

IBM

# Innovation Through Open Technology







### Innovation Through Open Technology



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1999	IBM creates Linux technology center		2011	IBM and Red Hat form oVirt alliance
1999	IBM founding member of Apache Foundation		2012	IBM joins OpenStack as Platinum sponsor
2001	IBM pledges \$1B to Linux		2013	IBM pledges \$1B to Linux
2001	Eclipse project created by IBM		2013	OpenPOWER consortium formed
2004	IBM contributes Derby to Apache Foundation		2013	IBM donates SystemML to Spark
2005	IBM pledges 500 patents to open source		2013	IBM founding member of OpenDaylight project
2006	IBM announces 2500 <sup>th</sup> app for Linux on Power		2014	IBM joins Open Compute Project. Platinum member
2008	IBM and Sun create ODF Toolkit Union		2016	IBM gives 40K lines of code to Linux HyperLedger project

# **2013 OpenPOWER consortium formed**

# OPEN SOURCE HARDWARE





# The OpenPOWER Foundation

#### Market Shifts

#### Open**POWER**

- Moore's law no longer satisfies performance gain
- Numerous IT consumption models
- Mature Open software ecosystem



### **Open** Development

open software, open hardware

#### **Collaboration** of thought leaders

simultaneous innovation, multiple disciplines

Performance of POWER architecture

amplified capability

#### New Open Innovation

- Rich software ecosystem
- Spectrum of power servers
- Multiple hardware options
- Derivative POWER chips

The OpenPOWER Foundation is an open ecosystem, using the POWER Architecture to serve the evolving needs of customers.









# OpenPOWER today



This is What a Revolution Looks Like								
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Implementation / HPC / Research 🔛 🐠 🏥 🔮 🚱 🍰 🔮 🛞 🍥 📀 📀								
Software								
System / Integration								
I/O / Storage / Acceleration PMC ologic Samisk Semptian Skinnix SolarFlare & XILINX.								
Boards / Systems Celestica. 企时和通讯 IEM Inventec MSI Celestica wistron								
Chip / SOC IBM (IDT. (Infineon APDWERCORE' SYNAPSE design								

# Over 50 new solutions announced

#### Xilinx / Samsung / Nallatech / IBM Technology

Card combines CAPI, FPGA, NVMe Flash to enable "IBM Engine for NoSQL"

#### Rackspace / IBM / Ingrasys / Mellanox / Broadcom / Micron / Samsung

Barreleye - OCP for Cloud 2.0

#### SuperMicro

**Power Systems** 

2U with up to 2 NVIDIA K80s and up to 2 Alpha-data KU3 Capi Adapters

#### **Edico Genome Solution**

DRAGEN – analyze entire human genome in 26 minutes















#### **Open Compute Project** POWER8 - open processors, servers, firmware, and software

Source:: http://blog.rackspace.com/openpower-open-compute-barreleye/







# **New Announcement Power System**

# 8 September 2016

Power Systems

# Introducing the Expanded LC Portfolio of servers



Systems designed to take **Data Rich** and **High Performance Computing** 



New Day in IBM HPC now that 'Minsky' is announced

#### Power Systems S822LC for High Performance Computing







Cost of moving work off-processor **vs.** benefit

Lower latency and higher bandwidth increases use cases

#### **Examples: FPGA and GPUs**





# **Coherent Accelerator Processor Interface**

<u>CAPI</u> is a platform to enable acceleration

<u>CAPI</u> provides an infrastructure to improve performance of an application through FPGA acceleration

Enables customer-defined acceleration within the processor complex

<u>CAPI</u> allows implementation of a wide range of accelerators to optimally address many different challenges Each implementation is a unique <u>CAPI Solution</u>









**OpenPOWER** open interfaces enable an unbeatable innovation pace



# **Use Case: Accelerated Database with Kinetica**

**Top solution – Kinetica** 

Kinetica's in-memory database powered by graphics processing units (GPUs) was built from the ground up to deliver truly real-time insights on data in motion: orders of magnitude faster performance (potentially 100X) at only 10% to 25% of the cost of traditional data platforms.



ki∩≡tica

PRODUCT SOLUTIONS DOCS & API'S WE ARE KINETICA

# The **fastest** in-memory database.

Kinetica harnesses the power of GPUs for unprecedented performance to ingest, explore and visualize streaming data.

