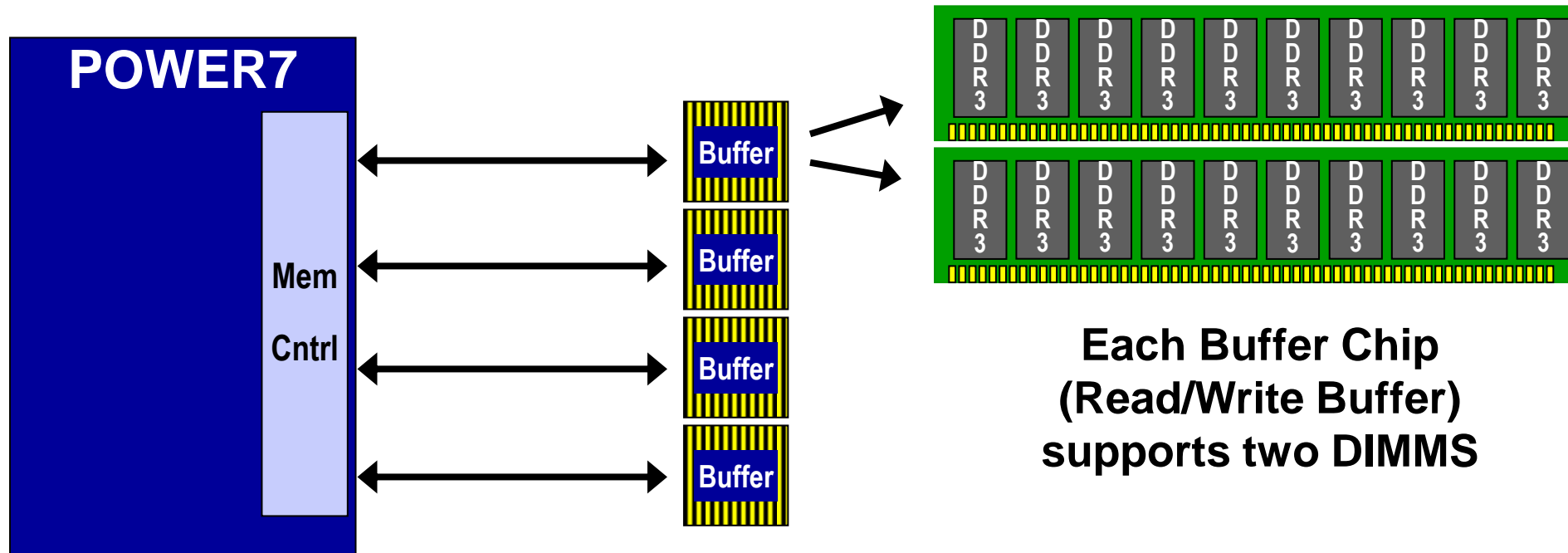
# Power 750 Front View



# Power 750 Rear View



# POWER7 Memory Bandwidth (750 / 755 / Blades )



## Chip Bandwidth

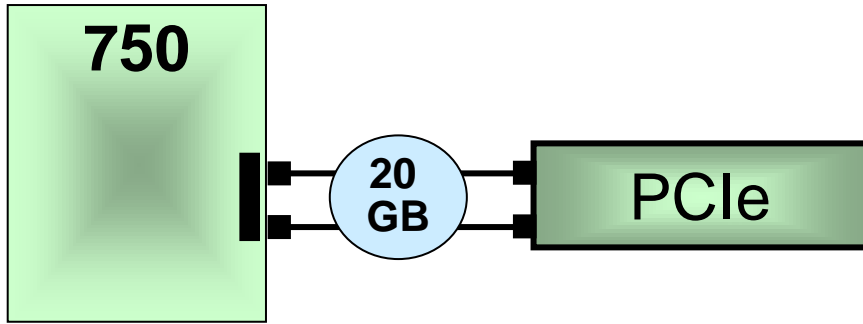
Max Read Bandwidth:	51.168 GB/sec
Max Write Bandwidth:	25.584 GB/sec
Max Combined Bandwidth:	68.224 GB/sec



