Power Systems

IBM

January 30, 2015

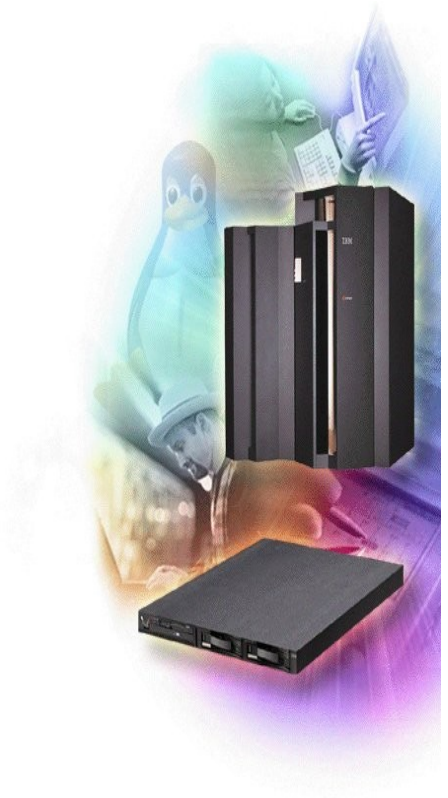
Power Systems Strategy - Linux

Open Innovation to Put Data to Work

Franz Bourlet
Power Systems Technical Sales
IBM Belgium & Luxembourg

How IBM is deploying Linux in data centers

- 1100+ servers WW
- Internal Linux Projects:
  - www.ibm.com/linux & w3.ibm.com/linux
    - redundant Linux servers
  - IGS Internet Vulnerability Security Scanning
    - 61 System x scanning 30k IP addresses/ week
  - Performance monitoring
    - 24 System x servers
    - 75% fewer Linux servers than Windows servers for same workload
  - IBM Global e-Mail Anti-virus Management
    - Linux servers scan incoming/outgoing mail for viruses
  - 300mm Wafer Manufacturing Equipment Control
    - Much more reliable than Windows
    - 300-400 systems

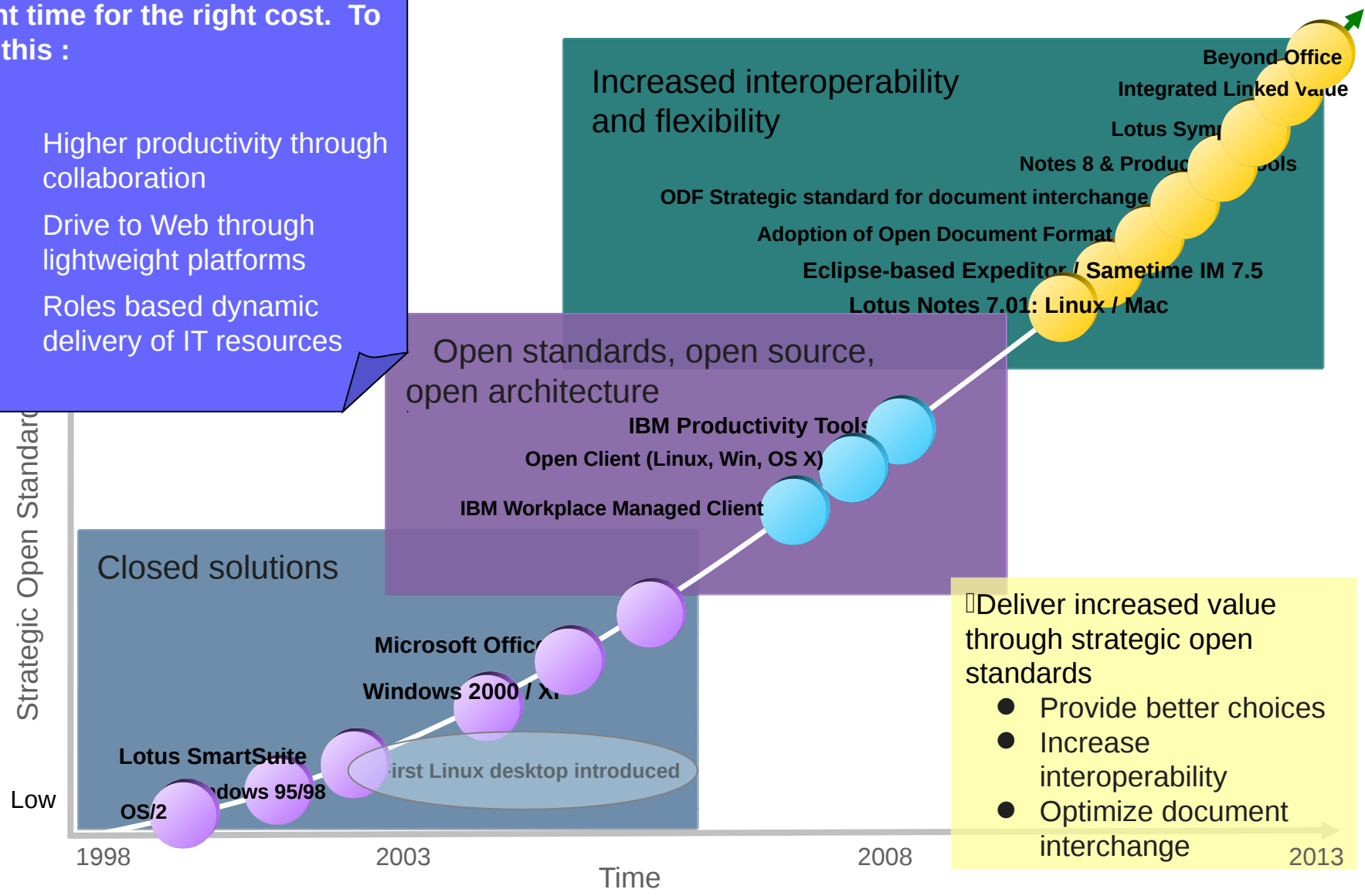


IBM consolidated more than 3,900 distributed servers onto just 33 mainframes running Linux**. This drove** HUGE **savings ... including an 80 percent reduction in energy consumption over 5 years**

How IBM is deploying Linux on clients

Vision: Employees get right tool at the right time for the right cost. To realize this :

- Higher productivity through collaboration
- Drive to Web through lightweight platforms
- Roles based dynamic delivery of IT resources



Deliver increased value through strategic open standards

- Provide better choices
- Increase interoperability
- Optimize document interchange

IBM Open Client for Linux penetration

Open Client for Linux Red Hat Edition

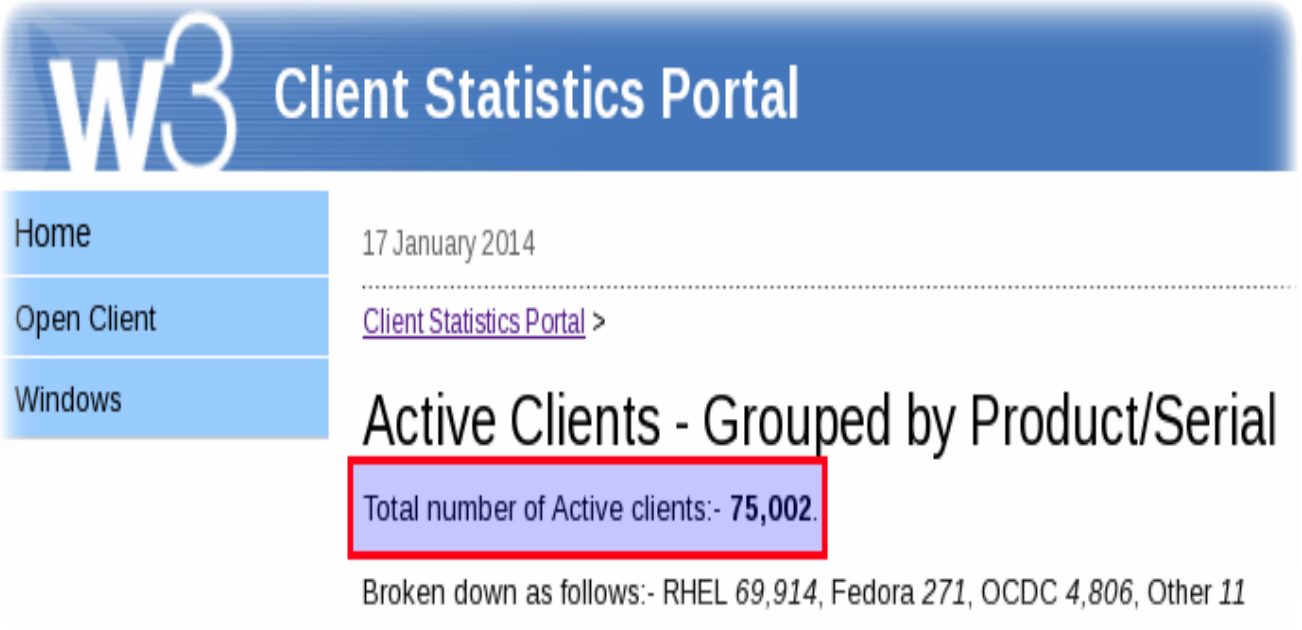
View All Entries

75000 Active Linux Users within IBM

John A. Walicki | Jan 17 | 12 Comments | 372 Visits

6

On January 17th, 2014 the Open Client for Linux usage metrics reported that there are over 75000 active Linux client workstations within IBM. An active system is defined as a system that has checked in during the prior 90 day period.



IBM's contribution to Linux and open source

IBM has been an active Linux community member since 1999

IBM is the leading systems vendor contributing to Linux

IBM has over 600 full-time developers working with Linux and open source

IBM is actively involved into over 100 open source projects

Linux Kernel & Subsystem Development

Kernel Base Architecture Support
GNU
Security
Systems Management
Scalability
RAS
Virtualization
Special Projects
Filesystems (JFS eg),, and more..

Expanding the Open Source Ecosystem

Apache & Apache Projects
Eclipse
Mozilla Firefox
OpenOffice.org
PHP
Samba, and more...

Foster and Protect the Ecosystem

Software Freedom Law Center
Free Software Foundation (FSF)
Open Invention Network, and more...

Promoting Open Standards & Community Collaboration

The Linux Foundation
Linux Standards Base
Common Criteria certification
Open Software Initiative, and more...