PROVEN AT ENTERPRISE SCALE





Pacific Gas and Electric Company





### Accelerated Database – Proof Points (Kinetica)

- Do you want faster?
  - 2.5x more queries/hour than x86



- 54% lower price / transaction



**54%** 

Lower Cost

355

POWER8

**IBM Power S822LC** 

(20c/4xP100)

per 1000 qph

600

500

400 300

Kinetica very quickly took advantage of **IBM** accelerator solutions.

NVLink to the CPU is a technology key to performance!

**Power Systems** 

x86

2xE5-2640v4 (24c/4xK80)



# **Kinetica Customer Examples**

#### Advantage – Performance, Cost, Scale

*Logistics* – United States Postal Service was billed \$100M by Oracle for Exadata and could only get 20% of their 220,000 mail carriers online with realtime Geospatial before it would crash. GPUdb does 100% at 95% less cost.





Retail – Large retailer estimates \$3B in lost sales last year due to empty shelves and lost purchase opportunities. They spend \$100M on HANA on HP, and could ingest 1B purchase records per hour. With Kinetica on POWER they did 4.5-6B records per minute.







### Hot off the Press: SAP announced S/4HANA\* on IBM Power Systems on May 11, 2016

HANA SPS 12 is released – at this very moment SAP HANA on IBM Power is the only available platform, but this will change soon. In addition our S/4HANA colleagues have finished their validation and officially released S/4HANA ON-PREMISE 1511 FPS 02 for SAP HANA on Power.

Your clients will have access to this URL <u>http://service.sap.com/sap/support/notes/2218464</u>, which is the official announcement. Team, you have a rich incentive for 2Q only and a new Program to work with Integrators. We have SAP support and next week, we are going to have Clients in Sapphire, sharing their success stories with SAP HANA on POWER.

*Time to call, time to engage, time to accelerate our execution.* 

**Good Selling!** 

Freddy

**Freddy Alves Vaquero** Vice President, Power Systems Brand Management, Global Sales Systems Solutions

### outthink limits



\* S/4HANA is the successor of SAP Business Suite



### **POWER8 Portfolio for Productive SAP HANA Use**













19 outthink limits



What makes **IBM Power Systems** the **Best platform** for your mission critical SAP HANA deployments?



### **Resiliency** (RAS) - Design to PREVENT failure



**Performance** - Design for SPEED, SPEED and SPEED



**Flexibility** – Design for COST optimization



What makes IBM Power Systems the best platform for your mission critical SAP HANA deployments?



#### **Resiliency** (RAS) - POWER8 Design to **PREVENT** failure

(rather than failed-over)

What customer should consider ?

- New ERP is the HEART of customer's business
- Need long up time (not outage and failed-over)
- Risk of large amount of Data in Memory (2TB)

POWER technology for RAS

- Mainframe's Memory Technology
  - ECC, ChipKill, Memory sparing
- Predictive failure analysis
- 86,536 censors / Server

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	Checkers	FIRs	
POWER8 S812L	30,068	13,200	
POWER8 S824	60,136	26,400	
Power 740	37,720	5,800	
Power 770 (one drawer)	39,800	6,500	
Power 795 (Maximum configuration)	598,000	96,000	
Intel Ivy Bridge EX	5,500	none	





What makes IBM Power Systems the best platform for your mission critical SAP HANA deployments?



#### **Performance** – POWER8 Design for **SPEED**, **SPEED** and **SPEED**

What customer should consider ?

- The right architecture that design for "In memory DB"
- Large memory bandwidth and Cache to provide fastest access to data
- Large number of thread to allow fastest computing and analytic

POWER technology provide

- 4X times more memory bandwidth
- 4X times more thread than Intel
- 5X times more cache on board



What makes IBM Power Systems the best platform for your mission critical SAP HANA deployments?



#### Flexibility – Design for COST optimization

What customer should consider ?

- Dynamic Infrastructure
- Batch vs Online resource sharing
- Un-predictable digital users
- Seasoning / promotion period workload support

POWER technology provide

- Advanced Virtualization
- Add & Remove CPU, Memory without downtime
- Share resources for cost saving



#### **IBM Power Systems – Designed for Big Data**



(up to 16TB of memory) Memory

**4X** 

more cache vs Intel (up to 224MB cache per socket)

**5X** 

flexible, fast execution of analytics algorithms

large, fast workspace to maximize business insight

Cache ensure continuous data load for fast responses



(intel?	





#### **IBM Power Systems – Designed for Big Data**

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**Open Innovation to Put Data to Work** 

#powersystems