CHOOSING THE RIGHT STORAGE FOR YOUR OPENSTACK CLOUD

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CLOUD & STORAGE
BUSINESS NEEDS CLOUD STORAGE

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

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

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

- Robust User Interface
- Simplified API
- Multi-tenancy
STORAGE STRATEGIES
STORAGE IS ALL ABOUT WORKLOADS!
&
IT COMES IN ALL SHAPES AND SIZES!
STORAGE DESIGN

1. Qualify need for scale-out storage
2. Design for target workload IO profile(s)
3. Choose storage access method(s)
4. Identify Capacity
5. Determine fault-domain risk tolerance
6. Select data protection method
UNDERSTANDING YOUR WORKLOADS

Latency

IO Size

Protocol

IO Pattern

IOPS

Capacity

Throughput

R/W %
OTHER FACTORS

- Hyper-convergence
- x-86 Architecture
- Management
- Monitoring
- Operations
- Disaster Recovery
- Backup / Replication
- BCP
- Reduced Costs
- Advanced features
- Thin Provisioning
- Dedup/ compression

STORAGE
OPENSTACK 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.
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

1. **Workload requirements and storage features**
   - How does the driver handle various storage functions?

2. **Hybrid strategy?**
   - Are both vendors members of TSANet?

3. **Does the vendor provide a driver to integrate the storage with OpenStack?**
   - Is the deployment tool capable to deploy and integrate OpenStack to the storage?

4. **Is the driver tested and certified?**
   - Is it the storage future proof?
ALL IN ONE

DISTRIBUTED FILE*  OBJECT  BLOCK

SOFTWARE-DEFINED STORAGE CLUSTER

iSCSI GATEWAY

NFS GATEWAY
<table>
<thead>
<tr>
<th>Throughput Optimized</th>
<th>SSD, HDD in standard / dense chassis</th>
<th>High MB/s throughput</th>
<th>Large, sequential IO</th>
<th>Read / write mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Case: Rich Media</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost / Capacity Optimized</th>
<th>HDD in dense / ultra-dense chassis</th>
<th>Low cost / GB</th>
<th>Sequential IO</th>
<th>Write mostly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Case: Active Archives</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>IOPS Optimized</th>
<th>NVMe SSD in SLED chassis</th>
<th>High IOPS / GB</th>
<th>Smaller, random IO</th>
<th>Read / write mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Case: MySQL</td>
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</table>
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 data 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

#redhat #rhsummit
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
|------------------------------------------|---------------------------------------------------------------|
BETTER TOGETHER
THANK YOU

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