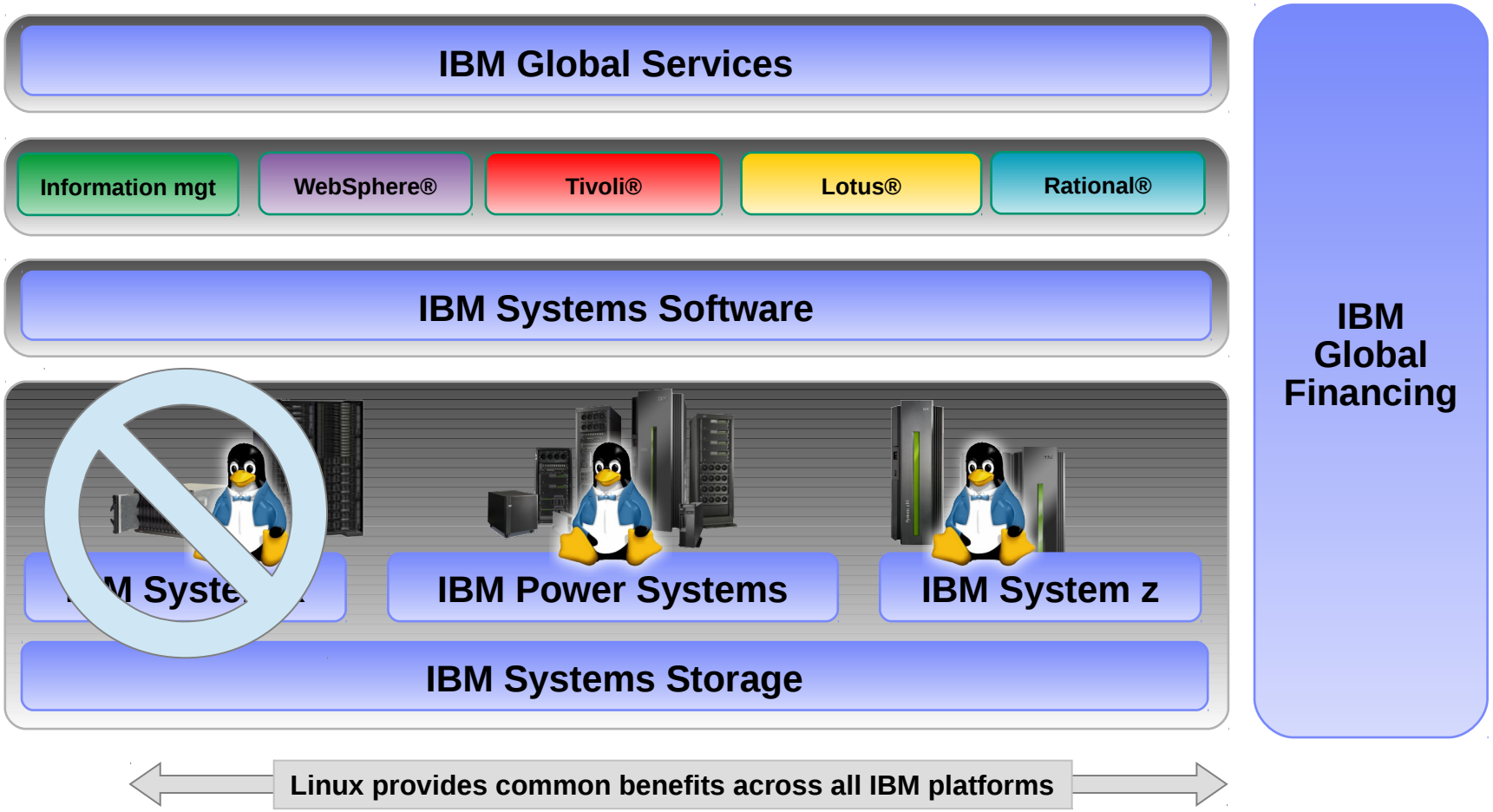
Company Name	Number of Changes	Percent of Total
None	46,982	17.9%
Red Hat	31,261	11.9%
Novell	16,738	6.4%
Intel	16,219	6.2%
IBM	16,073	6.1%
Unknown	13,342	5.1%
Consultant	7,986	3.0%
Oracle	5,542	2.1%
Academia	3,421	1.3%
Nokia	3,272	1.2%

http://go.linuxfoundation.org/who-writes-linux-2012

Linux in IBM's offerings

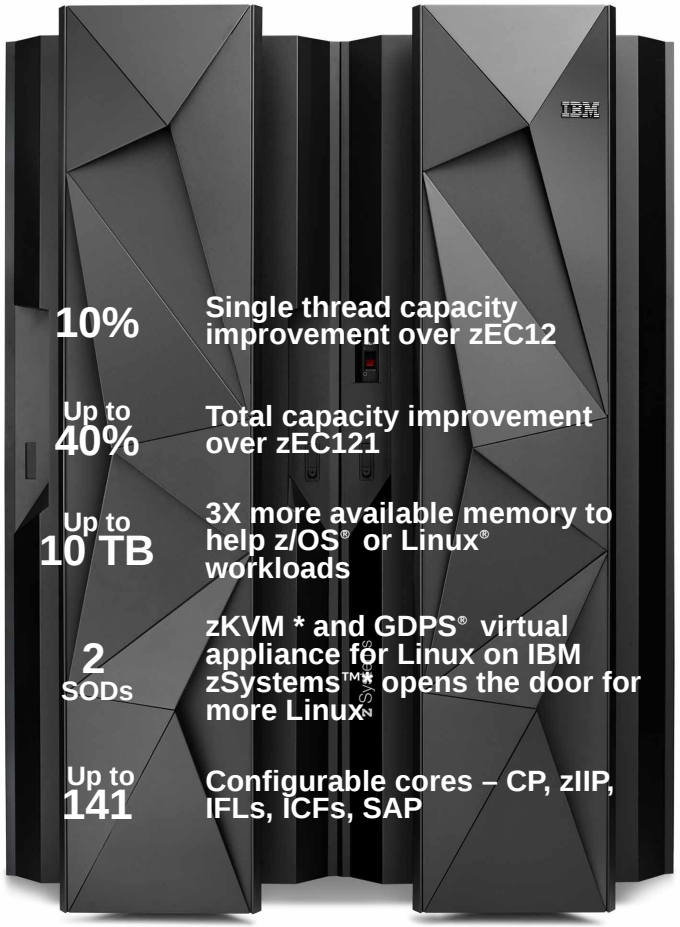
- In 1999, IBM announced 1 billion dollar investment to enable Linux throughout the company. As a result :
  - Hardware : all IBM HW platforms can run the Linux operating system.
  - Software : all IBM SW solutions can run on Linux.
  - Services : over 30 Linux Technology Centers (LTC) WW whose mission is to promote Linux.
- IBM is consistently among the top contributors of Linux code, with more than 600 IBM developers involved in over 100 open source projects.
- In 2013, the Linux Journal gave IBM the “Best Linux Server Vendor” Award for 2012, for the third year in a row.
- In 2013, IBM successively announced 1 billion dollar investment on Linux on Power systems and the OpenPOWER Foundation.
- In 2014, The OpenPOWER Foundation was elected in Linux. Com's top 5 enterprise open source projects to follow

IBM provides complete Linux solutions: top-to-bottom, end-to-end



Introducing the IBM z13

The mainframe optimized for the digital era



- Performance, scale, intelligent I/O and security enhancements to support transaction growth in the mobile world
- More memory, new cache design, improved I/O bandwidth and compression help to serve up more data for analytics
- Enterprise grade Linux solution, open standards, enhanced sharing and focus on business continuity to support cloud

Upgradeable from IBM zEnterprise® 196 (z196) and IBM zEnterprise EC12 (zEC12)

1 Based on preliminary internal measurements and projections. Official performance data will be available upon announce and can be obtained online at LSPR (Large Systems Performance Reference) website at: https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocument . Actual performance results may vary by customer based on individual workload, configuration and software levels

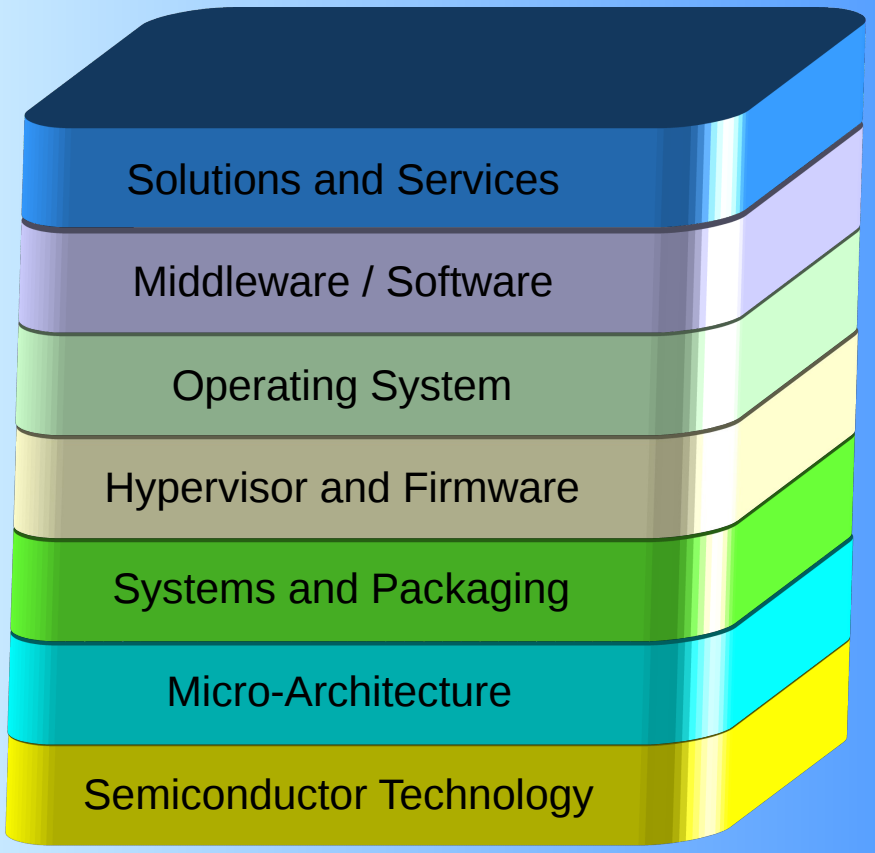
* All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Do you know ARM Ltd ?

