



Foundation Overview

April 2014

Gilad Shainer

HPC Advisory Council, Lugano Switzerland, April 2014

- OpenPOWER Foundation was founded in 2013
- Open technical membership organization
- To enable open data centers
- To enable open architecture
- To enable higher performance and efficiency

The ALTERA logo is the word "ALTERA" in a blue, outlined, sans-serif font.The Google logo is the word "Google" in its multi-colored, sans-serif font.The IBM logo is the word "IBM" in a blue, striped, sans-serif font.The Mellanox Technologies logo features a blue bridge-like icon above the word "Mellanox" in a blue sans-serif font, with "TECHNOLOGIES" in a smaller font below it.The Micron logo is the word "Micron" in a blue, italicized, sans-serif font.The NVIDIA logo features a green eye-like icon above the word "NVIDIA" in a black, bold, sans-serif font.The PowerCore logo is the word "PowerCore" in a green, bold, sans-serif font.The SAMSUNG logo is the word "SAMSUNG" in a white, bold, sans-serif font inside a blue oval.The TYAN logo is the word "TYAN" in a blue, bold, sans-serif font, followed by a blue and green circular icon.

Board of Directors



**Gordon MacKean, Chair
Google**



**Brad McCredie, President
IBM**



**Michael Diamond, Vice President and
Treasurer, NVIDIA**



**David Gamba, Director
Altera**



**Zheng Jiang, Director
Suzhou PowerCore Technology**



**Albert Mu, Director
Tyan**



**Gordon Patrick, Director
Micron**



**Gilad Shainer, Director
Mellanox**



**Mike Williams, Director
Samsung**

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.

- Opening the architecture to give the industry the ability to innovate across the full Hardware and Software stack
 - Simplify system design with alternative architecture
 - Includes SOC design, Bus Specifications, Reference Designs, FW OS and Open Source Hypervisor
 - Little Endian Linux to ease the migration of software to POWER
- Driving an expansion of enterprise class Hardware and Software stack for the data center
- Building a complete ecosystem to provide customers with the flexibility to build servers best suited to the Power architecture

- **The number of companies designing & building servers is increasing**
 - Traditionally there have been few companies designing systems: HP, IBM, SUN, Dell, etc.
 - Today there are many more: Google, Microsoft, Facebook, Rackspace, Huawei, Sugon, Inspur, etc.
 - A fairly mature ecosystem including the Taiwanese ODMs is a key enabler of this trend
- **Numerous disruptive forces are impacting these custom system designs and driving designers to consider new ways of innovating**
 - Ability to handle rapid growth in Big Data & Analytics based solutions
 - Choice and Innovation
 - CPU SOC integration drive need for chip development
- **These trends create a need for a server targeted “chip-system-software” ecosystem**
 - IBM has technology and a software stack ready to meet these needs
 - IBM recognizes the need to work with partners to create this ecosystem
 - IBM recognizes the need for choice and options in processor sourcing
- **This ecosystem will create enhanced revenue and profit opportunity for the ecosystem participants**

OpenPOWER will enable data centers to rethink their approach to technology.

Member companies may use POWER for custom open servers and components for Linux based cloud data centers.

OpenPOWER ecosystem partners can optimize the interactions of server building blocks – microprocessors, networking, I/O & other components – to tune performance.

How will the OpenPOWER Foundation benefit clients?

- OpenPOWER technology creates greater choice for customers
- Open and collaborative development model on the Power platform will create more opportunity for innovation
- New innovators will broaden the capability and value of the Power platform

What does this mean to the industry?

- Game changer on the competitive landscape of the server industry
- Will enable and drive innovation in the industry
- Provide more choice in the industry

