Storage Fault Tolerance in Hyper-Converged Clouds running Red Hat OpenStack Platform

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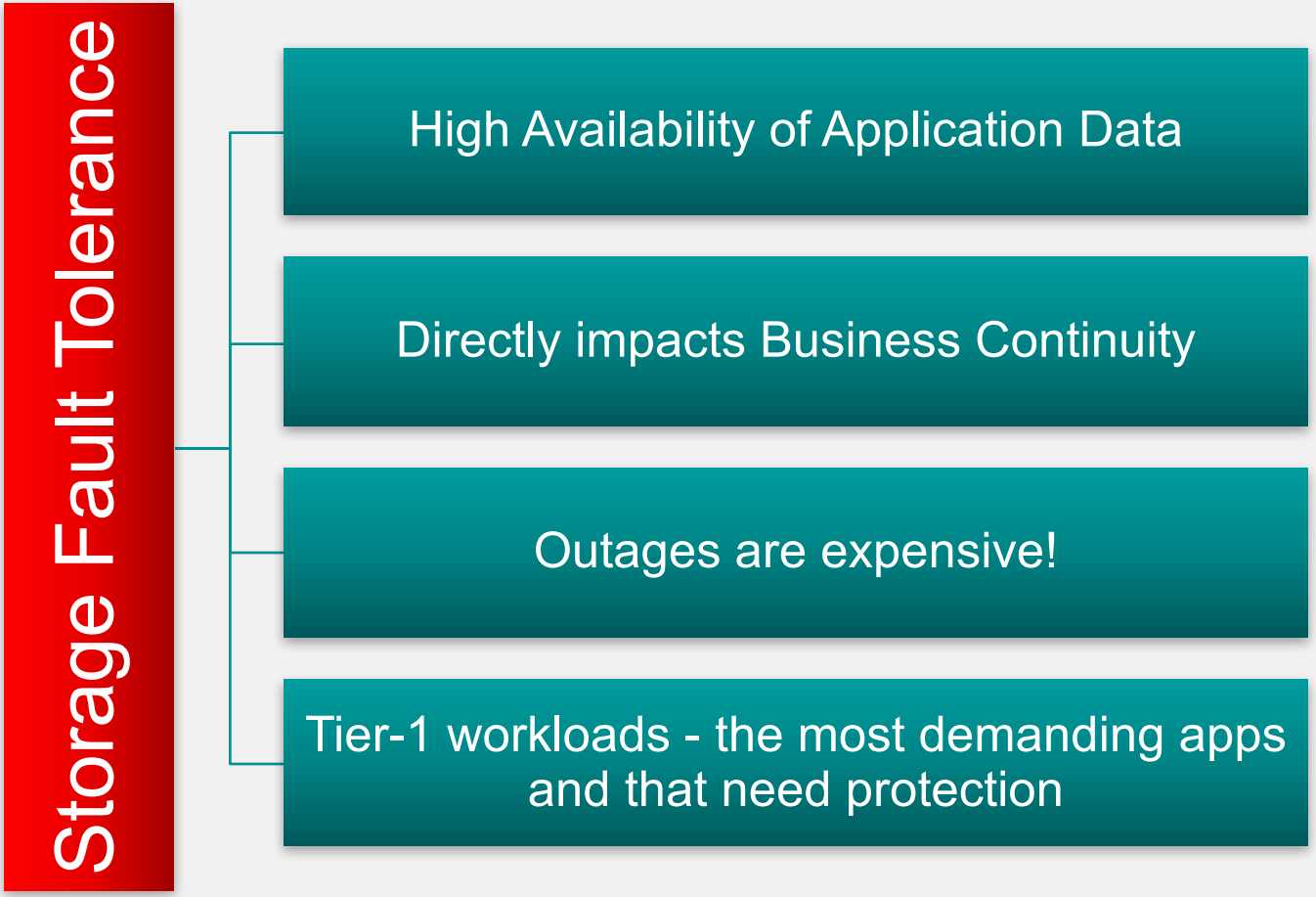
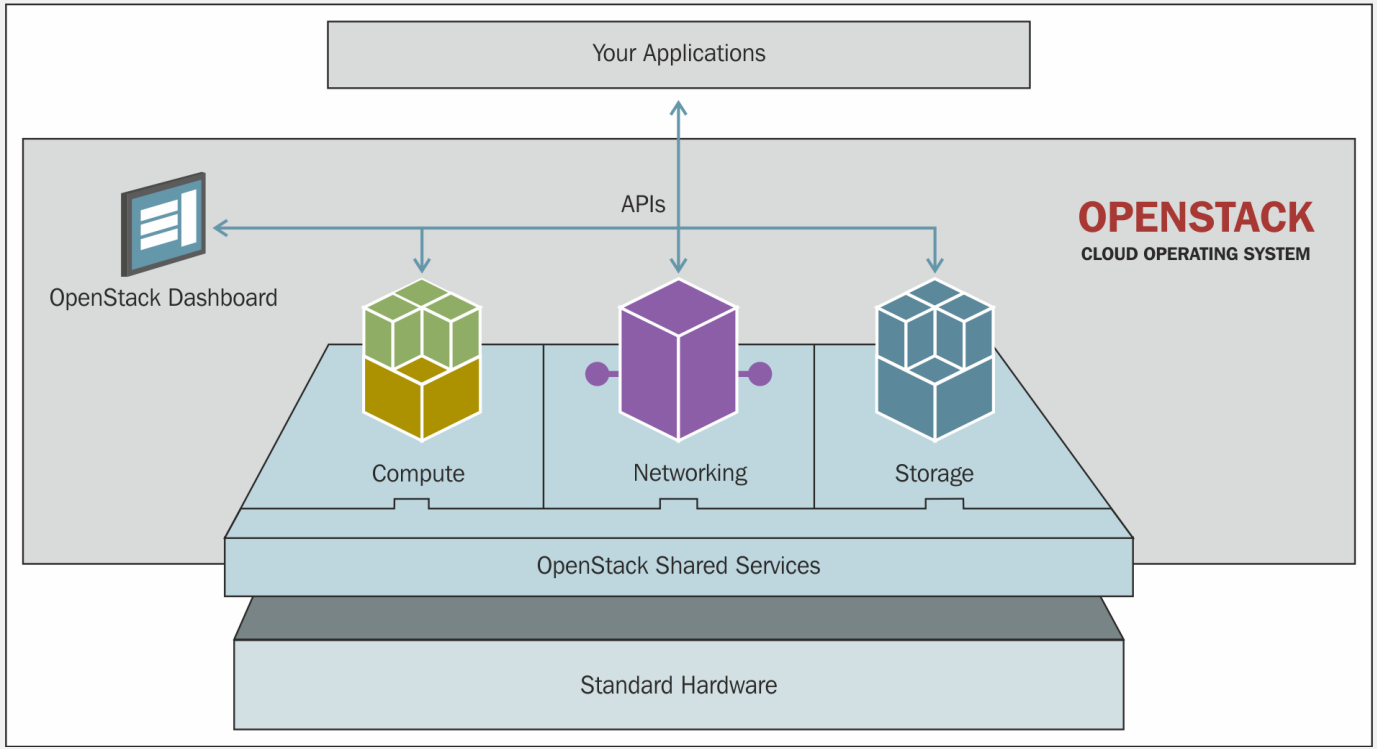
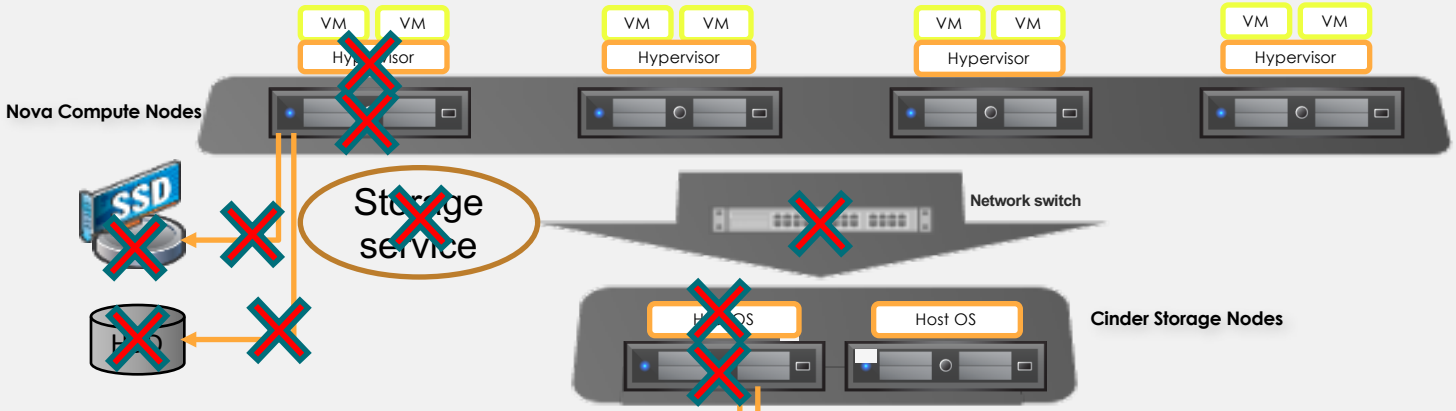
2nd May 2017


