

# CHOOSING THE RIGHT STORAGE FOR YOUR OPENSTACK CLOUD

Sadique Puthen  
Senior Cloud Success Architect  
[sputhenp@redhat.com](mailto:sputhenp@redhat.com) @sadiquepp

Rahul Vijayan  
Senior Specialist Solution Architect  
[rvijayan@redhat.com](mailto:rvijayan@redhat.com) @vrahulv

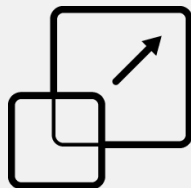
# CLOUD & STORAGE

# BUSINESS NEEDS CLOUD STORAGE



**Illusion of Infinite Capacity**

- **Massive scalability**
- **Easy to expand**
- **Elasticity**
- **No more guessing about future.**



**On Demand Scalability**

- **API driven**
- **On demand rapid provisioning and operations.**
- **Speed and agility**



**Pay As You Go**

- **Unified Management**
- **Effective Monitoring and Metering.**
- **Deeper Integration.**



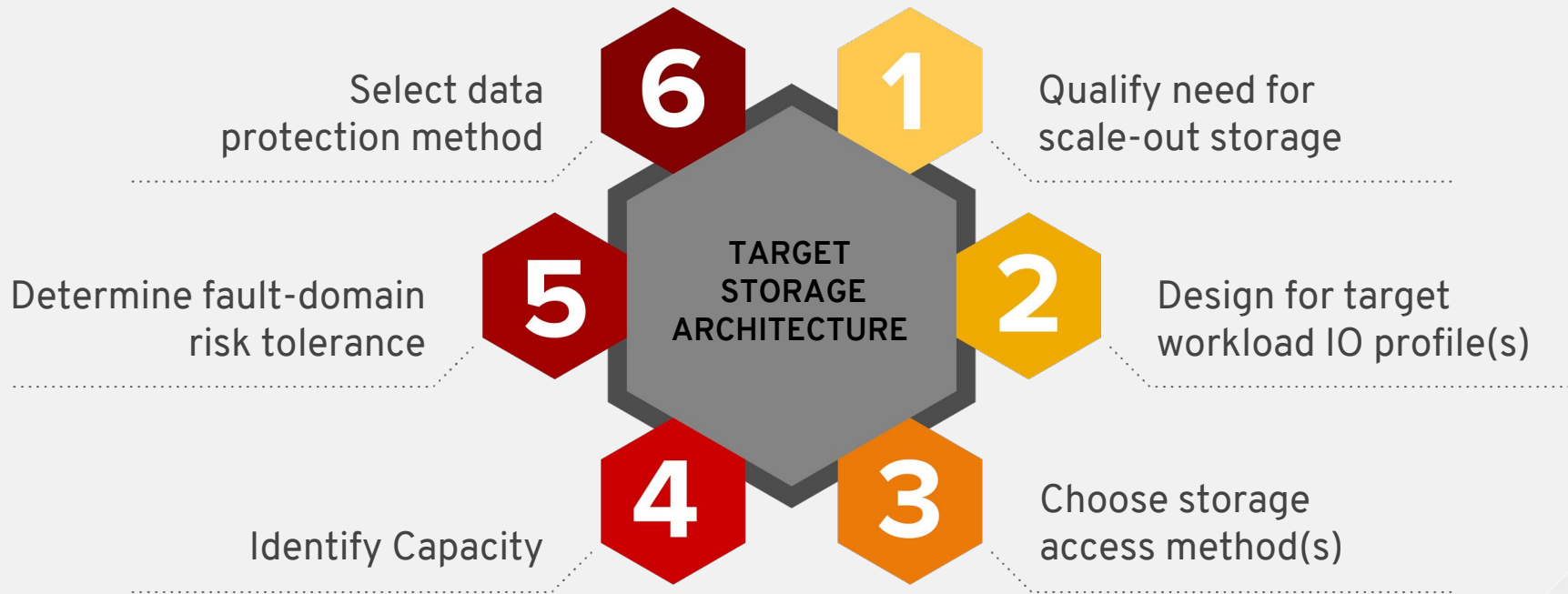
**Self Service**

- **Robust User Interface**
- **Simplified API**
- **Multi-tenancy**