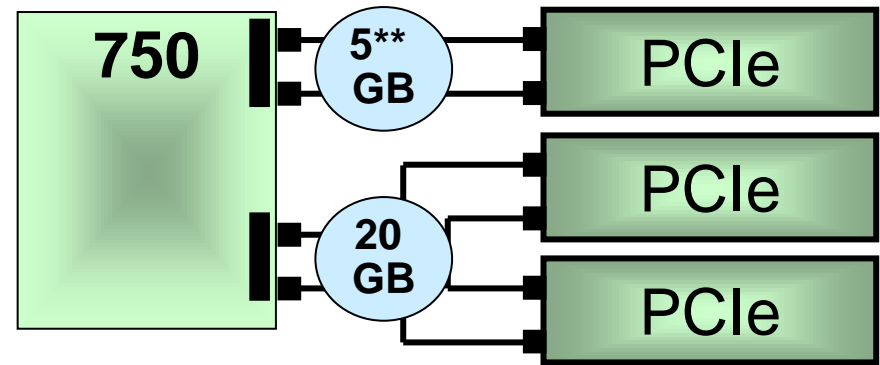
## Functional Differences

<b>Power 550</b>	<b>Power 750</b>
Up to 4 Sockets / 8 Cores 3.5 to 5.0 GHz POWER6 In-Order Execution Over Clocking: N / A Active Memory Expansion: N / A	<b>Up to 4 Sockets / Up to 32 Cores</b> <b>3.1 to 3.72 GHz</b> <b>POWER7 Out-of-Order Execution</b> <b>Over Clocking: Supported</b> <b>Active Memory Expansion: Supported</b>
Up to 256 GB Memory 32 DIMM slots	<b>Up to 512 GB Memory</b> <b>32 DIMM slots</b>
DDR2 DIMMS	<b>DDR3 DIMMs</b>
6 3.5 in or 8 SFF SAS DASD	<b>8 SFF SAS DASD / SSD</b>
3 PCIe & 2 PCI-X slots	<b>3 PCIe &amp; 2 PCI-X slots</b>
Max LPARs: 40	<b>Max LPARs: IVM: 80 HMC: 320</b>
GX++ Bus & GX+ Passthru Slots	<b>GX++ Bus &amp; GX+ Passthru Slots</b>
IVE: Dual Gbt Optional: Quad Gbt, ot 10 Gbt	<b>IVE: Quad Gbt</b> <b>Optional: Dual 10 Gbt</b>
TPMD	<b>Enhanced TPMD</b>
Guiding Light	<b>Light Path</b>

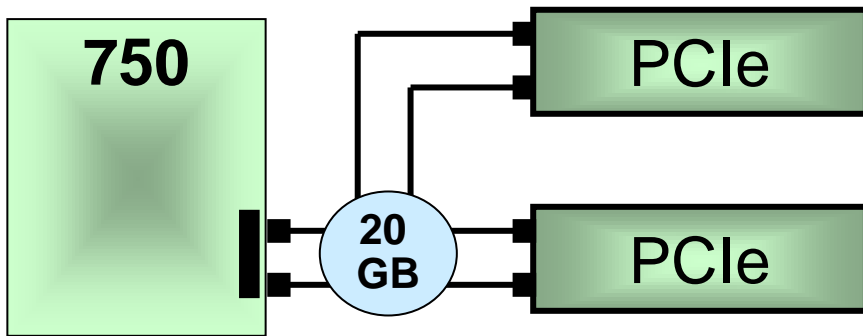
# POWER7 750– PCIe IO Drawer configurations



