



RED HAT OPENSTACK DEEP DIVE

OPEN CLOUD INFRASTRUCTURE
BUILT ON RED HAT TECHNOLOGIES

Steven Ellis

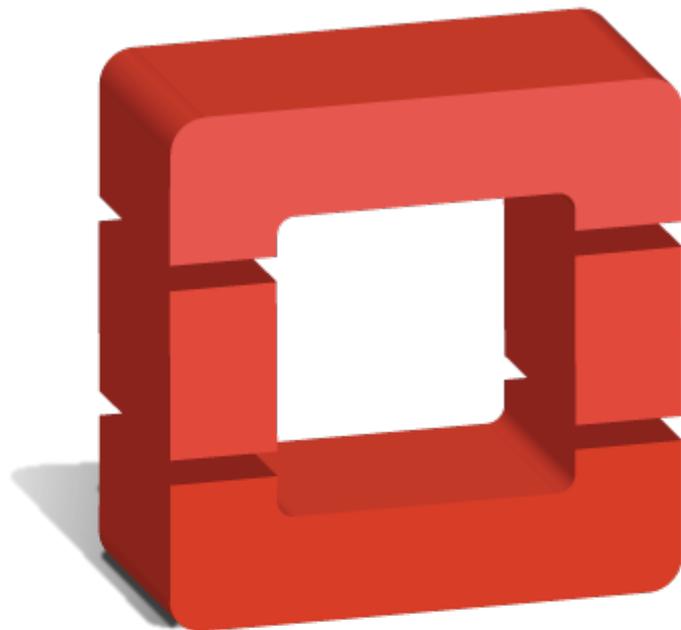
Solution Architect – Red Hat NZ

August 2013

AGENDA

- **What is OpenStack**
- **Cloud Workloads**
- **What is Red Hat OpenStack?**
- **Some OpenStack History**
- **OpenStack Components**
- **Red Hat in the OpenStack community and upstream**
- **RDO: Community OpenStack from Red Hat**
- **OpenStack Upstream vs Red Hat OpenStack releases**
- **What's next in OpenStack and Red Hat OpenStack**
- **Questions**

There will be Demo



openstack™

CLOUD SOFTWARE

OpenStack is ...

Compute, Networking, Storage

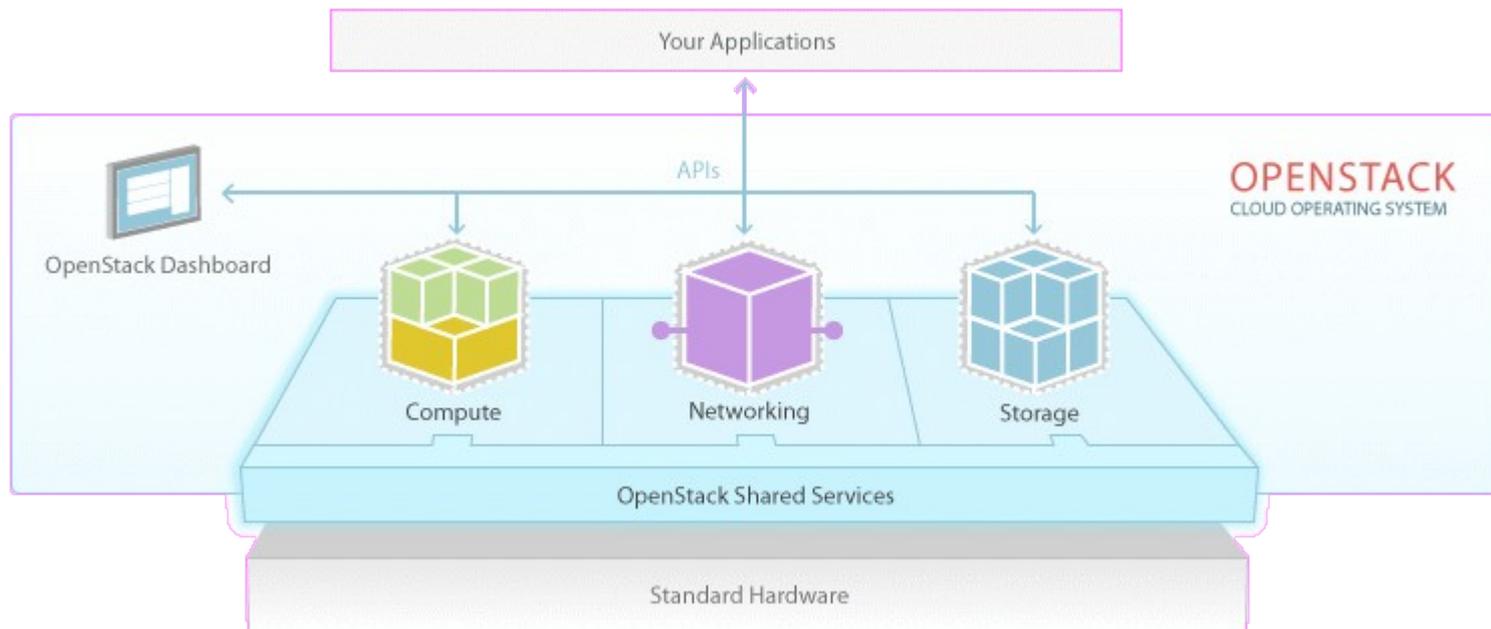
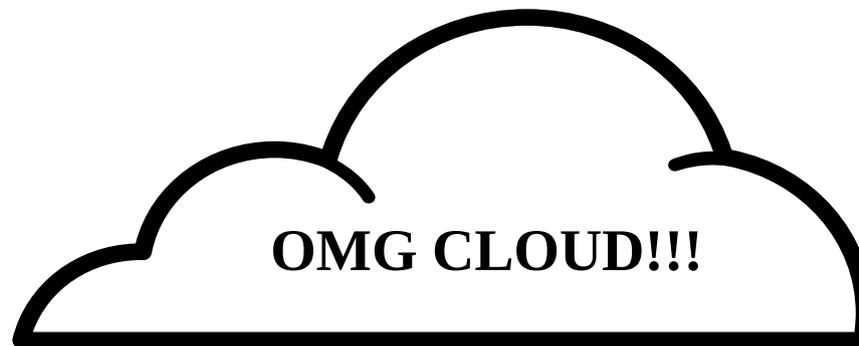


Image credit: <http://www.openstack.org/software>

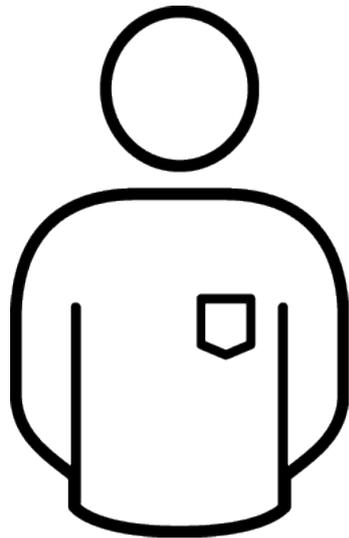
OpenStack is ...

Public or Private Cloud



OpenStack is ...

Self Service



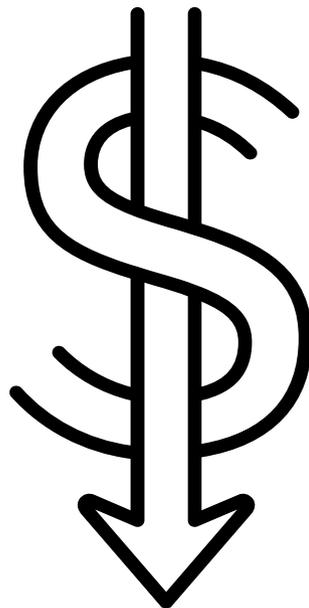
APIs



Web Dashboard

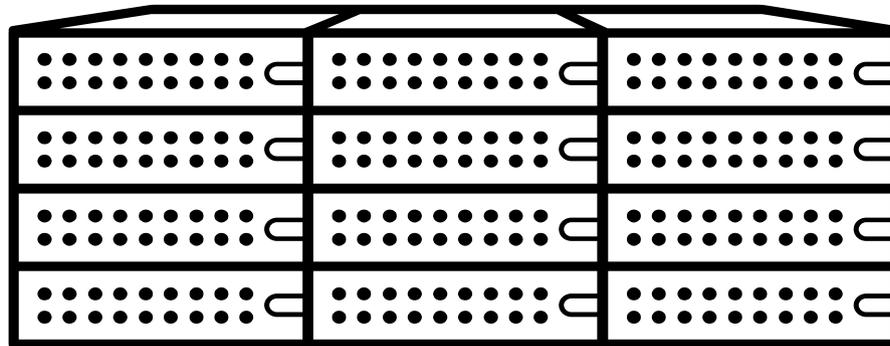
OpenStack is ...

Pay as you go



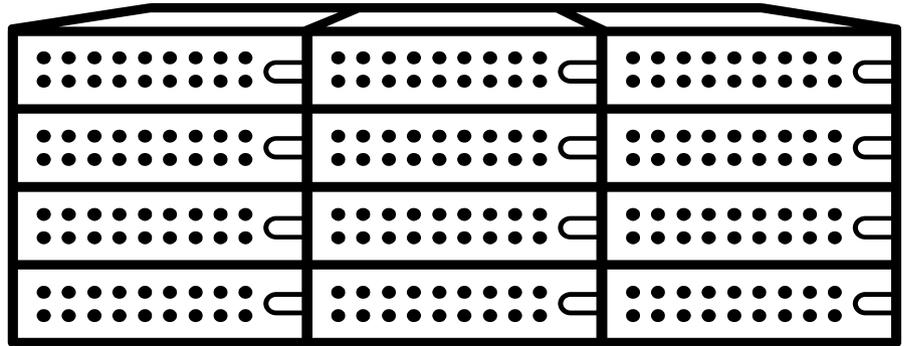
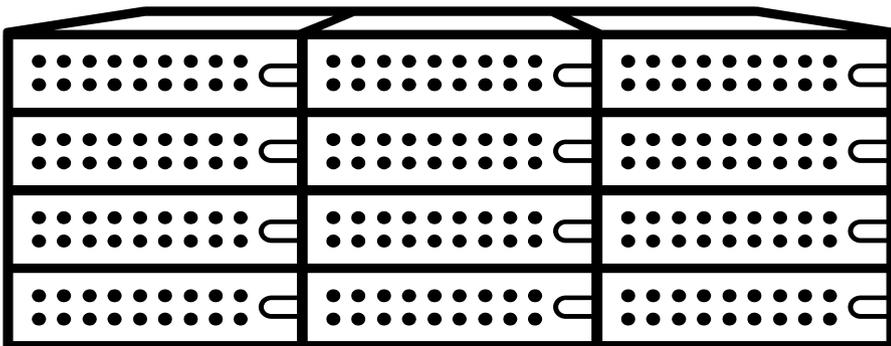
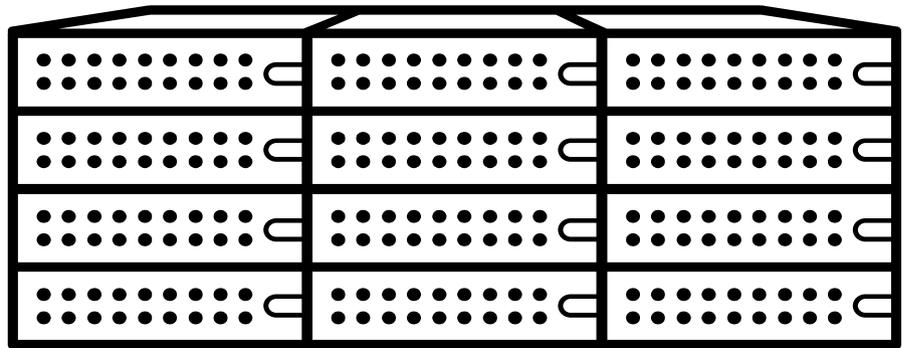
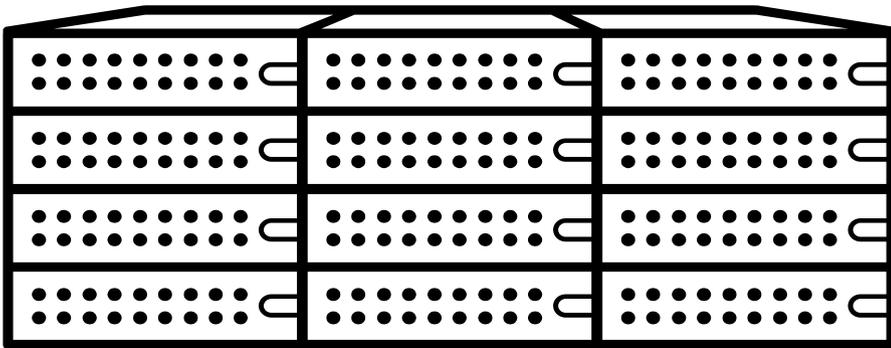
OpenStack is ...

