Power Systems

IBM

IBM Power Systems

Whats New/Next with Power Systems

31 March 2015

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agenda

- What'up ?
  - POWER8 2014 roadmap
- What's new ?
  - 1Q15 Annoncement
- What's next ?
  - h/w Roadmap overall : Habanero, firestone, Power9
  - s/w Roadmap overall : AIX, linux, IBM i

Power Systems - POWER8 Scale-Out Offerings






	Power Systems S812L	Power Systems S822L	Power Systems S822	Power Systems S814	Power Systems S824L	Power Systems S824
April Launch	AIX 7.1, TL3 SP3 6.1 TL9 SP3	AIX 7.1, TL3 SP3 6.1 TL9 SP3	AIX 7.1, TL3 SP3 6.1 TL9 SP3	AIX 7.1, TL3 SP3 6.1 TL9 SP3		AIX 7.1, TL3 SP3 6.1 TL9 SP3
	IBM i 7.2 and 7.1 TR8	IBM i 7.2 and 7.1 TR8	IBM i 7.2 and 7.1 TR8	IBM i 7.2 and 7.1 TR8		IBM i 7.2 and 7.1 TR8
	RHEL7.0 & 6.5 BE	RHEL7.0 & 6.5 BE	RHEL7.0 & 6.5 BE	RHEL7.0 & 6.5 BE		RHEL7.0 & 6.5 BE
	SLES 11 SP3 BE	SLES 11 SP3 BE	SLES 11 SP3 BE	SLES 11 SP3 BE		SLES 11 SP3 BE
	ubuntu 14.04 LE	ubuntu 14.04 LE				
	PowerVM BE	PowerVM BE	PowerVM BE	PowerVM BE		PowerVM BE
	KVM BE/LE	KVM BE/LE				
	16 GB, 32 GB, 64 GB DIMM Options					
October Launch	ubuntu 14.10 LE	ubuntu 14.10 LE			20 and 24 core offerings avail 10/31	**128GB DIMM Option In 1 TB or 2 TB configs**
	SLES 12 LE 10/2014	SLES 12 LE 10/2014			ubuntu 14.10 LE	

Power Systems - POWER8 Scale-Out Offerings

Expanding the POWER8 Linux Scale-out Portfolio

Power S824L: Incorporating the innovation of the OpenPOWER Community
Partnership with Nvidia to tackle the high performance analytic workloads

Power S812L: Announced in April
10 and 12 core ship support across Geos between 7/20 and 9/10

Delivering smaller core offerings, uniquely suited for IBM i clients

Power S814: Announced in April
4 core offering available 6/17 offering P05 level pricing for IBM i
6 and 8 core offerings available 6/10

Delivering on the promise of Optimization for Big Data

Doubling the memory capacity to 2 TB in the S824

128GB DIMMS will either be to have 1 TB or 2 TB configurations, no mix and match of DIMM sizings.

If buy 1 TB now can MES upgrade to different add'l DIMMS later

POWER S824L System

Power S824L
(8247-42L)

20 core and 24 core offerings avail 10/31

Target Markets: HPA/Technical Compute – leverage GPU, no virtualization needed
Big Data and Analytics Play – Financial Analytics

Specifications: 2 Socket, 4U, with up to 2 Nvidia GPU installed *(no non-GPU Version currently in plan)*

Support only Ubuntu 14.10

No Virtualization (FW does not support PowerVM or PowerKVM)

Run analytics workloads that extract patterns from large amounts of data 8X faster with the Power System S824L scale-out server, leveraging NVIDIA GPU technology to quickly discover fresh opportunities. This is the first solution borne of the OpenPOWER Foundation, now with seven active work groups focused on innovating across the full hardware and software stack and increasing investments in opening the POWER architecture

Power Systems - POWER8 Scale-Out Offerings October Launch

Differentiated value for the Telecommunications space

NEBS/ETSI compliant configurations available on the S822L & S822. Will be same model numbers but a specific feature code that will drive specific tested configurations

Expanded Linux Distros, delivering the promise of ease of porting

SUSE SLES12 (LE) Release 10/2014

Expanded Flexibility for PowerKVM Virtualization

Mixed Endian VM support on a single PowerKVM host and PCIe hot plug support

Support for SLES 12. RHEL 6.6 and Ubuntu 14.10

CAPI "Tech Preview" for early adopters

CAPI Technology

CAPI card and Support documentation will be made available for early adopters who wish to innovate custom logic / accelerator logic on an FPGA attached via CAPI

Power Enterprise Systems built on POWER8

Announcing Enterprise Pools on Power 770 & 780 and Statement of Direction for POWER8 support

IBM propose to …

•Bring POWER8 capability to the full Power Systems portfolio

- Deliver the most scalable, highest performing enterprise-class Power System with an advanced version of the POWER8 processor.

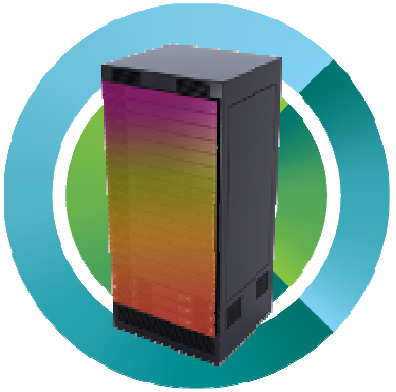
•Provide upgrade paths

- From the current POWER7+ Power 770 and 780 servers to enterprise-class POWER8 processor-based servers.

•Preserve client investment in Power Systems

- Enable POWER8 processor-based Power systems to interoperate and share Mobile Capacity on Demand (COD) resources with Power 795 or POWER7+ Power 770, 780 systems in a single Power Enterprise Pool.

POWER8 Enterprise Systems



- **Architectural strengths of Power 795**
- **Modularity & efficiencies of Power 770/780**
- **Performance and innovation of POWER8**
- **Greater Scalability & Reliability**
- **Increased Efficiency (Space, Energy)**

