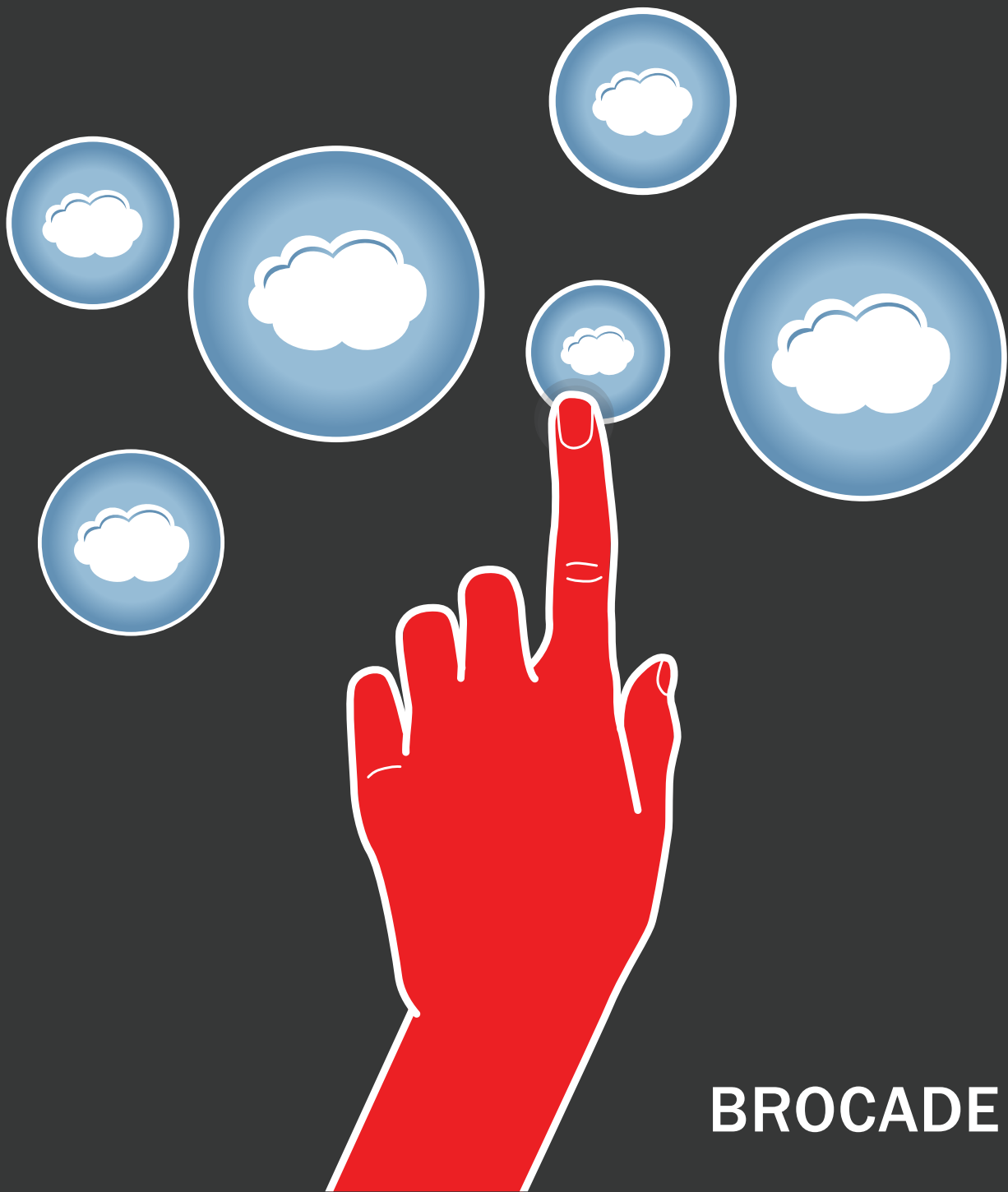


A GUIDE FOR IT DECISION MAKERS: TOP 6 RECOMMENDATIONS FOR SELECTING AN ETHERNET FABRIC

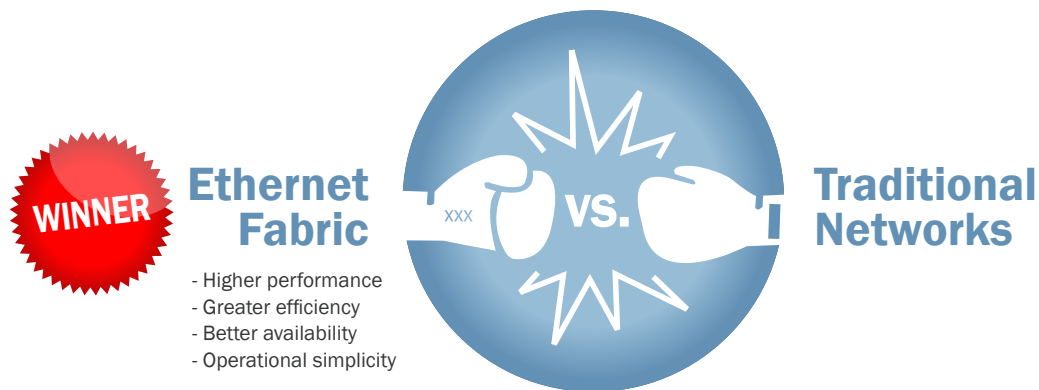


CHOOSING THE BEST ETHERNET FABRIC FOR YOUR ORGANIZATION

As organizations move to cloud-based architectures and IT models, their highly virtualized data centers often encounter underlying limitations. Traditional network architectures often prevent them from achieving cloud computing's true potential for performance, availability, automation, optimization, and efficiency.

In order to bring the promise of virtualization to fruition, the underlying infrastructure—especially the network—must evolve. New topology-agnostic Ethernet fabrics are an innovative approach specifically designed for virtualized data center environments.

However, it's often challenging for IT decision makers to decide which Ethernet fabric approach is the best fit for their organization. This guide summarizes research findings from the recent *Lippis Open Industry Active-Active Cloud Network Fabric Test for Two-Tier Ethernet Architecture*, which rigorously tested different types of Ethernet fabrics. The Lippis test's goal was to give IT architects and decision makers quantitative metrics and recommendations to help them with complex purchasing decisions.



LIPPIS RESEARCH COMPARES ETHERNET FABRIC PERFORMANCE AND RELIABILITY

The Lippis Open Industry Active-Active Cloud Network Fabric Test for Two-Tier Ethernet Architecture was an objective, open industry evaluation of Active-Active Ethernet Fabrics consisting of 10 Gigabit Ethernet (GbE) and 40 GbE data center switches¹. It was the first comparative study of Ethernet fabric performance and reliability to help IT architects decide which products are the best fit for their organization.

Participating in the test was free for industry suppliers of 10 GbE, 40 GbE, and 100 GbE modular and fixed configuration switching equipment. The testing took place at Ixia's modern test lab in Santa Clara, California. Multiple active-active protocols were tested, including Transparent Interconnection of Lots of Links (TRILL) and Shortest Path Bridging (SPB).

Key aspects of the test included measuring reliability (or packet loss) and packet loss duration. Fabric latency was also measured by increasing loads from 50 percent to 100 percent for north-to-south and east-to-west traffic.