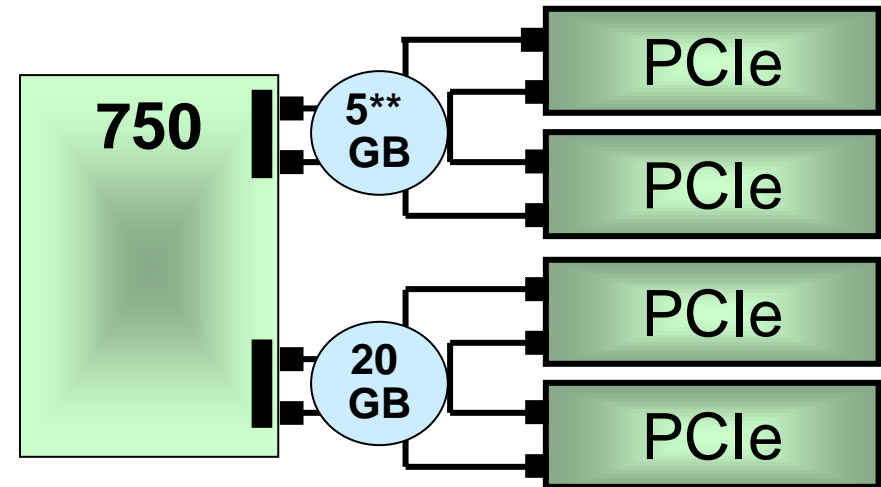
One PCIe IO Drawer



Three PCIe IO Drawers



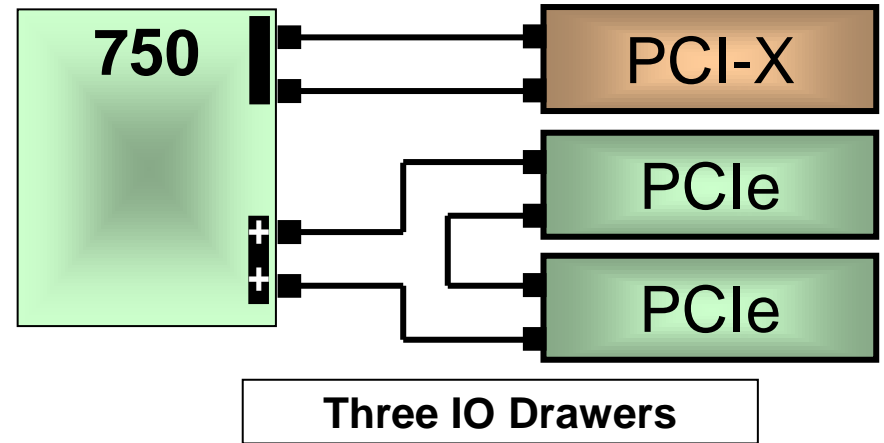
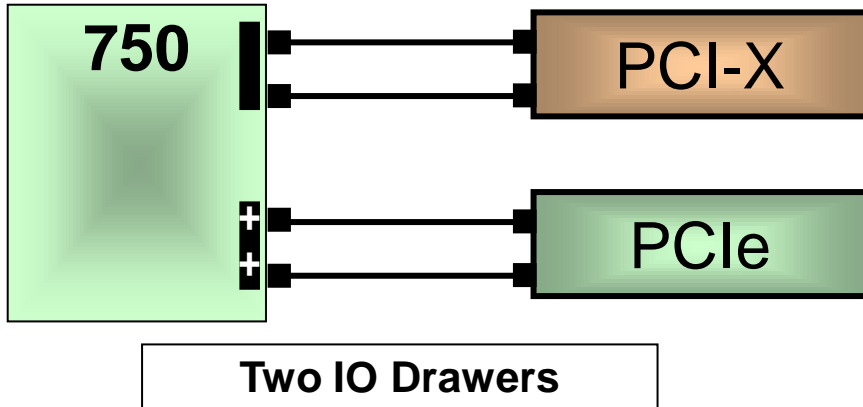
Two PCIe IO Drawers