Illusion of Infinite Capacity



OpenStack is ...

Massive Scale



Cloud Ready Workloads?

SERVICE MODELS / WORKLOADS



**TRADITIONAL
WORKLOADS**



**CLOUD
WORKLOADS**

SERVICE MODELS / WORKLOADS



TRADITIONAL WORKLOADS



CLOUD WORKLOADS

- Stateful VMs: Application defined in VM
- Application SLA = SLA of VM
- SLA requires enterprise virtualization features to keep VMs highly available
- VMs scale up: add vCPU, vRAM, etc.
- Lifecycle may be measured in years
- Applications not designed to tolerate failure of VMs

SERVICE MODELS / WORKLOADS



TRADITIONAL WORKLOADS



CLOUD WORKLOADS

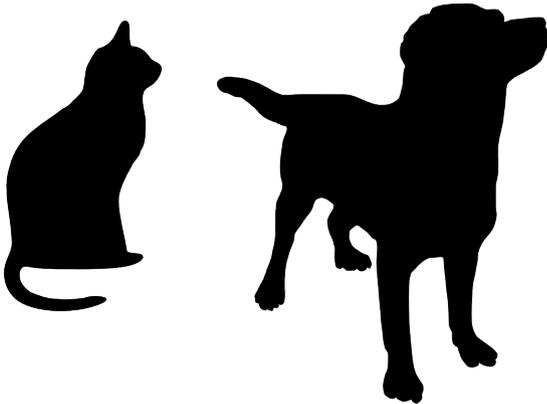
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- Stateless VMs : Application distributed
- Application SLA not dependent on any one VM
- SLA requires ability to create and destroy VMs when needed
- Applications scale out: add more Vms
- Lifecycle measured in hours to months
- Applications designed to tolerate failure of VMs

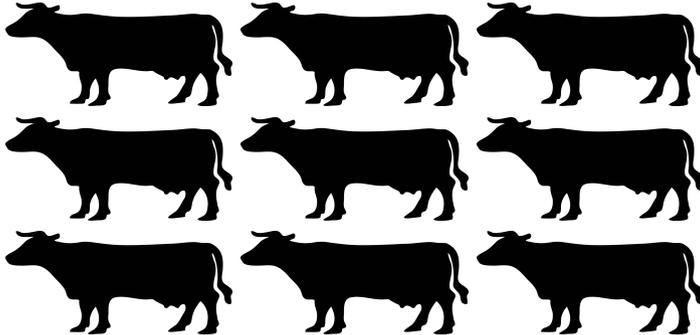
SERVICE MODELS / WORKLOADS



**TRADITIONAL
WORKLOADS**



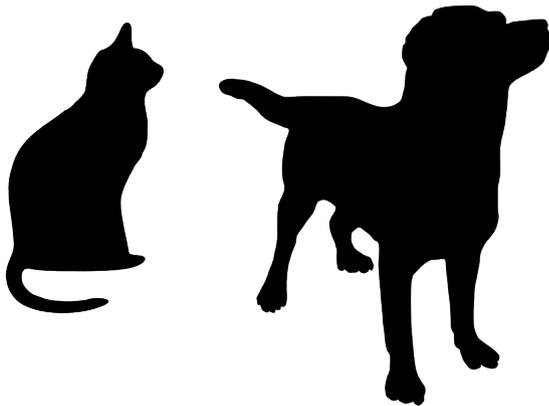
**CLOUD
WORKLOADS**



SERVICE MODELS / WORKLOADS



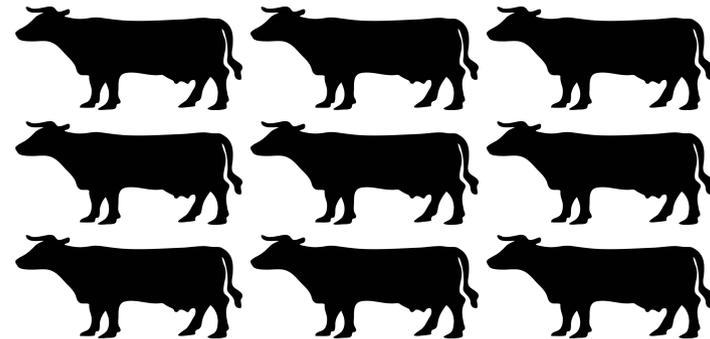
TRADITIONAL WORKLOADS



- Pets are unique, lovingly hand raised and cared for
- They are given names
- When they get ill you nurse them back to health



CLOUD WORKLOADS



- Cattle are almost identical to each other
- They are given numbers
- When they get ill you get another one

SERVICE MODELS / WORKLOADS



TRADITIONAL WORKLOADS



CLOUD WORKLOADS

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SERVICE MODELS / WORKLOADS



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EVOLVING IT ARCHITECTURES



RED HAT®
ENTERPRISE
VIRTUALIZATION



Datacenter
Virtualization

Private IaaS /
Private Cloud

Hybrid IaaS /
Hybrid Cloud

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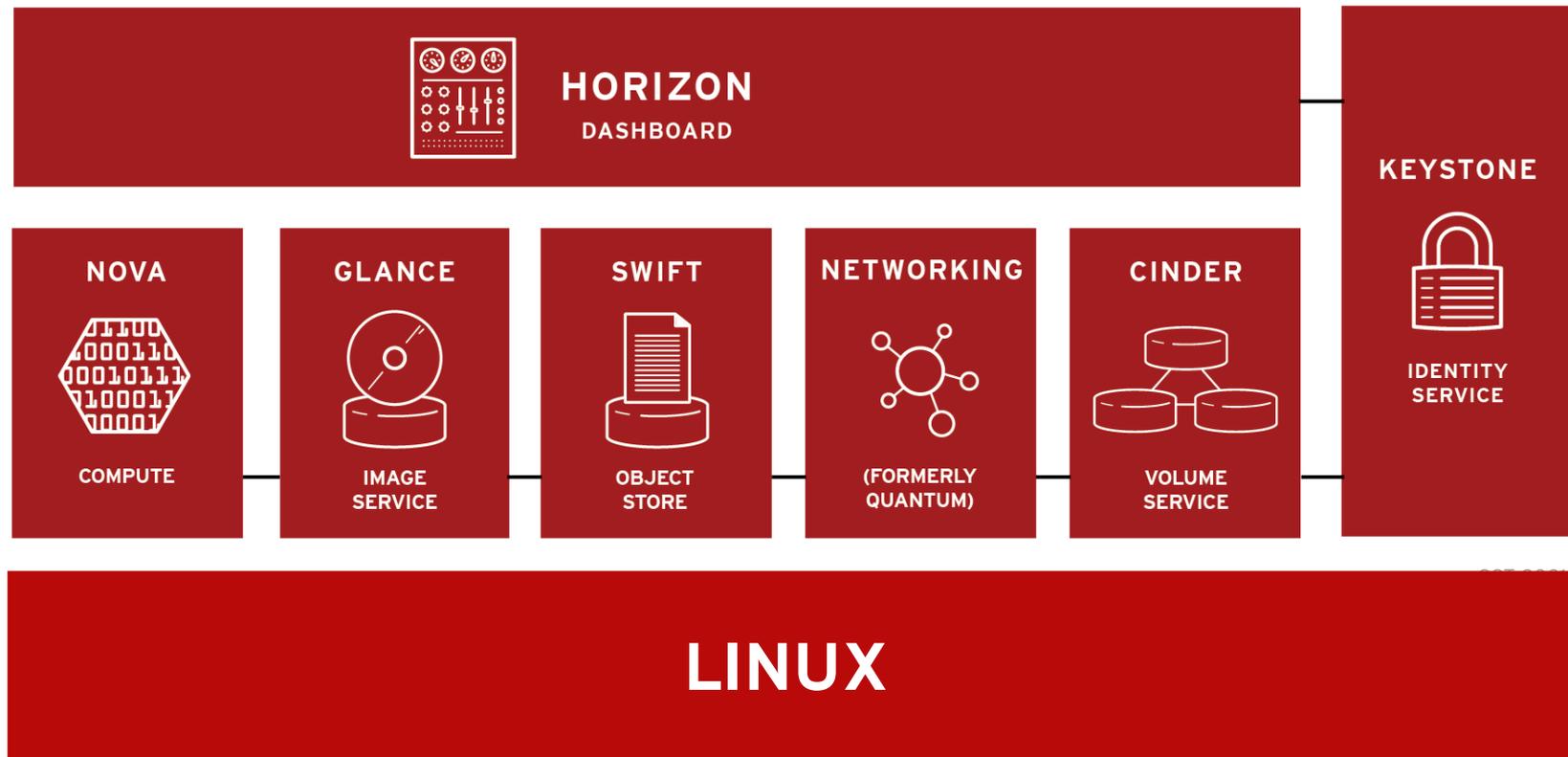
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Are You Cloud Ready?

OPENSTACK

RUNS ON LINUX

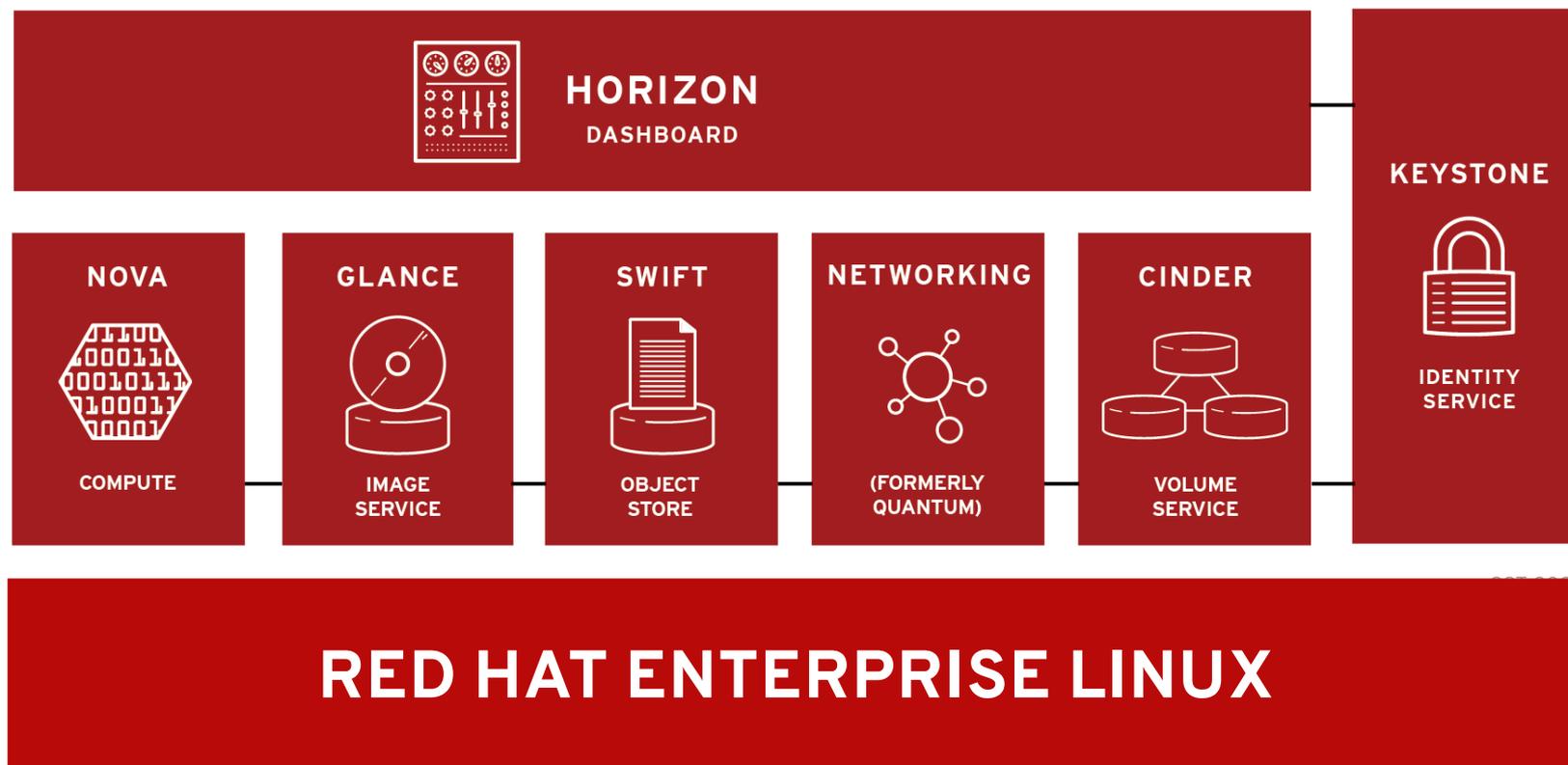
- Modular architecture
- Designed to easily scale out
- Based on (growing) set of core services



RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM

CLOUD INFRASTRUCTURE FOR CLOUD-ENABLED WORKLOADS

- Modular architecture
- Designed to easily scale out
- Based on (growing) set of core services



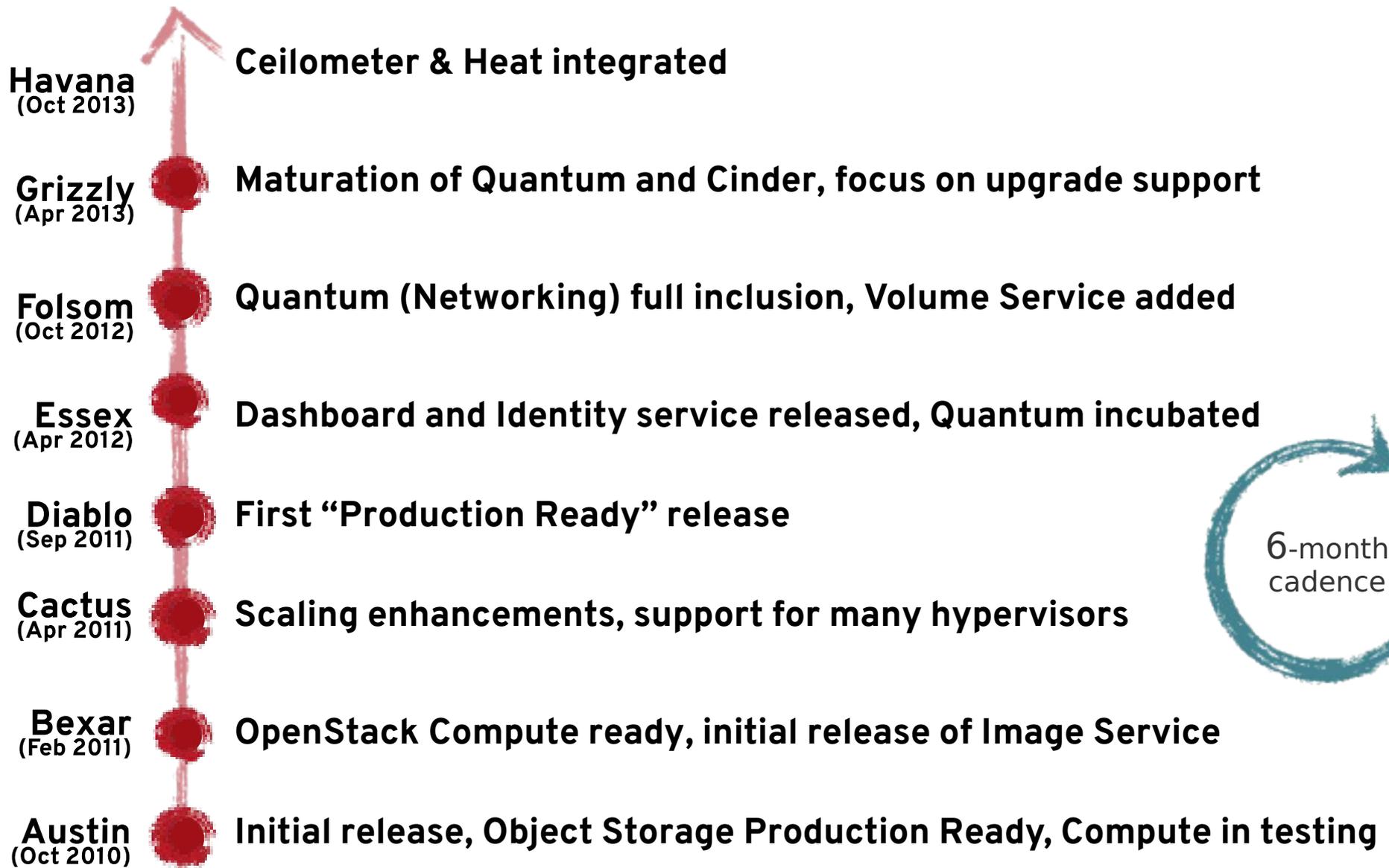
Demo

Demo Environment

- RHEL 6.4 + RHOS 3.0 (Grizzly)
- All In One profile using Packstack
- Hosted on dedicated hardware
 - Nova requires HW Virtualisation for Performance
- RHEL 6.4 pre-installed (kickstart)
 - Packages pre-cached to reduce install time

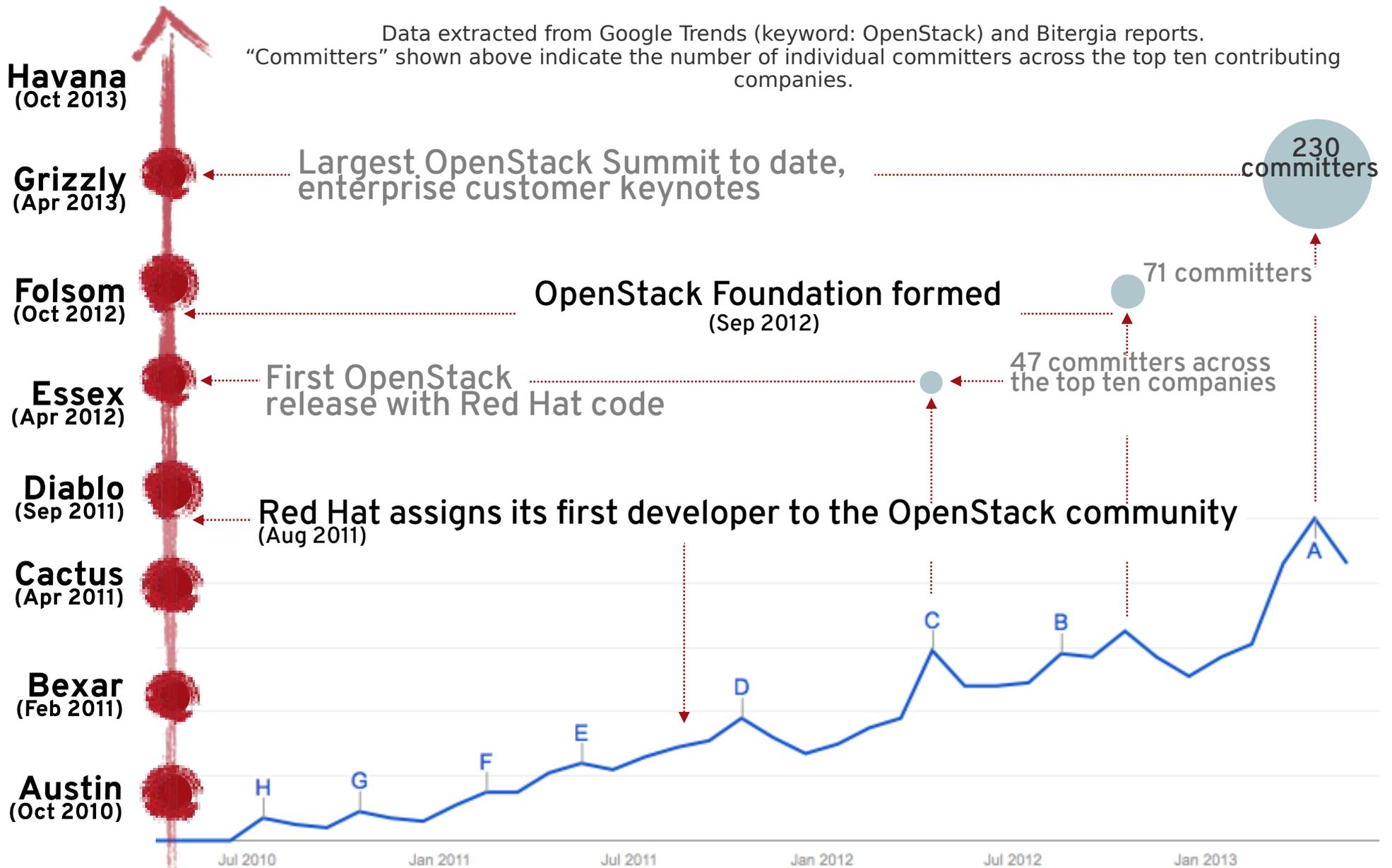
Timeline

OpenStack History and Cadence



OpenStack Trends, Growth & Milestones

Data extracted from Google Trends (keyword: OpenStack) and Bitergia reports.
 "Committers" shown above indicate the number of individual committers across the top ten contributing companies.





#1

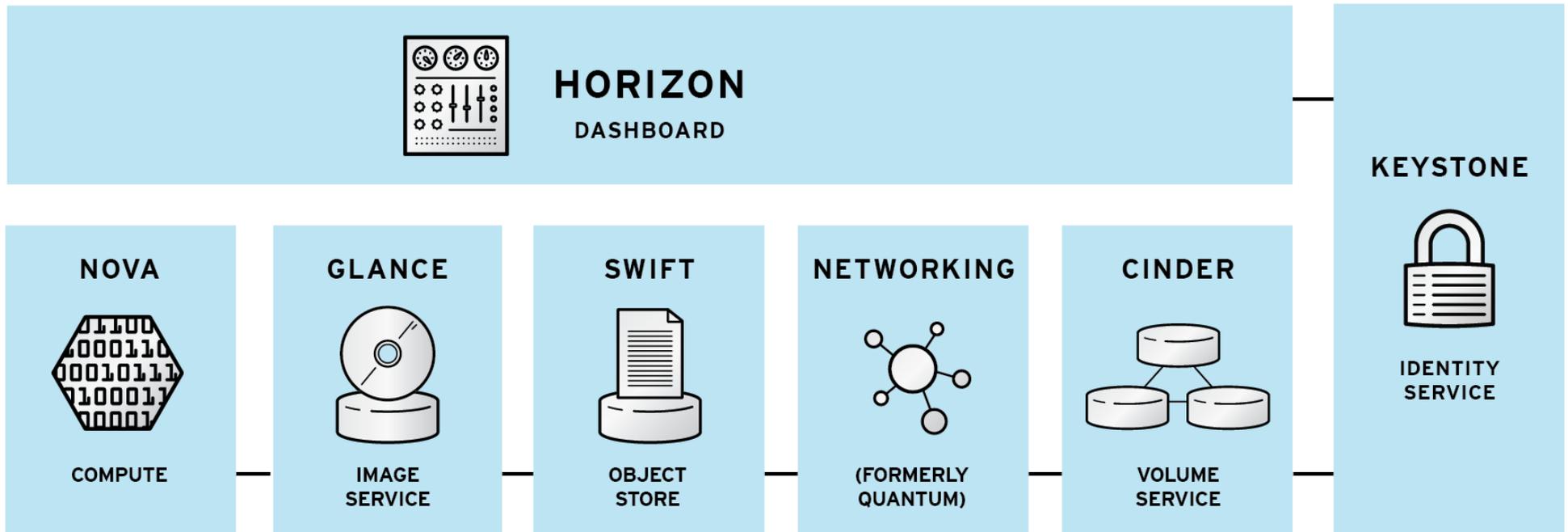
**OVERALL CODE
CONTRIBUTOR TO
GRIZZLY
(Apr 2013)**

WHY ARE WE INVOLVED WITH OPENSTACK?