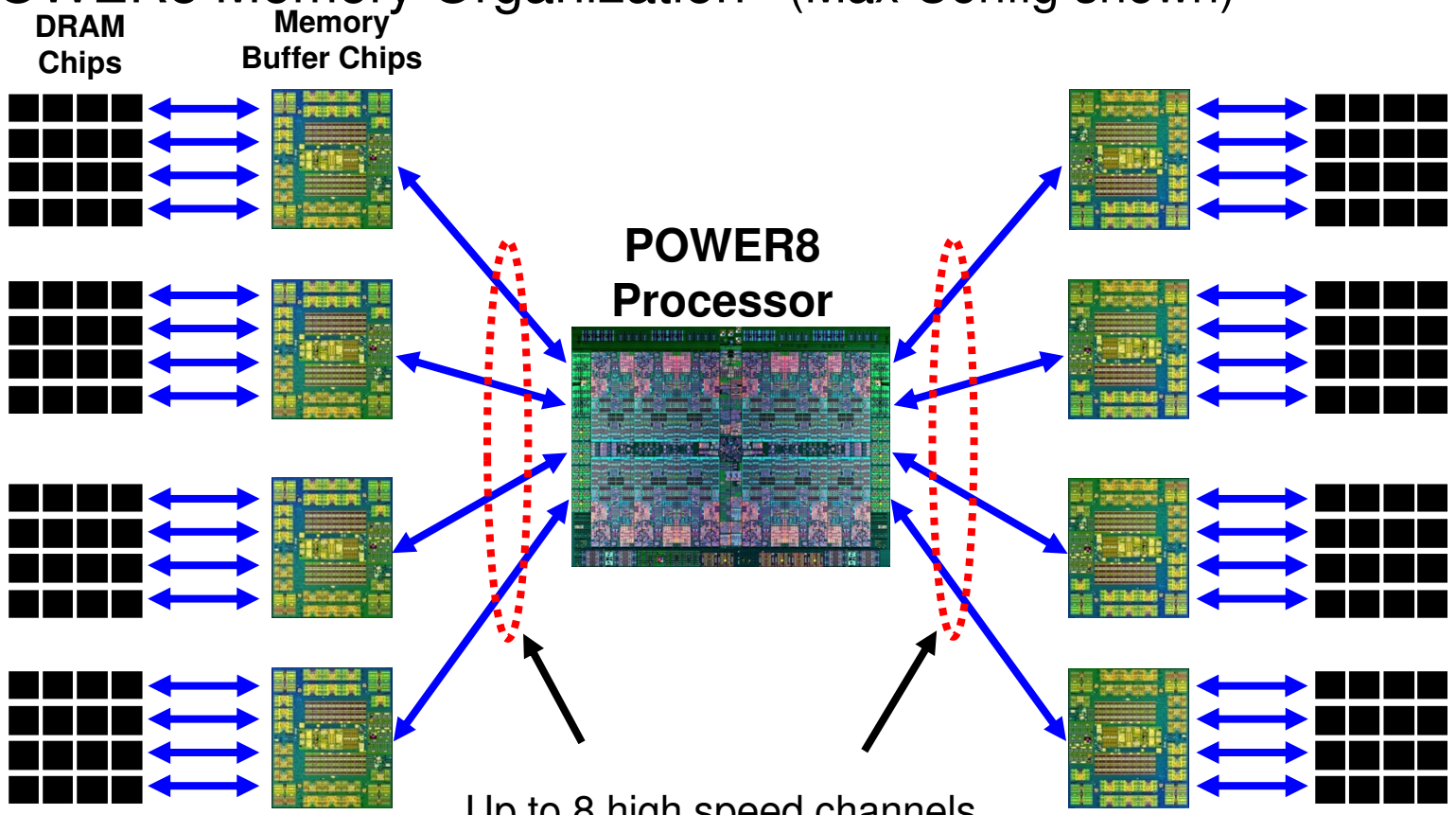
Enterprise POWER8 Server*

- ✓New system design
- ✓Increased system performance
- ✓Large-scale, dynamic resource sharing
- ✓New I/O scale & flexibility
- ✓Reduced footprint
- ✓Improved energy efficiency
- ✓24x7 Warranty
- ✓PowerCare

Upgrades from POWER7+
Power Enterprise Pool interoperability
with Mobile CoD

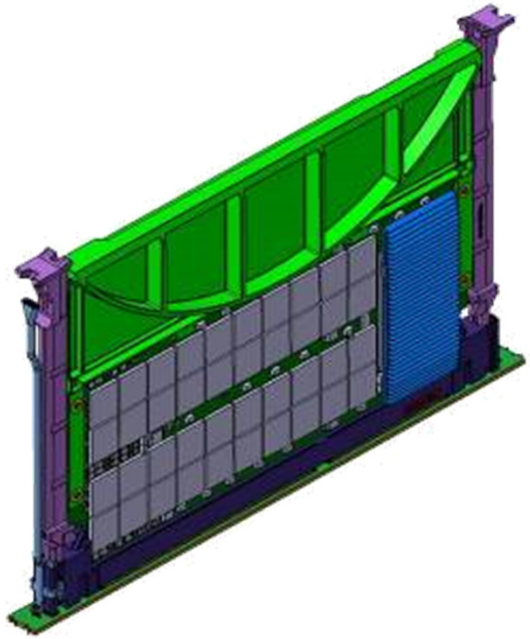
*All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

POWER8 Memory Organization (Max Config shown)



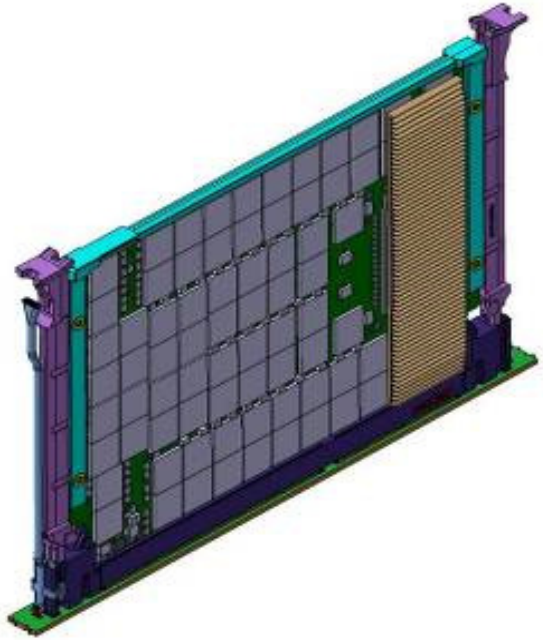
Up to 8 high speed channels,
Up to 9.6 GB/s per channel
Up to 230 GB/s sustained

POWER8 Memory CDIMMs



Capacity: 16GB / 32 GB / 64 GB

- **1600 MHz**
- **DRAM Sparing**
- **Up to 8 Cards per socket**
  - **Quad Interleave**
- **E870 & E880**



Capacity: 128 GB

- **1600 MHz**
- **DRAM Sparing**
- **Up to 8 Cards per socket**
  - **Quad Interleave**
- **E880 in 2014**
- **E870 in 2015***

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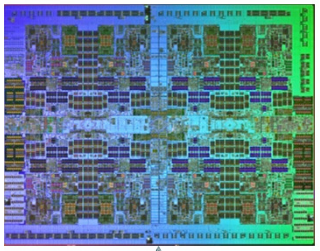
POWER8 Integrated PCI Gen 3

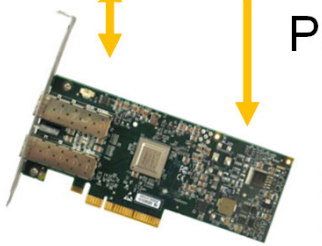
POWER7



GX Bus

I/O Bridge

PCIe G2

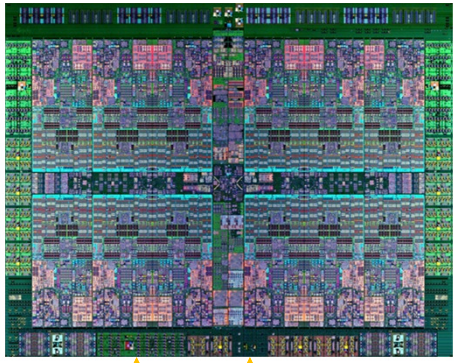


PCI Device

Native PCIe Gen 3 Support

- Direct processor integration
- Replaces proprietary GX/Bridge
- Low latency
- Gen3 x16 bandwidth (16 Gb/s)

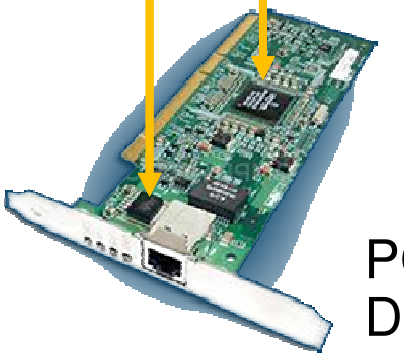
POWER8



x16

x16

PCIe G3



PCI Device

Evolving the best aspects of enterprise Power servers

Power 795 Attributes

- Largest scale & most capacity
- No primary node
- Isolated resources – service processor, clock, oscillators
- Largest memory footprint
- Redundant thermal monitoring

Power 770 & 780 Attributes

- 19” Rack mount
- Modular, energy efficient
- Blind swap I/O Adapters
- Integrated Ethernet adapter
- Internal disk/media

Architectural strengths of Power 795
Modularity & efficiencies of Power 770/780

Power 795

Power 780

Power 770

Power E880

Power E870

POWER8 Attributes

- Increase system performance and scale
- Increase memory footprint/core
- New I/O scale & flexibility
- No primary nodes
- Isolated resources (service processor, clock, oscillators)
- 19” Rack mount
- Modular, energy efficient
- Blind swap I/O adapters
- Integrated on-chip thermal monitoring