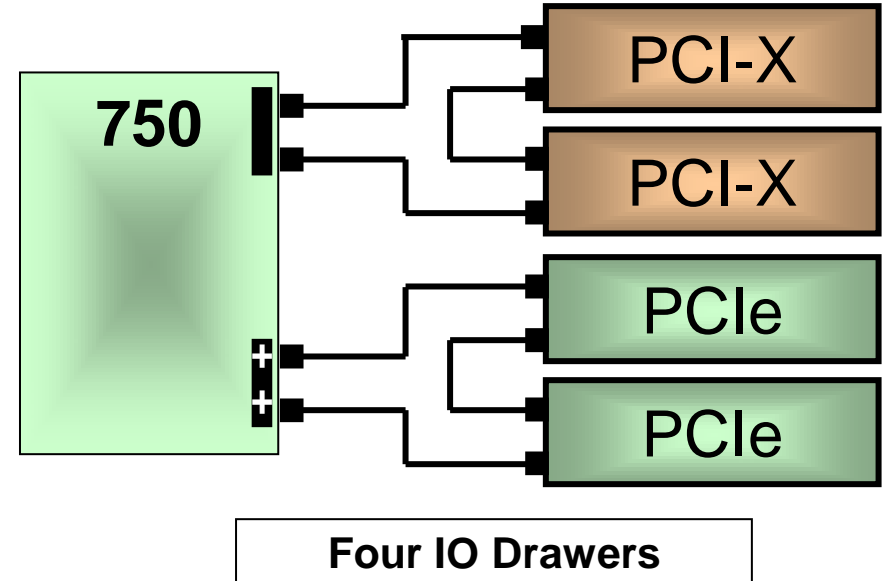
Four PCIe IO Drawers

**Populate GX++ bus first**

# POWER7 750 – Mixed IO Drawer configurations



**General Rules**  
 Populate GX++ with PCIe drawers  
 Populate GX+ with PCI-X drawers





# Smart Analytics

# Smart Analytics System 7700 Hardware

## POWER7 Specifications

- Power 740 @ 3.55 Ghz
- Multi Core (16)
- 10 GB Ethernet

## IBM System Storage

- Denser Packaging
- 300 GB 2.5" HDD; Raid 5
- FC links 2x faster than 7600 Storage
- Optional SSD storage

## IBM InfoSphere Warehouse 9.7.2

- Powered by DB2



## Compared to Smart Analytics System 7600 w/ 8 Data Partitions

- Data Partitions: 2x increase from 7600
- Bandwidth increases: 4x
- Capacity increase: 2.2x
- Cores increases: 4x



# Support

# Power Systems

# AIX / VIOS Software Support

	Power 750 / 755	Power 770 / 780	PS700 PS701 PS702	Power 710 / 730 720 / 740 795	PS703 PS704	Power 710 <sup>1</sup> / 730 <sup>1</sup> 720 <sup>1</sup> / 740 <sup>1</sup> 770 <sup>1</sup> / 780 <sup>1</sup>
AIX.5.3 TL9	SP7	SP7	N / A	N / A	N / A	N / A
AIX.5.3 TL10	SP4	SP4	SP5	SP5	N / A	N / A
AIX.5.3 TL11	SP2	SP2	SP5	SP5	SP7	N / A
AIX.5.3 TL12	New	New	New	SP1	SP4	SP5
AIX 6.1 TL2	SP8	SP8	N / A	N / A	N / A	N / A
AIX 6.1 TL3	SP5	SP5	SP7	SP7	N / A	N / A
AIX 6.1 TL4	SP2	SP3	SP7	SP7	SP10	N / A
AIX 6.1 TL5	New	New	New	SP3	SP6	SP7
AIX 6.1 TL6	New	New	New	New	SP5	SP6
AIX 6.1 TL7	New	New	New	New	New	New
AIX 7.1 TL0	New	New	New	New	SP3	SP4
AIX 7.1 TL1	New	New	New	New	New	New
VIOS	2.1.2.11 FP 22.1 + SP1	2.1.2.12 FP 22.1 + SP2	2.1.3	2.2	2.2.0.12 FP24 + SP2	2.2.1