- Founded in November 1990 – www.arm.com
  - Spun out of Acorn Computers
- Runs 95% of mobile phones and tabs
- Arm designs a range of RISC processor cores but does not fabricate silicon itself
- Licenses ARM core designs to semiconductor partners who fabricate and sell to their customers
  - Examples include Apple, Samsung, Nvidia, Qualcomm,...
- Also develops technologies to assist with the design-in of the ARM architecture
  - Software tools, boards, debug hardware, application software, bus architectures, peripherals, etc

POWER is becoming the ARM of the datacenter

IBM Research: Innovation Strengthens the Stack



IBM is Unique in the World

- No other company plays in all the layers. IBM is world-class in all layers

- Those that play in multiple layers are world-class only in few.

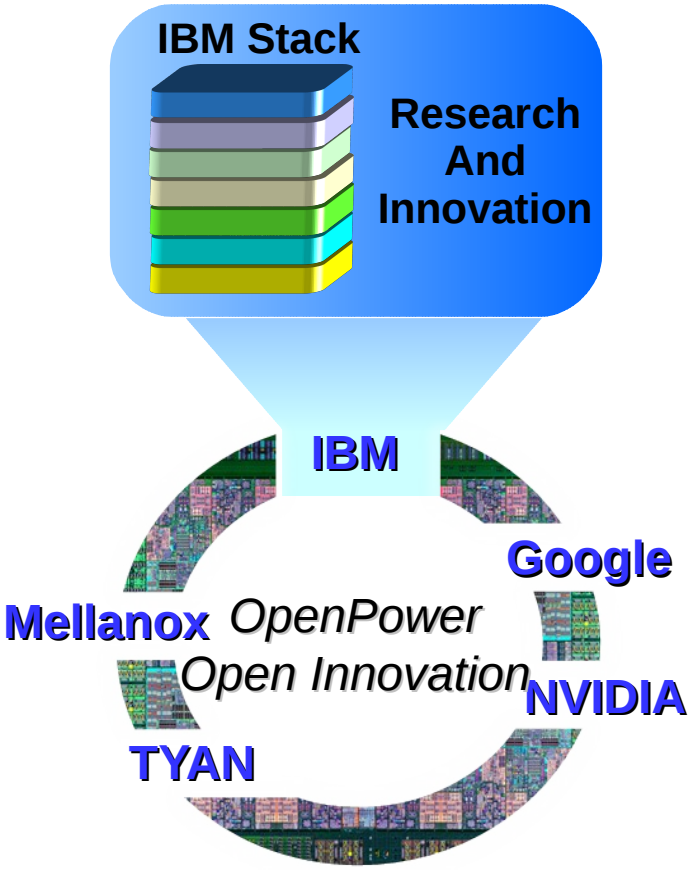
IBM R&D investment

- $6 Billion annually
- Human capital and culture
- 3000+ Researchers
- 6478 U.S. patents in 2012
- Patent leader past 20 years

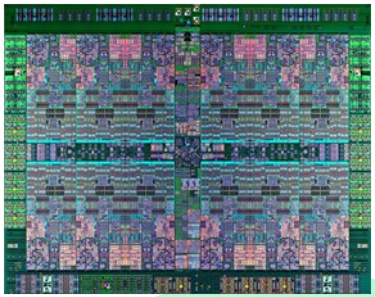
As CMOS scaling slows, Value comes from Innovating across the Stack

OpenPOWER and Innovation

OpenPOWER: Bringing Partner Innovation to Power Systems



IBM POWER8



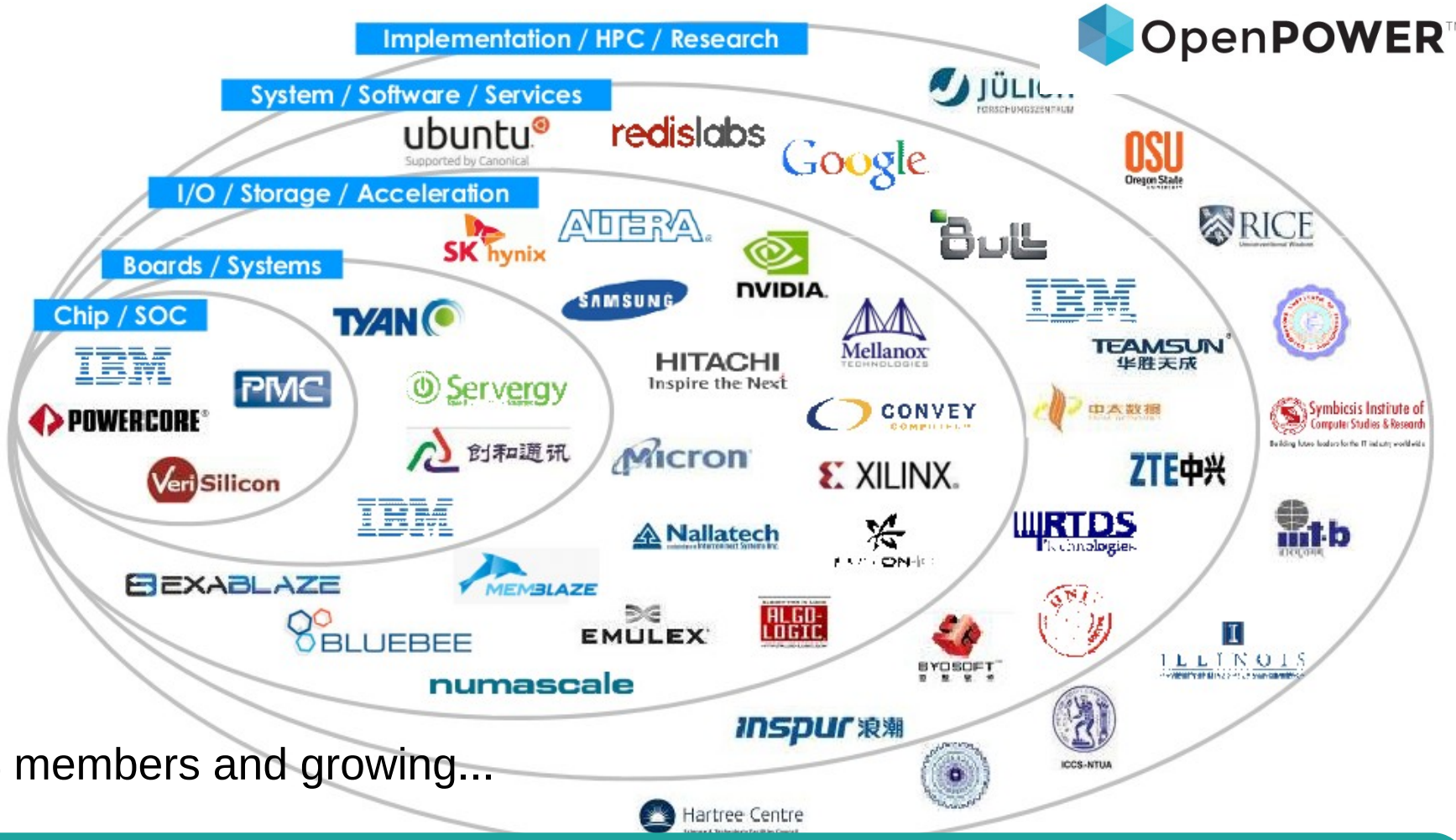
Google
IDC System, Software Stack

CAPI / PCI G3
Directly Integrate Partner IP into Power8 Chip protocols

Mellanox
World class Networking and Switching

NVidia
World class GPU Compute Capabilities

Collaboration at all levels



84 members and growing...

The goal of the OpenPOWER Foundation is to create an open ecosystem, using the POWER Architecture to share expertise, investment and server-class intellectual property to serve the evolving needs of customers.

Proposed Ecosystem Enablement

Power Open Source Software Stack Components

Software

- Cloud Software — openstack CLOUD SOFTWARE
- Standard Operating Environment (System Mgmt) — Ganglia, CAT, oVirt
- Operating System / KVM — Linux

Existing Open Source Software Communities

- Firmware — OpenPOWER Firmware
- Hardware — OpenPOWER Technology

New OSS Community

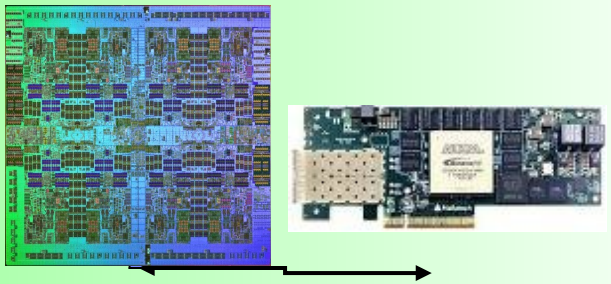
System Operating Environment Software Stack

A modern development environment is emerging based on this type of tools and services

Multiple Options to Design with POWER Technology Within OpenPOWER

Hardware

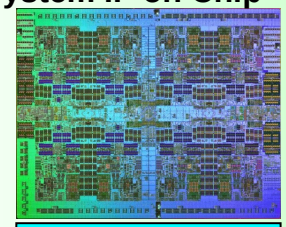
POWER8



CAPI over PCIe

"Standard POWER Products" – 2014

Framework to Integrate System IP on Chip



Customizable

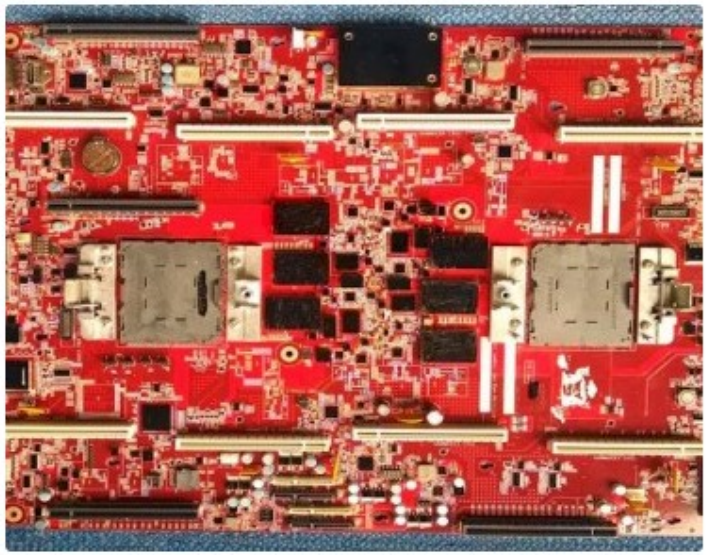
Industry IP License Model

"Custom POWER SoC" – Future

ENTERPRISETECH
SYSTEMS EDITION

Open Sourced BIOS Helps Power8 Compete With X86

July 15, 2014 by Timothy Prickett Morgan



IBM is deadly serious about fostering an open ecosystem around the Power8 processor and its follow-ons, and has taken the next step in advancing its OpenPower cause by open sourcing the microcode that manages the boot sequence on the Power8 chips.