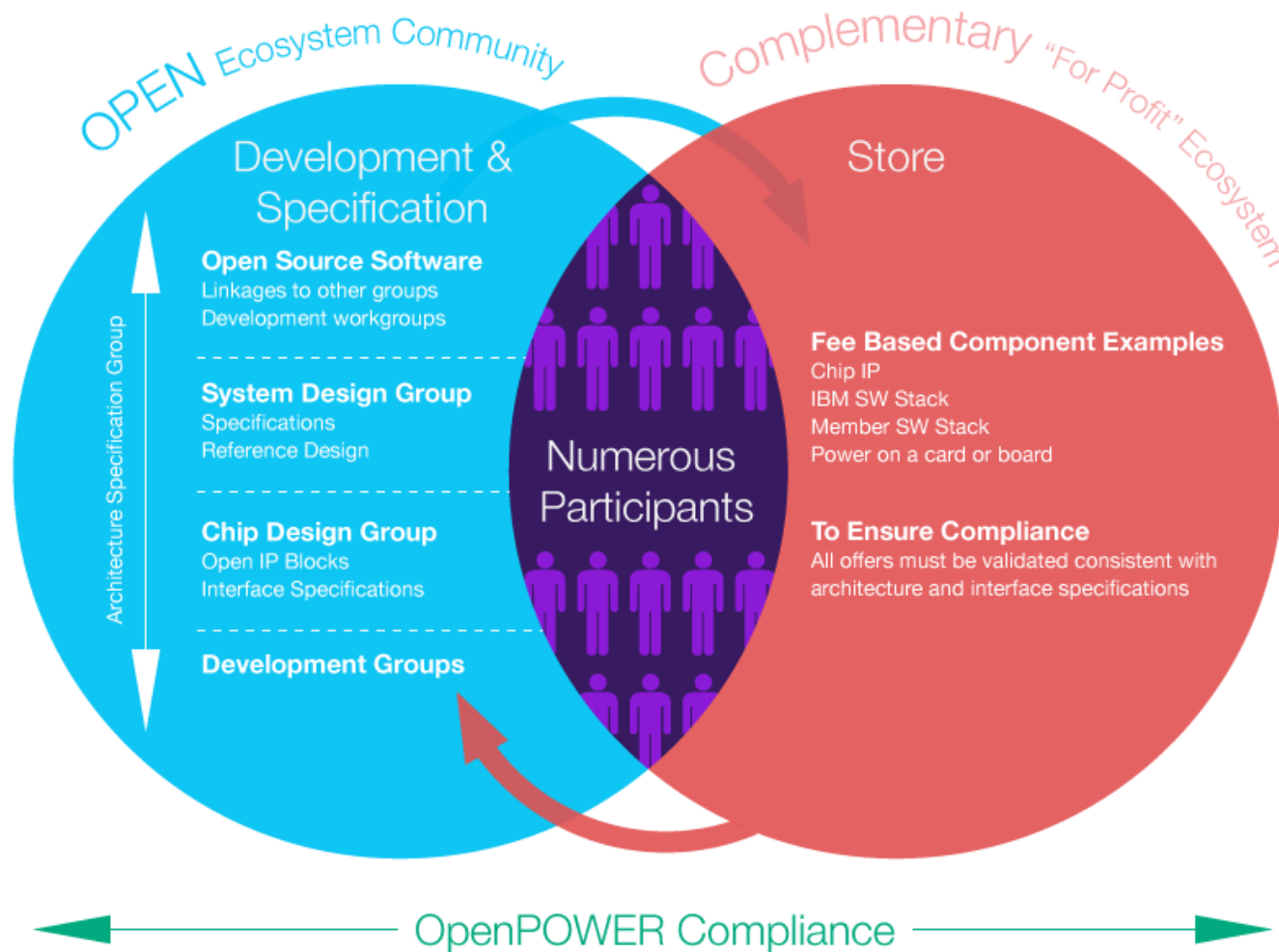
Platinum Members



OpenPOWER Foundation Structure



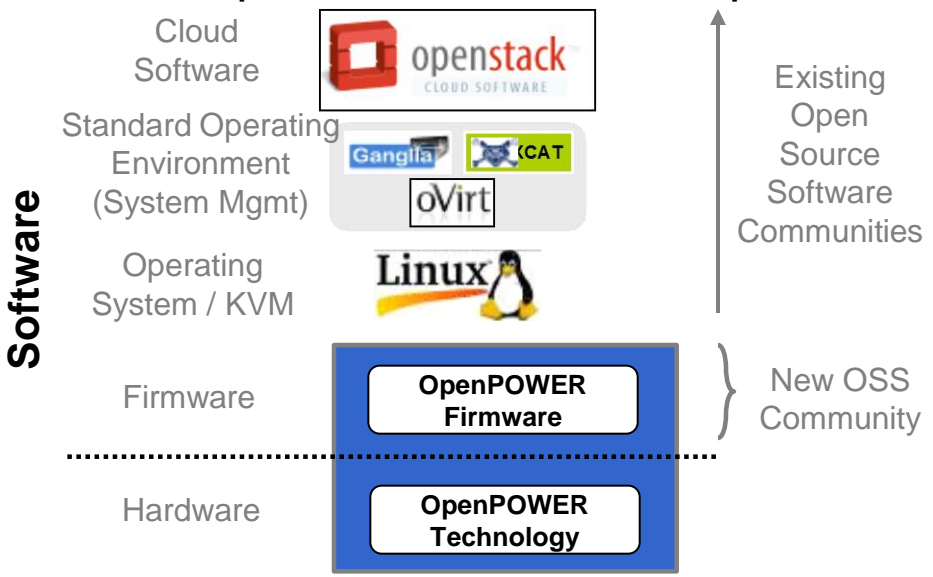
OpenPOWER is an industry foundation based on the POWER architecture, enabling an Open community for development and opportunity for member differentiation and growth