1 = New Models

## FC #2319 Enhancements

### Availability of FC #2319 "Factory deconfiguration of a core"

- ❖ Allow customers to optimize SW licensing by only licensing the cores required by their workloads.
- ❖ Customers pay up-front for all hardware and activations
- ❖ Customers do not have to license deconfigured cores as
  - For each quantity of one feature code 2319, manufacturing will deconfigure 1 core which will prevent use of this core
  - Default number of AIX licenses / PowerVM licenses / IBM Systems Director licenses will be reduced by one with each FC 2319
  - If more cores are needed at a later date, Can reconfigure cores using ASMI
    - ❖ Terms and conditions of SW used on the server are met. .

### Feature code 2319 will be available on the following servers.

- **POWER 750**                      1- 4 sockets, 4 - 32 cores
- **POWER 720**                      1 socket, 4 - 8 cores
- **POWER 740:**                      1- 2 sockets, 4 - 6 cores
- **POWER 710/730**                      1- 2 sockets, 4 - 16 cores



# Reliability Ability Serviceability

## Power Systems

# POWER7 RAS Feature Overview

- Standard
- ◐ Optional
- Not Available

RAS Item	Power 710	Power 720	Power 730	Power 740	Power 750
Redundant / Hot Swap Fans & Blowers	●	●	●	●	●
Hot Swap DASD & Media / PCI Adapters	●   —	●   —	●   —	●   —	●   ●
Concurrent Firmware Update	●	●	●	●	●
Redundant / Hot Swap Power Supplies	◐	◐	●	●	◐
Dual disk controllers (split backplane)	—	◐	—	◐	◐
Processor Instruction Retry	●	●	●	●	●
Alternate Processor Recovery	●	●	●	●	●
Storage Keys	●	●	●	●	●
PowerVM™/Live Part. Mobility/Live App Mobility	◐	◐	◐	◐	◐
Redundant Service Processors	—	—	—	—	—
Redundant System Clocks	—	—	—	—	—
Redundant / Hot Swap Power Regulators	—	—	—	—	—
Dynamic Processor Sparing	—	—	—	—	—
Memory Sparing	—	—	—	—	—
Hot GX Adapter Add and Cold Repair	—	—	—	—	—
Hot-node Add / Cold-node Repair	—	—	—	—	—
Hot-node Repair / Hot-memory Add	—	—	—	—	—
Dynamic Service Processor & System Clock Failover	—	—	—	—	—
Hot-node Repair / Hot-memory Add for all nodes**	—	—	—	—	—
Enterprise Memory	—	—	—	—	—
Hot GX Adapter Repair	—	—	—	—	—
Midplane connection for inter-nodal communication	—	—	—	—	—
Active Memory Mirroring for Hypervisor	—	—	—	—	—

# Power 710 / 720 / 730 / 740 Memory RAS

## Memory RAS Features

Supports Memory Scrubbing, 64-Byte Marking ECC and Chipkill.

- Memory scrubbing corrects soft single bit errors in background while memory is idle preventing multiple bit errors.
- 64-Byte Marking ECC code is able to detect and correct single bit memory errors, which make up the majority of memory errors.
- Can also isolate a single chipkill to a bad DRAM chip.

## Memory Channel Repair

Spare lanes on memory channels are available

Memory channel design provides CRC error checking capability.

- Includes the ability to re-try a failed bus operation (new RAS feature) and to re-train the channel when excessive CRC errors are seen.
- Includes the ability to dynamically replace one of the bits on the bus (dynamic bit-lane sparing) based on a hardware detected error.

# Competition

## Oracle SPARC/Solaris Pain Points



- SPARC split-personality problem makes it difficult to position and sell
- No capacity-on-demand or utility pricing
- Very rudimentary virtualization capabilities are insufficient for driving up utilization on systems with many cores and threads
- Poor per-core performance keeps ISV licensing costs high
- Upcoming Solaris 11 migration will be an administrative nightmare, and many application programming interfaces have been removed
- SPARC/Solaris market share has been plummeting: for the last two years, SPARC hasn't been selling as well as Itanium!