- Red Hat Enterprise Linux OpenStack Platform will be to OpenStack what Red Hat Enterprise Linux is to Linux
- We bring what OpenStack needs
 - Supportability
 - Stability
 - Enterprise grade features (Security, Performance, RAS)
 - Certified ecosystem
 - Lifecycle

OpenStack Components

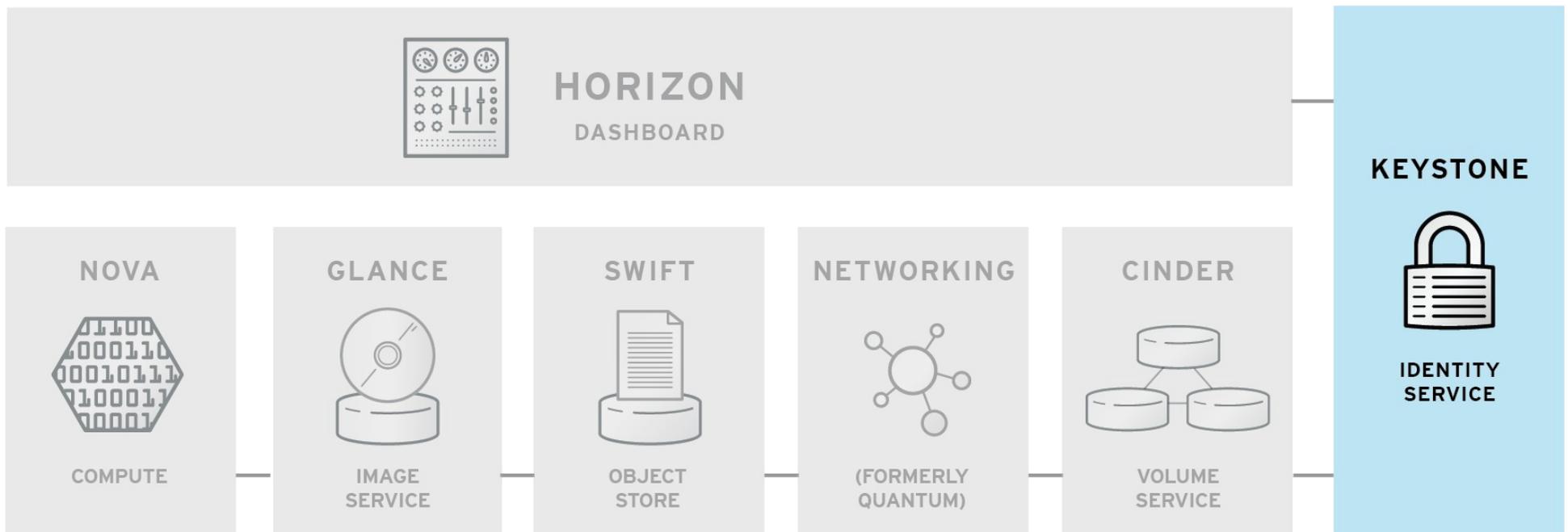
OPENSTACK ARCHITECTURE



OST 0001

- Modular architecture
- Designed to easily scale out
- Based on (growing) set of core services

OPENSTACK CORE PROJECTS

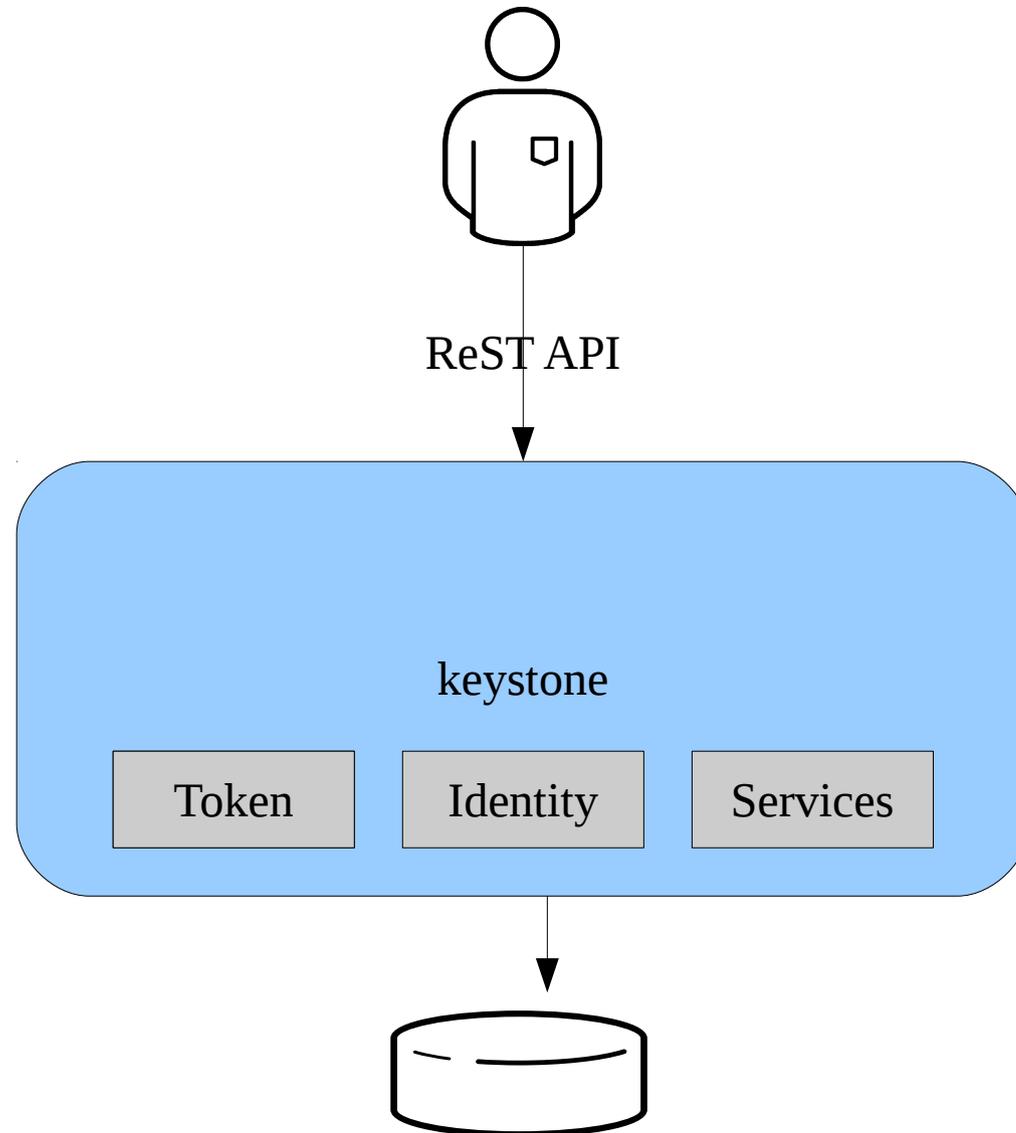


OST 0001

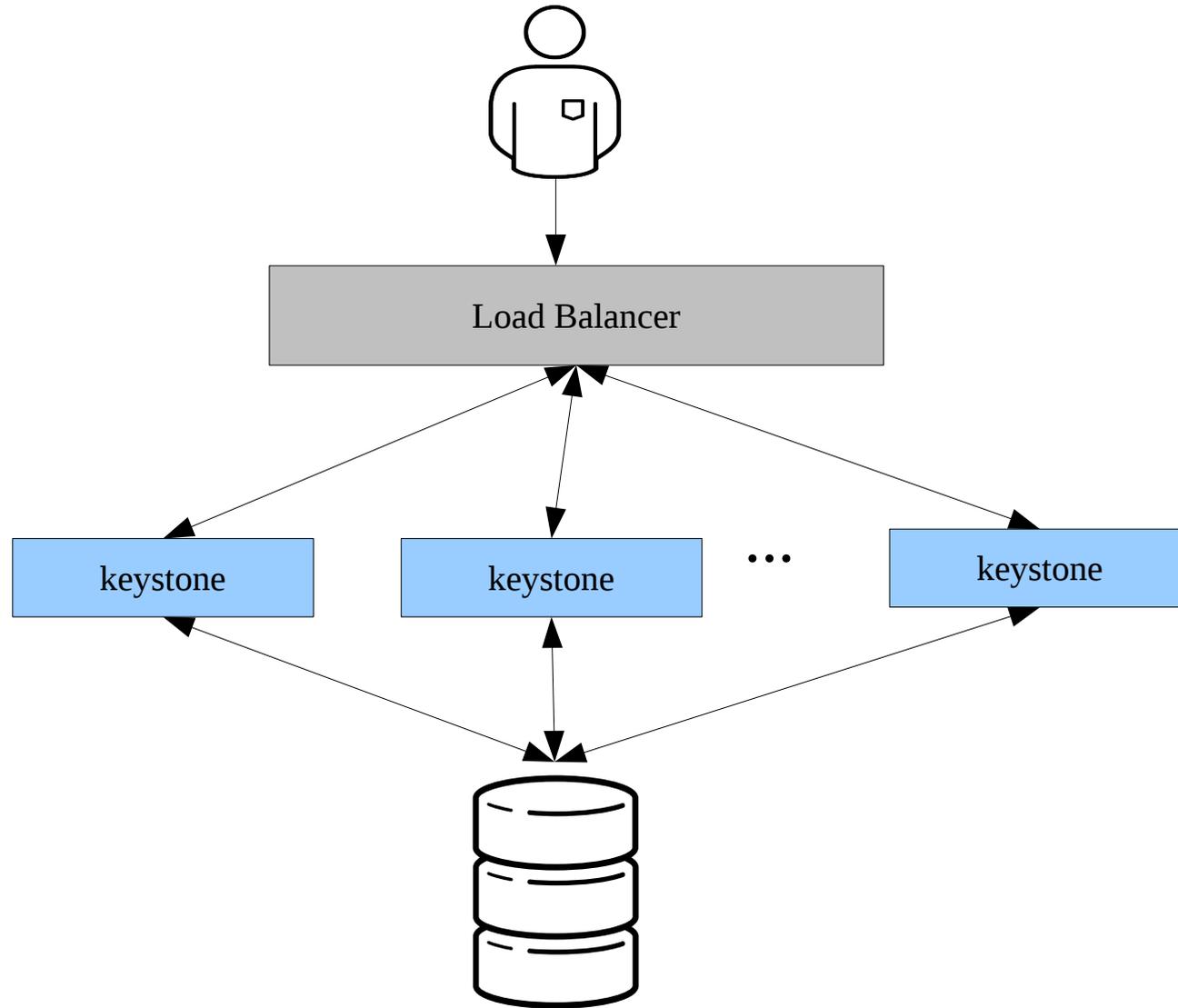
OpenStack Identity (KEYSTONE)

- Identity Service
- Common authorization framework
- Manages users, tenants and roles
- Pluggable backends (SQL, PAM, LDAP, etc)