This may sound like a small thing, but it has important ramifications for IBM and the OpenPower Foundation partners who are making motherboards based on the Power8 processor. At the moment, this includes a single-socket board made by Tyan aimed at software developers and early system builders and a two-socket board made by Google for its own internal testing. Google has been testing IBM and homegrown Power8 systems since earlier this year, and both companies were showing off their Power8 boards at IBM's Impact2014 conference back in April. In February, *EnterpriseTech* reported that Google was testing homegrown Power8 systems and that the company's software engineers were working on the

SEARCH

Search...

RECENT NEWS

Study Probes Ways to Avoid Datacenter Outages
January 28, 2015

CoreOS Releases Building Block For Distributed Systems
January 28, 2015

Cisco Fleshes Out Cloud Strategy
January 28, 2015

Cloud, Storage Deals Likely in '15
January 27, 2015

Researchers Put a New Spin on Graphene Chips
January 26, 2015

More Like This

POWER8 CAPI

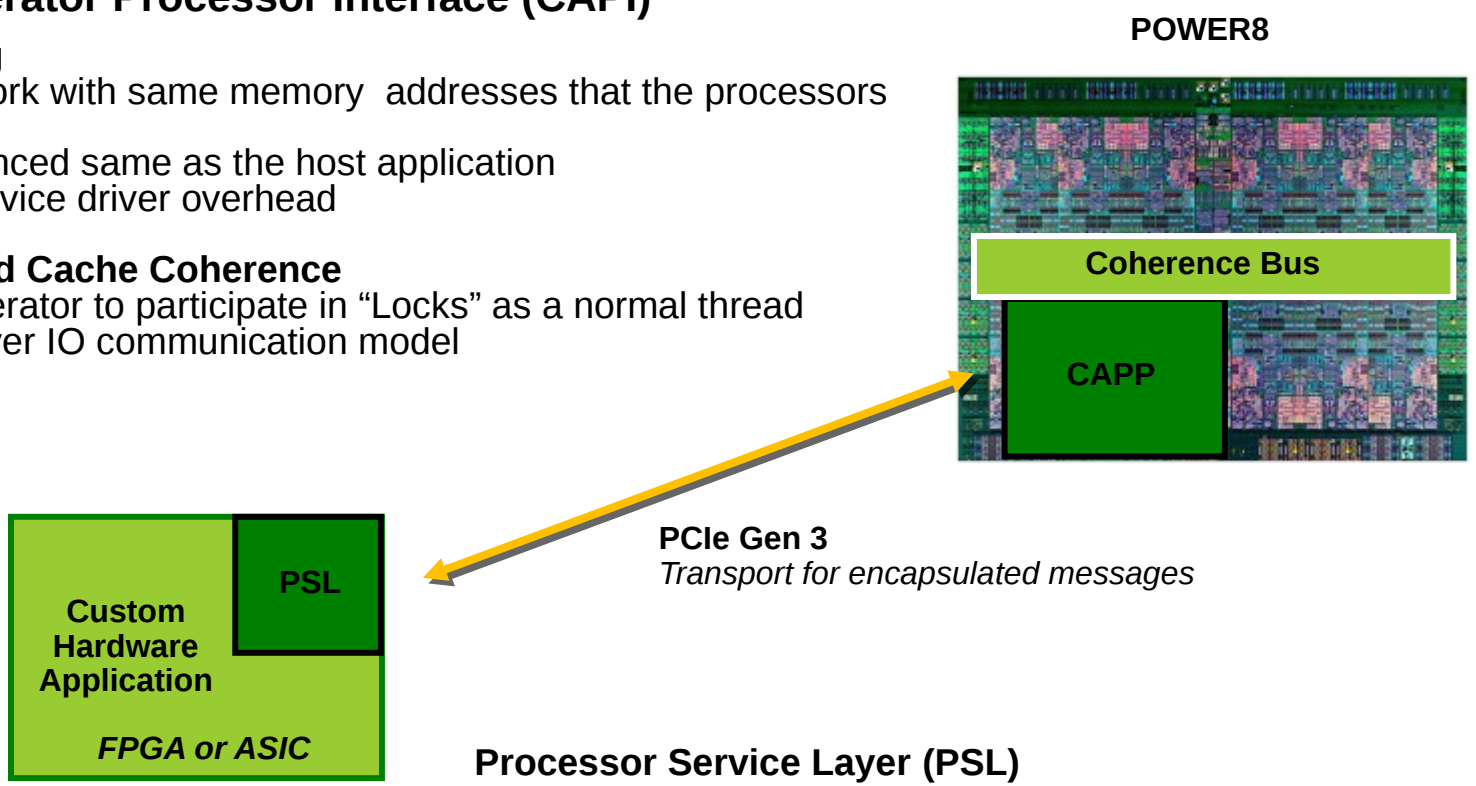
Coherent Accelerator Processor Interface (CAPI)

Virtual Addressing

- Accelerator can work with same memory addresses that the processors use
- Pointers de-referenced same as the host application
- Removes OS & device driver overhead

Hardware Managed Cache Coherence

- Enables the accelerator to participate in “Locks” as a normal thread Lowers Latency over IO communication model



Processor Service Layer (PSL)

- Present robust, durable interfaces to applications
- Offload complexity / content from CAPP

Customizable Hardware Application Accelerator

- Specific system SW, middleware, or user application
- Written to durable interface provided by PSL

OpenPOWER CAPI Developer Kit for POWER 8

What is CAPI?

IBM developed the Coherent Accelerator Processor Interface (CAPI) as a new means for solution architects to improve system-level performance.

Most FPGA Accelerators utilize PCIe as their link to the host. CAPI provides a unique alternative, allowing the FPGA accelerator to coherently attach to the fabric of a **POWER8**™ chip and up to 1 TB of system memory.

This new hybrid solution has a simple programming paradigm while delivering algorithm acceleration and performance well beyond what's available today.

Learn More About CAPI

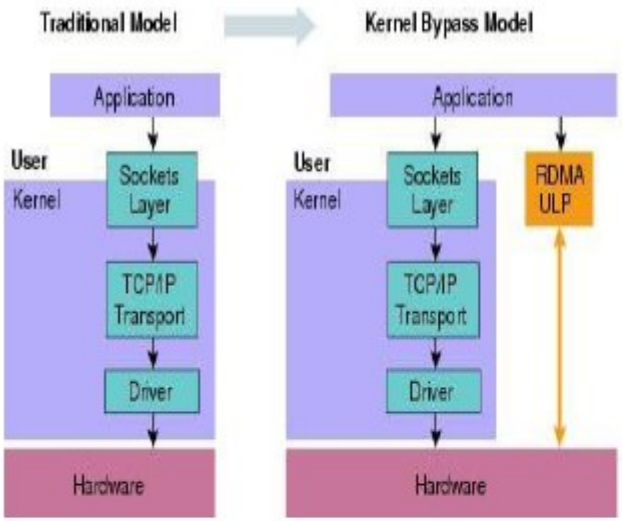
IBM CAPI Home Page

CAPI Product Overview

IBM CAPI Presentation

IBM CAPI White Paper

Business analytics acceleration



OpenPOWER™

IBM Power Systems and Mellanox® Technologies partnering to simultaneously accelerate the network and compute for NoSQL workloads

10x Higher Throughput

Dramatically *faster* responsiveness to customers!

Utilizing high speed interconnect with RDMA (Ethernet, InfiniBand)

10x Lower Latency

Increasing your datacenter efficiency!

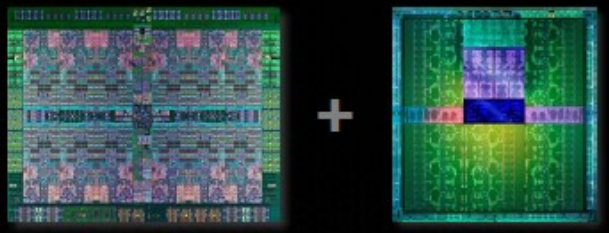
Leveraging POWER8 high throughput low latency I/O

"Applications that historically struggled with scalability and performance can now benefit from In-Memory processing," said Terri Virnig, Vice President, IBM Power Ecosystem. "Our collaborative efforts with Mellanox resulted in a robust architecture with Power8-based systems and high-performance interconnects designed to tackle the Big Data processing requirements of today."