# SPARC Has a Split-Personality Problem

**SPARC T4-based  
CMT Servers  
a.k.a. "T-series"**



**T4-1B**

**T4-1**

**T4-2**

**T4-4**

- ⑩ SPARC T4 designed by Oracle and manufactured by TSMC for highly-threaded, stateless, throughput workloads: web and application tier; chip multi-threading ("CMT")
- ⑩ Each socket has cryptographic, memory, 10GbE, and PCIe control on-chip
- ⑩ Virtualization through Oracle VM for SPARC, formerly called "logical domains" (LDOMs)

**SPARC64-based  
Enterprise Servers  
a.k.a. "M-series", "APL", "OPL"**



**M3000**

**M4000**

**M5000**

**M8000**

**M9000-  
32**

**M9000-  
64**

- ⑩ Systems designed by Fujitsu under the Advanced Product Line ("APL") contract with Sun
- ⑩ SPARC64-VII+ microprocessor designed by Fujitsu and manufactured by TSMC
- ⑩ Designed for single-threaded, latency-driven workloads: DW, BA, large OLTP; SMT threading
- ⑩ No virtualization in hardware, electrical partitioning only with "dynamic system domains"

# SPARC T4 “SuperCluster”: Oracle’s Plan B

## Compute Nodes

- Up to four T4-4 nodes
- Half rack and full rack configurations available

## Storage

- Oracle Exadata Storage Servers and ZFS Storage Appliance
- Connectivity to existing storage is supported, but Oracle says so in the context of migrating existing data to Exadata storage servers

## Software

- Oracle Solaris 10 or 11; 11 is required if customer wants to run database workloads
- Oracle Database 11gR2 Enterprise Edition, Oracle Weblogic, and Oracle Fusion Apps sold separately



- Targeted to customers who are not buying into Oracle’s rigid Exadata/Exalogic appliance vision
- An attempt to salvage the small and shrinking remaining SPARC installed base before it’s too late
- No public database benchmarks, only Oracle’s own applications (PeopleSoft Enterprise Payroll, JD Edwards EnterpriseOne)

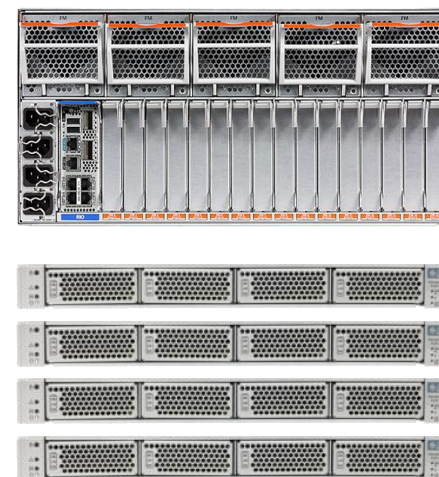
<http://www.oracle.com/us/products/servers-storage/servers/sparc-enterprise/t-series/sparc-supercluster-ds-496616.pdf>

# Oracle's SuperCluster Benchmarking TPC-H @ 1000GB

Oracle used a single T4-4 node, not a SuperCluster, possibly due to terrible scalability of Oracle RAC

Oracle claimed TPC-H as one of 9 SuperCluster “world records”, but it is nowhere close

Oracle used a slew of benchmark shenanigans to drive the cost of the solution down and performance up



***Where are the Exadata storage servers and ZFS storage appliances?***

***Where is the hardware and software engineered to work together?***

[http://tpc.org/results/FDR/TPCH/Oracle\\_T4-4\\_1TB\\_TPCH\\_FDR\\_092611.pdf](http://tpc.org/results/FDR/TPCH/Oracle_T4-4_1TB_TPCH_FDR_092611.pdf)