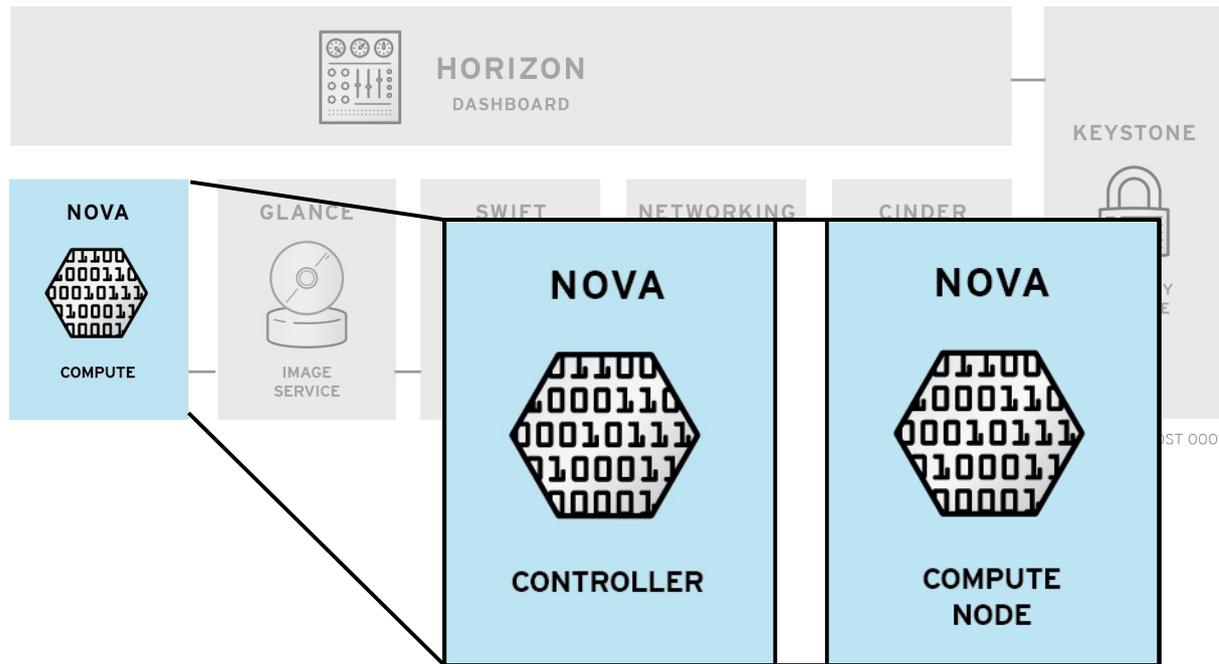
OpenStack Identity (Keystone)



OpenStack Identity (Keystone) Scaling



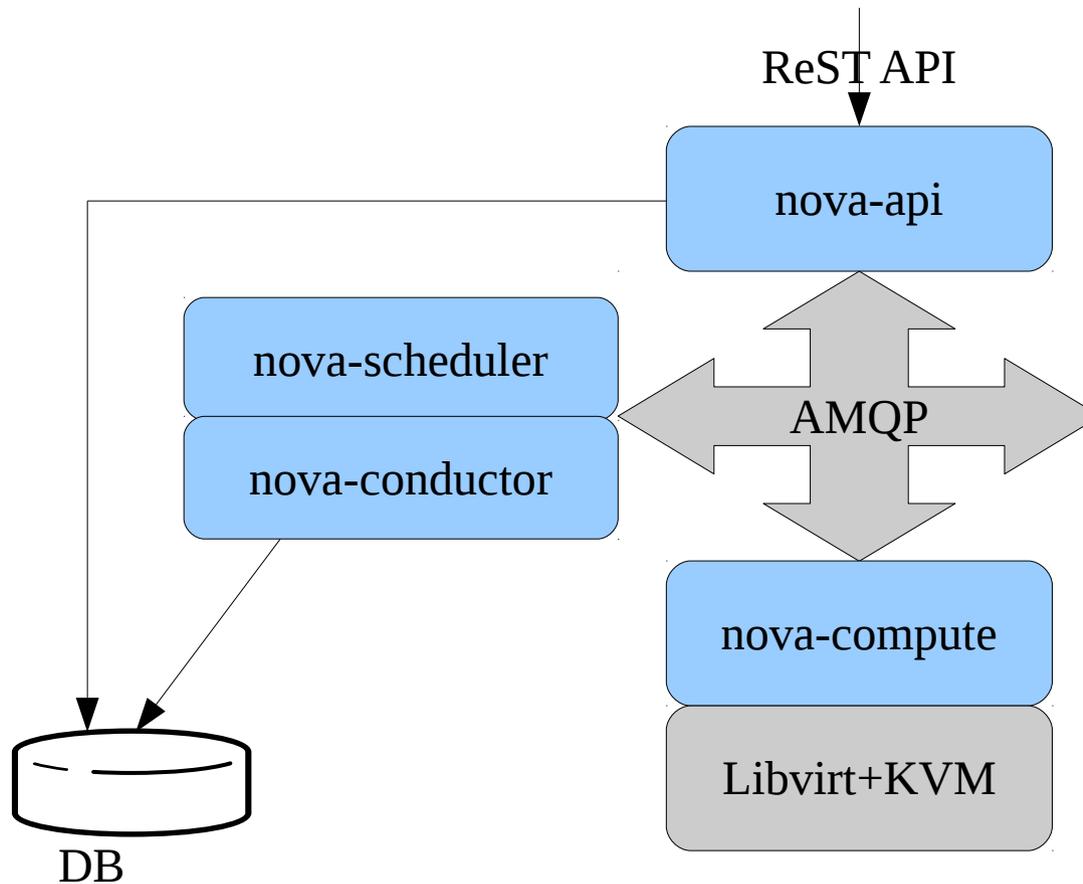
OPENSTACK CORE PROJECTS



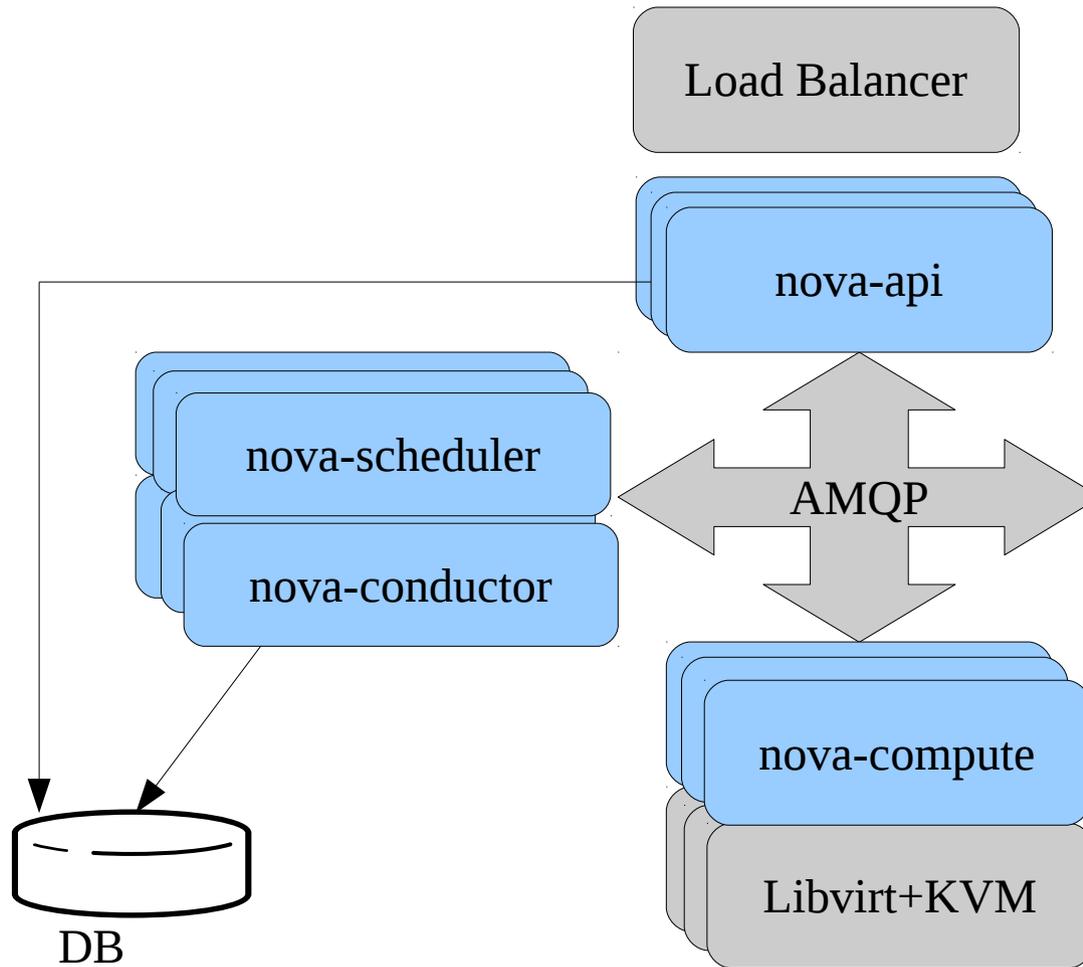
OpenStack Compute (NOVA)

- Core compute service comprised of
 - Compute Nodes – hypervisors that run virtual machines
 - Supports multiple hypervisors KVM, Xen, LXC, Hyper-V and ESX
 - Distributed controllers that handle scheduling, API calls, etc
 - Native OpenStack API and Amazon EC2 compatible API

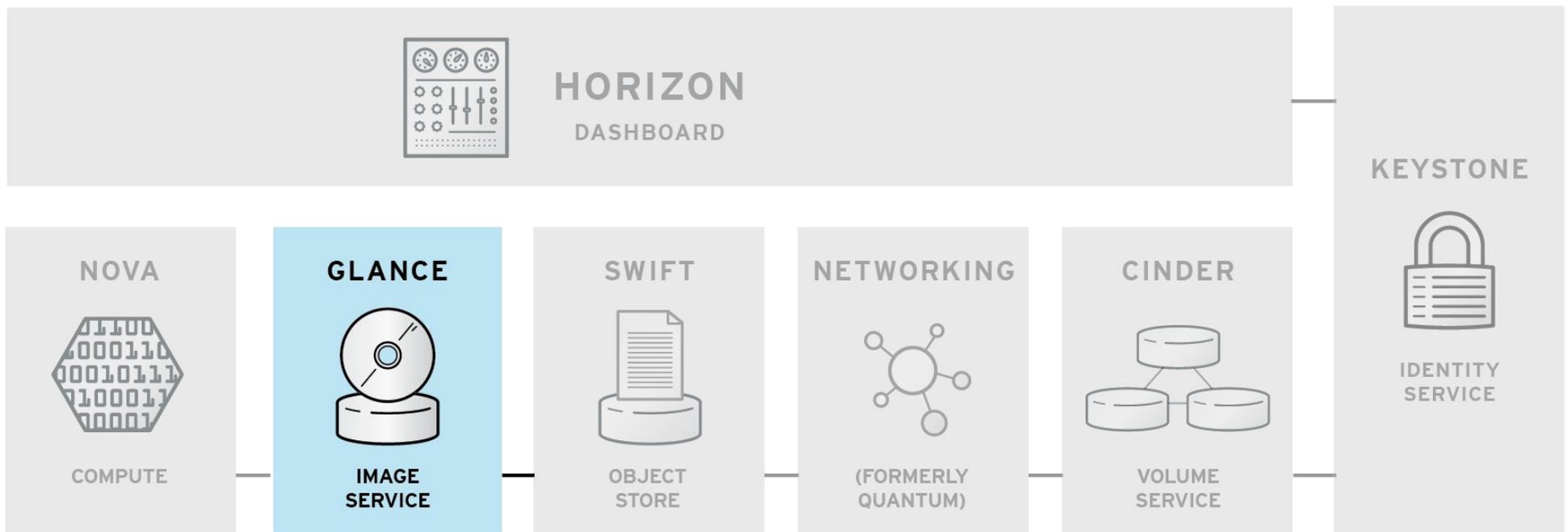
OpenStack Compute (Nova)