¹ 10GbE and 40GbE data center switches were specifically tested, but the Lippis study's results are also applicable to 1 and 100 GbE switches.

6 KEY RECOMMENDATIONS

for IT Decision Makers

Based on the Lippis testing results, IT decision-makers should consider these six recommendations as they evaluate cloud network fabrics:

- 1 Consider Full-Mesh Non-Blocking:** Most of the fabric configurations tested were fully meshed and non-blocking which provided a highly reliable and stable infrastructure. This architecture scales, thanks to active-active protocols, and enables a two-tier design (also known as Leaf-Spine Architecture), which lowers equipment cost plus latency. In addition to being highly reliable, it also enables dual-homed server support at no performance cost.
- 2 Evaluate Two-Tier Network Fabrics:** To reduce equipment cost, support a smaller number of network devices, and increase application performance, consider implementing a two-tier leaf-spine Ethernet fabric. Lippis tests demonstrated that two-tier networks are the preferred architecture.
- 3 Consider Utilizing TRILL and/or SPB:** Over time, most vendors will support TRILL and SPB in addition to vLAG and ECMP. Both TRILL and SPB offer unique auto-provisioning features that simplify network design. Network architects should experiment with both active-active protocols to best understand their utility within their data center network environment.
- 4 Use a Strong Underlay for a Dynamic Overlay:** The combination of a fully meshed, non-blocking two-tier network built with standard active-active protocols constructs a strong underlay to support a highly dynamic overlay. This huge demand in overlay traffic is yet another good reason to consider a two-tier active-active Ethernet fabric for data center and cloud networking.
- 5 Be Open to Different Fabric Architectures:** Not all data centers support 10,000 or 100,000 servers and require enormous scale. Many vendors offering Ethernet fabrics have product strategies to scale up as requirements demand.
- 6 Get Ready for Open Networking:** Consider vendors that support all types of networking, as this is a fast-moving target. Auto provisioning of networking with compute and storage is increasingly important. Look for networking vendors that support network configurations via SDN controllers plus virtualization and cloud orchestration systems.

