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:

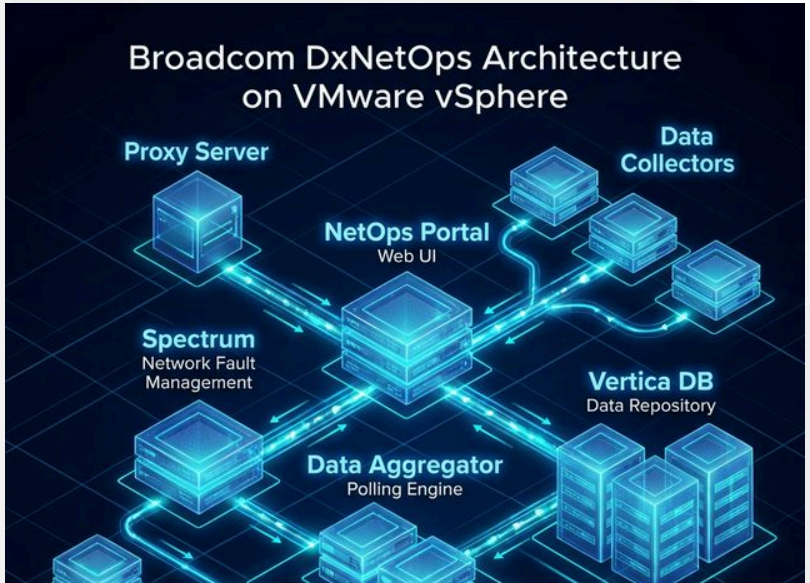
- **Double Hardware:** 1-to-1 mapping for Active/Standby clusters.
- **Complex Licensing:** Idle standby licenses often required.
- **Manual Failover:** Physical failover can be complex and slow.
- **High TCO:** Significant CapEx and OpEx for minimal resilience gain.

The Solution: Virtualized Resilience

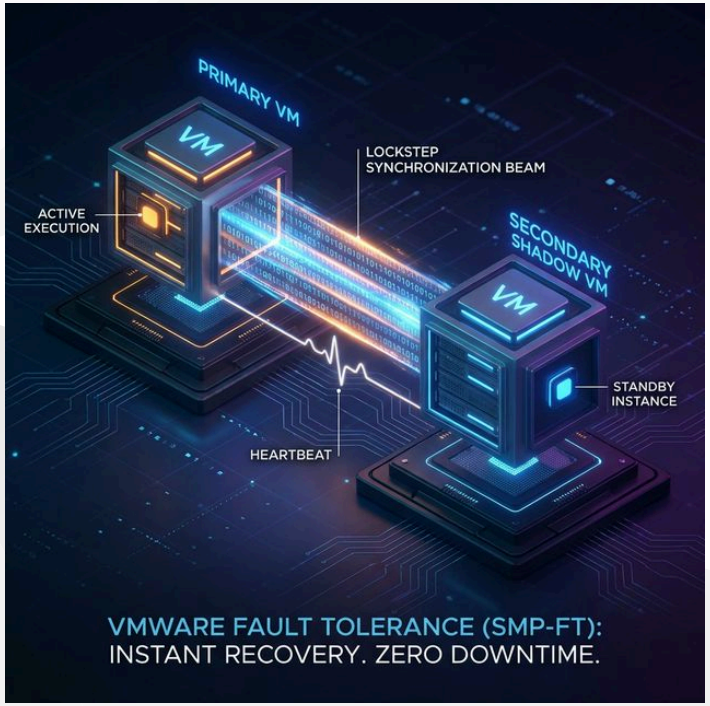
By virtualizing DxNetOps on VMware vSphere, we shift resilience from the *Application* layer to the *Infrastructure* layer.

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.



Visualizing Fault Tolerance



Comparison of active execution path between Primary and Shadow VMs.