OpenStack Compute (Nova) Scaling



OPENSTACK CORE PROJECTS

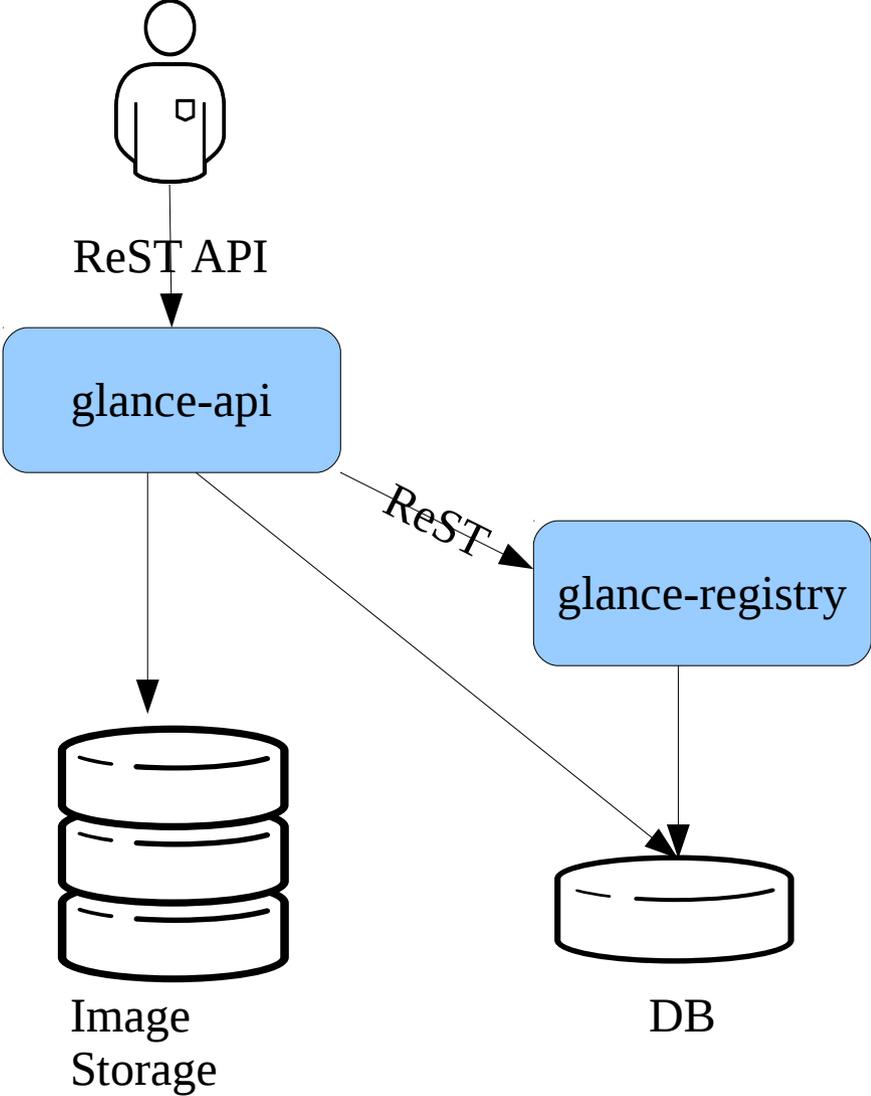


OST 0001

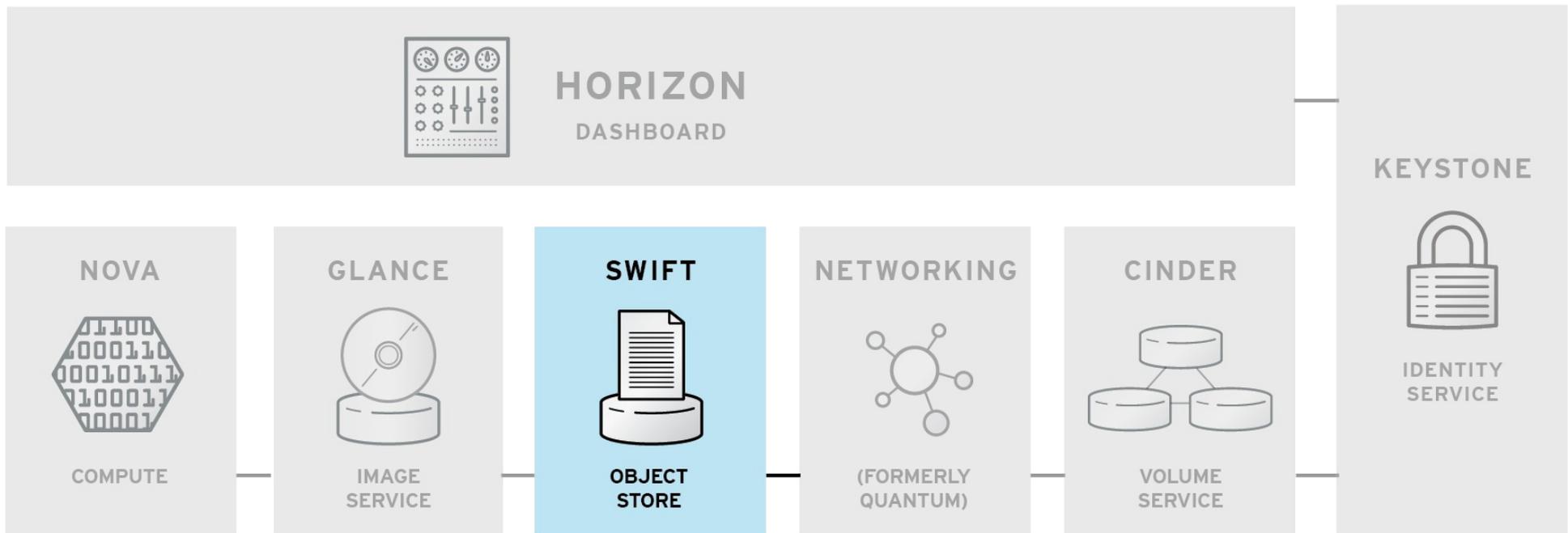
OpenStack Image Service (GLANCE)

- Image service
- Stores and retrieves disk images (virtual machine templates)
- Supports Raw, QCOW, VMDK, VHD, ISO, OVF & AMI/AKI
- Backend storage : Filesystem, Swift, Amazon S3

OpenStack Image Service (Glance)



OPENSTACK CORE PROJECTS

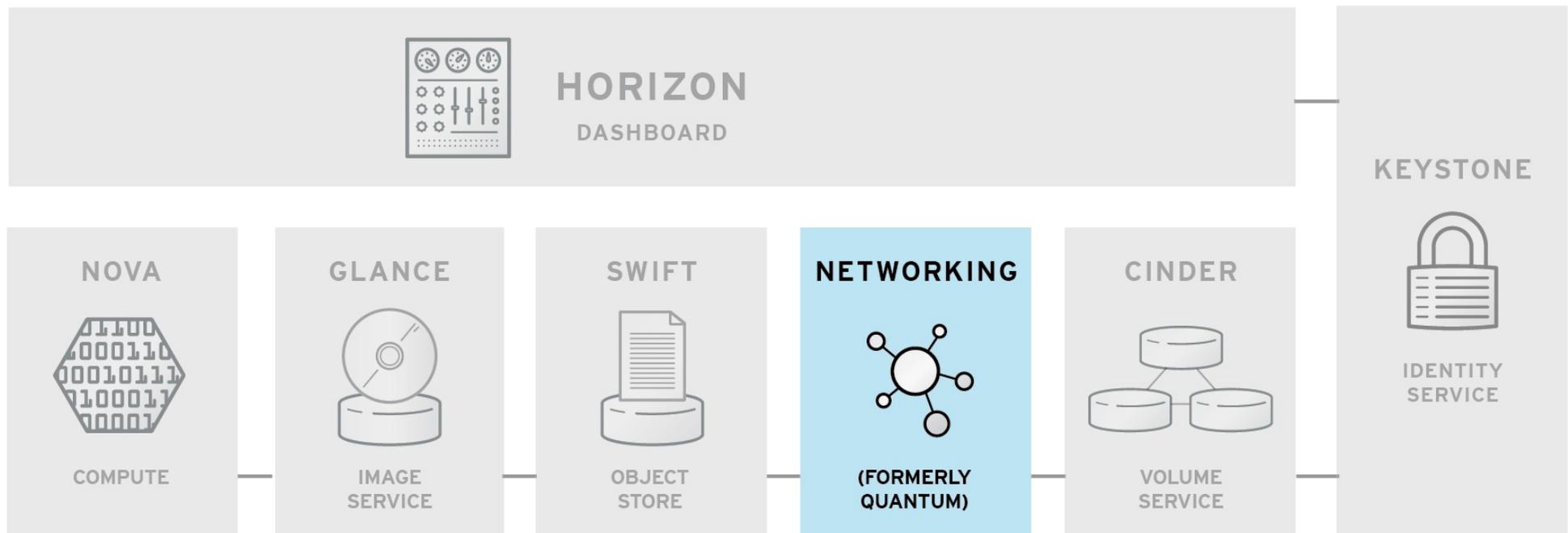


OST 0001

OpenStack Object Storage (SWIFT)

- Object Storage service
- Modeled after Amazon's S3 service
- Provides simple service for storing and retrieving arbitrary data
- Native API and S3 compatible API

OPENSTACK CORE PROJECTS

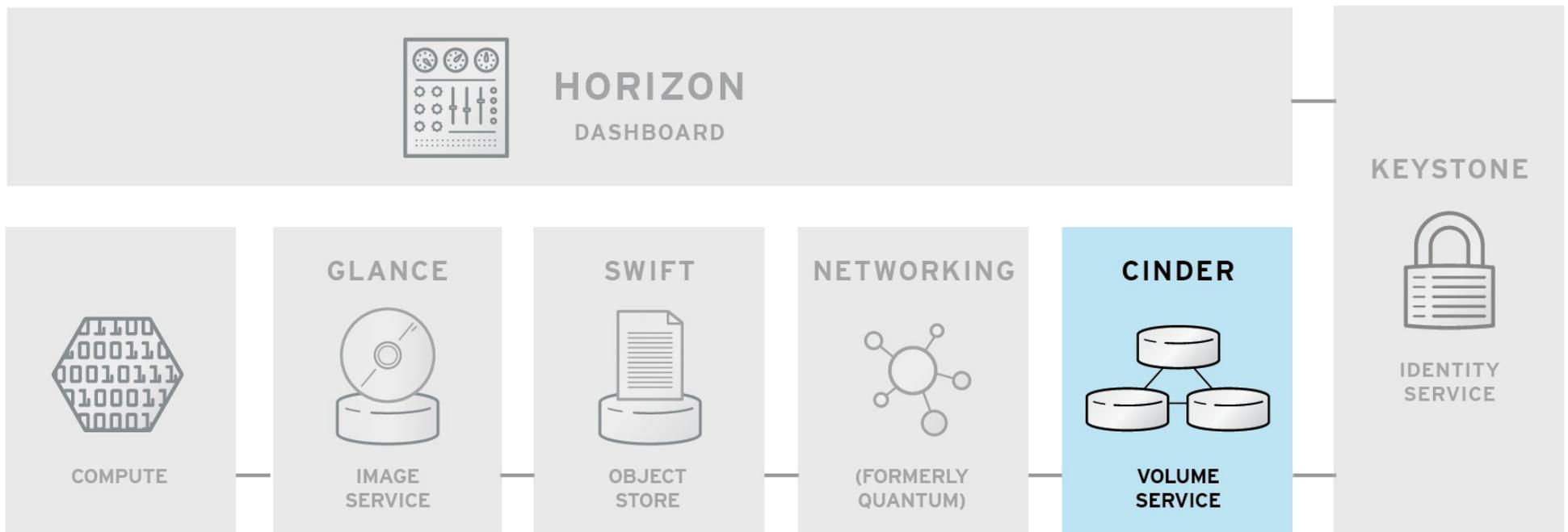


OST 0001

OpenStack Networking (NEUTRON formerly QUANTUM)

- Network Service
- Provides framework for Software Defined Network (SDN)
- Plugin architecture
 - Allows integration of hardware and software based network solutions