IBM & NVIDIA Accelerating Computing

Next-Gen IBM Supercomputers and Enterprise Servers

Long term roadmap integration



POWER CPU + Tesla GPU

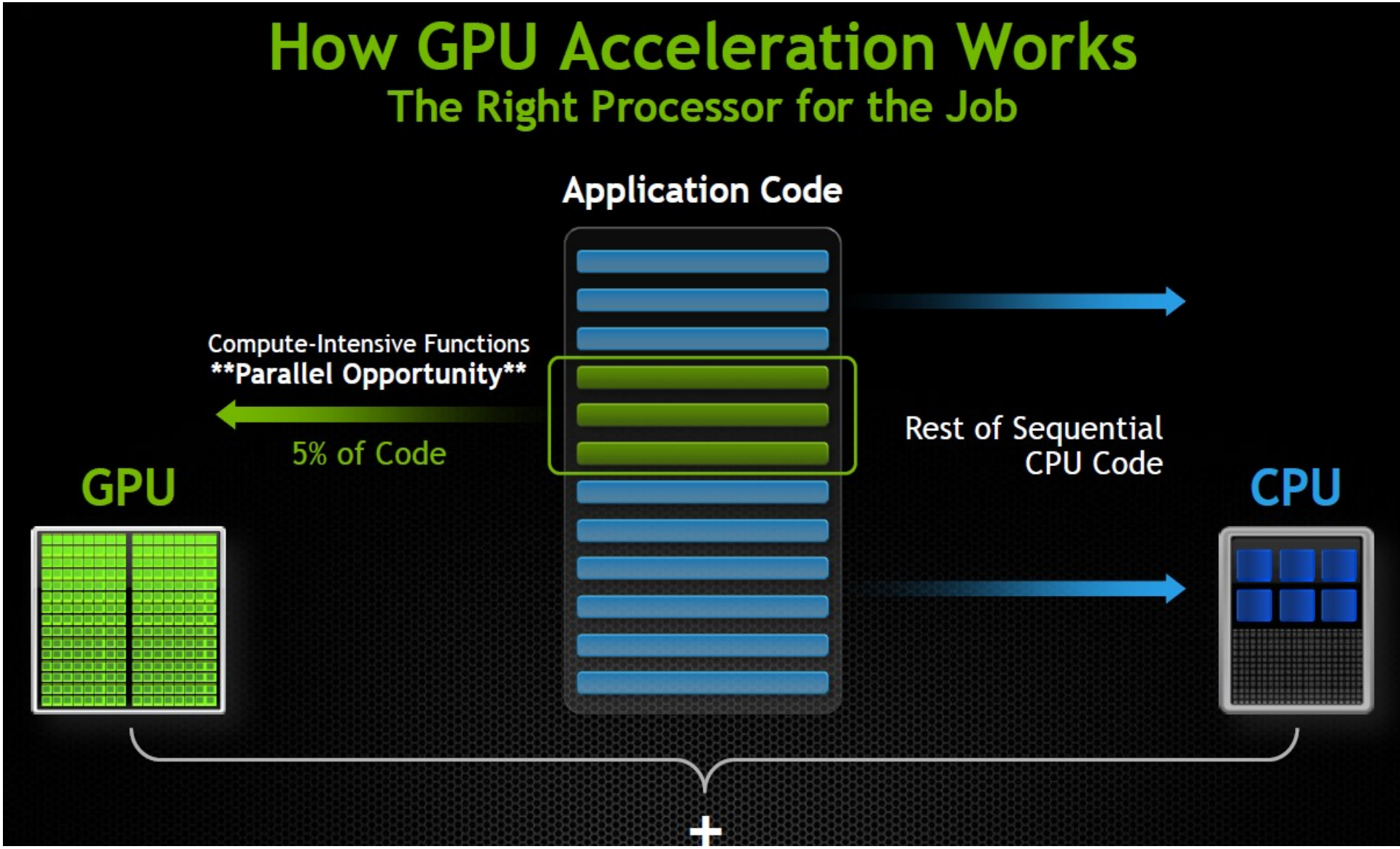
OpenPOWER Foundation

Open ecosystem built on Power Architecture

NVIDIA. IBM. Google Mellanox TECHNOLOGIES TYAN

& 30+ more...

1st GPU-Accelerated POWER-Based Systems Available in Oct 2014



GPU Acceleration Coming to Java

- *"Duimovich also referenced OpenPOWER, which is a new ecosystem around the POWER architecture driving innovation to the platform by leveraging the power of open markets and partners like NVIDIA. The Java on GPU development is one in a series of impacts of the OpenPOWER announcement." -* ***John Duimovich, IBM's Chief Technology Officer of Java***

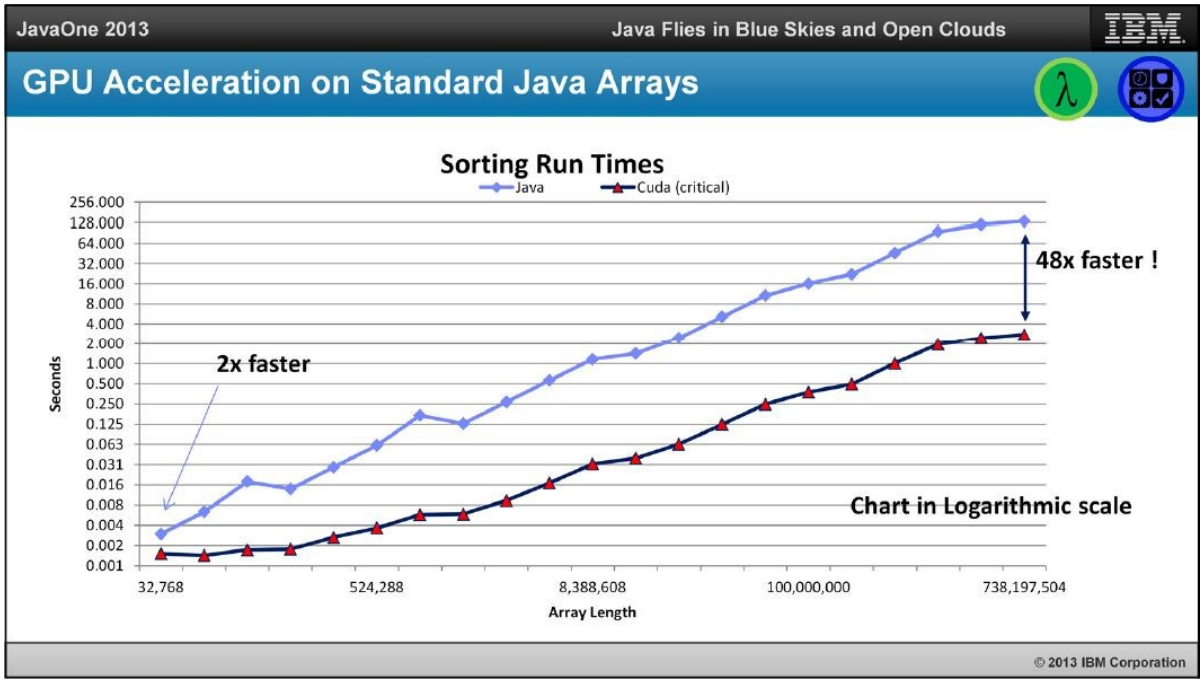
- *http://blogs.nvidia.com/blog/2013/09/22/gpu-coming-to-java/*

NVIDIA

Java

GPU Acceleration Coming to Java, Says IBM Exec

By Sumit Gupta on September 22, 2013



Examples of OpenPOWER innovation

NoSQL KVS Acceleration with CAPI Flash (Sure Lock)

- IBM POWER8 Linux Server
- TMS Flash – CAPI attached

NoSQL based solution with IBM Flash and CAPI. Attaching large flash arrays to the processor, without overhead, to drive down costs of large NoSQL deployments.

Financial Risk Modeling with CAPI Accelerator (Monte Carlo) featuring Altera technology

- IBM POWER8 Linux Server
- Altera FPGA Computing Card

Monte Carlo financial simulations run on an Altera FPGA accelerator via CAPI compared to published non-CAPI best case performance for dedicated workload acceleration.

KVS Acceleration with RDMA (Gun Hill) featuring Mellanox technology

- IBM POWER8 Linux Server
- Mellanox RDMA interface
- IBM Research HydraDB software

POWER8 network acceleration for Big Data utilities high speed RDMA networking with acceleration technology to reduce latency by 10x when working with big data, reducing infrastructure requirements.

Big Data and Java Workload Acceleration (Espresso) featuring NVIDIA technology

- IBM POWER8 Linux Server
- Apache Hadoop/Mahout
- NVIDIA GPU / CUDA
- IBM Java with new GPU Framework

Exploit GPUs for customized acceleration directly from Java. Ideal for Big Data and Analytic Java workloads. Demo uses GPU exploitation for 8x acceleration of a machine learning algorithm for Big Data segmentation.

KVS Acceleration with CAPI FPGA featuring Xilinx technology

- IBM POWER8 Linux Server
- Xilinx FPGA Computing Card

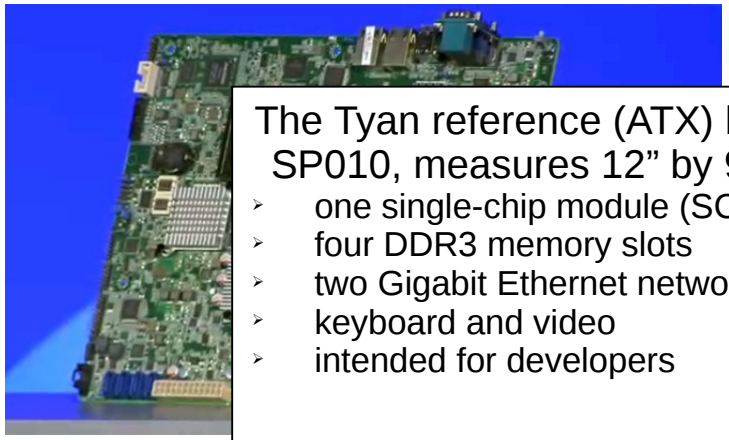
Compare performance of Key Value Store on a normal configuration, to an acceleration using a Xilinx CAPI attached FPGA accelerator.

Watson on Power in SoftLayer (Tornado)

- IBM POWER8 Linux Server
- Watson Engagement Advisor
- Watson ISV (MD Buyline) Smart Advisor

SoftLayer is now providing Watson as a service on a Power System, and Tornado demonstrates that service with an application.

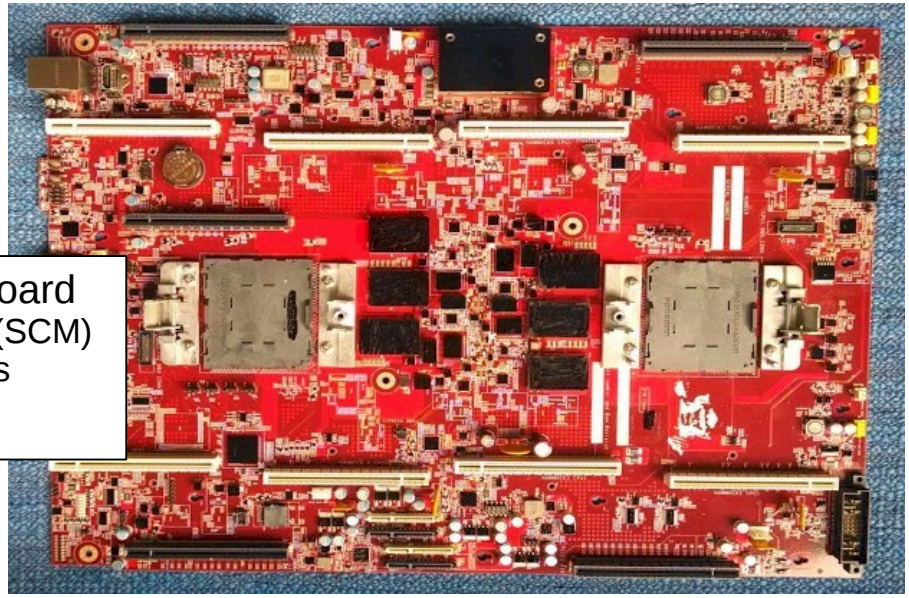
Non-IBM POWER8 products



The Tyan reference (ATX) board, SP010, measures 12” by 9.6”

