

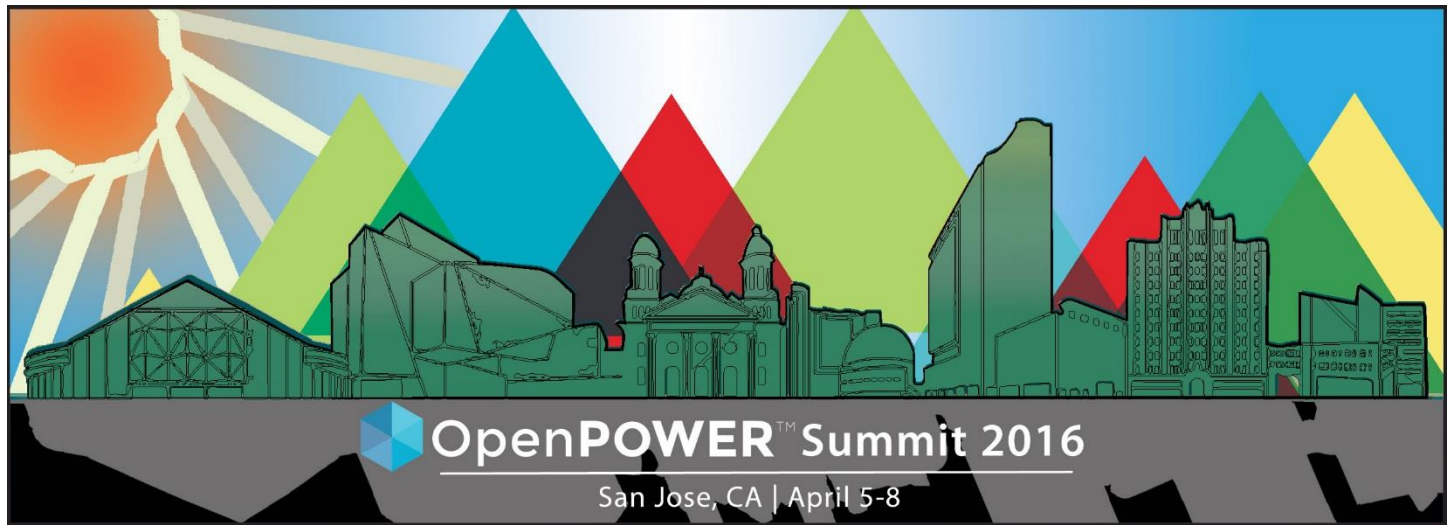


OpenPOWER Container Cloud In Practice

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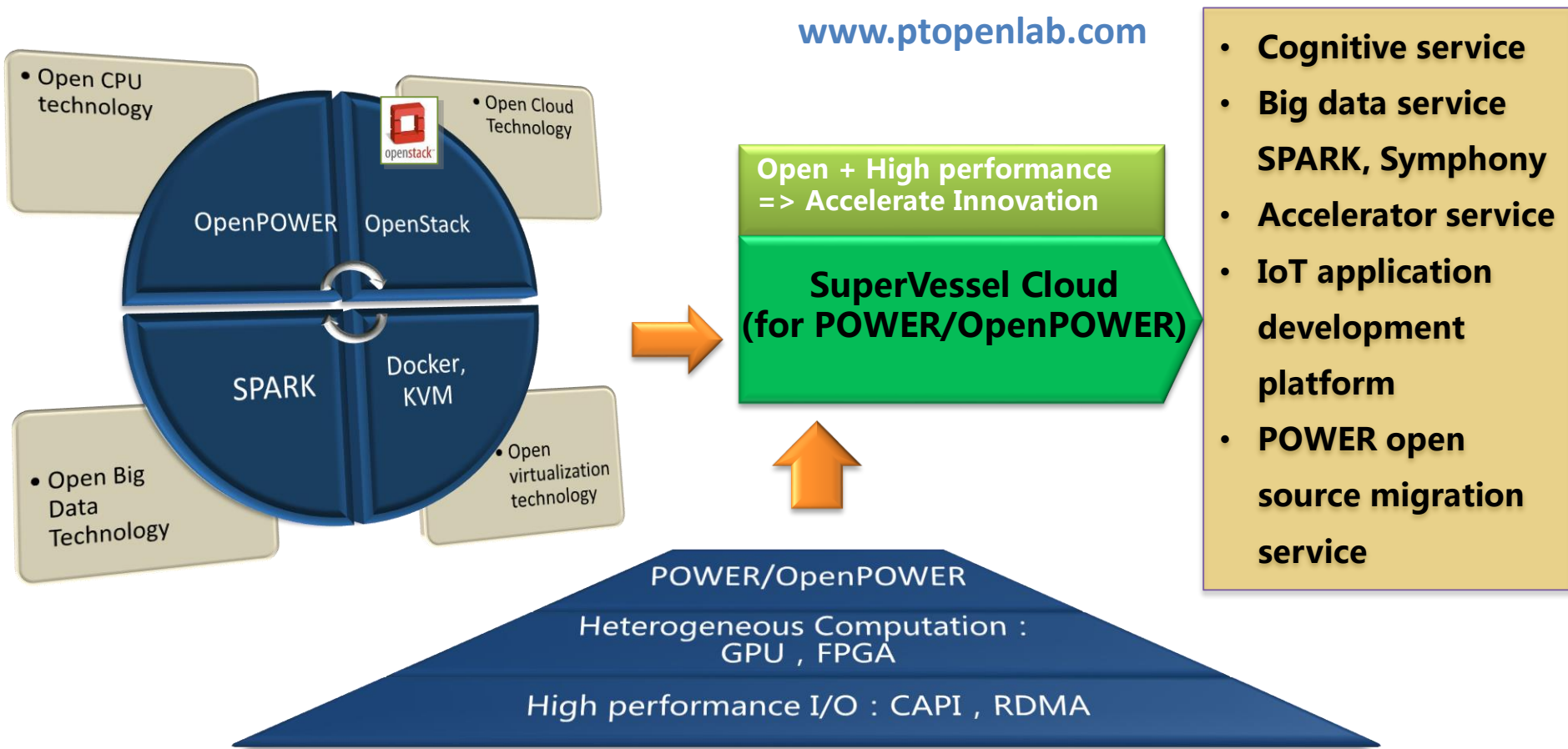
IBM China Research Lab