OPENSTACK CORE PROJECTS



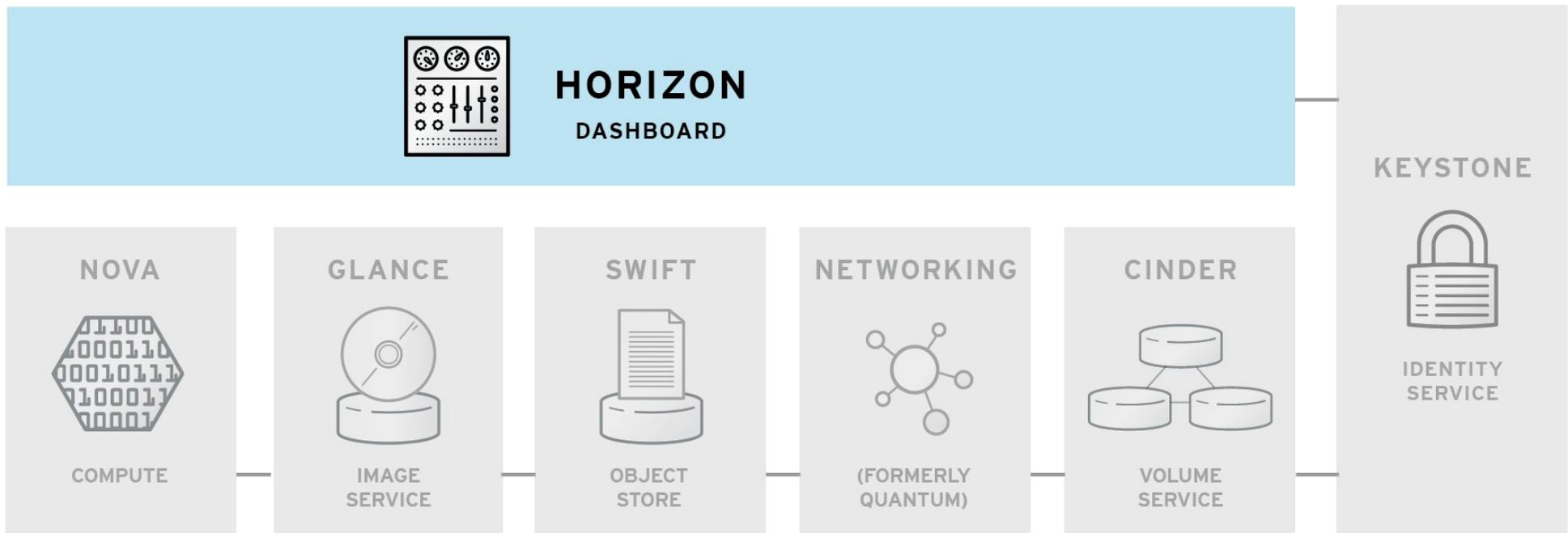
OST 0001

OpenStack Block Storage (CINDER)

- Block Storage (Volume) Service
- Provides block storage for virtual machines (persistent disks)
- Similar to Amazon EBS service
- Plugin architecture for vendor extensions

eg. NetApp driver for Cinder

OPENSTACK CORE PROJECTS



OST 0001

OpenStack Dashboard (HORIZON)

- Dashboard
- Provides simple self service UI for end-users
- Basic cloud administrator functions
 - Define users, tenants and quotas
 - No infrastructure management

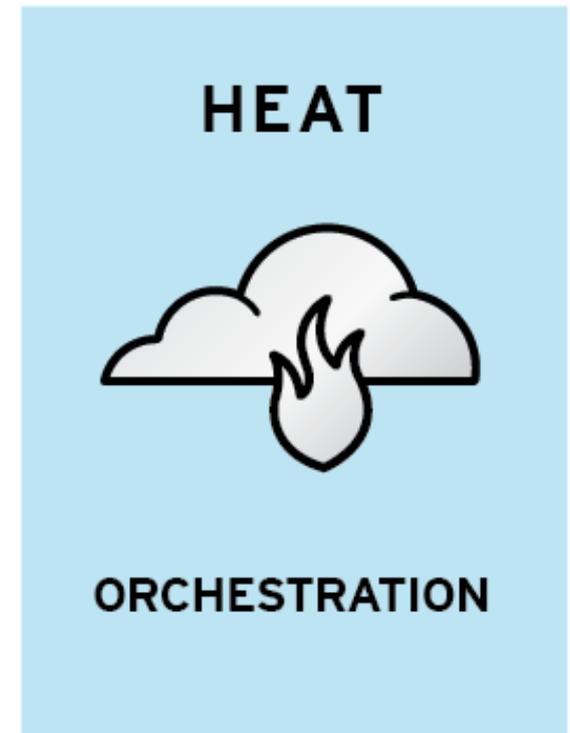
Demo – Horizon

OPENSTACK INCUBATING PROJECTS

OpenStack Orchestration (HEAT)

- Provides template driven cloud application orchestration
- Modeled after AWS CloudFormation
- Targeted to provide advanced functionality such as high availability and autoscaling
- Introduced by  **redhat.**

Graduated from Incubation to Integrated status
for the Havana release

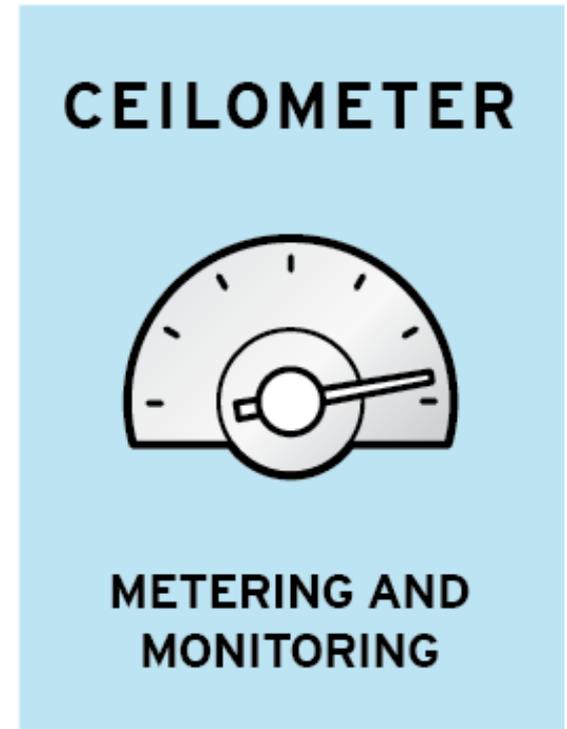


OPENSTACK INCUBATING PROJECTS

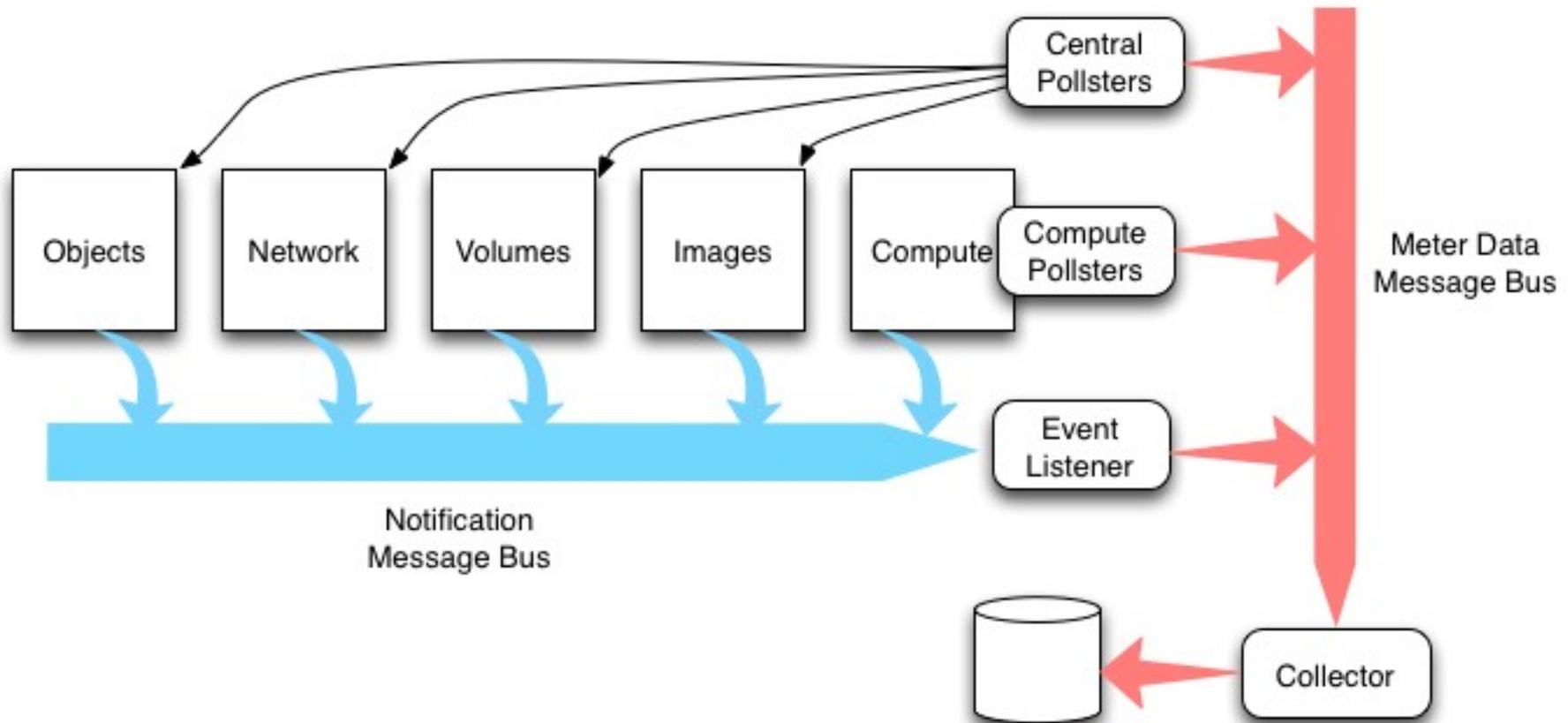
OpenStack Monitoring and Metering (CEILOMETER)

- Goal: To provide a single infrastructure to collect measurements from an entire OpenStack infrastructure; eliminate need for multiple agents attaching to multiple OpenStack projects
- Primary targets metering and monitoring; provides extensibility

Graduated from Incubation to Integrated status for the Havana release



OpenStack Metering (Ceilometer)



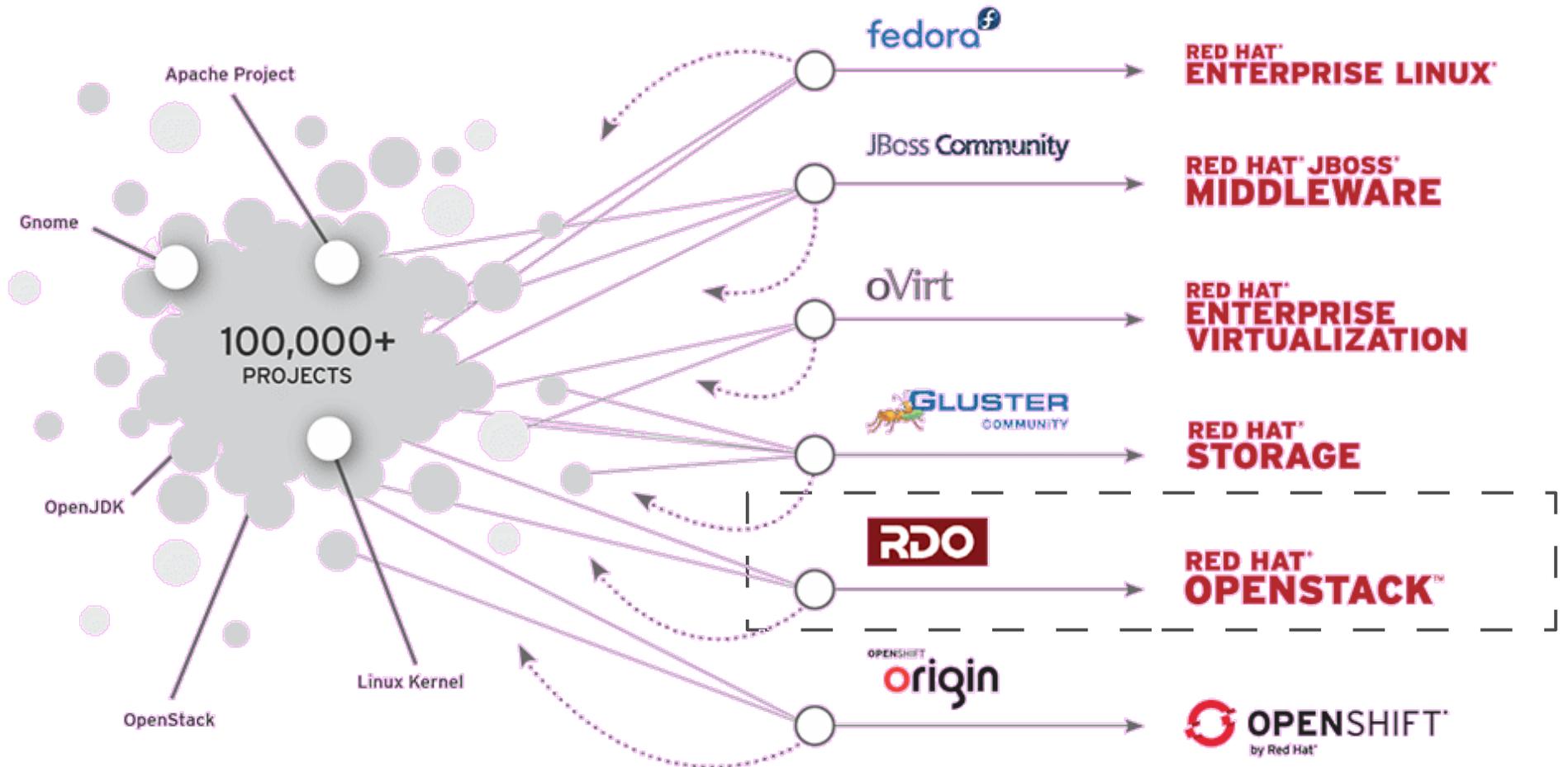
Credit: Doug Hellman

<http://stevedore.readthedocs.org/en/latest/essays/pycon2013.html#requirements-for-ceilometer>