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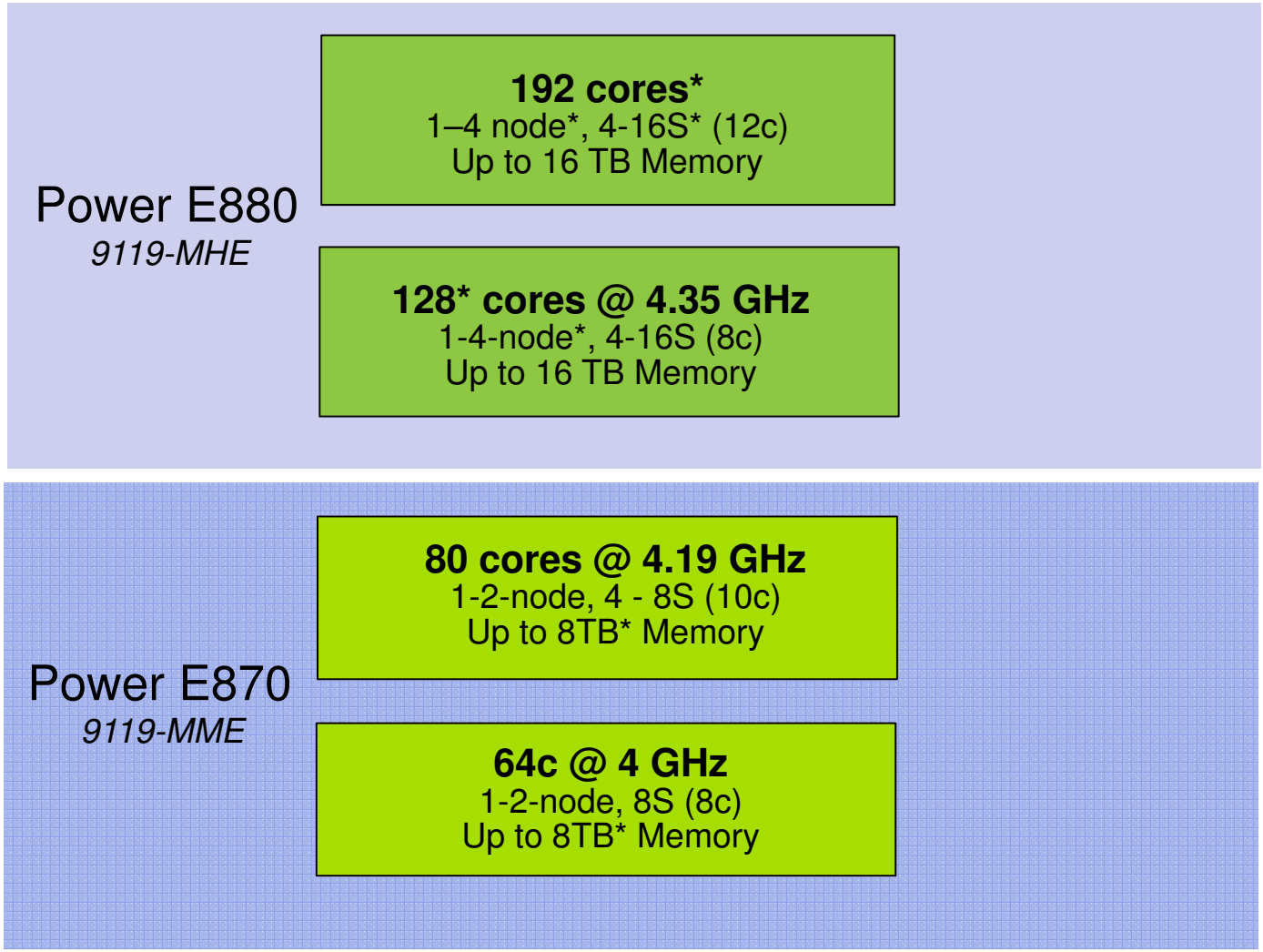
POWER8 Midrange & High-end Servers*



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POWER8 Midrange & High-end Roadmap*

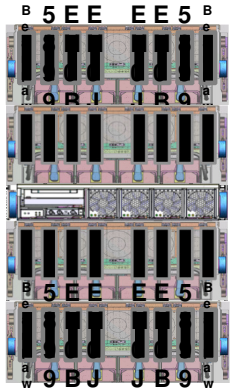
1 or 2 Nodes

- Minimum 8 cores active
- Minimum 256GB / 50% active
- 0 or 2 PCIe I/O Drawers

4Q14	*2Q15*
	192c@4GHz 4-node, 16S 16TB Memory *9119-MHE*
64c @ 4.35GHz 2-node, 8S 8TB Memory *9119-MHE*	MES → **128c @ 4.35GHz** 4-node, 16S 16TB Memory *9119-MHE*
80c @ 4.19GHz 2-node, 8S 4TB Memory *9119-MME*	
64c @ 4GHz 2-node, 8S 4TB Memory *9119-MME*	

- AIX 7.1 TL03, AIX 6.1 TL9
- IBM i 7.2 TR1, IBM i 7.1 TR9
- RHEL 7, RHEL 6.5 or later
- SLES 11 SP3

1 - 4 Nodes



- Minimum 8 cores active
- Minimum 256GB / 50% active
- 1 – 4 PCIe I/O Drawers

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Power Systems

IBM

Enterprise Power Systems with POWER8

Power E870

- Up to 80 cores @ 4.19 GHz
- Up to 64 cores @ 4.0 GHz
- 32 or 40 core nodes (5U)
- Up to 8TB* Memory
- 1 or 2 Nodes per system

✓ *Increased system scale*
✓ *Increased performance per-core*
✓ *Up to 20 VMs per-core*
✓ *Enterprise RAS*
✓ *Increased energy efficiency*
✓ *Elastic Capacity on Demand*
✓ *Share resources in Power Enterprise Pool*

Power E880

- Up to128* cores @ 4.35GHz
- Up to 192* cores
- 32 or 48 core nodes (5U)
- Up to 16* TB Memory
- 1 to 4 Nodes per system

✓ *Increased system scale*
✓ *Increased performance per-core*
✓ *Up to 20 VMs per-core*
✓ *Enterprise RAS*
✓ *Increased energy efficiency*
✓ *Built-in Elastic Capacity on Demand*
✓ *Share resources in Power Enterprise Pool*

*E880 supports 2 nodes, 64 cores, 8 TB Memory in 2014. Statement of Direction for 128-core system with 4 nodes, 16TB in 2015.
*E870 supports up to 4TB Memory in 2014 in 2014. Statement of Direction to support 8TB Memory maximum in 2015.

Enterprise POWER8 system structure

CEC

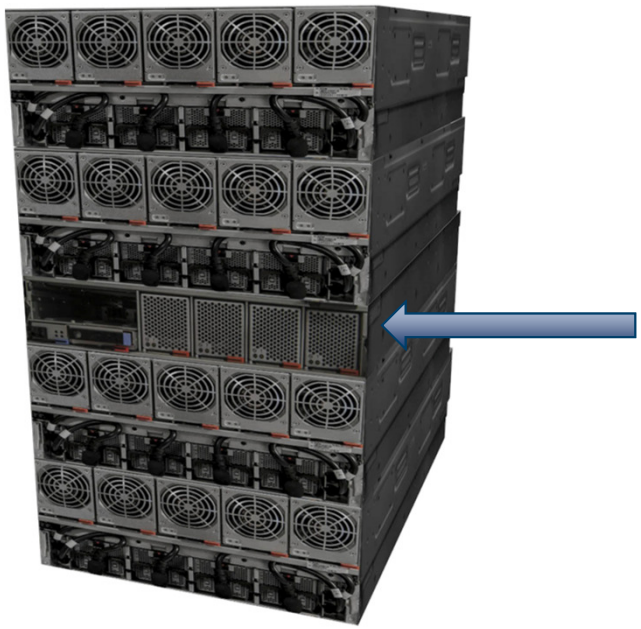
Node

Node

Sys Ctl Unit

Node

Node



22U in 19” rack

I/O Drawers

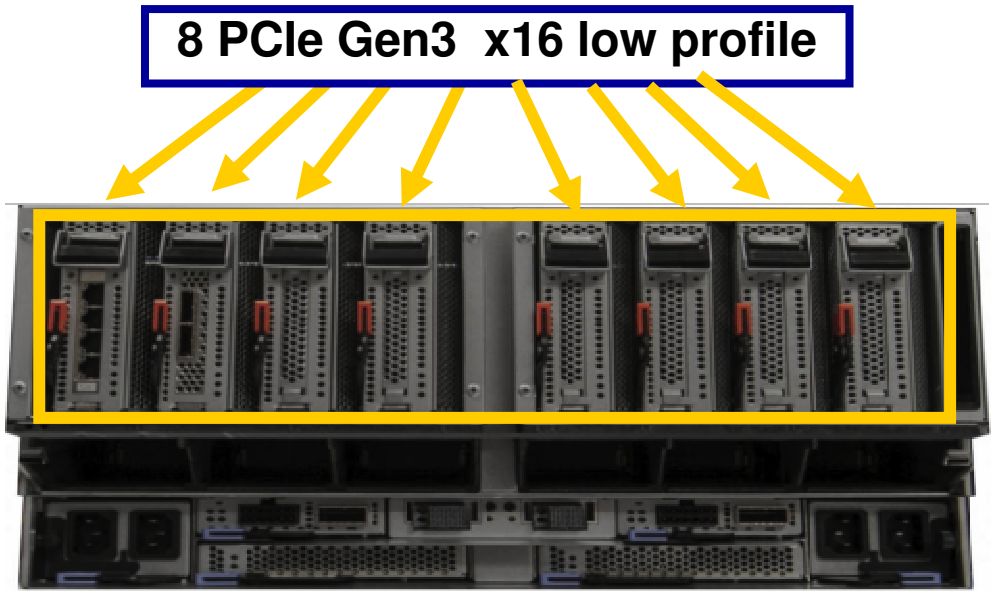
PCIe Expansion

EXP24S
2U SAS HDD/SSD

System Control Unit:

- 2U Form factor
- External FSP
- Clock / Oscillator Support
- Optional DVD
- 19” Form Factor
- Connect multiple nodes
- Required on all systems