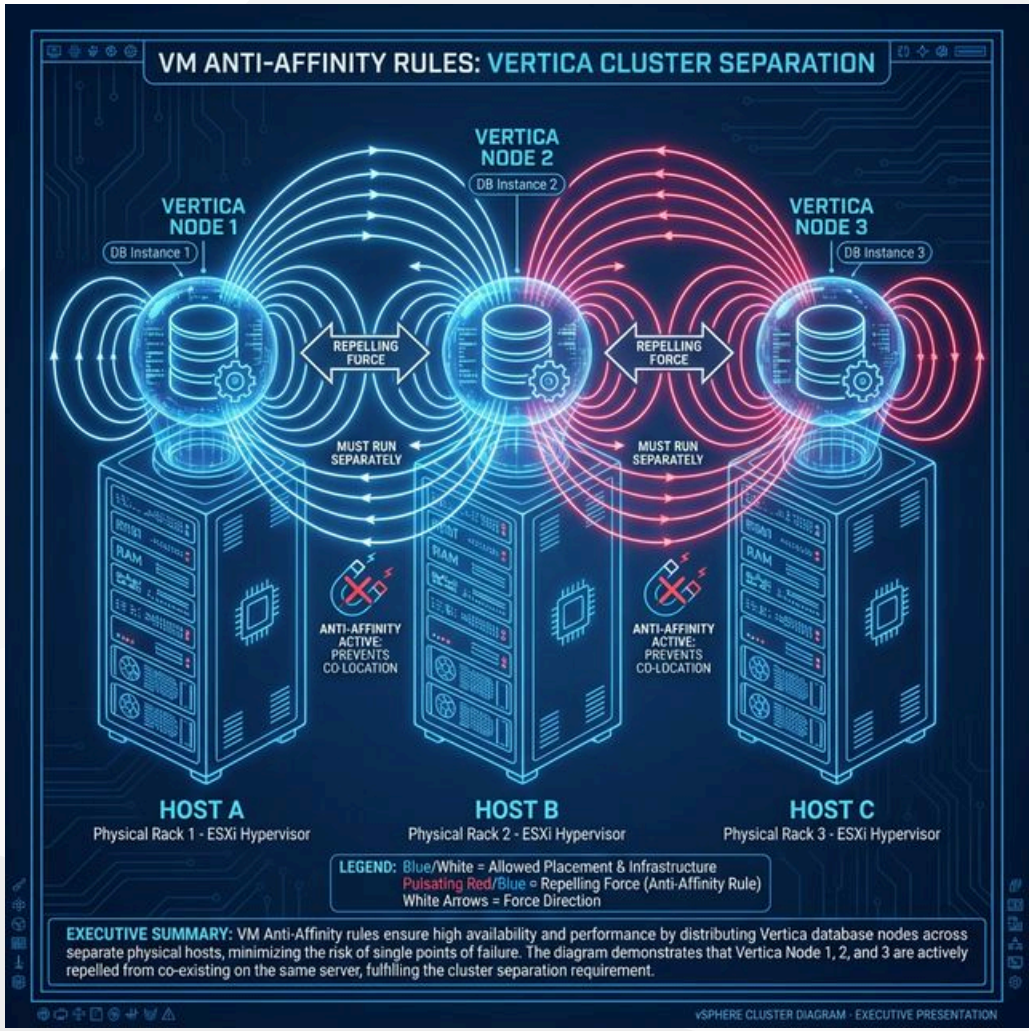
Deep Dive: Component Strategy

App	Strategy	RTO	Rationale
Data Aggregator	**Fault Tolerance**	**Zero**	Critical; no polling gaps.
Performance Ctr	**vSphere HA**	Mins	UI critical; tolerates reboot.
Data Collectors	**vSphere HA**	Mins	Buffers data during outage.
Vertica DB	**HA + Anti-Affinity**	Mins	Priority: K-safety & consistency.

Vertica on VMware: Best Practices

To ensure bare-metal performance for the Data Repository:

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



Cost-Benefit Analysis

Feature	Physical Active-Active	VMware vSphere Solution
CapEx	$$$$ (2x Hardware)	$$ (Shared Pool)
OpEx	$$$$ (Power/Cooling)	$$ (Consolidated)
Licensing	Double (Standby)	Standard vSphere
Complexity	High (Custom Scripts)	Low (Native)

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.