## Oracle's SuperCluster Benchmarking TPC-H @ 1000GB

Avoided all of the technologies one would get in a SuperCluster (Oracle RAC, Infiniband, Exadata storage servers, and ZFS storage appliances)

Used Solaris 10, not Solaris 11, possibly due to poor performance of ZFS (TPC-C result on T3 SuperCluster also avoided ZFS, using Solaris Logical Volume Manager instead)

Required the use of an absurd 10.85 times the storage needed, just for the disk spindle count, despite the heavy use of flash devices

Used leased software licensing for three years rather than the per-core perpetual license that most customers buy

Used a ridiculous 1% maintenance package that provides only 10-incident-per-year web-based support, rather than the standard 22% 24/7 premium support package

# Oracle's SuperCluster Benchmarking

## SPECjEnterprise® 2010

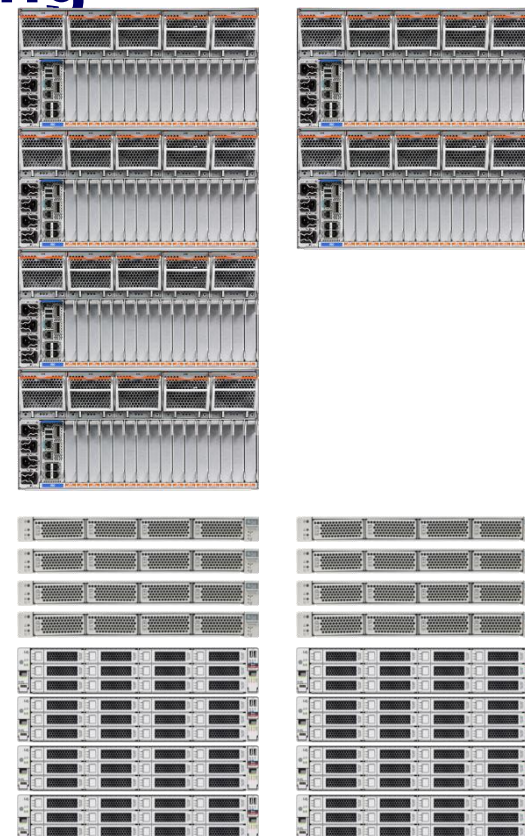
Once again, Oracle did not use an actual SuperCluster

- 4 T4-4 application servers and 2 T4-4 database servers
- 8 4270 M2 storage servers and 8 F5100 flash arrays, not ZFS appliances or Exadata storage servers

In order to get 2.4 times better performance than IBM POWER7, Oracle

- Used 4 times the number of application nodes
- Used 2 times the number of processor cores
- Used 4 times the number of threads
- Used 4 times the amount of memory
- Used 8 times the amount of storage
- Turned off 2 levels of database integrity checks

In order to keep prices deceptively low, Oracle cited only the costs of the application tier, and discarded the costs of all database server hardware, storage, and software



***Where are the Exadata storage servers and ZFS storage appliances?***

***Where is the hardware and software engineered to work together?***

<http://www.spec.org/jEnterprise2010/results/res2011q3/jEnterprise2010-20110907-00027.html>

# IBM/Oracle Virtualization Comparison

POWER™/AIX Capability	SPARC/Solaris Equivalent
PowerVM™	Oracle VM for SPARC on T-series; no hypervisor on M-series, hard partitions only
Logical Partition (LPAR)	Logical Domain on T-series
Live Partition Mobility	Very rudimentary migration to identical systems only and only on T-series; no equivalent on M-series
Shared processor pools	None
Active Memory Expansion	None
Active Memory Sharing	None
AIX Workload Partition (WPAR)	Solaris container
AIX System WPAR	Solaris full-root container
AIX Application WPAR	None
WPAR (Application) Mobility	None
Capacity on Demand	None

# Smarter Computing



**Smarter Processors**  
**Smarter Systems**  
**Smarter Operating Systems**  
**Smarter Virtualization**  
**Smarter System Management**  
**Smarter Software**



# The End.....