**HOW DO WE GET FROM
COMMUNITY OPENSTACK TO
RED HAT OPENSTACK?**

RED HAT LEADS THROUGH OPEN INNOVATION



OPENSTACK PROGRESSION



- Open source, community-developed (upstream) software
- Founded by Rackspace Hosting and NASA
- Managed by the OpenStack Foundation
- Vibrant group of developers collaborating on open source cloud infrastructure
- Software distributed under the Apache 2.0 license
- No certifications, no support



- Latest OpenStack software, packaged in a managed open source community
- Facilitated by Red Hat
- Aimed at architects and developers who want to create, test, collaborate
- Freely available, not for sale
- Six-month release cadence mirroring community
- No certification, no support
- Installs on Red Hat and derivatives

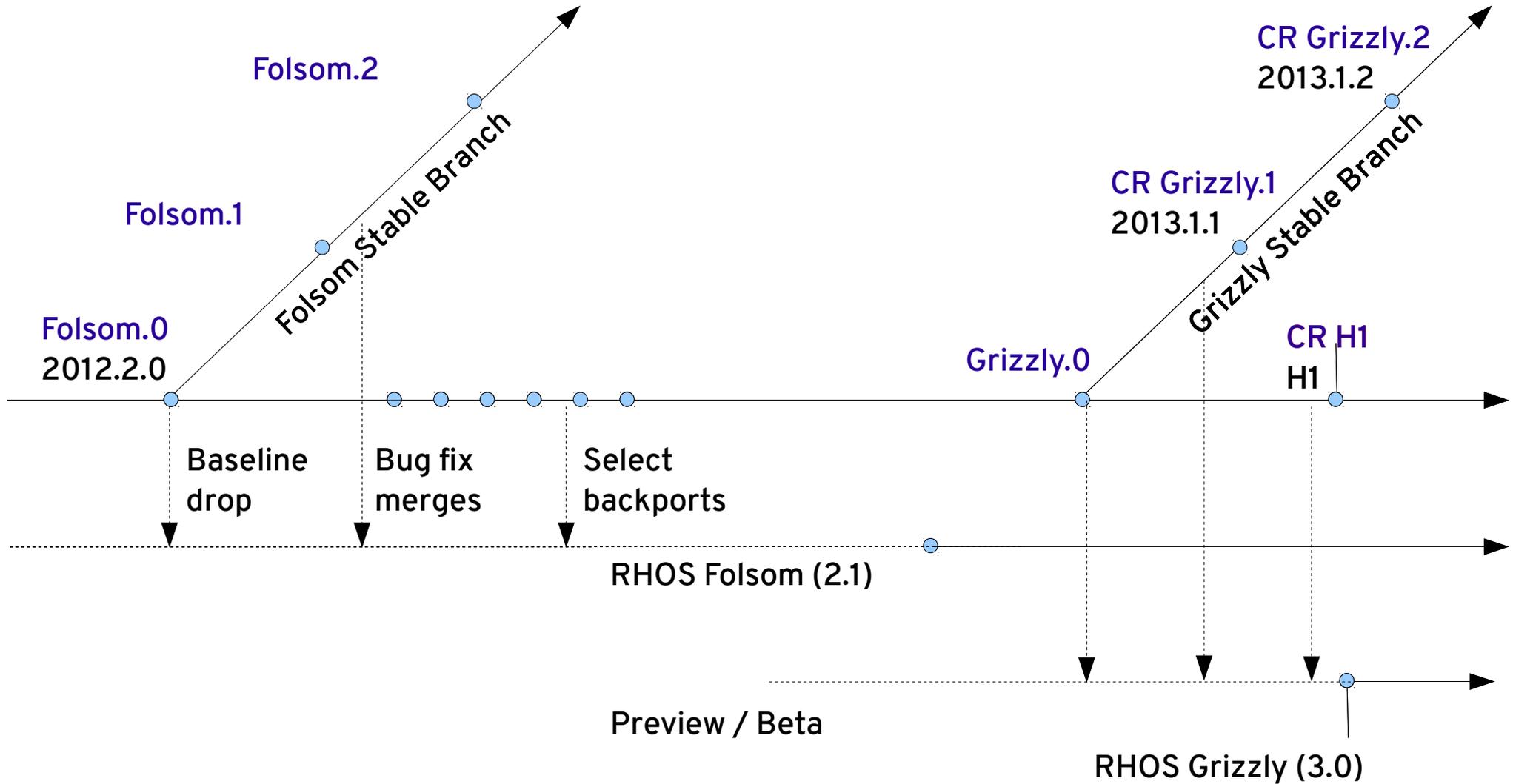


- Enterprise-hardened OpenStack software
- Delivered with an enterprise life cycle
- Six-month release cadence offset from community releases to allow testing
- Aimed at long-term production deployments
- Certified hardware and software through the Red Hat OpenStack Cloud Infrastructure Partner Network
- Supported by Red Hat

OPENSTACK RELEASE CADENCE

- **Upstream**
 - Source code Only
 - Releases every 6 month
 - 2 to 3 'snapshots' including bug fixes
 - No more fixes/snapshots after next release
- **RDO**
 - Follows upstream cadence
 - Delivers binaries

OPENSTACK RELEASE CADENCE



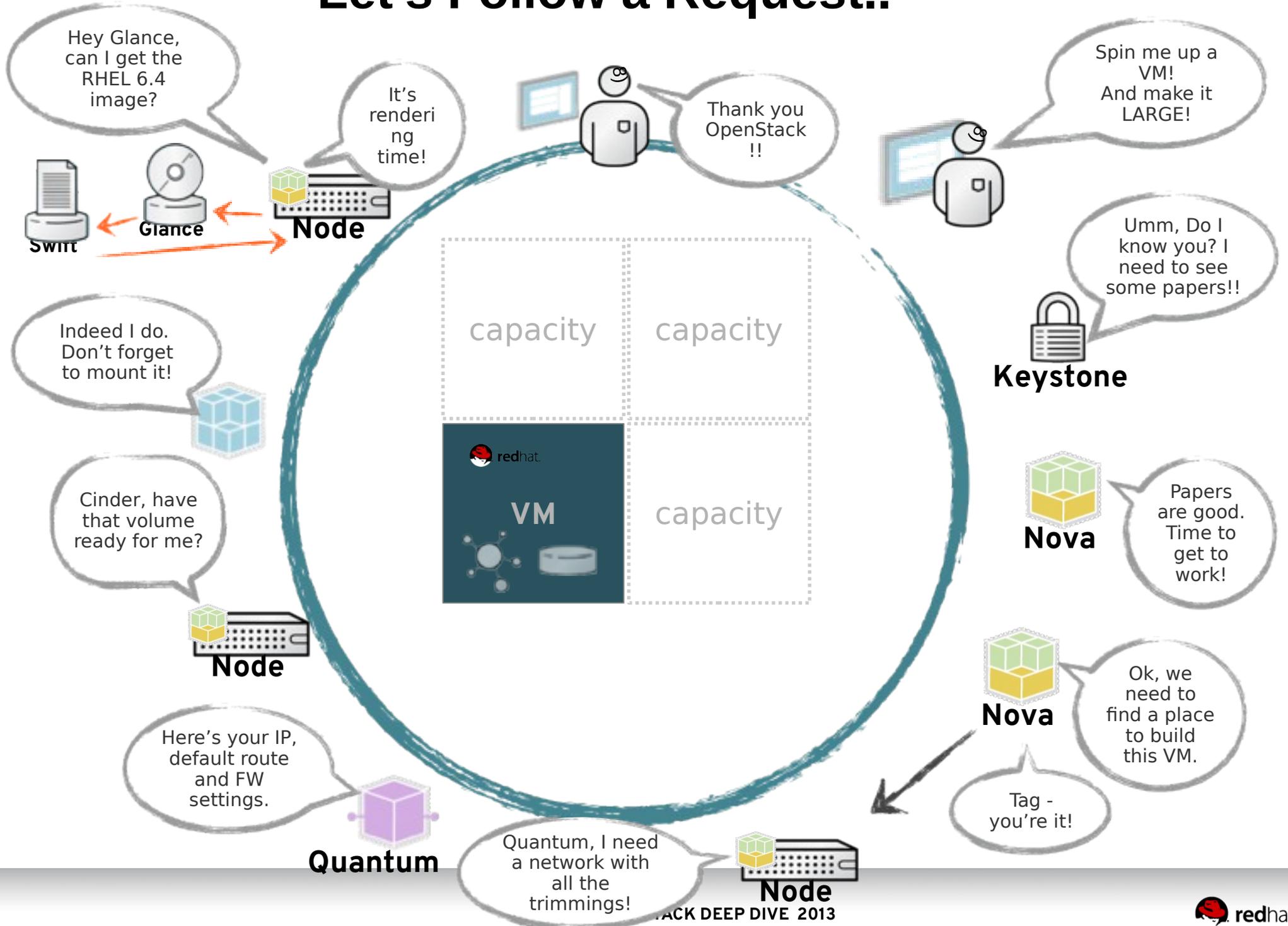
OPENSTACK RELEASE CADENCE

- **Red Hat Enterprise Linux OpenStack Platform**
 - 6 Month cadence
 - Roughly 2 months AFTER upstream
 - Time to stabilize, certify, backport etc.
 - Initially 1 year lifecycle
 - e.g., Support for Folsom ends after Havana release
 - Support for Grizzly ends after “I” release
 - Will increase lifecycle over time
 - Based on upstream stability and resources

RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM VALUE

- Enterprise grade OpenStack deployment with ecosystem, lifecycle, support that customers expect from Red Hat
 - Based on RHEL and includes required fixes in both OpenStack and RHEL
 - Enterprise hardened OpenStack code
 - Longer supported lifecycle
 - includes bug fixes, security errata, selected backports
 - Certified ecosystem (Red Hat Certified OpenStack Partner program and Red Hat Enterprise Linux ecosystem)
 - Full support and Certifications for RHEL and Windows workloads

Let's Follow a Request..



Futures

OPENSTACK: WHAT'S NEXT?

Common customer concerns :

- No centralized management or installer
- Limited storage options
 - No fiber channel support, no storage migration, backup, DR,etc
- No (or limited) Live Migration
- No workload management (DRS)
- No High Availability
- No monitoring
- Upgrading
- No reporting
- Limited configuration options
- Performance concerns

**Q: WHO WILL
BE THE RED HAT
OF OPENSTACK?**

A: RED HAT WILL

TRADEMARK STATEMENTS

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THANK YOU

Questions