

DxNetOps High Availability

A Cost-Effective VMware vSphere Solution

Broadcom DxNetOps + VMware vSphere

Executive Summary

Objective: Achieve High Availability (HA) and Disaster Recovery (DR) for Broadcom DxNetOps without the prohibitive cost of duplicate physical hardware.

Solution: Leverage **VMware vSphere HA** and **Fault Tolerance (FT)** to provide infrastructure-level resilience.

Outcome:

- Reduced Hardware Costs
- Simplified Management
- Near-Zero RTO for Critical Components

The Challenge: Traditional Physical HA

Deploying DxNetOps on bare metal requires:

- **Double Hardware:** 1-to-1 mapping for Active/Standby clusters.
- **Complex Licensing:** Idle standby licenses often required.
- **Manual Failover:** Physical failover can be complex and slow.
- **High TCO:** Significant CapEx and OpEx for minimal resilience gain.

The Solution: Virtualized Resilience

By virtualizing DxNetOps on VMware vSphere, we shift resilience from the *Application* layer to the *Infrastructure* layer.

Key Technologies

1. **vSphere HA:** Automatic restart of VMs on healthy hosts.
2. **vSphere Fault Tolerance (SMP-FT):** Instant failover with zero data loss.
3. **vMotion:** Zero-downtime maintenance.

Architecture Overview

```
graph TD
    subgraph "vSphere Cluster"
        Host1[ESXi Host 1]
        Host2[ESXi Host 2]
        Host3[ESXi Host 3]

        Storage[(Shared Storage SAN/NAS)]

        Host1 --> Storage
        Host2 --> Storage
        Host3 --> Storage

        VM_DA[Data Aggregator VM] -.->|Fault Tolerance| VM_DA_Shadow[DA Shadow VM]
        VM_PC[Portal VM]
        VM_DC[Collector VM]
        VM_DB[Vertica Node 1]
    end

    style VM_DA fill:#d4f1f9,stroke:#333
    style VM_DA_Shadow fill:#e1e1e1,stroke:#333,stroke-dasharray: 5 5
```

Deep Dive: Component Strategy

Component	Strategy	RTO (Recovery Time)	Why?
Data Aggregator	vSphere Fault Tolerance	Zero	Critical polling engine; cannot tolerate gaps.
Performance Center	vSphere HA	Minutes	Web UI availability is critical but can tolerate distinct reboot.

Vertica on VMware: Best Practices

To ensure bare-metal performance for the Data Repository:

- **100% Memory Reservation:** Prevent swapping/ballooning.
- **Anti-Affinity Rules:** Ensure Vertica nodes *never* share a physical host.
- **Paravirtual SCSI (PVSCSI):** Low CPU overhead for high I/O.
- **Thick Provision Eager Zeroed:** Eliminate first-write latency.

Cost-Benefit Analysis

Feature	Physical Active-Active	VMware vSphere Solution
CapEx (Hardware)	\$\$\$\$\$ (2x Full Stack)	\$\$ (Shared Pool)
OpEx (Power/Cooling)	\$\$\$\$\$	\$\$
Licensing	Application Standby Licenses	vSphere Standard/Enterprise
Complexity	High (Custom Scripts)	Low (Native feature)

Conclusion

Adopting a **VMware vSphere-based HA architecture** for Broadcom DxNetOps offers the optimal balance of:

1. **Resilience:** Enterprise-grade protection (up to 99.99%).
2. **Simplicity:** No complex application clustering to manage.
3. **Cost Efficiency:** Maximizes hardware utilization.

Recommendation: Proceed with virtualized deployment using Fault Tolerance for the Data Aggregator and HA for all other components.