Storage Fault Tolerance
High Availability of Application Data
Directly impacts Business Continuity
Outages are expensive!
Tier-1 workloads - the most demanding apps and that need protection

OpenStack Hyper-converged Environment



Storage Faults in hyper-converged environments



Host OS/hardware failure

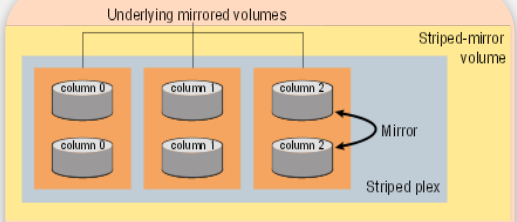
Storage media failure

Network failure

Storage service dead

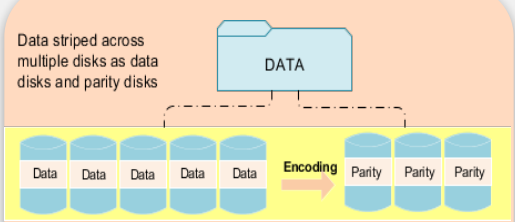
Storage connectivity loss

Fault Tolerance Mechanisms



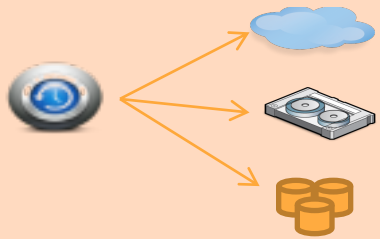
- Need extra storage for full copy of data
- No impact to I/O performance
- Zero RPO