- one single-chip module (SCM)
- four DDR3 memory slots
- two Gigabit Ethernet network interfaces
- keyboard and video
- intended for developers

Available from October 2014:
TYAN GN70-BP010
Customer reference system
http://www.tyan.com/campaign/openpower/



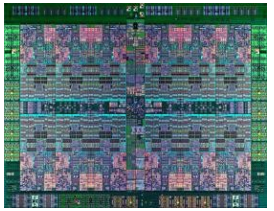
The Google reference board

- two single-chip module (SCM)
- four modified SATA ports
- Google use only

http://www.enterprisetech.com/2014/04/28/inside-google-tyan-power8-server-boards/

POWER8 Processors

Open Innovation to put Data to work



POWER8

- More threads
  - Up to **12 cores** per socket
  - **SMT8** mode for up to **96 threads per socket**
- More bandwidth
  - **2.3 x** memory bandwidth per socket over POWER7+ (4 x x86)
  - On chip PCIe3 controller for I/O adapters
  - **CAPI** interface for accelerators
- More performance
  - Higher performance per core (35% over POWER7+, 2 x Ivy Bridge for Java)
  - Larger caches and additional **L4 cache**
  - **Transactional** memory

50x performance improvement for Analytics workloads

2 socket POWER8 running DB2 and Cognos versus similarly specified 2 socket Ivy Bridge solution with alternative Database and Cognos

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 7.2 and 7.1 TR8	*SOD only*	AIX 7.1, TL3 SP3 6.1 TL9 SP3 7.2 and 7.1 TR8
	redhat. RHEL7.0 & 6.5 BE	redhat. RHEL7.0 & 6.5 BE	redhat. RHEL7.0 & 6.5 BE	redhat. RHEL7.0 & 6.5 BE		redhat. RHEL7.0 & 6.5 BE
	SUSE SLES 11 SP3 BE	SUSE SLES 11 SP3 BE	SUSE SLES 11 SP3 BE	SUSE SLES 11 SP3 BE		SUSE 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 SUSE SLES 12 10/2014 LE	ubuntu 14.10 LE SUSE SLES 12 10/2014 LE			20 and 24 core offerings avail 10/31 ubuntu 14.10 LE	**128GB DIMM Option In 1 TB or 2 TB configs**

Linux on Power – Hypervisor choice

Market need: customer wants to avoid coping with multiple virtualization engines :

- **Skills**
- **Migration issues**
- **Processes**
- **Licensing**

Fact : KVM is the only virtualization available on every platform :

- **KVM is a versatile virtualization engine :**
  - **x86**
  - **Power**
  - **System z (zBX)**
  - **IBM Pure Systems**
  - **Others**
- **Optimized for POWER8**
- **KVM centers for excellence opened :**
  - **KVM Center of Excellence in Beijing**
  - **KVM Center of Excellence for Wall Street in NY**

Linux on Power – Options

6 distributions are currently available on Power :

- **3 enterprise distributions with official support :**
  - **Red Hat Enterprise Linux (RHEL) : 6.5BE, 7.1 BE**
  - **Suse Linux Enterprise Server (SLES) : 11 BE, 12 LE**
  - **Ubuntu Server : 14.04 LE, 14.10 LE**
- **3 community distributions :**
  - **Fedora :** http://fedoraproject.org/get-fedora-options#2nd_arches
  - **OpenSuse :** http://download.opensuse.org/ports/ppc/
  - **Debian :** http://www.debian.org/distrib/
- **Expected Q1 2015 :**
  - **CentOS : announced today**
  - **RHEL LE : beta available, GA february 2015**

Linux support for POWER

Power Systems

IBM

redhat fedora

- RHEL 7
  - POWER8 (native mode) and POWER 7/7+
  - Available June 2014
- RHEL 6
  - POWER8 supported with U5 (P7-compatibility mode)
  - Full support of POWER6 and POWER7 (native mode)
- Fedora
  - Fedora 16 was first release to re-launch POWER
  - Fedora 20 has POWER8 support
- Supported add-ons
  - JBoss
  - High Performance Network Add-on

SUSE openSUSE

- SLES 12
  - Anticipated to support POWER8 (native mode) and POWER 7/7+
  - Available October 2014
- SLES 11
  - POWER8 with SP3 (P7-compatibility mode)
  - POWER7+ encryption, RNG accelerators with SP3
  - Full support of POWER7 (native mode)
- openSUSE
  - openSUSE 12.2 re-launched for IBM POWER
  - openSUSE 13.2 includes POWER8 support
- Supported add-ons
  - SUSE Linux Enterprise High Availability Extension

ubuntu debian

- Ubuntu 14.10
  - Continued support for POWER8
  - Anticipate 4Q14 availability
- Ubuntu 14.04
  - POWER8 enabled (native mode)
  - No official support for POWER7+ and older systems
  - No support for 32-bit applications. 64-bit only.
  - Supported in KVM only at this time
  - LTS
- Supported add-ons
  - JuJu Charms
  - MaaS (Metal as a Service)
  - Landscape
- Debian
  - Debian community now supports Power as of Sid release

Built from the same source as x86
Delivered on the same schedule as x86
Supported at the same time as x86

Fostering open innovation for cloud based applications with Linux and Power Systems

Moving Linux apps to Power has never been easier

Well-written Java applications written in **scripting or interpretive languages** will **run as is**

Java perl php python

>95%
Require no source code change

Estimated **>95%** x86/Linux applications written in **C/C++** will require **no source code change, only a recompile**

C C++

Growing portfolio of ISV applications for Linux on Power

Supported by
All Power Systems
including Linux
only hardware and
Enterprise IFLs

Thousands of applications available on Linux on Power servers

For detailed and up to date support information see the IBM Global Solutions Directory:
https://www.ibm.com/partnerworld/gsd

POWER8 => micro-architecture advantage

	Sandy Bridge EP E5-x6xx	Ivy Bridge EP E5-26xx v2	Ivy Bridge EX E7-88xx v2	Haswell EP E5-26xx v3	POWER 7+ Systems	POWER8
Clock rates (GHz)	1.8–3.6	1.7-3.7	1.9-3.4	1.6-3.5	3.1–4.4 GHz	3.0-4.1 GHz
SMT options	1,2*	1, 2*	1, 2*	1, 2*	1, 2, 4	1. 2. 4. 8
Max Threads / sock	16	24	30	36	32	96
Max L1 Cache	32KB	32KB*	32KB*	64 KB	32KB	64KB
Max L2 Cache	256 KB	256 KB	256 KB	256KB	256 KB	512 KB
Max L3 Cache	20 MB	30 MB	37.5 MB	45 MB	80 MB	96 MB
Max L4 Cache	0	0	0	0	0	128 MB

Performance comparison => POWER8 vs x86 E5

- ALL data is PUBLISHED

	x86 "Haswell"	IBM POWER S824	POWER8 vs. x86 Core Performance Ratio
	Intel Xeon E5-2699 v3 (except where noted)	POWER8 @ 3.5 GHz	
# Cores	36	24	
SAP 2-Tier	16500	21212	1.9
SPECint_rate2006	1400	1750	1.8
SPECfp_rate2006	942	1370	2.1
SPECjbb2013 (max-jOPS)	190674	167958	1.3
SPECjEnterprise2010	11260 (24-core E5-2697 v2)	22543	2.0
Oracle eBS 12.1.3 Payroll	1017639 (24-core E5-2697 v2)	1090909 (12-core)	2.1
Siebel CRM Release 8.1.1.4	10000 (16-core E5-2690)	50000 (6-core)	13.3

SAP results are based on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application. Results valid as of September 8, 2014. Source: http://www.sap.com/benchmark
SPECcpu2006 results are submitted as of 9/8/2014. For more information go to http://www.specbench.org/cpu2006/results/
SPECjbb2013 results are submitted as of 9/8/2014. For more information go to http://www.specbench.org/jbb2013/results
SPECjEnterprise2010 results are valid as of 9/8/2014. For more information go to http://www.specbench.org/jEnterprise2010/results/
Oracle eBS 12.1.3 Payroll Batch Extra Large Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/apps-benchmark/results-166922.html
Siebel 8.1.1.4 PSPP Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/white-papers/siebel-167484.html

Core Performance – POWER8 vs. x86

Power Systems

IBM

Updated with Haswell

- Industry Standard Benchmarks –
- All Intel performance numbers are IBM internal projections and publishes where available
- IBM S824 data is published/projected

	x86 E5	IBM Power S824	POWER8 vs. x86 Core Performance Ratio		
	Intel Xeon E5-2699 v3	Power 8 @ 3.5 GHz	P8 Util: 100% x86 Util: 100%	P8 Util: 65% x86 Util: 40%	P8 Util: 65% x86 Util: 20%
# Cores	36	24	Benchmark Utilization	Utilization with virtualized x86	Utilization without virtualized x86
OLTP	2400	3585	2.2	3.6	7.2
ERP SAP 2-Tier	16500	21212	1.9	3.2	6.3
SPECjbb2013 (max-jOPS)	195119	361293	2.7	4.5	9.0
SPECint_rate	1430	1750	1.8	2.9	5.9
SPECfp_rate	965	1370	2.1	3.4	6.8
			2.0	3.3	6.5

LEGEND:

Published | Projected

1) IBM Power System S824 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 4 processors / 24 cores / 96 threads, POWER8; 3.52GHz, 512 GB memory, 21,212 SD benchmark users, running AIX® 7.1 and DB2® 10.5, Certification # 2014016. Source: http://www.sap.com/benchmark All results valid as of October 3, 2014

2) Dell PowerEdge R730, on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors/36 cores/72 threads, Intel Xeon Processor 2699v3; 2.30 GHz, 256 GB memory; 16,500 SD benchmark users, running RHEL 7 and SAP ASE 16; Certification # 2014033. Source: http://www.sap.com/benchmark.