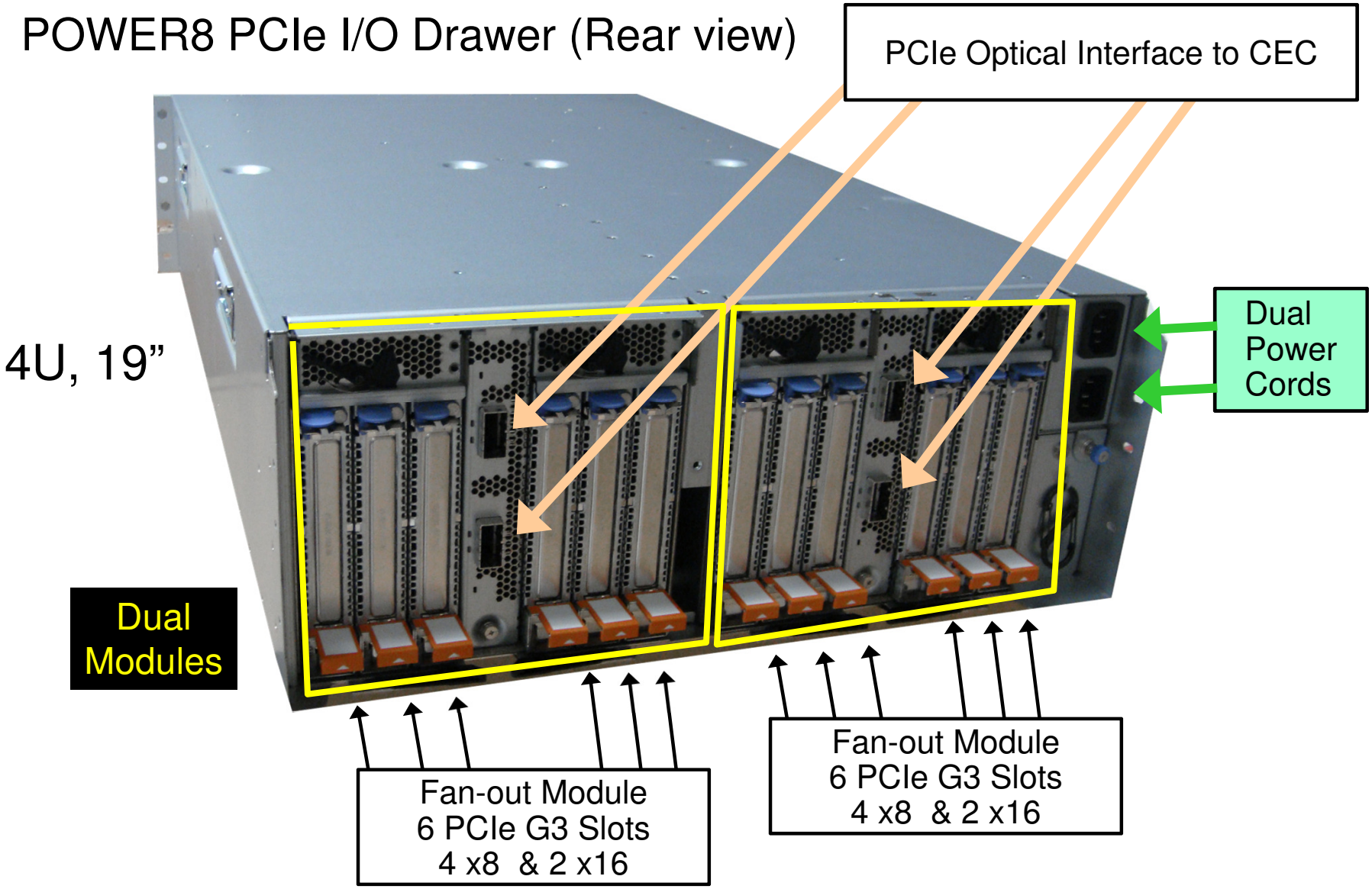
CEC PCIe slots



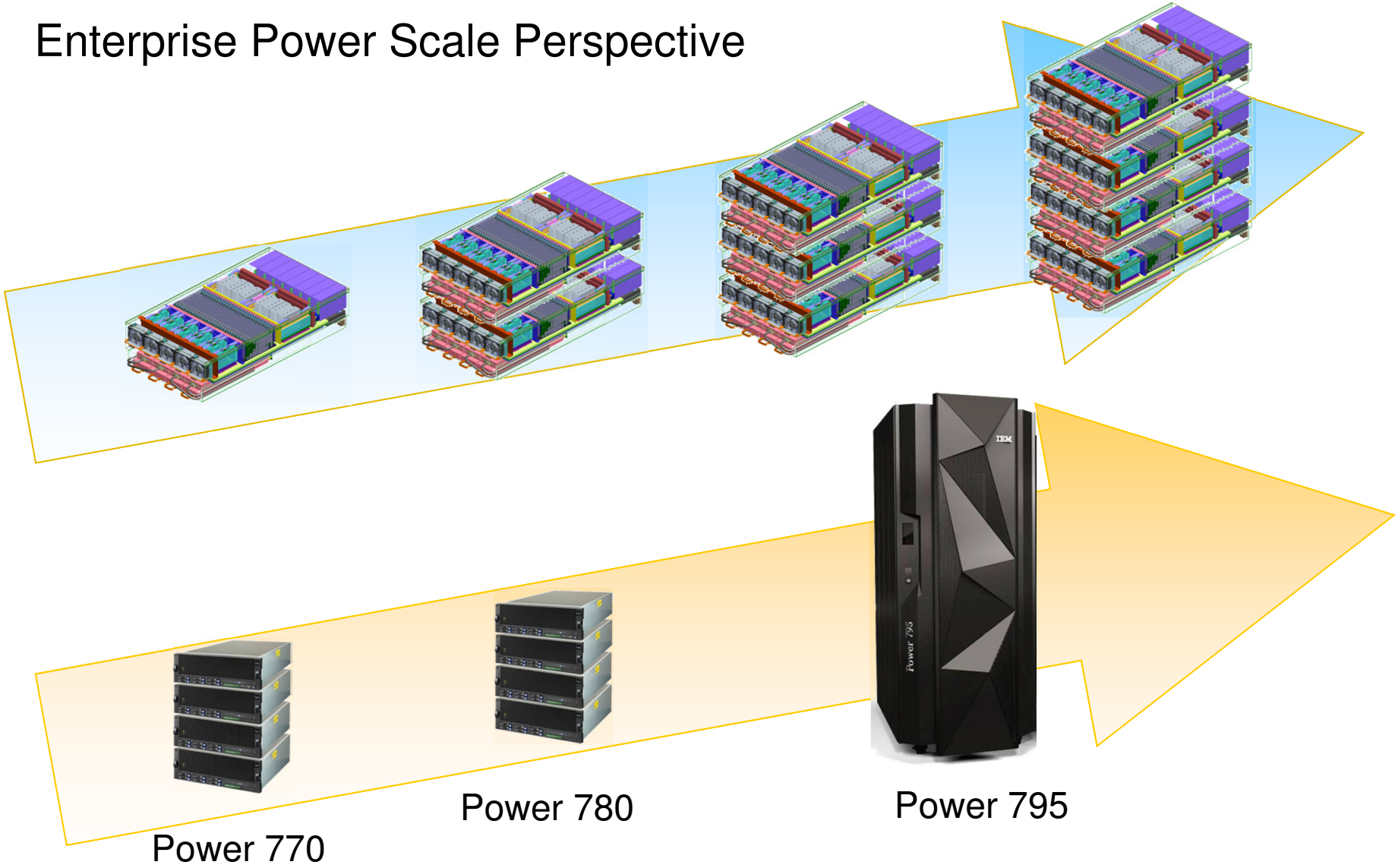
- Slots use a new low profile blind swap cassette (BSC)
- Servers come fully populated with these cassettes

Focused set of PCIe adapters supported in CEC drawer.
Very large set of PCIe adapters supported in PCIe I/O drawer.