Mirroring & Striping



- Need extra storage for erasure codes
- Some impact to I/O performance
- Zero RPO

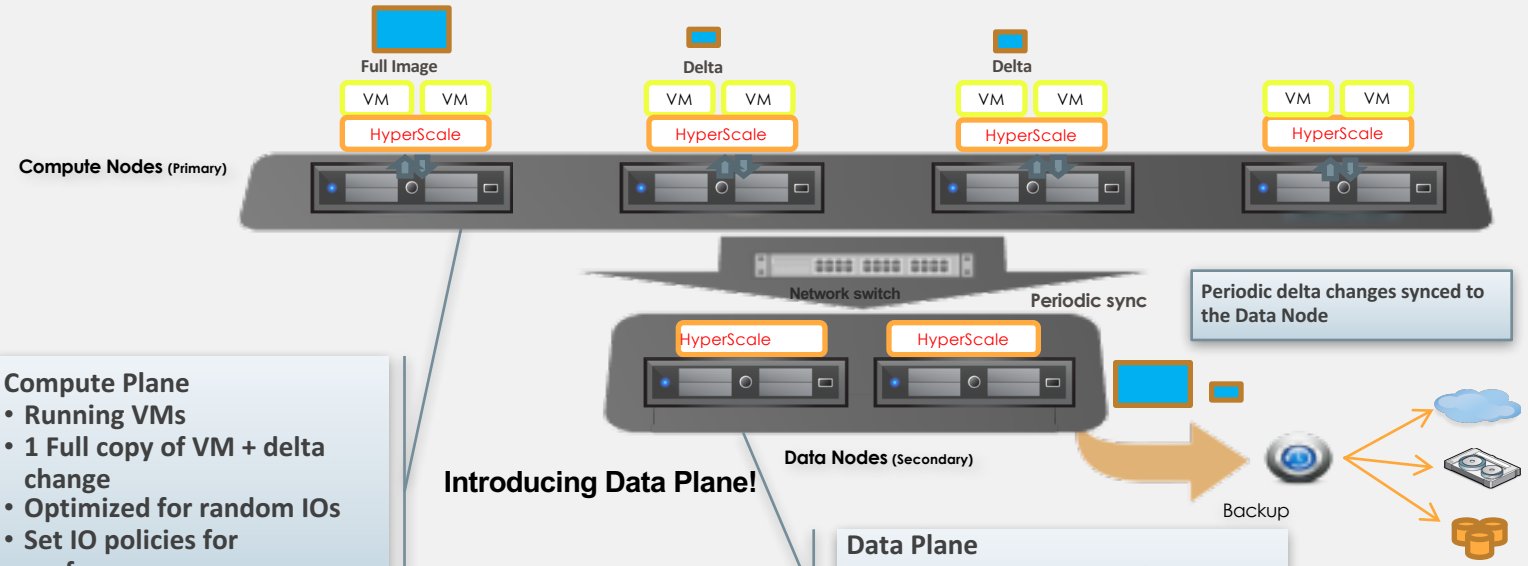
Erasure Coding



- Need extra storage for snapshot data
- Indirect impact to I/O performance
- RPO up to last snapshot/backup