3) SPECcpu2006 results are submitted as of 9/8/2014. For more information go to http://www.specbench.org/cpu2006/results/

4) SPECjbb2013 results are submitted as of 9/8/2014. For more information go to http://www.spec.org/jbb2013/results

5) SPECjEnterprise2010 results are valid as of 9/8/2014. For more information go to http://www.spec.org/jEnterprise2010/results/

6) Oracle eBS 12.1.3 Payroll Batch Extra Large Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/apps-benchmark/results-166922.html

7) Siebel 8.1.1.4 PSPP Kit and are current as of 3/24/2014. For more information go to http://www.oracle.com/us/solutions/benchmark/white-papers/siebel-167484.html

IBM Power 822L pricing comparison ($US) – *Scale-Out Cloud with KVM*

Power Systems

IBM

Comparable TCA	Dell PowerEdge R720	HP ProLiant DL380 G8	IBM Power 822L
Linux on Intel Ivy Bridge + KVM Vs. Linux on POWER8 + KVM	$21,300	$22,763	$22,382
			
	redhat KVM intel Ivy Bridge	redhat KVM intel Ivy Bridge	redhat POWER8 PowerKVM
Server list price* -3-year warranty, on-site	**$12,605**	**$14,068**	**$14,895**
Virtualization - OTC + 3yr. 9x5 SWMA	**$2,998** KVM for Red Hat on x86 (RHEV)	**$2,998** KVM for Red Hat on x86 (RHEV)	**$2,998** KVM for Linux on Power (PowerKVM)
Linux OS list price - RHEL, 2 sockets, unlimited	**$5,697**	**$5,697**	**$4,489**
Server model	Dell R720	HP Proliant DL380p G8	IBM Power 822L
Processor / cores	**Two 2.7 GHz , E5-2697, Ivy Bridge, 12-core processors**		**Two 3.4 GHz POWER8, 10-core**

** Based on US pricing for Power S822L announcing on April 28, 2014 matching configuration table above. Source: hp.com, dell.com, vmware.com*

Hot off the press – OVH MSP to offer POWER8 platform

"OVH has become the first commercial partner outside of IBM to formally announce the deployment of POWER8 servers inside their data centre. These will deployed as bare metal servers for customers who have big data and analytics problems and want the most powerful solution that they can get access to. As part of this announcement, OVH will become an OpenPOWER Foundation member."

OVH.COM

https://www.business-cloud.com/articles/news/ovh-makes-big-cloud-announcements

U.S. government spending $425 million to build fastest supercomputers

…"The supercomputers, made with components from **IBM, Nvidia and Mellanox**, will run five to **seven times faster** than the United States' current fastest computers.
Summit and Sierra will operate at **150 petaflops and 100 petaflops, respectively**, compared to the world's current top super-computer, the Tianhe-2 in China, which performs at 55 petaflops, Nvidia said in a separate news release."…

REUTERS EDITION: U.S. SIGN IN

HOME BUSINESS MARKETS WORLD POLITICS TECH OPINION BREAKINGVIEWS

U.S. government spending $425 million to build fastest supercomputers

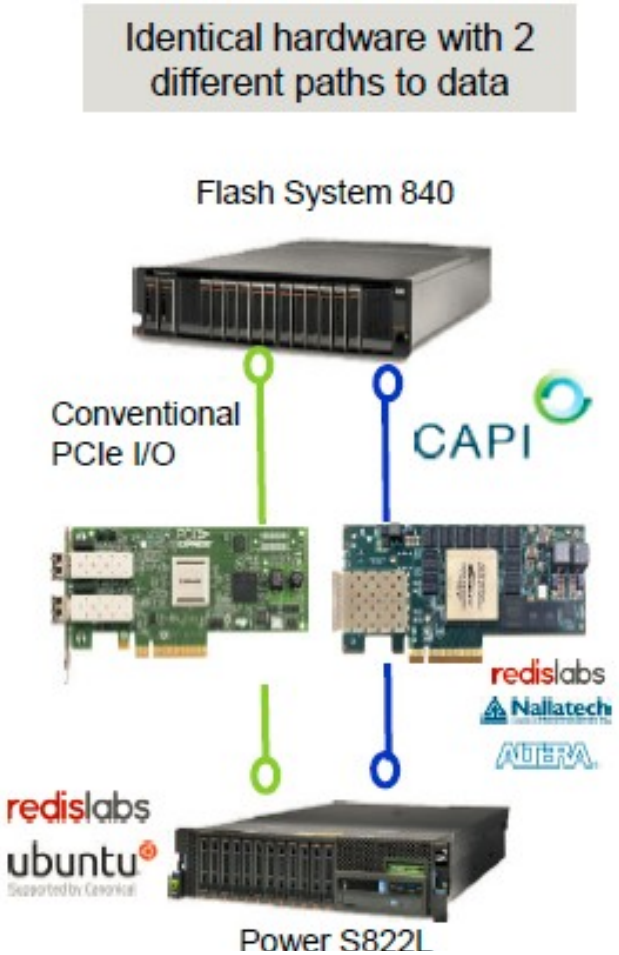
BY NOEL RANDEWICH

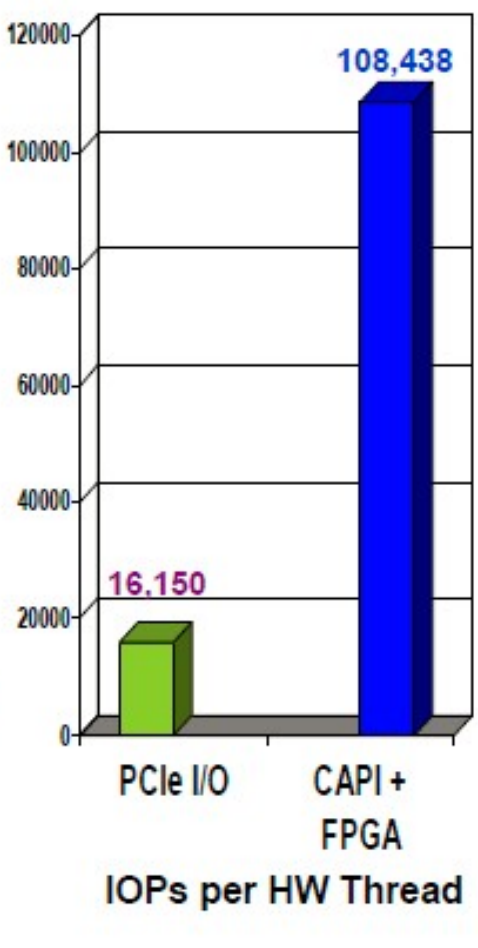
Fri Nov 14, 2014 10:14am EST

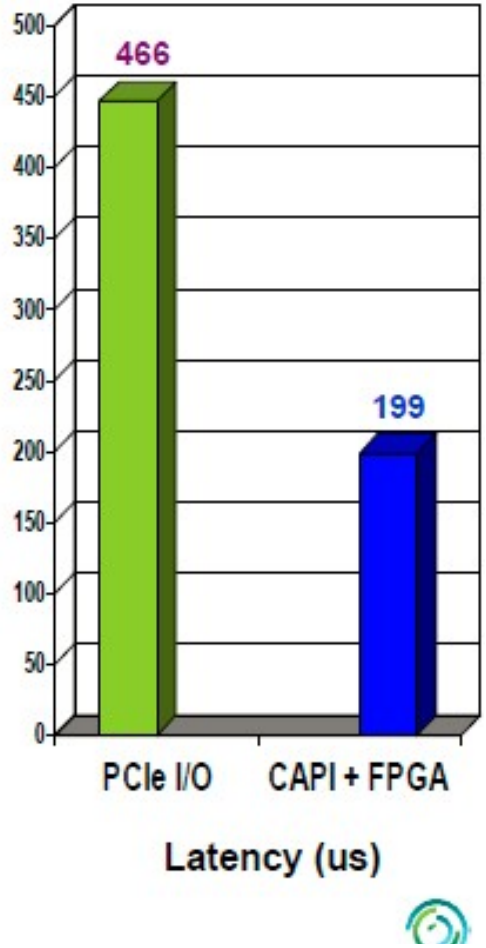
Tweet 47 Share 71 Share this 9 Email Print

http://www.reuters.com/article/2014/11/14/us-nvidia-supercomputers-idUSKCN0IY1MX20141114

Demonstrating the Value of CAPI Attach Flash







IBM Solution for Hadoop – Power Systems Edition

A storage-dense integrated big data platform optimized to simplify & accelerate big data analytics:

Benefits

- Accelerate ROI: easy to procure, deploy, use and manage
- Higher ingest rates delivers **2.5x faster** insights than competitive hadoop solutions*
- Better reliability and resiliency with **73% fewer outages** and **92% fewer performance problems over x86****
- Tailor cluster resources to meet specific workload CPU, memory, I/O requirements

Solution Components

- **Compute nodes & storage**: IBM Power S822L Systems + SAS-attached DCS3700
- **Management software & install scripts**: IBM Platform™ Cluster Manager, automated installation scripts
- **Choice of Application Software Optimized for Linux on Power:** IBM InfoSphere® BigInsights™ with Platform Symphony for accelerated map reduce & GPFS FPO or IBM Platform Symphony Advanced Edition & IBM GPFS™

Faster time to insight, right-sized for your business needs

*Based on STG Performance testing comparing to Cloudera/HP published benchmark
** CLAIMS: Solitaire Interglobal Paper - Power Boost Your Big Data Analytics Strategy – http://www-03.ibm.com/systems/power/solutions/assets/bigdata-analytics.html?LNK=wf

Introducing the “Turbo LAMP Stack”