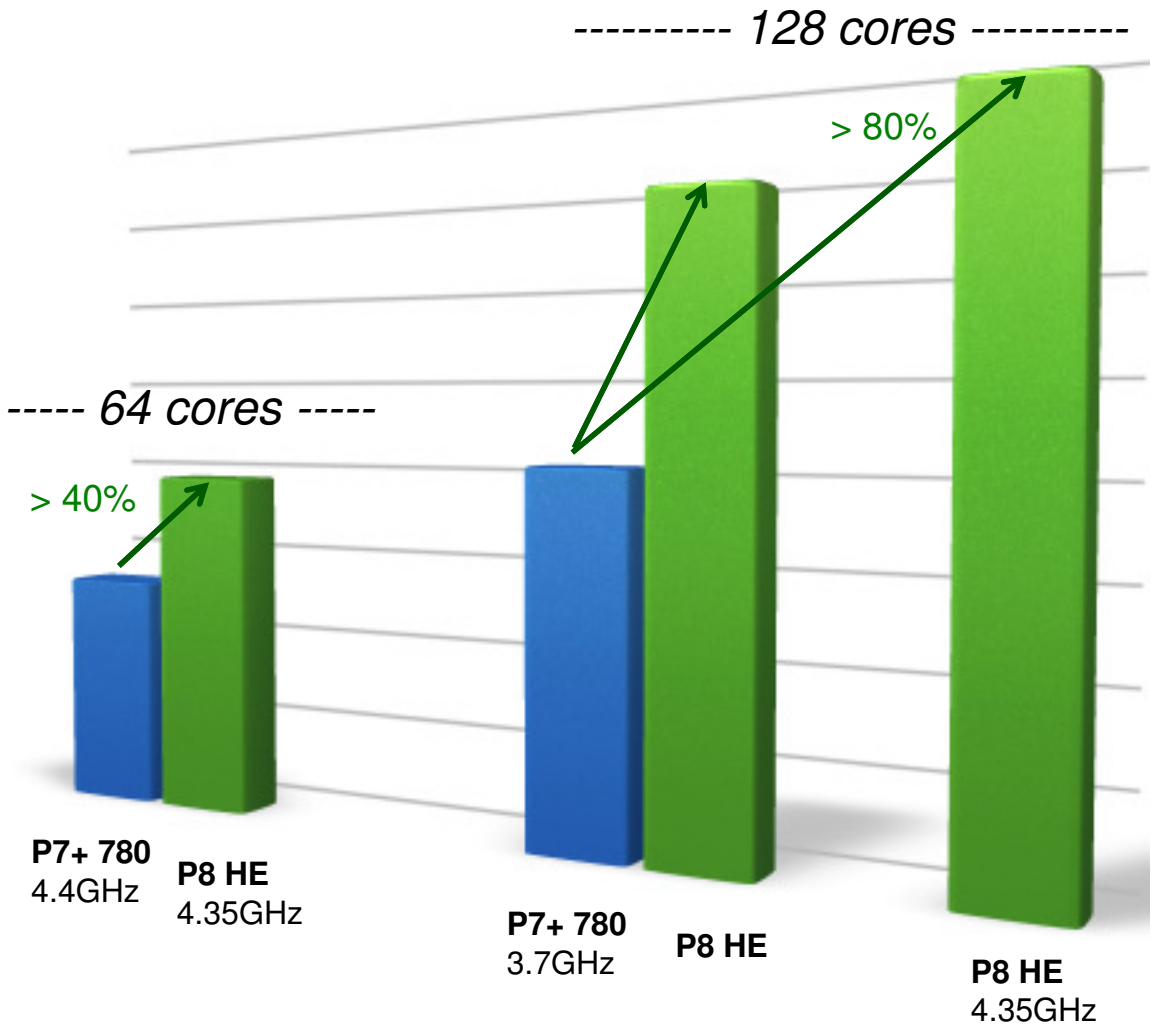
POWER8 PCIe I/O Drawer (Rear view)



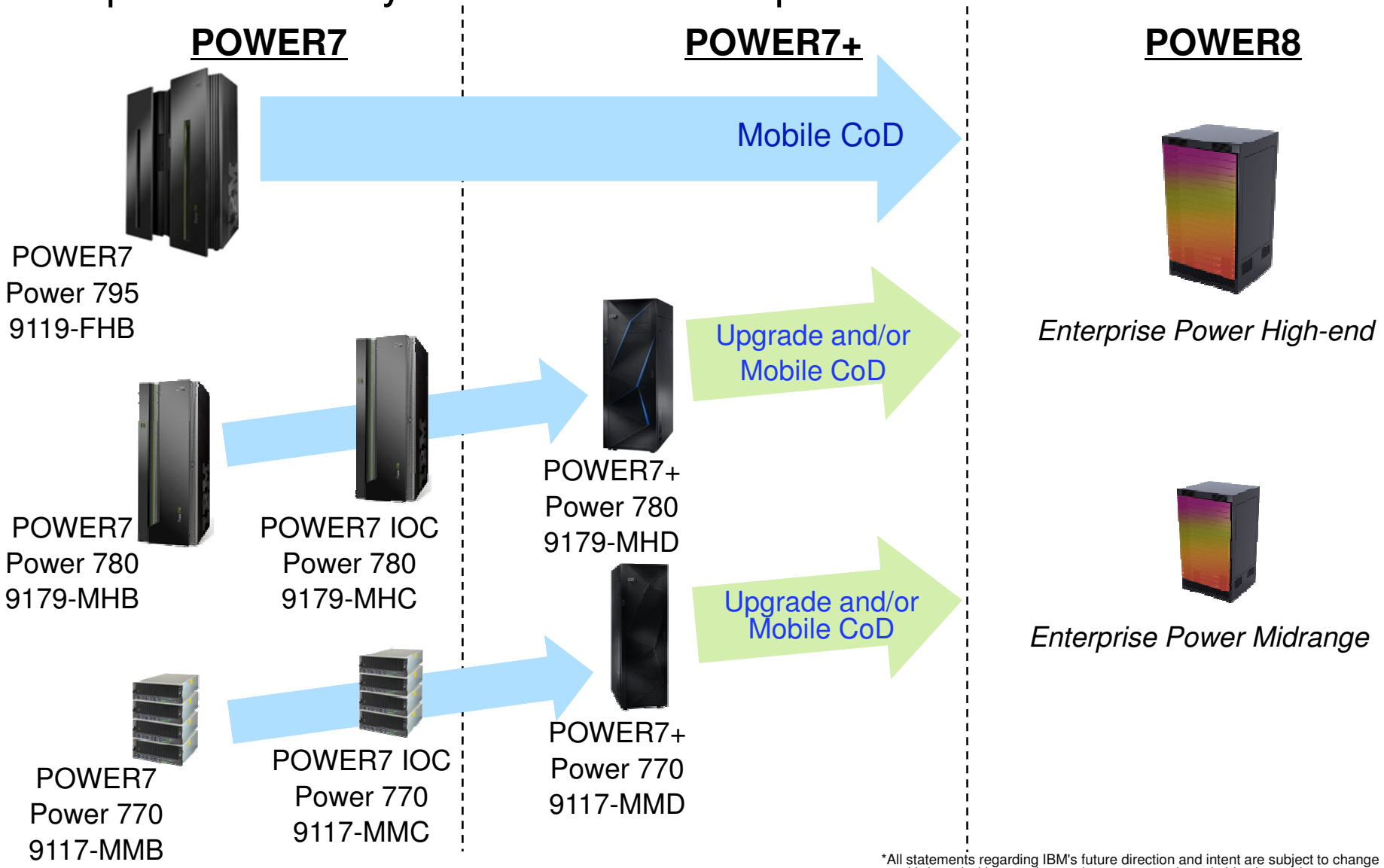
Enterprise Power Scale Perspective



POWER8 High-end rPerf Projection



Enterprise Power Systems Transition Options*



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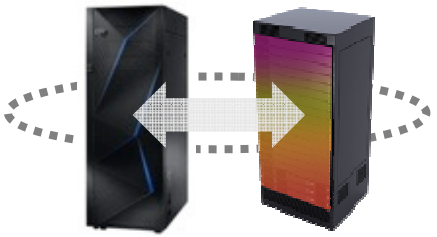
Primary Transition Scenarios for 2-step to POWER8

Single system upgrade

1. Purchase new or Upgrade to POWER7+
2. Model upgrade to POWER8

Delivers great price/performance; may lower cost of transition to POWER8 with POWER7+ upgrade

Power Enterprise Pool for migration or box swap



1. Purchase a POWER7+ or 795 server with new Mobile CoD activations
2. Purchase a new POWER8 server & integrate with POWER7+ in a Power Enterprise Pool
3. Transition capacity & applications to POWER8 via Mobile CoD and PowerVM
4. Use POWER7 or 795 system for HA, etc. or remove from environment

Key option for investment preservation, risk reduction and high availability / flexibility with Pools

Mobile CoD features will convert via RPQ from POWER7 to POWER8 at no additional charge!

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Power Solutions Overview for October Launch

Big Data and Analytics

BLU Acceleration – Power Sys Edition
New pre-installed, optimized Power Enterprise System with DB2 with BLU Acceleration and InfoSphere DataStage option

Update

IBM Data Engine for Analytics
Adjustable storage and compute resources that are easy to deploy for data intense workloads like Hadoop and align to specific LOB requirements for faster time to value.