Revolutionizing the Datacenter



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SuperVessel: The OpenPOWER Cloud for Developers and Ecosystem



Overview of SuperVessel

- Freely open to all POWER/OpenPOWER ecosystem partners, development teams, and individual developers
- 3 sites: Beijing, Hang Zhou, New York
- 3 zones:
 - Enterprise Zone: ISV development, demonstration on cloud. >10 partners/companies
 - Academic Research zone: University education and innovation. >40 Universities
 - Individual Developer zone: Community activities, contest, development. Users from > 30 countries
- Services:
 - Cloud Infrastructure Service: Docker, KVM
 - Cognitive service
 - Bigdata service
 - Application Acceleration service
 - IoT service
 - Cloud data service

Docker in SuperVessel

- Default option for OpenStack instances
- 2000+ docker instances
- Pre-shipped images and image market
- ppc64le, ppc64 and x86_64
- RHEL, Ubuntu, CentOS, RedFlag
- nova-docker

Benefits

Rapid Deploy

- Standalone instances
- cluster

Lightweight

- More instances with same hw resource
- Resource overcommit

HW Resource Multiplexing

- Application acceleration & Cognitive services with GPU, FPGA

Monitoring

- Access instances from docker host
- Agent-less

Cornerstone of PaaS/SaaS

- Easy to build and distribute

Major Challenges

Ecosystem – Docker on Power

- Docker build on Power
- Docker images for Power
- Nova-docker supports Power

Docker resource management issues

- Resource abuse
- Resource overcommitment
- Performance consistency
- QoS and SLA
- Resource visibility inside containers

Docker Stability Issues

- Intermittent disk access errors
- Zombie processes
- Manipulate docker instances in parallel
- Applications in Kernel space

Docker Functionality issues with IaaS

- Hotplug (PCI, volume)
- Kernel version sensitive applications
- Crontab
- Hostname
- Reboot
- /etc/resolv.conf
- /etc/hosts
- Loop mount
- Nfs mount

Research work going on - QoS extension for containers

Resources to manage

- CPU, memory, disk space,
- Memory bandwidth, Network bandwidth, disk bandwidth

Resource management granularity for docker instances and docker clusters

- Minimum: resource guarantee
- Maximum: resource capping

Manual input boundaries vs Dynamic boundaries

A resource management daemon runs side-by-side with dockerd

- Monitoring resource usage
- Adjust resource guarantee and capping boundaries

Users and applications in containers

- Usable resources only

Research work going on – Scalability and accelerators virtualization

Scalability

- Run 10,000+ docker on a single docker host
- Run 20,000+ Marathon/Mesos tasks in one cluster

Accelerators Virtualization

- Transparent to users
- Supports Docker, Mesos, Marathon, OpenStack

Contact us

Home page: www.ptopenlab.com

Link on OpenPOWER Foundation:

<http://openpowerfoundation.org/technical/technical-resources/development-environmentvm/>



**SuperVessel
Portal**



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Thank You !