Snapshots & Backups

Veritas™ HyperScale for OpenStack

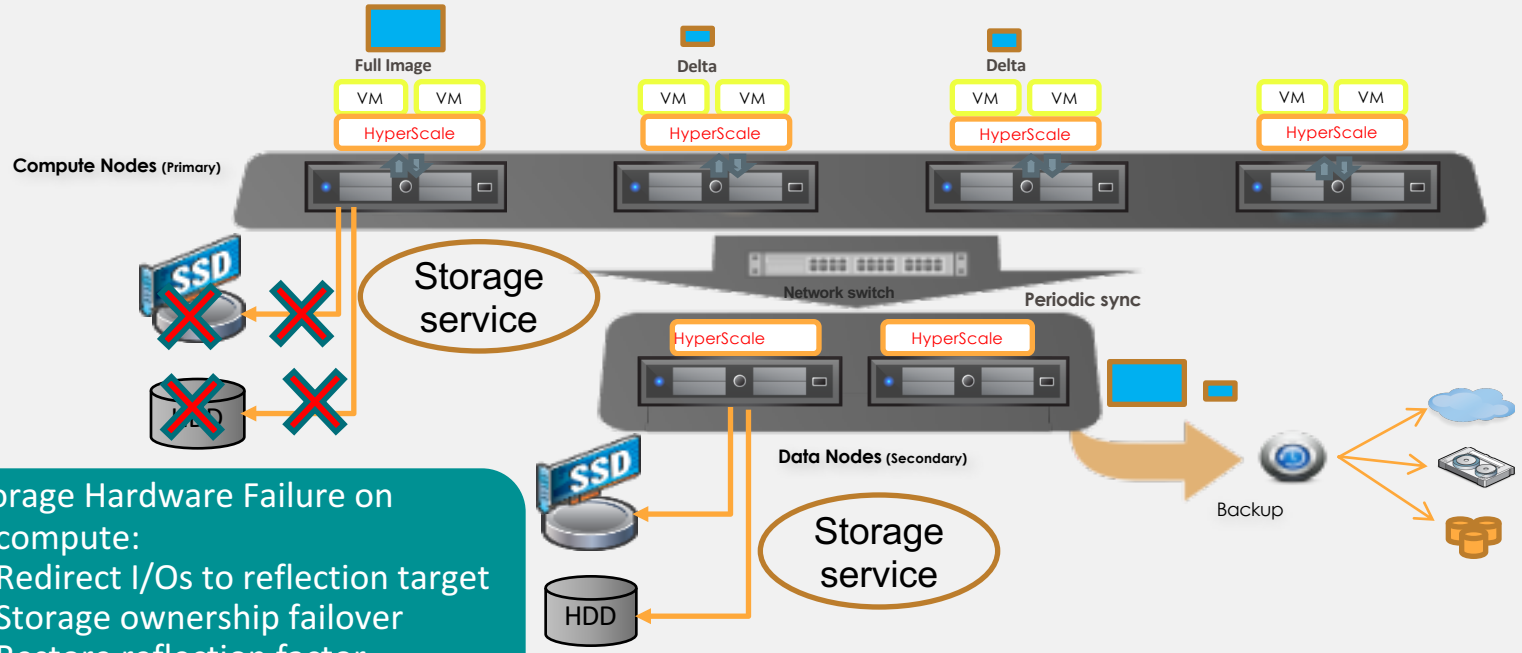


Compute Plane
- Running VMs
- 1 Full copy of VM + delta change
- Optimized for random IOs
- Set IO policies for performance

Introducing Data Plane!

Data Plane
- Point-in-Time copies of VMs
  - Real time fault recovery
  - Rapid VM provisioning
- "Off-hosting" – Running VMs not impacted by Backup operations
- Optimized for sequential IOs

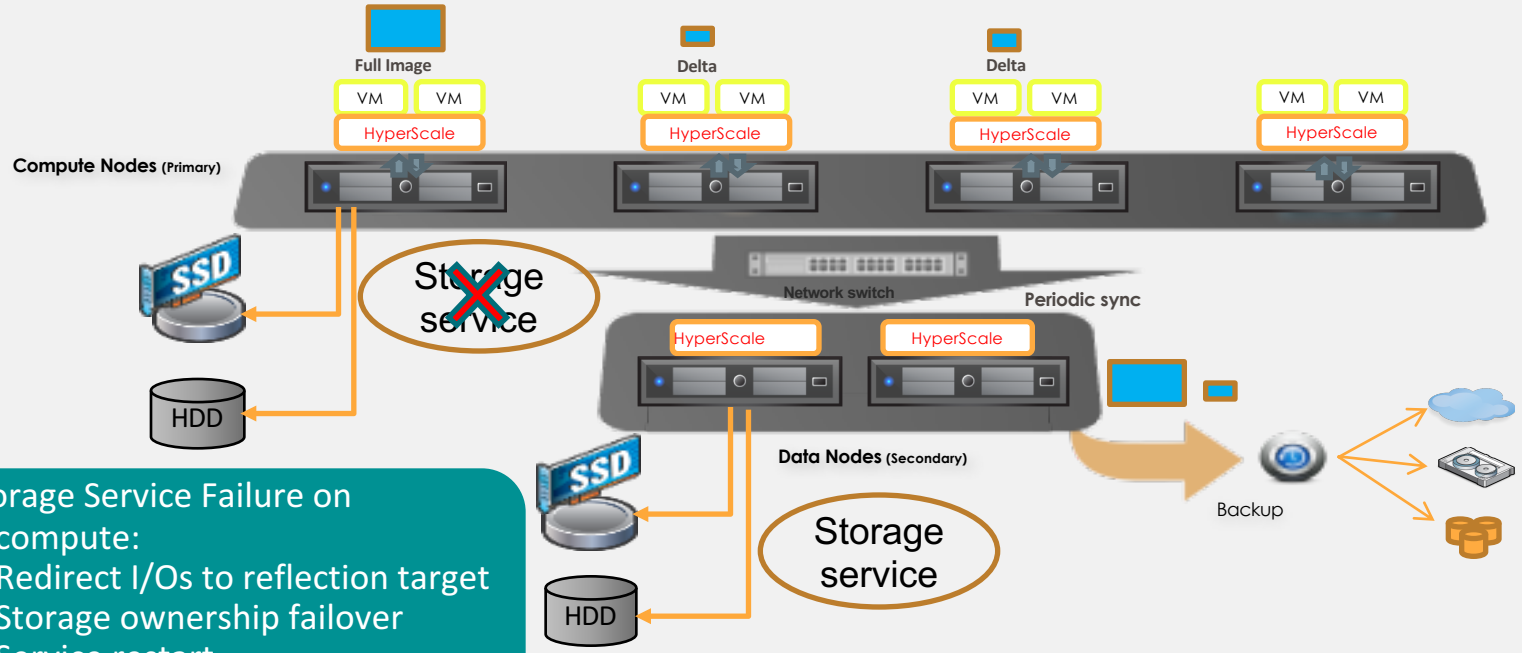
Storage Fault handling in Veritas HyperScale