Power Systems

IBM

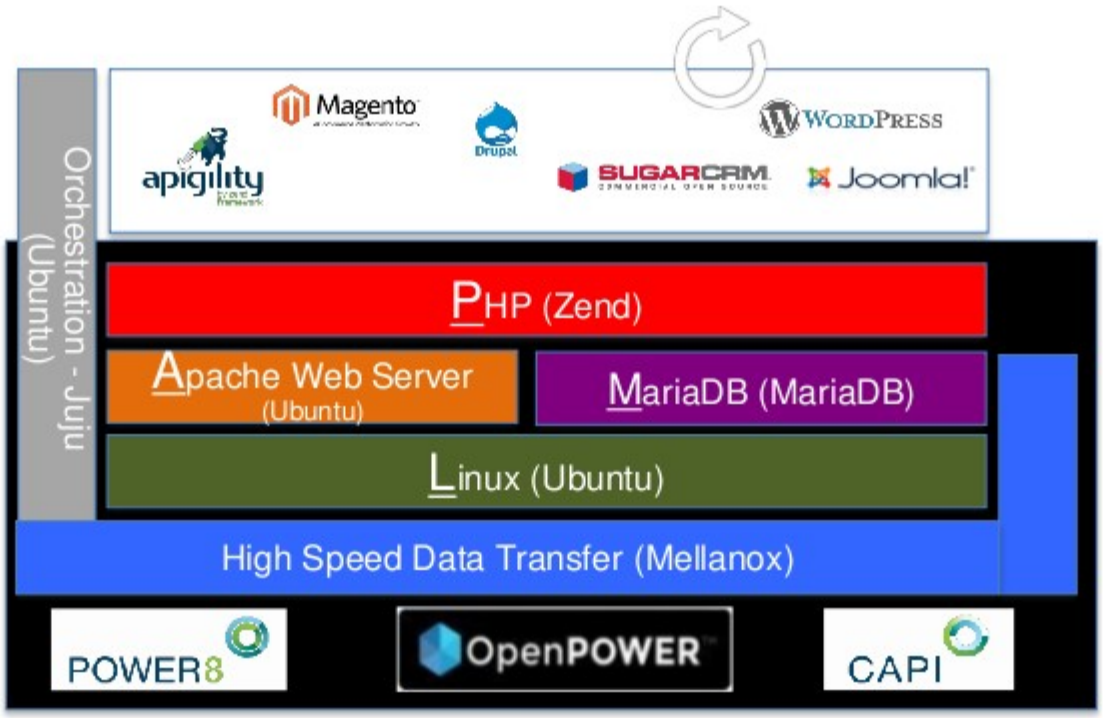
Faster Innovation

Performance and scalability

Compliance and security

ubuntu
Supported by Canonical

Faster time to value via provisioning and orchestration in minutes



zend

Continuous mobile application development for rapid innovation

Mellanox TECHNOLOGIES

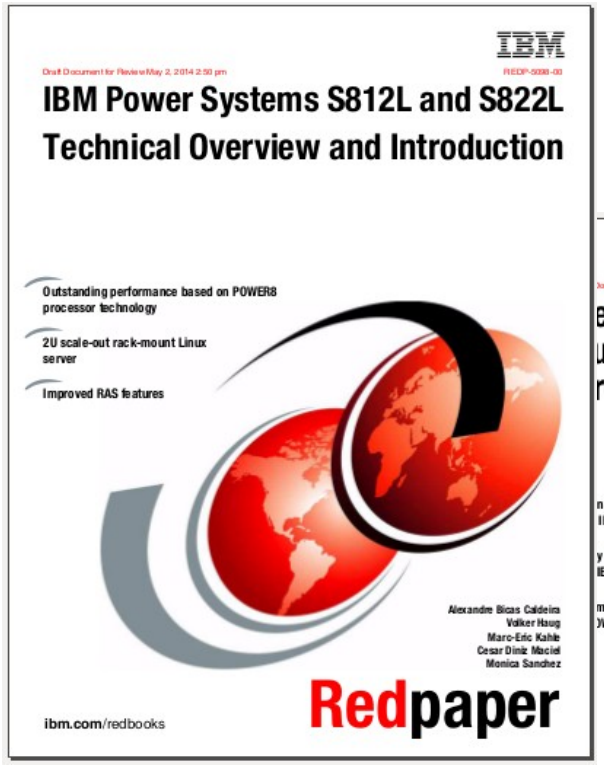
High performance, internet scale and availability across multiple locations

MariaDB

Exploitation of multi-threading, memory bandwidth and stack integration with Zend

Open Innovation Platform | Superior Cloud Economics | Designed for Big Data

Recent Redbooks



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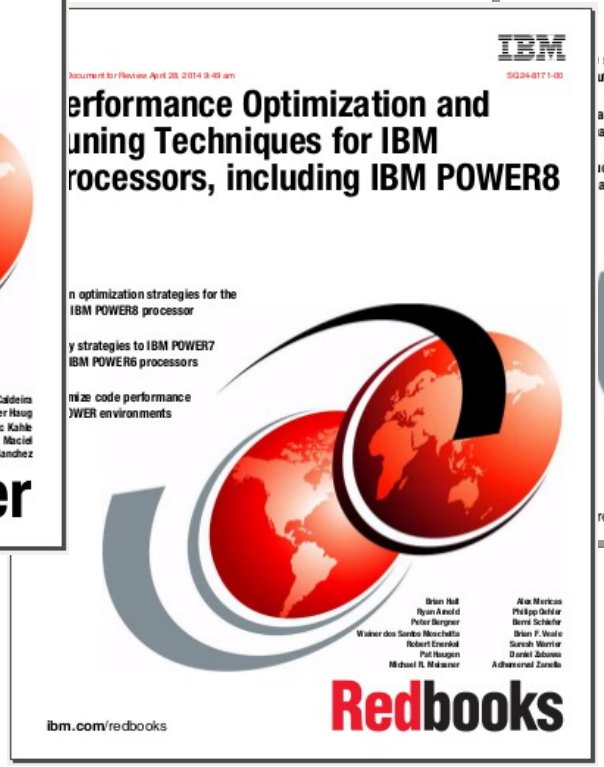
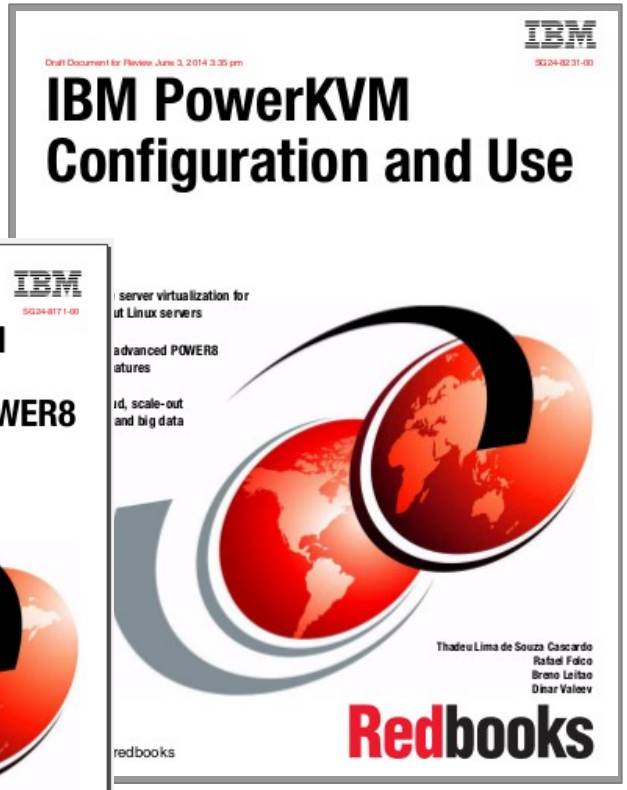


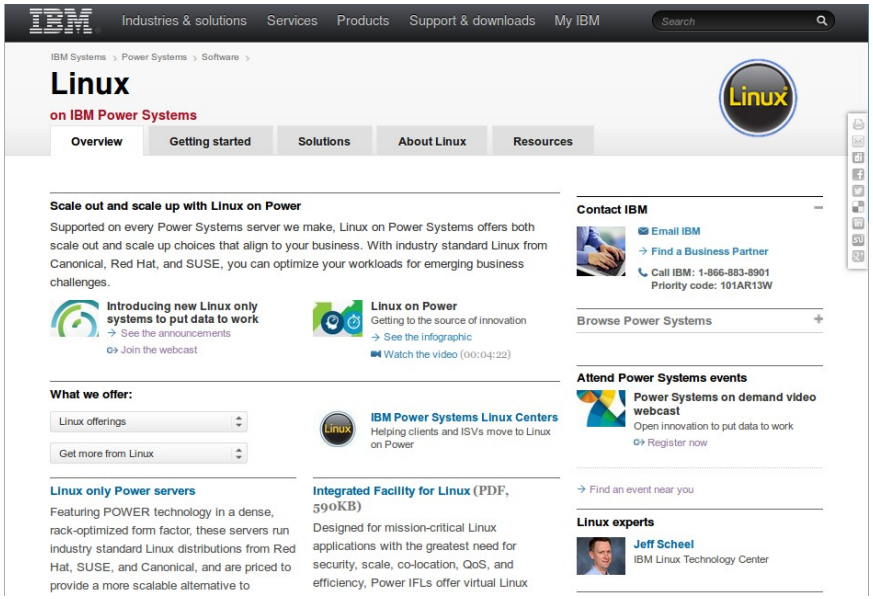


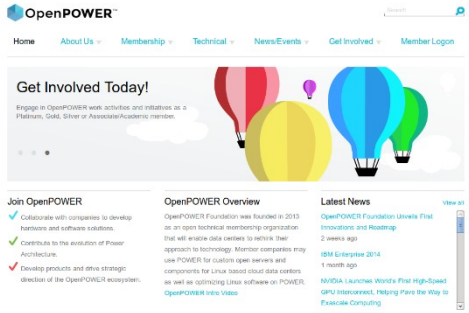
Link

Link to search for “Linux” on the Power Systems Redbooks site

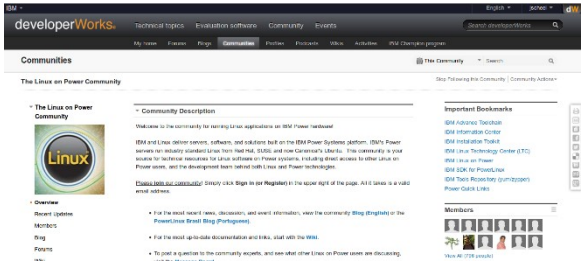
Where to find more information?

Power Systems Linux Portal
(Product Information)





The OpenPOWER Foundation



The Linux on Power Community

Google+

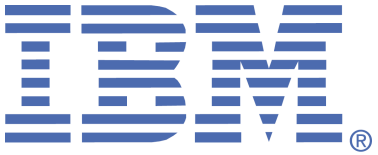
twitter

Further information

- Setup guide for PowerVM using HMC or IVM:
  - IBM PowerVM Getting Started Guide RedBook
- Introduction to Power Systems S822L model:
  - IBM S812L and S822L Overview RedPaper
- Guide to the VIO server and IVM management:
  - Integrated Virtualization Manager RedPaper
- Performance tools for Linux on Power:
  - IBM Advance Toolchain for PowerLinux

- IVM management video guides and tutorials:
  - Nigel Griffiths' YouTube IVM Playlist
  - With links to many other useful video tutorials

- Knowledge base for Power Systems hardware and software:
  - POWER8 on the IBM Knowledge Center



Your picture

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धन्यवाद
Hindi

多謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Gracias
Spanish

Thank You
English

شكرا
Arabic

Obrigado
Brazilian Portuguese

多谢
Simplified Chinese

Danke
German

Grazie
Italian

Merci
French

நன்றி
Tamil

ありがとうございました
Japanese

감사합니다
Korean