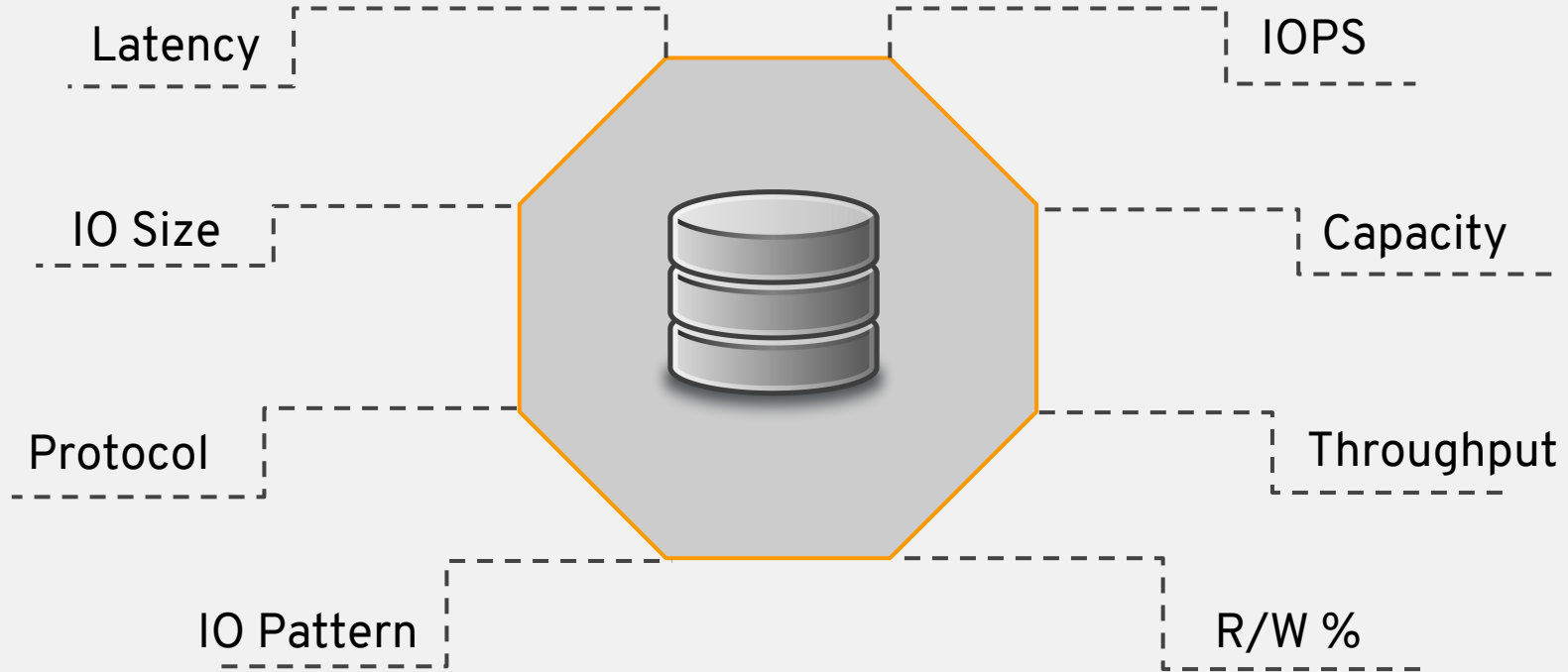
# STORAGE STRATEGIES

**STORAGE IS ALL ABOUT WORKLOADS !**  
**&**  
**IT COMES IN ALL SHAPES AND SIZES !**

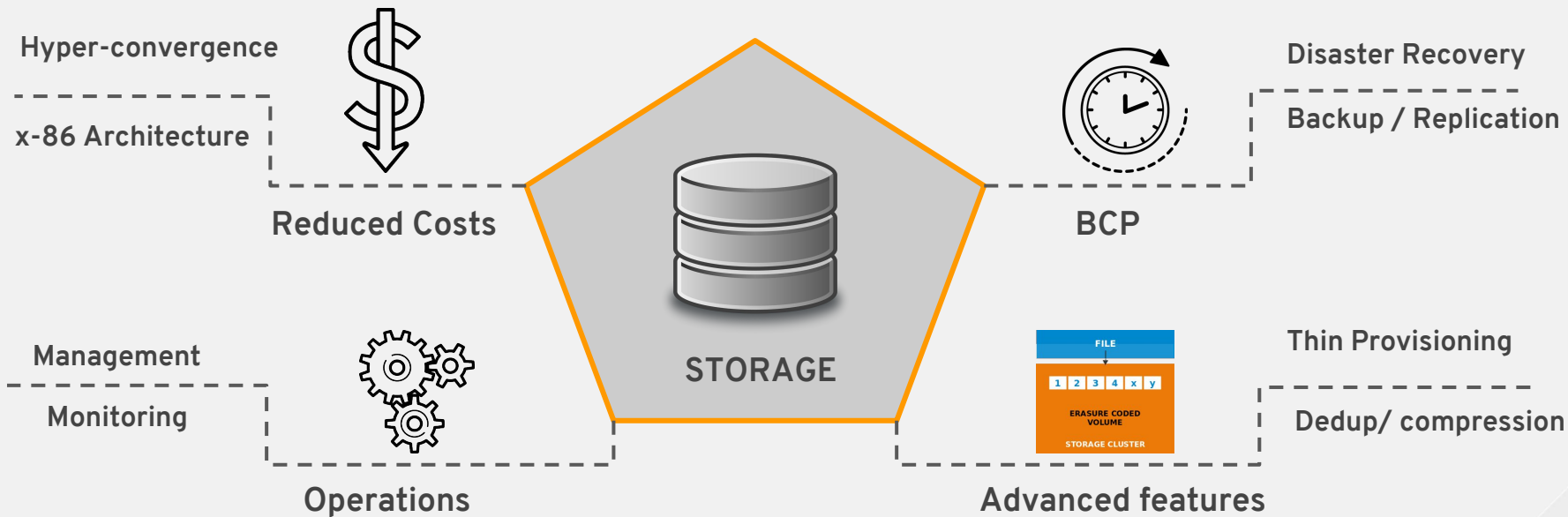
# STORAGE DESIGN



# UNDERSTANDING YOUR WORKLOADS



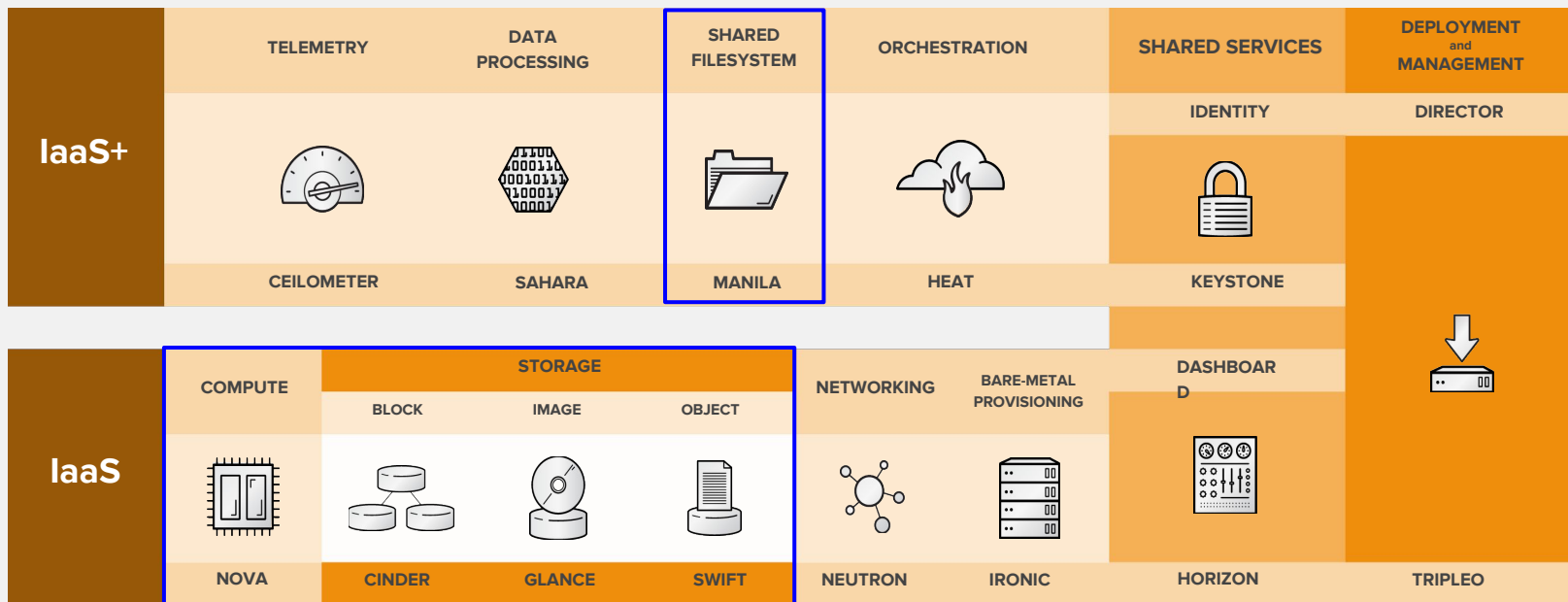
# OTHER FACTORS





# OPENSTACK STORAGE

# OPENSTACK NEEDS STORAGE

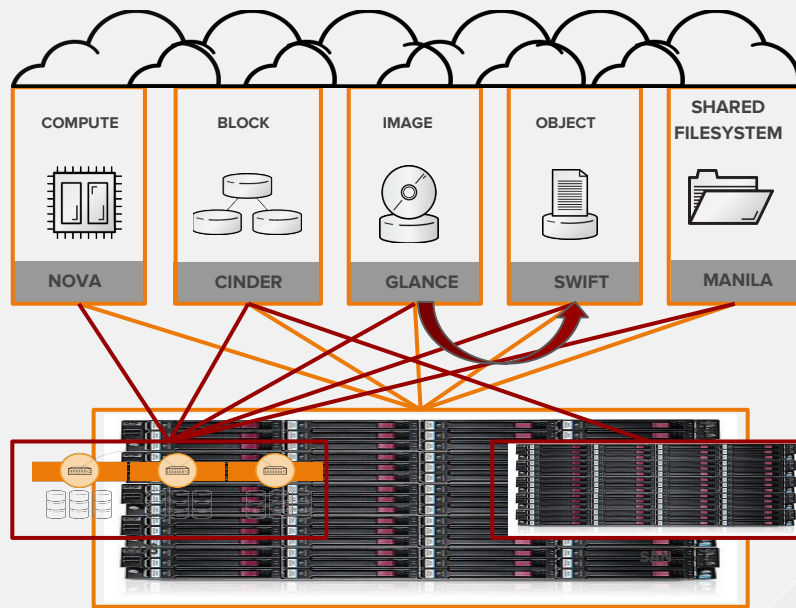


Mainly Nova, Cinder, Glance, Swift, Manila, Sahara, DBaaS, etc.