Storage Hardware Failure on compute:

- Redirect I/Os to reflection target
- Storage ownership failover
- Restore reflection factor
- Live migrate VM

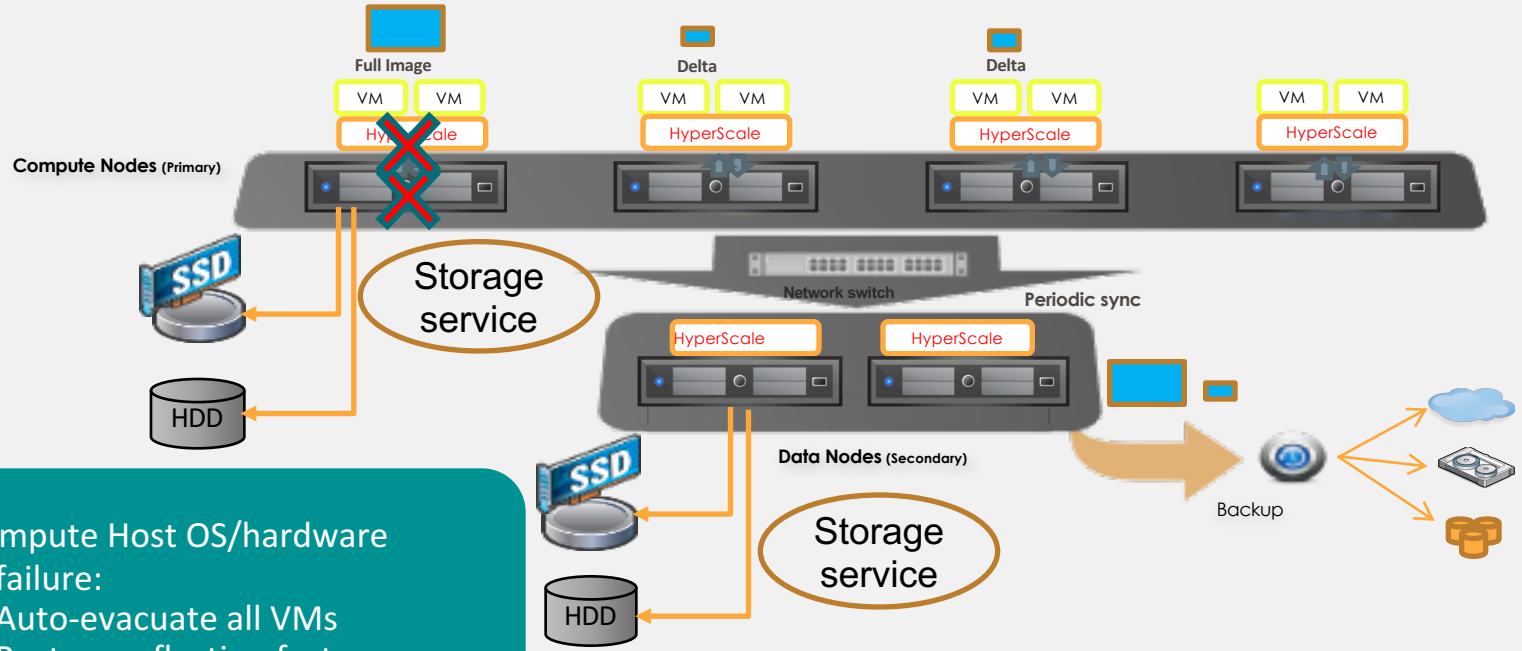
Storage Fault handling in Veritas HyperScale



Storage Service Failure on compute:

- Redirect I/Os to reflection target
- Storage ownership failover
- Service restart
- Storage ownership failback