Proposed Ecosystem Enablement



Power Open Source Software Stack Components

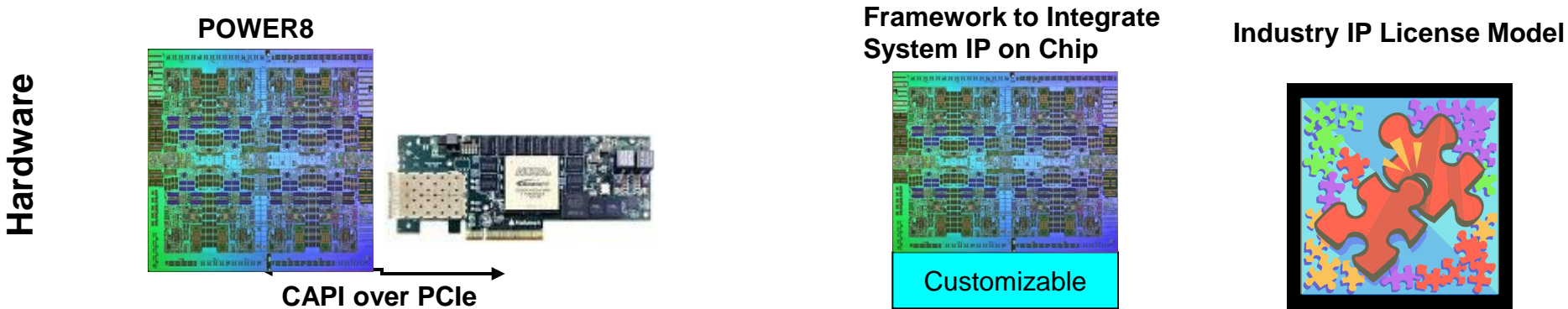


System Operating Environment Software Stack

A modern development environment is emerging based on tools and services



Multiple Options to Design with POWER Technology Within OpenPOWER



“Standard POWER Products” – 2014

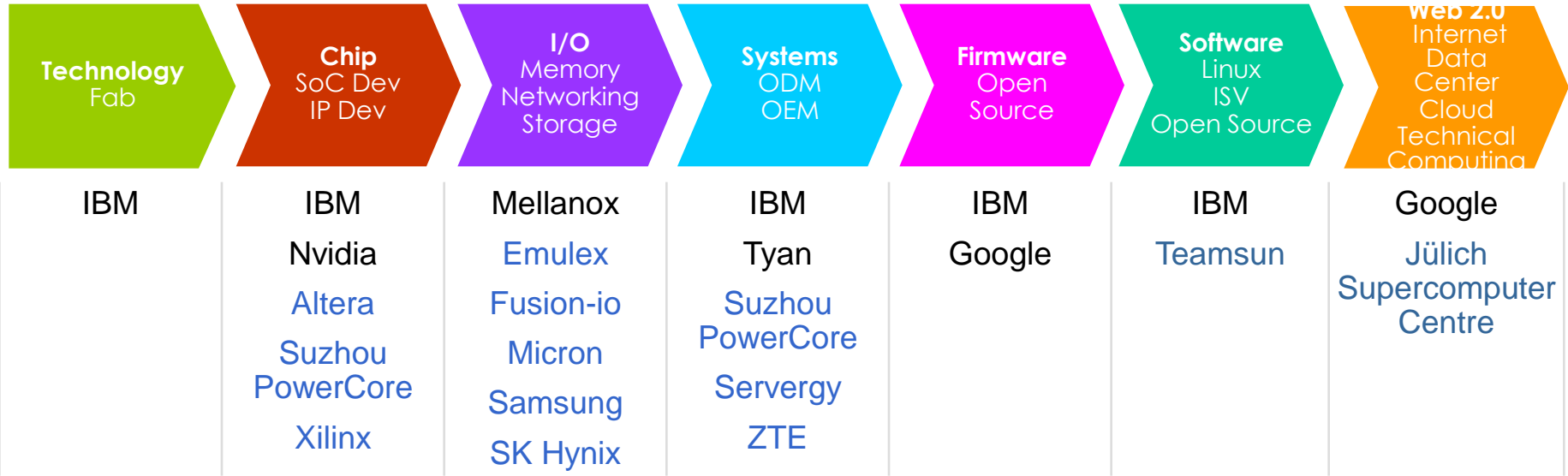
“Custom POWER SoC” – Future

OpenPOWER software commonality

- Linux – to provide commonality for:
 - Operating system management
 - Operating system feature
 - Application programming model
- Little Endian – to provide source code and data commonality
- KVM – to provide virtualization management and feature commonality
- Firmware interfaces – to provide platform management commonality