# HYBRID STORAGE?

**SDS is well aligned with translating illusion of infinite capacity into reality.**

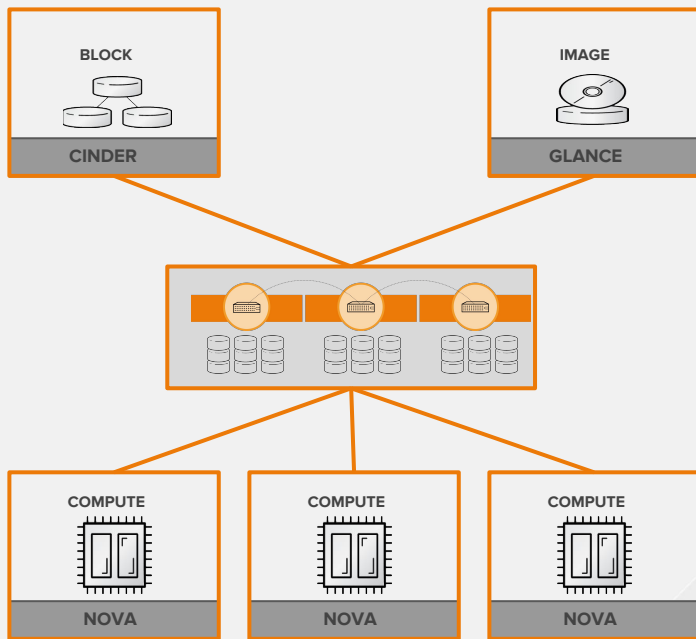
- Is SDS the right option for all storage requirements?
- Should I go with SAN/NAS storage back end?
- Should I have a hybrid storage strategy?
- An answer for this highly depends on how predictable the workload is and if the environment is
  - An on premise private cloud
  - Or Public cloud.



# SHARED STORAGE

Connecting each component to the same shared storage is ideal.

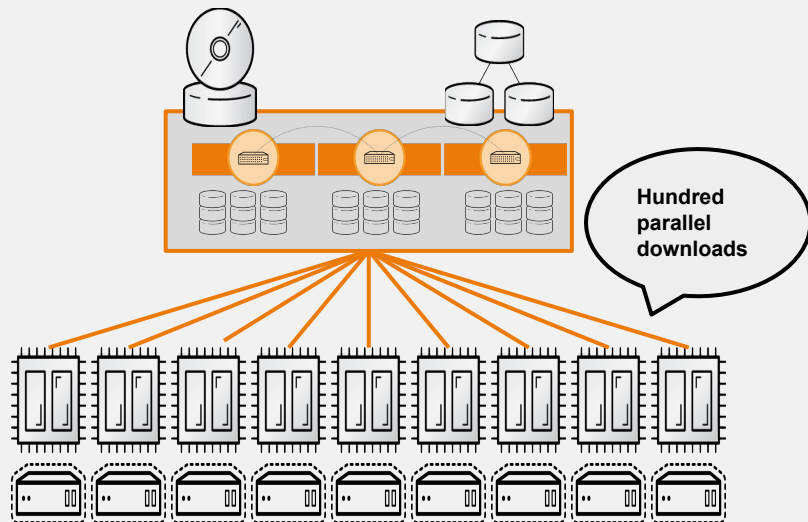
- Should I use different types of storage backend for each component? Eg
  - Object Storage/NFS for glance.
  - Local storage for nova ephemeral
  - Shared storage for cinder.
- Should I use same storage back end for each component?
- This is a better approach than connecting each component to different storage.



# INTEGRATED STORAGE

## How deep the storage is integrated with openstack ?

- Integration between Nova, Glance and Cinder when provisioning instance.
- Create a volume from image.
- Create image from volume.
- Managing Snapshots
- Backup



**Does the storage vendor provide a driver to integrate OpenStack with Storage? If yes, is it tested and certified? To what extent it's integrated?**

# INTEGRATED STORAGE

- **Ask Your Storage Vendor for a POC**

- Technical explanation of how each functions are handled by the driver.
- Showcase how much time it takes for large scale storage tasks to finish.
  - Booting 100+ instances via boot from volumes.
- Is the driver certified by OpenStack vendor (Integration testing) and how is it distributed?
- Can I integrate your storage using vendor deployment tools?