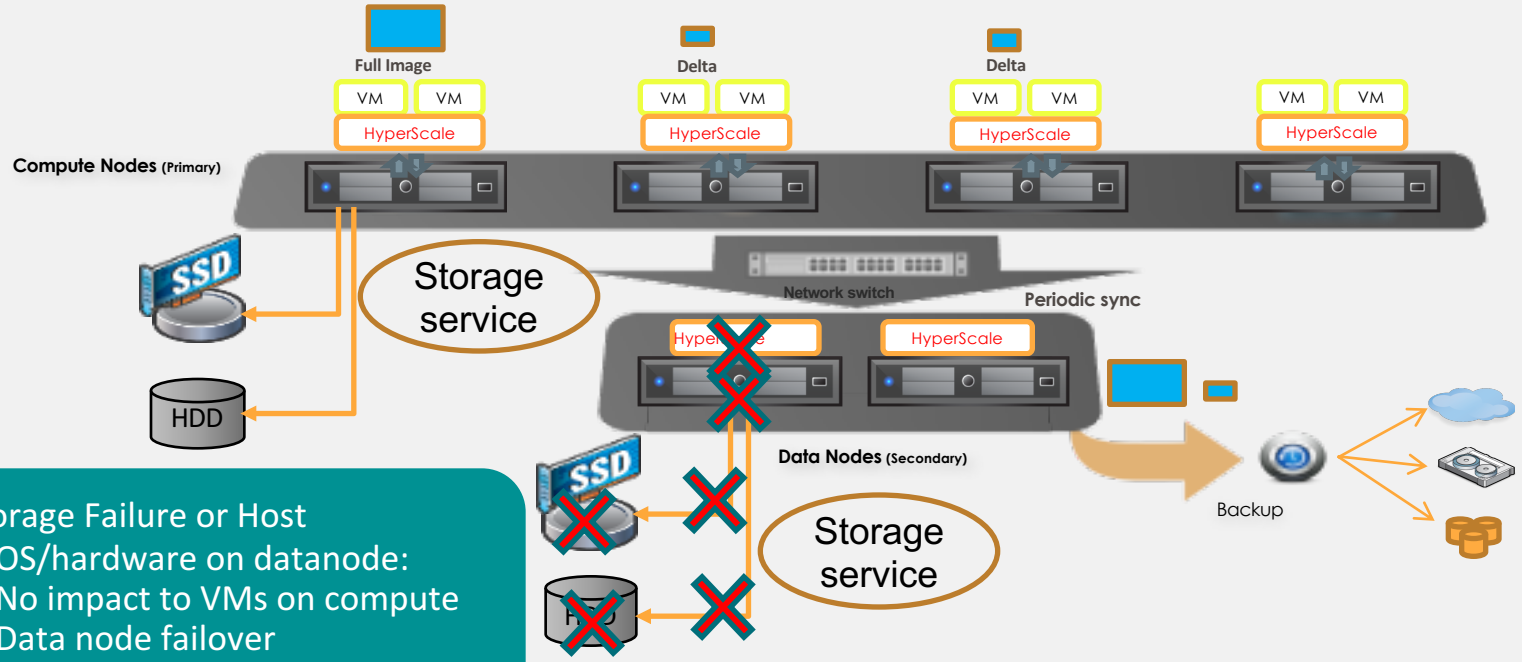
Storage Fault handling in Veritas HyperScale



Compute Host OS/hardware failure:

- Auto-evacuate all VMs
- Restore reflection factor

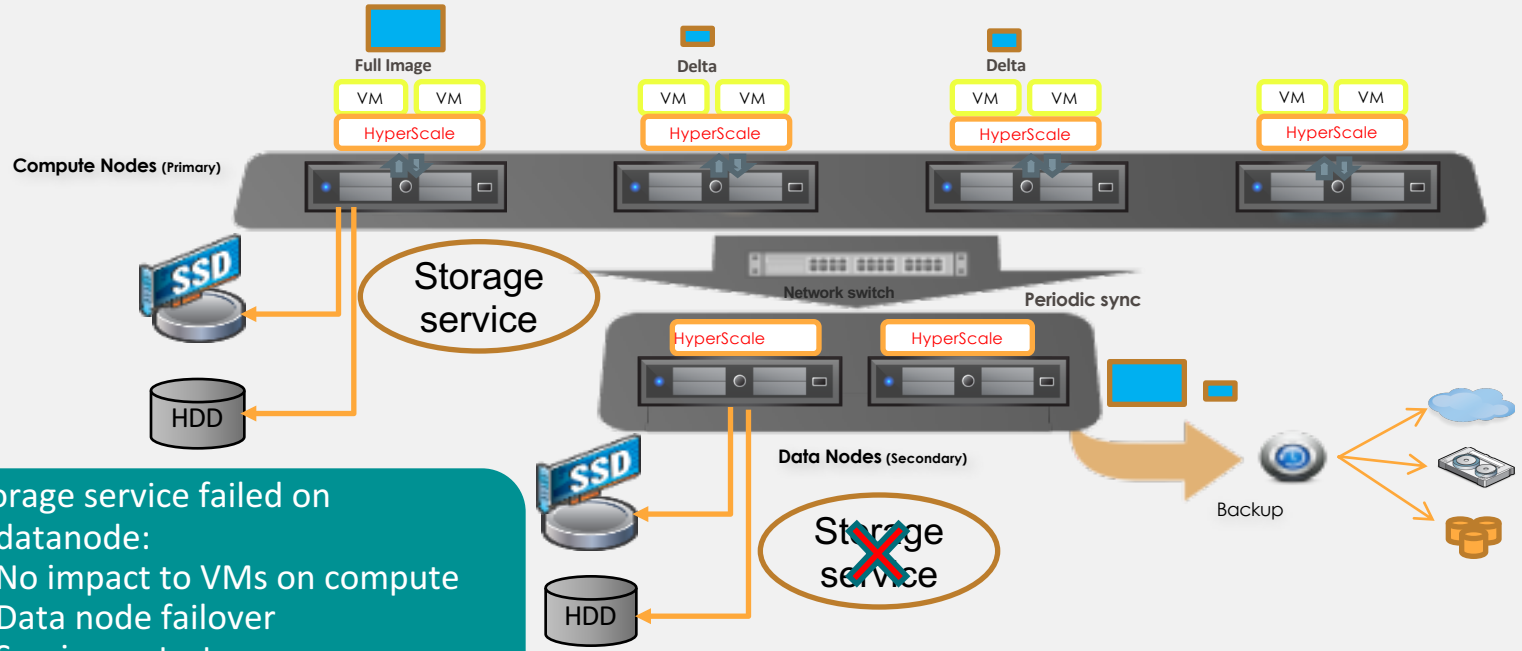
Storage Fault handling in Veritas HyperScale