New

Solution for Analytics – Power Systems Edition
New pre-installed, optimized Power Enterprise System with Cognos Business Intelligence and/or SPSS predictive analytics and DB2 BLU option

Update

IBM Solution for Flash Optimized NoSQL – Power Systems Edition
CAPI attached Flash for in-memory NoSQL data stores provides higher workload density to x86 RAM only systems to lower infrastructure costs up to 3x

New

Mobile

Mobile Scale-Out Sales Offering with WorkLight + WAS
New Power Enterprise System options and enhanced with latest WorkLight and WAS releases

Update

Cloud and MSPs

Private Cloud: Solution Edition for Cloud
New Power Enterprise System options & enhanced IBM Cloud Manager, PowerKVM, PowerVC with 1 button configs

Update

Public Cloud: Power Systems Solution for Service Providers with new Power Enterprise System options and enhanced IBM Cloud Manager, PowerKVM, PowerVC and SUSE LE Linux

Update

Public Cloud: Solution Edition for Scale Out Cloud with enhanced PowerKVM, PowerVC, IBM Cloud Manager and SUSE LE Linux (in addition to Ubuntu LE)

Update

Hybrid Cloud: IBM Cloud Manager with OpenStack
'single pane of glass' advanced VM workload placement and best practices for creating secure connection for on premise to off premise clouds built on Open APIs w/ IBM enhancements & support for new PowerVC functions

Update

PowerKVM v2.1.1

Open Virtualization Choice for Linux-only Scale-out Servers

- ✓ *Optimize **Linux Workload Consolidation and scale out** of workloads at a lower cost of ownership*
- ✓ *Maintain flexibility and agility by exploiting **Open Source** Community*
- ✓ ***Leverage** traditional **Linux admin skills** on Power Systems to administer virtualization*
- ✓ *Use **open source tools like OpenStack** to manage virtualization*

- ✓ *Reduces IT Infrastructure costs*
- ✓ *Optimize Linux workload consolidation at a lower cost*
- ✓ *Simplify your virtualization management using open source tools*

Announced – 10/6 GA – 10/28

- Kernel-Based Virtual Machine(KVM) Linux based virtualization For Scale Out POWER8 Linux Servers
- PCI Pass through I/O Support allows more options for performance
- Mixed Endian VM support on a single PowerKVM host provides increased flexibility
- PCI Hot Plug support provides expanded availability by allowing new devices to be added dynamically
- Support for SLES 12, RHEL 6.6 and Ubuntu 14.10 provides a larger choice of Linux versions
- Energy Star Improvements provides new policies for energy control

PowerVM v2.2.3.4

Virtualization without Limits

- ✓ ***Reduces IT infrastructure costs***

  Consolidate diverse workloads save operational costs

- ✓ ***Improves service levels***

  Virtualized resources can be applied dynamically to workloads as needed

- ✓ ***Manages risk***

  Unrivaled flexibility enables rapid response to business change minimizing risk

- ✓ *Improved User Experience for PowerVM*
- ✓ *Industrial Strength Server Virtualization*
- ✓ *POWER8 Enterprise Systems Support*

Announced – 10/6 GA – 10/28

- **Improved Virtualization User Experience – HMC 8.20**
  - Enhanced, simplified HMC Virtualization UI lowers cost of operation
  - No Touch VIOS Management simplifies administration
  - One Touch VIOS Deployment from the HMC accelerates virtualization deployment
  - System and Partition Templates reduces risk by providing repeatable deployments and best practices enforcement
  - *Tech Preview for new UI capabilities* like Quick search, gallery views, graphical topologies, improved resource views
- **Simplified VM Remote Restart** CLI accelerates recovery
- **POWER8 Enterprise Systems Support** enables improved Power capabilities

PowerVC v1.2.2

Virtualization Center

openstack CLOUD SOFTWARE

- ✓ *Improve resource utilization to **reduce capital expense and power consumption***
- ✓ ***Increase agility** and execution to quickly respond to changing business requirements*
- ✓ ***Increase IT productivity** and responsiveness*
- ✓ ***Manage scalability** without adding complexity*
- ✓ ***Dynamically adjusts** workloads to ease burden on systems management*

"I have a certain set of skills. For me to do these tasks without any background of the product shows it's intuitive." Spencer Siu

Colgate World of Care

"PowerVC is so easy I could have an intern do this for me." David Jackson

GHY INTERNATIONAL

Announce – 10/6 GA – 12/12

- Improved Switch Storage Support – EMC, IBM xiv, Cisco
- Support for managing IBM i LPARs
- Support for importing existing PowerKVM VMs
- Support for importing PowerVM LUN images
- 3rd Party Supported OpenStack drivers increases device support
- Scaling Improvements allowing larger configurations to be managed
- Support for managing SLES v12 and Ubuntu v14 VMs
- IP Pooling support which automates assignment of Addresses
- One click evacuation of a server for scheduled maintenance

IBM Cloud Manager with OpenStack v.Next 4Q14

Announce: 10/06/14
Release to manufacturing: 11/21/14
GA: 12/12/14

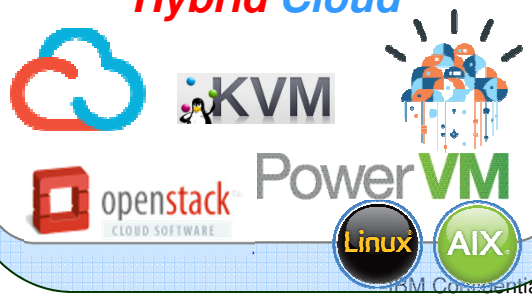
IBM Cloud Manager with OpenStack

NEW

Next Generation of SmartCloud Entry with OpenAPIs

- ✓ *Complete OpenStack distribution with simplified installation, config and support*
- ✓ *Cross-platform support for x86, Power and System z*
- ✓ *Single pane of glass for hybrid*

Hybrid Cloud



- Hybrid (OpenStack multi-region management)
  - Best practices for creating secure connection for on premise to off premise clouds
  - Ability to configure and connect to Cloud Manager-based off-premise cloud as a region
  - Placement and optimization policies for both on premise and off premise clouds**
- Service Management Connect Client Interaction
  - Support up to 20 participants in 'Inner Circle'
- Support for all "core" packages in OpenStack Juno release
  - Database (Trove)
  - Data Processing Hadoop (Sahara)
  - Queue service (Marconi)*
  - Bare metal (Ironic)*
- Take advantage of new PowerVC functions
  - Provisioning of IBM i workloads
  - Additional storage support (vSCSI, XIV, CISCO SAN, EMC)
  - New networking capabilities for PowerVC (vNIC, IP Pools)
  - Host Maintenance mode
  - Support cloud_init metadata fields in deploy UI
  - Support multiple storage connectivity groups in deploy UI
  - Support multiple storage templates in boot volume deploy UI

Note:
* Not yet Core in Juno; will only be included if become Core
* Not applicable to PowerVM, PowerKVM only

agenda

- What'up ?
  - POWER8 2014 roadmap
- What's new ?
  - 1Q15 Annoncement
- What's next ?
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  - s/w Roadmap overall : AIX, linux, IBM i

Power Systems 1Q launch – delivering proof of momentum

IBM Offerings – New & Enhancements

- **SoftLayer** – Bare Metal cloud offerings on Power Systems
- Tivoli Storage Manager, Websphere Application Server, DB2 with BLU Acceleration for Linux on Power in **little endian** mode
- **New Bluemix** Cloud Integration Services (SOE/SOR integration) with Power Systems

Power Ecosystem

- Red Hat in little endian mode
- Veristorm open source Hadoop offering
- Docker for Power Systems
- OpenStack HEAT and Chef Server for Power Systems
- **SAP HANA** Ramp-Up early adoption program for Linux on Power

OpenPOWER

- Rackspace joins the OpenPOWER Foundation
- OpenPOWER Foundation membership nearly doubles in the last 6 months growing to *xx* members