- **Benefits Of Strong Integration**

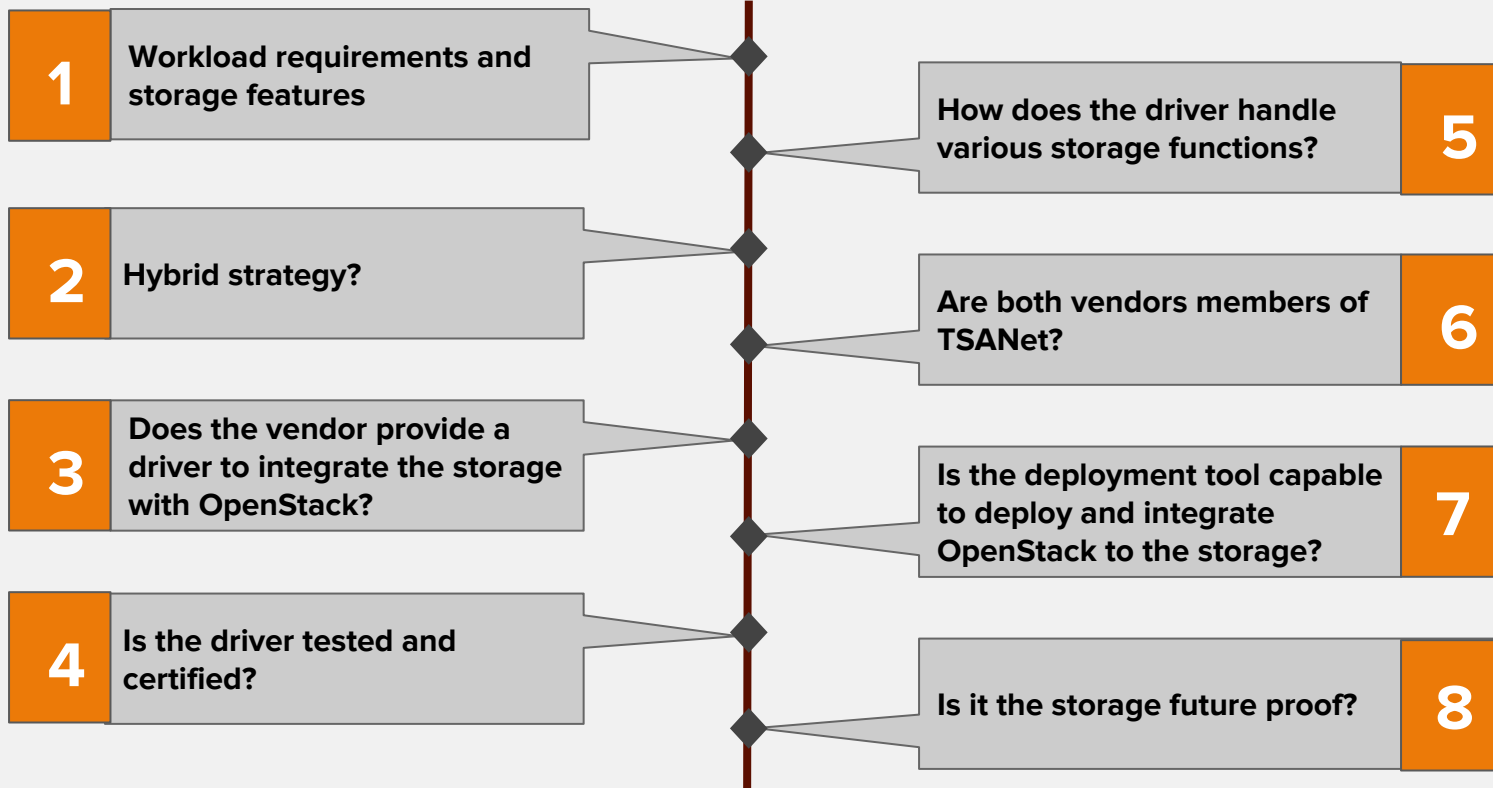
- Saves disk space on compute nodes and storage nodes.
- Saves network bandwidth.
- Reduce the time required for the operations, especially at scale.
  - Rapid provisioning of storage for workload requirements.

# FUTURE-PROOF

**Is the selected storage going to allow you to meet your future storage requirements for IaaS+ and PaaS use cases? BigData as a Service, DBaaS, Manila, etc.**

- Initiate a discussion with storage vendor to what extent it supports my future storage requirements.
  - Support for PaaS (eg OpenShift)
  - Support for containers
  - DBaaS
  - Big Data as a Service
  - Manila - File sharing as a service