Storage Failure or Host OS/hardware on datanode:

- No impact to VMs on compute
- Data node failover
- Restore DN reflection factor

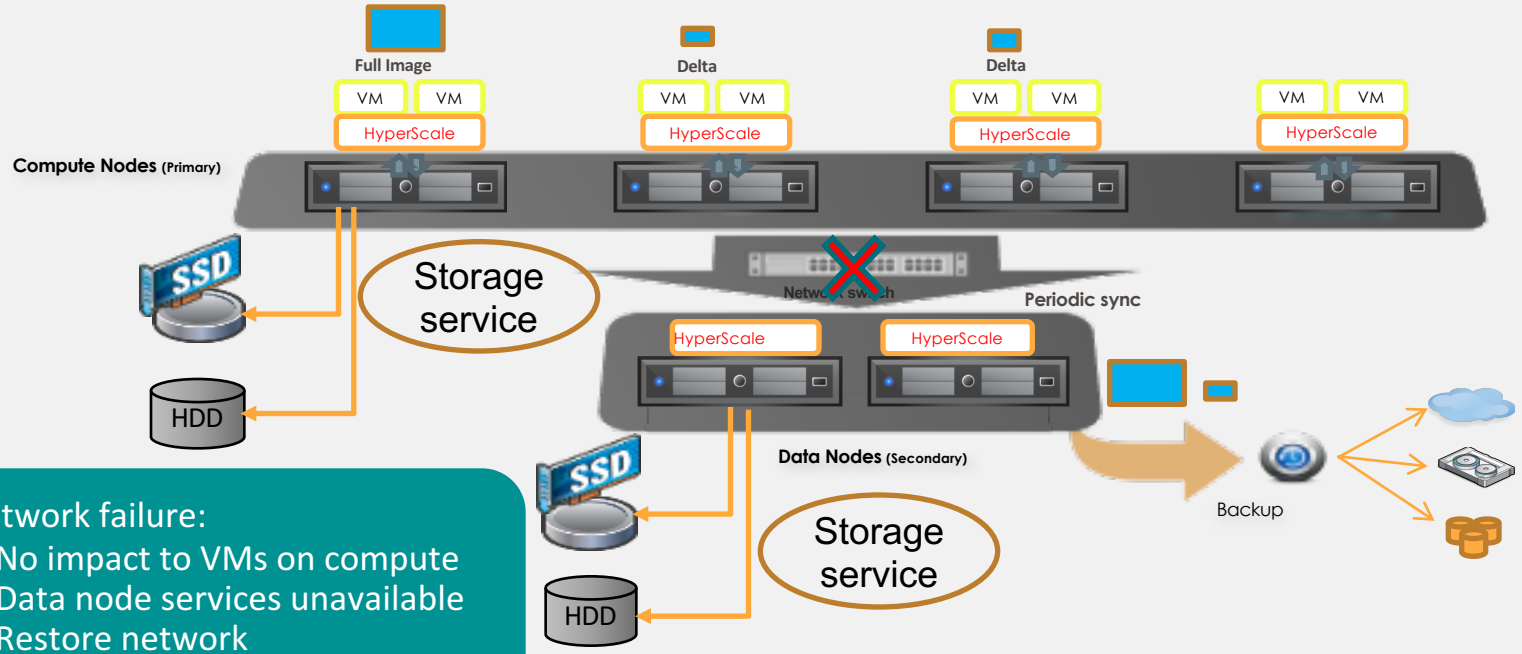
Storage Fault handling in Veritas HyperScale



Storage service failed on datanode:

- No impact to VMs on compute
  Data node failover
- Service restart
- Data node resync

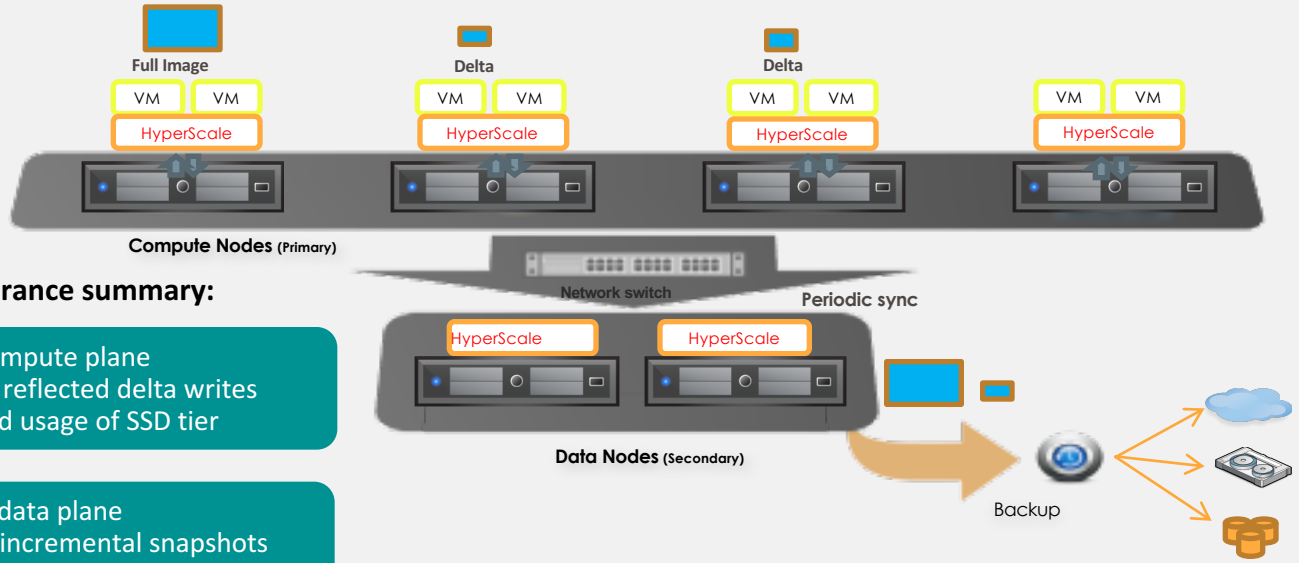
Storage Fault handling in Veritas HyperScale