IBM Programs

- Showcasing the Innov8 with POWER8 university challenge teams

agenda

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Operating Systems

POWER8 Ecosystem

ISV Applications Available on POWER8

All applications which run these OS levels will run on POWER8

AIX 6.1 or 7.1

IBM i 7.1 or 7.2

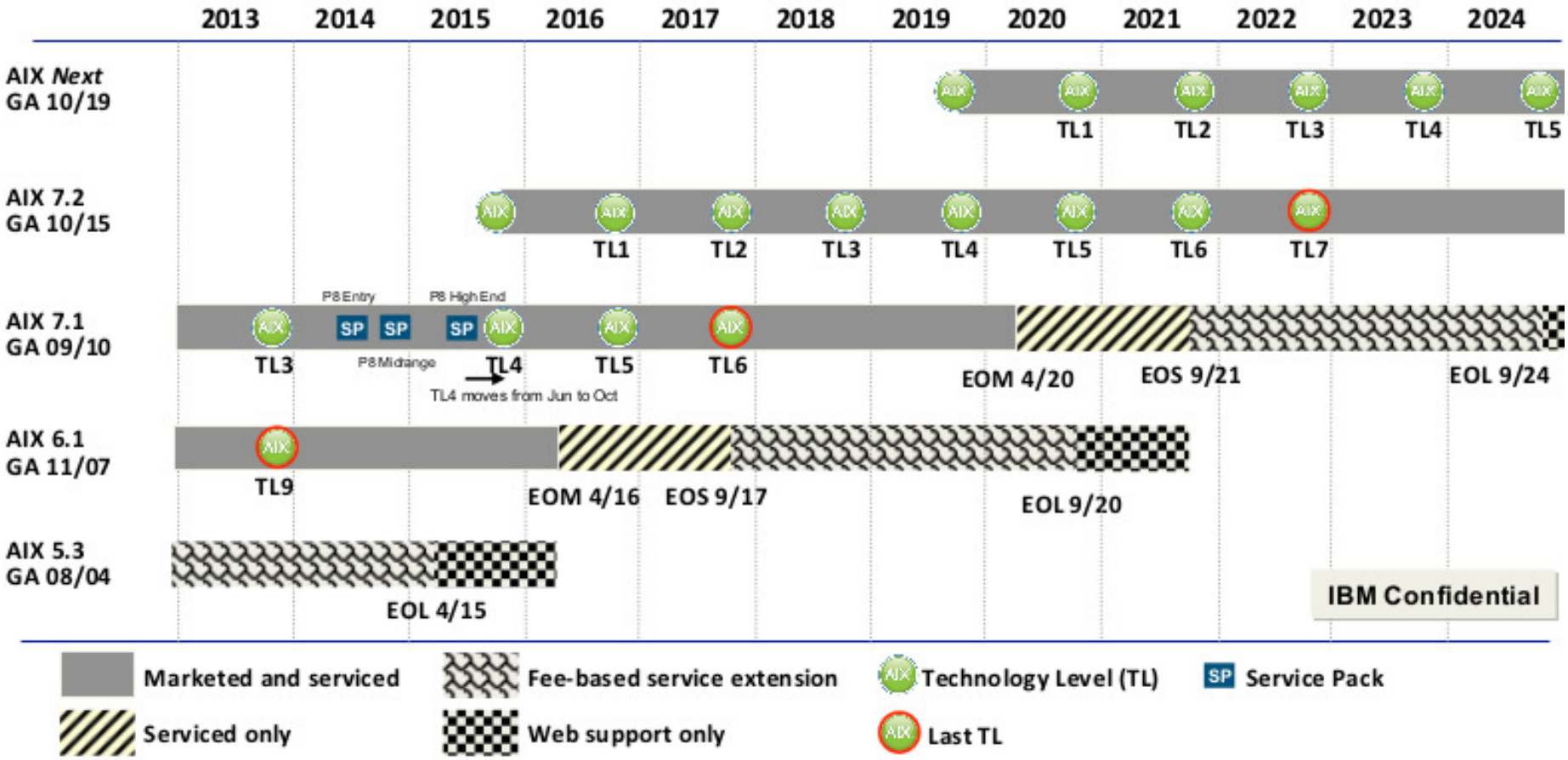
Red Hat 6

SUSE 11

Ubuntu 14

Additional certification, validation, porting, testing, etc. are not required

AIX Release Lifecycle View



Notes:

- Lifecycle model ships a new AIX level ~4 years
- Current AIX level will support new Power systems features at System GA
- IBM supported levels of AIX operate in compatibility mode on new Systems

AIX Performance Optimization for POWER8

Feature	Description
Transactional Memory	Hardware managed atomicity to shared data; Parallel thread concurrency
More cores per socket 8-threads per core	SMT8, Improved Socket Density, and throughput performance from a single socket.
Hybrid Thread Optimizations	Maximize single thread performance while balancing throughput. Fast SMT mode switching. Hardware thread mixing, thread balancing, automatic perfomance boost on low thread-count, faster inter-thread communication, sibling thread managements, direct control of thread priority, temporary increase of thread priority.
Affinity Helpers	Hardware tracked last socket of reference, to aid in affinity optimization
New Vector Instructions	Various new instructions for vector scalar, CRC calculations, 16-byte atomics, etc.
Java code optimization with Hardware Assist	Hardware helpers for Java JIT Code Optimization

Power Systems AIX – Driving Innovation and Preserving Client Investments

IBM

2013	2014	2015	2016
Workloads • Oracle RDSv3 Certification • OFED 1.5 for RoCE • SSD Flash I/O Caching w/ DS8K **Virtualization:** • WPAR update w/ rollback **Security:** • Russian Security Certification • PCI V2 • TNC Alerting and i-fix Tools • Enhanced LDAP users and groups **HW Support/Exploitation:** • POWER7+ • Energy Management++ **Availability:** • Enhanced Live mksb Backup • Active-Active Storage Hyperswap	**Workloads** • V8 Javascript & node.js • P8 SMT 8 • P8 Transactional Memory • P8 in-core crypto • 40 Gb Ethernet • Enhanced UDP Performance • DB2 Compression Acceleration **Virtualization:** • Non-disruptive P8 Live Migration • SR-IOV NIC **Security:** • China Security Certification • PCI V3 Compliance Profile • DOD STIG V2 Profile • RSCT NIST Support	**Workloads** • LVM Flash Cache Mirrors • ProbeVue Extensions • Enhanced syncd Scaling Enhanced LVM rsync Controls CAPI Attached Flash • RDSv3 over RoCE **Virtualization** • VIOS LPM for Concurrent HW Maintenance • SR-IOV VNIC • VIOS SSP Storage Tiers • SR-IOV RDMA **Security:** • PowerSC NERC Compliance Profile **Availability:** • Live Kernel Update (i-fixes) • PowerHA Enterprise Pools • PowerHA SAP HA V2 Certified	**Workloads** • Additional Open Source • 32 TB Single LPAR Image • Live SP Updates • Transparent Transactional Memory • HW Assisted Large Page AME • Storage Agnostic Flash Caching • Sockets over RDMA (SMC-R) **Virtualization** • VIOS LPM over RDMA • Virtual Flash Caching • Open Stack ready AIX Images • Cloud-init Activation Engine **Security:** • PowerSC Client Compliance Snapshots **Availability:** • PowerHA EMC Hyperswap Support • PowerHA 3-site DR & VM Restart
			2017+ • 1536 way LPAR Image • Hybrid Threading • Live TL Updates • Next Gen Zero Copy FS • P9 Support & Exploitation • DSO V4 • CAPI NIC & RDMA • Sentry Crypto Card + Key Mgr • TPM Secure Boot

Blue – candidates to only be included in a new release and not in prior TLs
Green – content that is outside of AIX OS delivered in separate offering, i.e. PowerVM, PowerHA, PowerSC

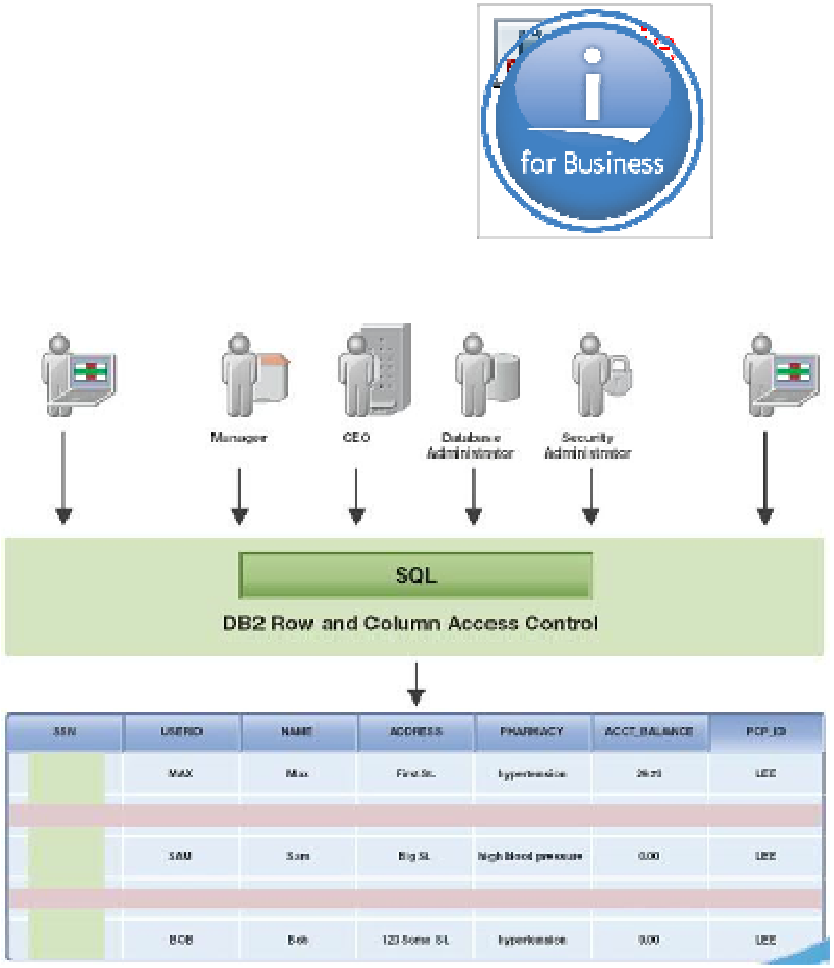
IBM i Levels

	IBM i 7.1 TR8
POWER7	Max Scale = 32 cores (SMT4) Max Partition = **64 cores (SMT4)** Threads = ST, SMT2, SMT4 up to 256 threads in single partition
POWER8	Max Scale = 32 cores (SMT8) Max Partition = **64 cores (SMT4)** Threads = ST, SMT2, SMT4, SMT8 up to 256 threads / single partition