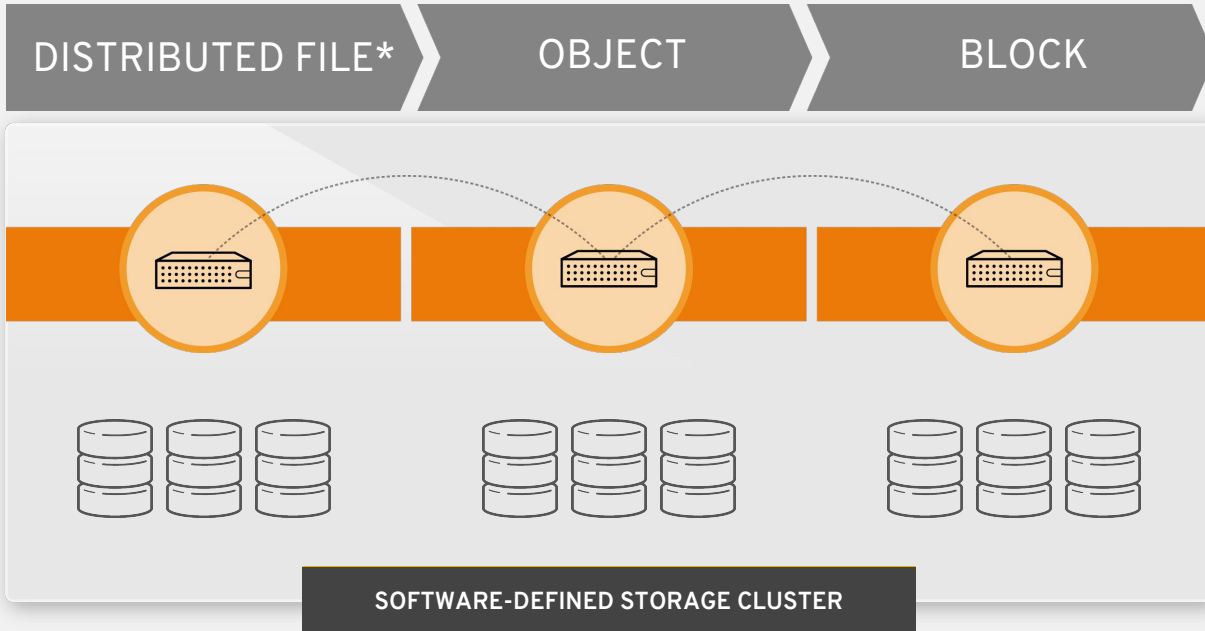
# IN A NUTSHELL





# RED HAT CEPH STORAGE

# ALL IN ONE



# CEPH IS NOT JUST SCALE OUT CAPACITY

## IOPS Optimized

NVMe SSD in SLED chassis

High IOPS / GB  
Smaller, random IO  
Read / write mix

Use Case: MySQL



## Throughput Optimized

SSD, HDD in standard / dense chassis

High MB/s throughput  
Large, sequential IO  
Read / write mix

Use Case: Rich Media



## Cost / Capacity Optimized

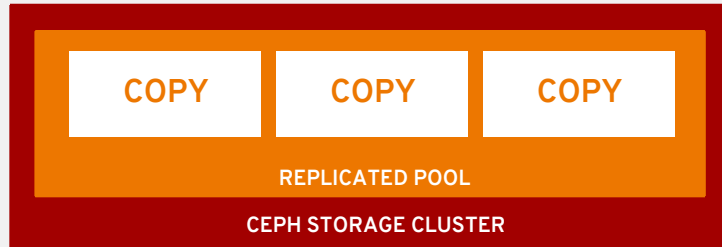
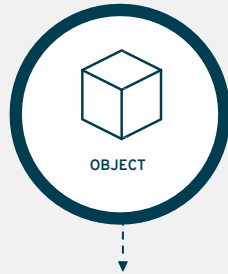
HDD in dense / ultra-dense chassis

Low cost / GB  
Sequential IO  
Write mostly

Use Case: Active Archives

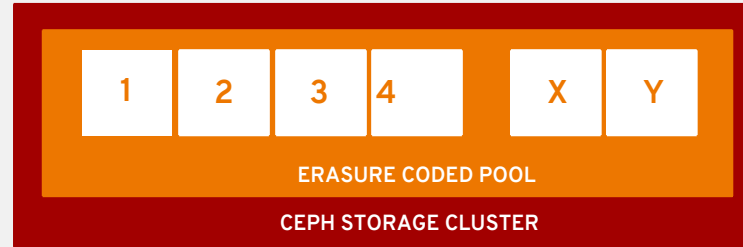
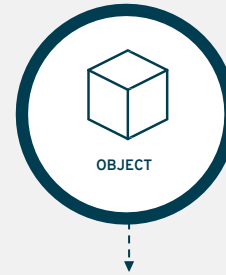


# DATA PROTECTION SCHEMES



## FULL COPIES OF STORED OBJECTS

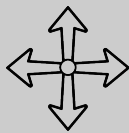
- Very high durability
- Quicker recovery