Network failure:

- No impact to VMs on compute
- Data node services unavailable
- Restore network
- Re-enable data node

Storage Fault handling in Veritas HyperScale



Storage Fault Tolerance summary:

For hot data, at compute plane
- 1 Full copy and reflected delta writes
- Space optimized usage of SSD tier

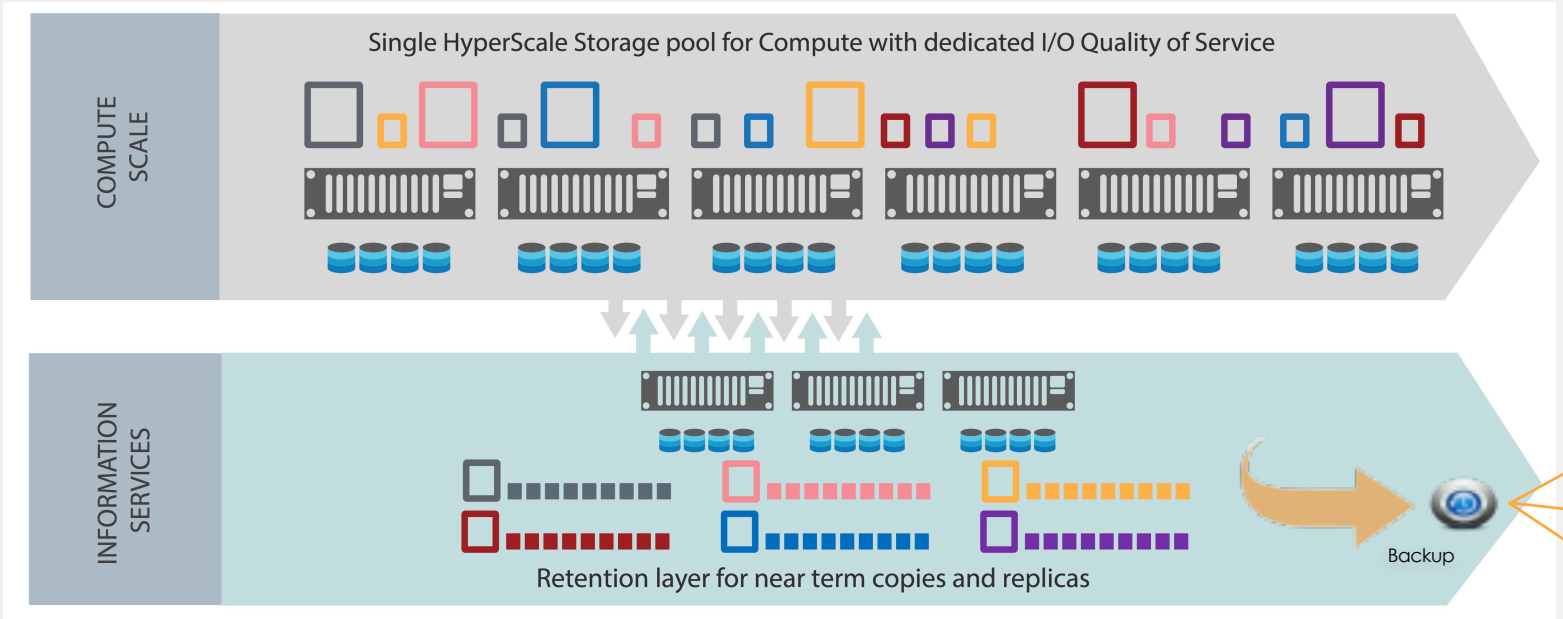
For warm data, at data plane
- 1 Full copy and incremental snapshots
- Inexpensive commodity HDD tier

For cold data, at external backup server
- Scheduled periodic backups
- No impact to primary compute

Veritas™ HyperScale for OpenStack

VERITAS

Software-defined storage designed for OpenStack

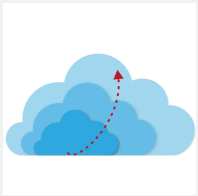


Veritas HyperScale Value Props

VERITAS

Simplified
Storage Management GUI

Predictable I/O Performance



Compute and
Storage Scalability

No noisy neighbours!

Storage resiliency for
all data tiers

Integrated Zero Window
Backups

Storage Fault Tolerance for Red Hat OSP in action!

RED HAT SUMMIT

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