Migrating software to OpenPOWER

- Software written in interpreted languages (Javascript, PHP, Perl, Python, Ruby, Java, etc.)
 - Generally, no work is required.
- Software written in compiled languages (C/C++, Fortran, etc.)
 - Generally, this requires just a simple recompile for POWER.
- Rarely, dependencies on specific behaviors can require source code modification:
 - Multi-threaded applications that don't use standard synchronization models and depend upon specific memory ordering behavior (unusual)
 - Applications that depend upon specific memory page sizes (rare)



Welcoming new members in all areas of the ecosystem

100+ inquiries and numerous active dialogues underway

Key

Founding Members

New Members since announce

Membership Benefits



Anyone may participate in OpenPOWER. Membership levels are designed for additional benefit to those invested in growing the OpenPOWER community and proliferation within the industry.

	Platinum	Gold	Silver	Associate & Academic
Contribute to and develop OpenPOWER elements. Participate in Members only initiatives and events.	✓	✓	✓	✓
Incorporate OpenPOWER elements into independent solutions with appropriate license	✓	✓	✓	✓
Vote for representative Board delegate for membership level	Includes Board Seat	✓	✓	✓
May lead a technical work group with seat on the Technical Steering Committee	✓	✓	✓	✓
May use OpenPOWER Logo in reference to membership and on compliant product promotion	✓	✓	✓	✓
Logo on membership website page	✓	✓	✓	✓
Brief member write-up including link to member site in membership roster	✓	✓		
Showcase in monthly home page spotlight	✓	✓		
Logo in printed materials including events promotion	✓	✓		
Seat on both the Board of Directors and the Technical Steering Committee	✓			

- The OpenPOWER Foundation is a 501c6 Not-for-profit entity with a Board of Directors and a Technical Steering Committee.
 - Membership levels provide either a default Board of Director position (Platinum) or an opportunity to be elected to the Board (Gold, Silver, and Assoc/Academic members). The Bylaws detail additional governance by the Board including maximum seats, terms, etc.
 - Technical Steering Committee. Formed from the Project Leads from the core projects and one representative designated by each Platinum member

- Includes tiered membership of Platinum, Gold, Silver, and individual memberships
 - Annual fee and dedicated full-time equivalent (FTEs) - verification of committed number of FTEs on honor system
 - Contributors, committers, and project leads influence Technical Steering Committee

Membership Obligations

Membership Level	Annual Fee	FTEs	IP contribution	Technical Steering Committee	Board / Voting position
Platinum	\$100k	10	Desired significant, in addition to FTEs	One seat per member not otherwise represented	Includes board position Includes TSC position
Gold	\$60k	3	Not required	May be on TSC if Project Lead	Gold members may elect up to one BOD member per three gold members
Silver	\$20k	0	Not required	May be on TSC if Project Lead	One Board seat elected by all Silver members
Associate & Academic	\$0	0	Not required	May be on TSC if Project Lead	May be elected to one community observer board seat

Membership agreement, Bylaws, and IP Rights Policy available for review
membership@open-power.org

Proposed Work Groups and Projects



Work Group	Projects	Participants
System Software (Open Source)	• Linux LE	Public
	• KVM	Public
	• Firmware – OpenPOWER FW interface	Public
	• POWER LE ABI	Public
Application Software (Open Source)	• System Operating Environment – OpenPOWER Software ecosystem enablement	Public
	• Toolchain	Public
Open Server Development Platform	• Power 8 Developer Board	Restricted
	• POWER 8 Reference Design	Restricted
Hardware Architecture	• OpenPOWER profile of architecture – Power8 ISA Book 1, 2, 3	Restricted
	• Coherent Accelerator Interface Architecture (CAIA)	Restricted
Compliance	• Compliance	Member

OpenPOWER Progress and Next Steps



• Completed legal formation activities.

- Completed Legal formation of entity as a stand alone not-for-profit 501c6 entity, ratified Bylaws and IP Rights Policy
- Formalized Board of Directors and elected officers:
 - Chairman: Gordon MacKean, Engineering Director, Platforms, Google
 - President: Brad McCredie, VP and IBM Fellow, IBM
 - Vice President: Michael Diamond, Senior Director Marketing, Nvidia
- Chartered Technical Steering Committee and initiated Work Groups: System Software, Application Software, Open Server Development Platform, Hardware Architecture, Compliance

• Current initiatives to build industry momentum and strengthen organization

- Make progress on work groups and projects, formalize process for initiating new work groups or projects,
- Welcome new members via individual conversations, initiate on-boarding process
- Develop identity / web site

• March/April 2014 launch with software development environment and preliminary hardware design