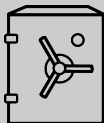
## ONE COPY PLUS PARITY

- Cost-effective durability
- Expensive recovery

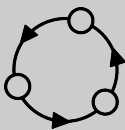
# FEATURES & FUNCTIONALITIES



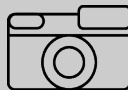
**SCALE**



**ENCRYPTION**



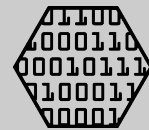
**RE-BALANCING**



**SNAPSHOTS**



**REPLICATION**

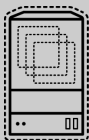


**CRUSH**

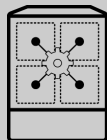


**Ceph RBD - 65%**

**Ceph FS - 53%**



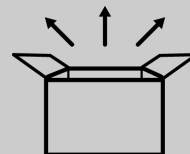
**HYPER  
CONVERGENCE**



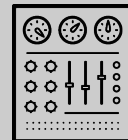
**CONTAINERIZED  
CEPH**



**RED HAT  
SUPPORT**



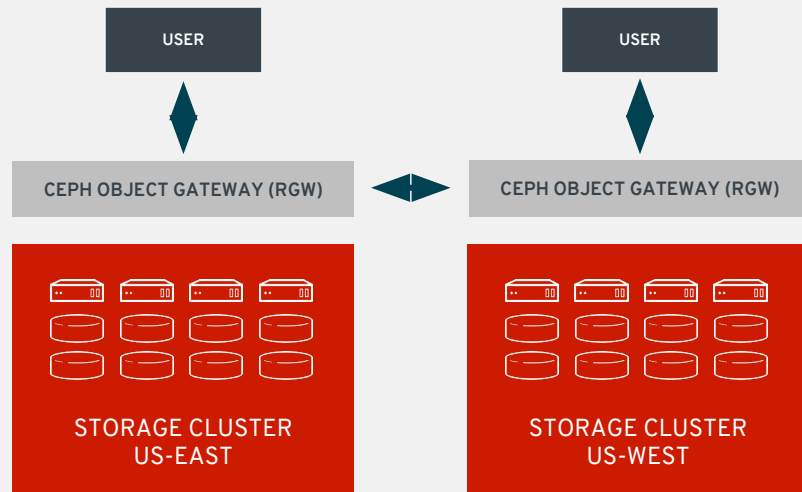
**ONLINE  
UPGRADES**



**STORAGE  
CONSOLE**

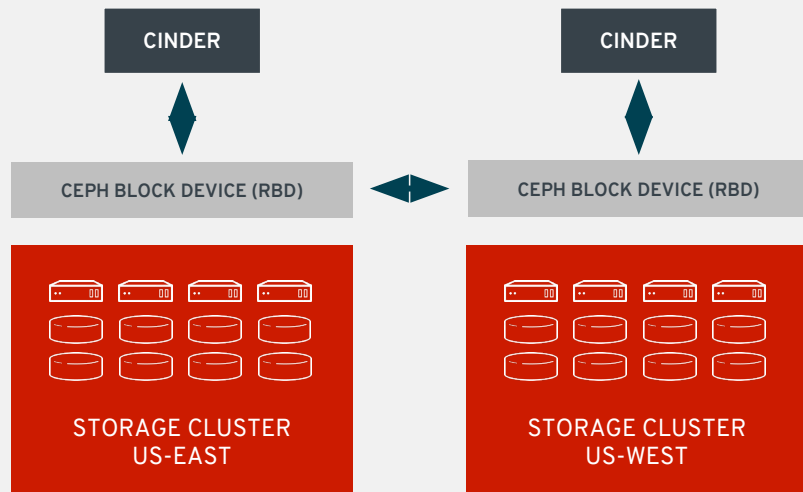
# MULTI-SITE CONFIGURATION

- Configure each Ceph Object Gateway to work in an active active zone configuration, allowing for writing to non-master zone
- Global object storage clusters with a single namespace
- Enables deployment of clusters across multiple geographic locations
- Clusters synchronize, allowing users to read from or write to the closest one



# RBD MIRRORING

- Multi-site replication for block devices
- Replicates virtual block devices across regions
- Designed for disaster recovery and archival
- Integration with Cinder Volume Replication (OSP-10)



# BACKUP STRATEGIES

- Volume backup with cinder backup driver
- Backs up volumes of any type to a Ceph back-end store
- Volume snapshot with cinder volume snapshot
- Establish backup policies for datas in the VMs



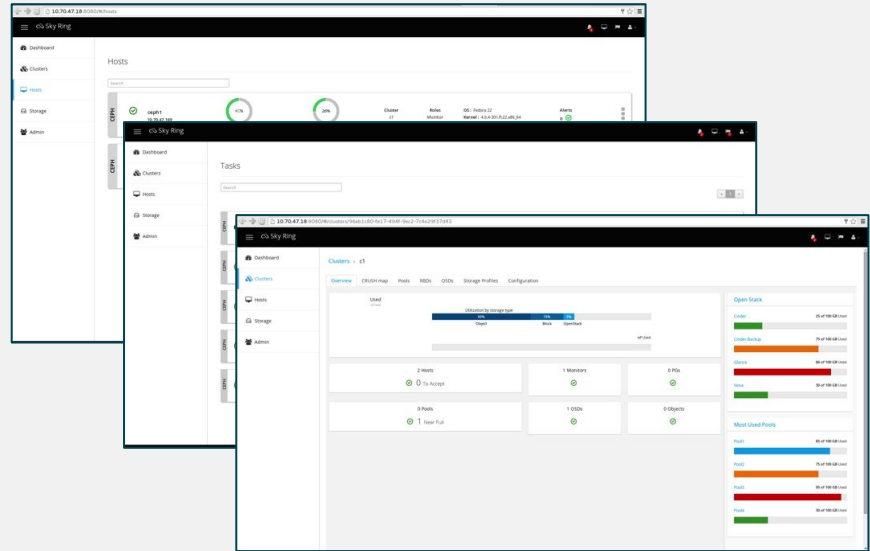
# USABILITY: RED HAT STORAGE CONSOLE

An easy to use interface for managing cluster lifecycles

- Ansible-based deployment tools for driving granular configuration options from CLI or GUI