	IBM i 7.2
POWER7	Max Scale = 32 cores (SMT4) Max Partition = **96 cores (SMT4)** Threads = ST, SMT2, SMT4 up to 384 threads in single partition
POWER8	Max Scale = 48 cores (SMT8) Max Partition = **96 cores (SMT8)** Threads = ST, SMT2, SMT4, SMT8 up to 768 threads / single partition

IBM i 7.2

- A major new release featuring extensive enhancements to support the integrated value of IBM i
- Powerful new features of DB2 for i simplify securing enterprise data
- IBM Navigator extends simpler management and monitoring services
- Integrated application server now uses latest WebSphere Liberty Profile
- Free format RPG transforms traditional programming language

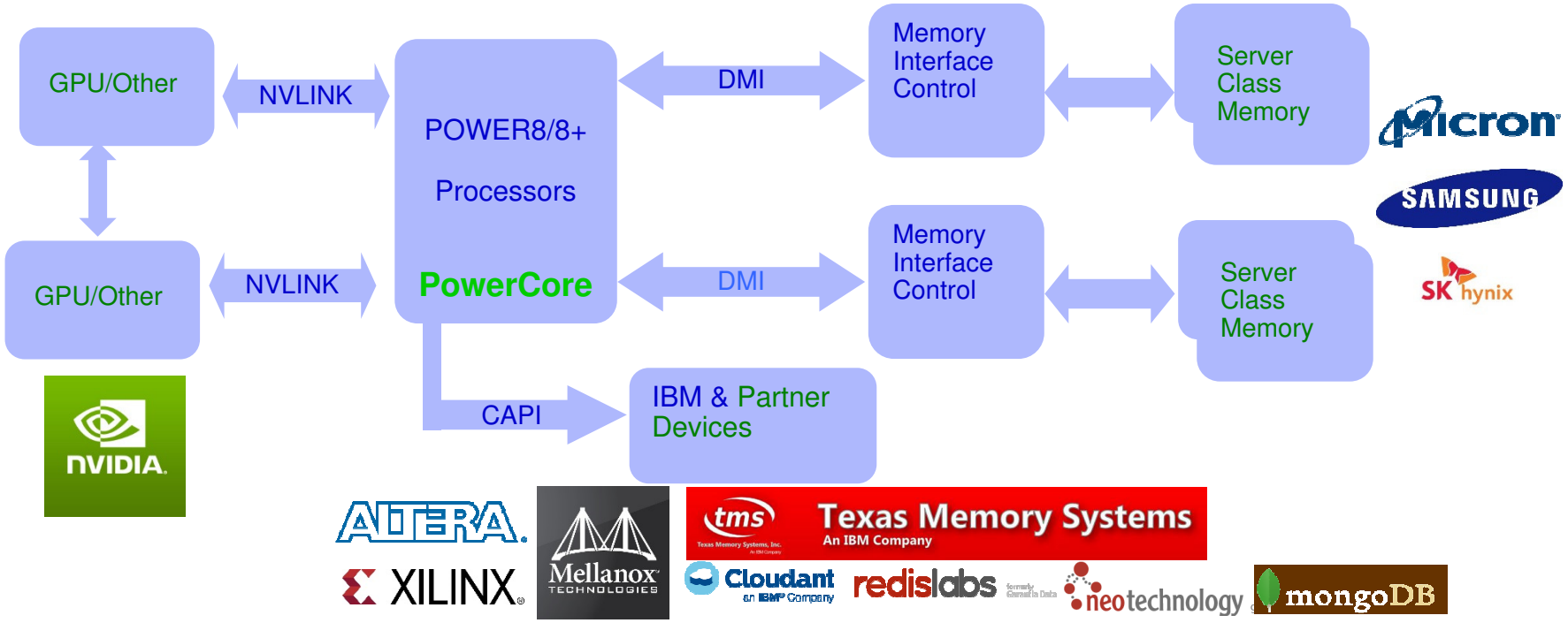


Row and Column Access Control

Technical Computing h/w roadmap

"POWER" Built for Open Innovation

POWER Processors have a Leadership Set of Differentiated Interfaces



Innovation with OpenPOWER is taking place on all interfaces and with custom SOC Designs

Our Technical Computing Hardware Strategy Has Evolved

- High-performance computer and high-performance analytics drive common platform design
- Servers will be predominately 2-socket designs
- Developing deeper relationships with technology partners – ref OpenPOWER
- Majority of floating-point performance will come from GPUs
- Utilize Industry-standard compliant racks and electronics enclosures
  - Air and water cooling options

Power Systems

Open innovation to put data to work across the enterprise

Power Systems

IBM

Power Systems February 2015 launch messaging summary

Open innovation to put data to work across the enterprise

Power Systems with POWER8, are built with open innovation to accelerate big data insights and hybrid cloud deployment. A growing open server ecosystem continuously infuses innovation into Power Systems with new capabilities so clients are better equipped for Cloud, Analytics & Mobile workloads as well as handling complex, mission critical applications with confidence.

Superior Cloud Economics: Flexible, cloud-based private, public and hybrid offerings with Power Systems support open standards and technologies with rapid innovation, secure automation, and efficient deployment

- Deliver hybrid cloud solutions for enterprises and internet datacenters (CSPs) that offer *[up to TBD% cost savings]* per VM on a more secure and reliable platform compared to Intel with new choices for Power Systems in the public cloud with SoftLayer announcing bare metal offerings and Rackspace announcing plans to build an OpenPOWER-based, Open Compute platform, joining VMaaS offerings from OVH and SiteOx amongst others
- Rackspace joins the OpenPOWER Foundation to innovate and build an OpenPOWER-based, bare-metal Open Compute platform, integrated with OpenStack cloud services to provide improved performance, greater efficiency and differentiated features for hybrid cloud
- Improve application integrity and shorten time to market by connecting on and off premises cloud infrastructure with Power Systems apps and databases using Bluemix Cloud Integration Services
- Now available on Power Systems today, Docker enables clients to maximize the simplicity, efficiency and portability of their application provisioning with lightweight and flexible Docker containers.
- Reduce cost and risk *(by TBD%)*, and improve efficiency by automating deployment of cloud images with a large and growing ecosystem of community-based patterns and tools available from Canonical Juju Charms, the IBM Cloud Marketplace and now OpenStack HEAT and Chef Server for Power Systems

Open Innovation Platform: Benefit from continuous innovation and best-of-breed services delivered through an open and collaborative POWER ecosystem

- Innovate new solutions without constraint from commodity Intel servers with Red Hat (RHEL and RHEV) little endian support for Linux on Power and key offerings from Tivoli, WebSphere, and Veristorm. (GA: Veristorm 01-15)
- Achieve higher ROI and adapt to demand more quickly with rapid innovation from the OpenPOWER Foundation ecosystem membership nearly doubling in the last six months as it grows to *## members.*
- Align the next generation of IT innovators to business needs – showcasing the Innov8 with POWER8 university challenge teams as POWER8 academic programs guide students from *## universities* working on big data and cloud business challenges in collaboration with the OpenPOWER Foundation, key ISVs, and SWG.

Designed for Big Data: Provide a personalized, engaging customer experience with Power Systems innovations that accelerate insights

- Deliver insights *50X (TBC)* faster and enable access to legacy data stored on commodity Intel data warehouses using DB2 with BLU Acceleration (in little endian mode) now available for Ubuntu and Red Hat Linux on Power
- Building on early, successful evaluations with SAP HANA customers, businesses with a HANA strategy can now realize greater agility by participating in the Ramp-Up early adoption program for HANA on Power Systems with Linux.

* Claims are undergoing benchmark testing and will be available prior to launch. All announcement content and naming will be finalized