## ANSIBLE

- Monitoring and graphs for troubleshooting with statistical information about components

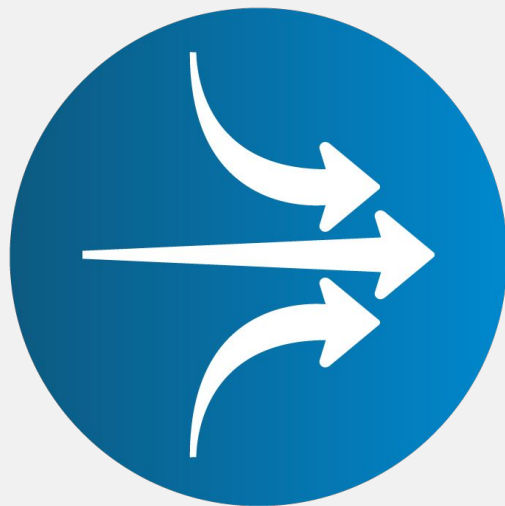


# RED HAT CEPH STORAGE 2

## PERFORMANCE: BLUESTORE (TECH PREVIEW)

BlueStore is a new Ceph storage backend optimized for modern media

- Replaces FileStore, which was designed for HDDs
- Supports flexible media topologies (flash, K/V drives, persistent memory)
- Eliminates the need for an underlying filesystem or dedicated journal device
- Provides a 2-3X performance boost



# RED HAT CEPH TECHNICAL REFERENCES

## **RHCS Test Drive : Hands-on Lab for Ceph**

★ <http://bit.ly/ceph-test-drive>

## **RHCS Hardware Selection Guide**

★ <http://bit.ly/RHCS-hardware-selection-guide>

## **RHCS Hardware Configuration Guide**

★ <http://bit.ly/RHCS-hw-configuration-guide>

## **MySQL on RHCS Reference Architecture**

★ [http://bit.ly/MySQL\\_DB-on-RHCS](http://bit.ly/MySQL_DB-on-RHCS)

## **RHCS on Intel CPUs and SSDs Config Guide**

★ <http://bit.ly/RHCS-on-Intel>

## **RHCS Ready Supermicro Server SKUs**

★ <http://bit.ly/RHCS-SuperMicro-SKU>

## **RHCS on CISCO UCS Servers**

★ <http://bit.ly/RHCS-on-Cisco-UCS>

## **RHCS on QCT Servers Perf & Sizing Guide**

★ <http://bit.ly/RHCS-on-QCT>

## **RHCS on Supermicro Servers Perf & Sizing Guide**

★ <http://bit.ly/RHCS-on-SuperMicro>

## **RHCS on DELL EMC PE 730xd Servers Perf & Sizing Guide**

★ <http://bit.ly/RHCS-on-DellEMC-PE730xd>

## **RHCS on DELL EMC DSS 7000 Servers Perf & Sizing Guide**

★ <http://bit.ly/RHCS-on-DellEMC-DSS7000>

## **RHCS on Samsung Sierra Flash Array Perf & Sizing Guide**

★ <http://bit.ly/RHCS-on-Samsung-flash-array>

## **RHCS Ready QCT Server SKUs**

★ <http://bit.ly/RHCS-QCT-SKU>

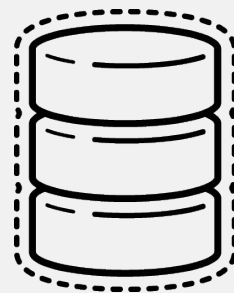
## **RHCS on SanDisk Infiniflash**

★ <http://bit.ly/RHCS-on-Sandisk-Infiniflash>

## **RHCS and RHOSP HCI Ref. Arch**

★ <http://bit.ly/RHCS-RHOSP-HCI>

# BETTER TOGETHER



RED HAT  
**SUMMIT**

# THANK YOU



[plus.google.com/+RedHat](https://plus.google.com/+RedHat)



[facebook.com/redhatinc](https://facebook.com/redhatinc)



[linkedin.com/company/red-hat](https://linkedin.com/company/red-hat)



[twitter.com/RedHatNews](https://twitter.com/RedHatNews)



[youtube.com/user/RedHatVideos](https://youtube.com/user/RedHatVideos)

The logo consists of a red speech bubble shape pointing downwards, containing the text "RED HAT" in a smaller font above "SUMMIT" in a larger font, both in white.

**RED HAT**  
**SUMMIT**

**LEARN. NETWORK.  
EXPERIENCE  
OPEN SOURCE.**