**WHAT IS
THE LIPPIS
REPORT?**

The Lippis Report is a resource for network and IT business decision makers. Mr. Nick Lippis, the study's author, is a world-renowned authority on corporate computer networking.

BROCADE VCS FABRIC PERFORMANCE ON THE LIPPIS TEST

Brocade® VCS® Fabric technology was also part of The Lippis Active-Active Cloud Network Fabric Test. The modular Brocade VDX® 8770 Switch and the Brocade VDX 6720 Switch for Top-of-Rack (ToR) deployments were evaluated and run through assessments to determine reliability, latency, and other important metrics.

BASED ON TESTING RESULTS, THE LIPPIS TEAM HIGHLIGHTED THESE BENEFITS OF BROCADE VCS FABRIC:

- ✓ **Automates Configuration Tasks:** Brocade VCS radically simplifies the configuration, management, and ongoing operation of network infrastructures by automating most of the configuration tasks.
- ✓ **Flawless Performance:** The Brocade VDX switches performed flawlessly over the six Lippis Cloud performance tests. Not a single packet was dropped as the mix of east-west and north-south traffic increased in load from 50 percent to 100 percent of link capacity.
- ✓ **Excellent Network Utilization:** With Brocade Layer 1, 2, and 3 multipathing, VCS fabric powered networks deliver two times greater network utilization compared to traditional networks that use standard LAG and an active/standby or just two active/active gateways at Layer 3.
- ✓ **Auto-Discovery of VMs:** Brocade VCS is VM aware, thanks to the Brocade VDX 8770 distributed CAM or Channel Access Method intelligence that auto discovers VMs and auto configures the fabric during VM moves.
- ✓ **ECMP n-way Scales:** vLAG at Layer 2 and Equal Cost Multi-Path, or ECMP, at Layer 3 are dominant approaches to increasing bandwidth between switches. Brocade demonstrated that an ECMP-based fabric scales to 32 with bandwidth consistency among links that is evenly distributed between the 32 10GbE.

WHAT IS THE BROCADE VDX 8770 SWITCH?



A scalable, low-latency, 1/10/40 GbE module switch, the Brocade VDX 8770 is 100 GbE ready-through hardware support and hardware-enhanced SDN.

“[Brocade] VCS fabric powered networks deliver two times greater network utilization compared to traditional networks...”

- Lippis Report



TRADITIONAL NETWORKS



“The Brocade VDX switches performed flawlessly over the six Lippis Cloud performance tests.”

- Lippis Report



✓ **Efficient Multiple Load-Balanced Paths at Layers 1-3:**
 With Brocade Network OS 3.0, Brocade VCS Fabric technology enables highly elastic Layer 2 and Layer 3 domains with extremely efficient load balancing and multiple active Layer 3 gateways, on top of L2 ECMP and Brocade ISL Trunking. This means more effective link utilization that reduces overall cost, greater application uptime, and a more flexible and agile network.

✓ **Virtual Link Aggregation Group (vLAG): the Path to Two-Tier Data Center Networks:** vLAG provides a path to two-tier data center networking along with future support for TRILL and/or SPB (Shortest Path Bridging). vLAG takes traditional link aggregation and extends it by allowing one device to essentially dual home into two different devices, thus adding limited multi-path capability to traditional LAG. With Brocade NOS v3.0, a maximum of 4 switches can participate in a single vLAG and a maximum of 32 ports in a vLAG where up to 16 of those ports can belong to a single switch.

“Not a single packet was dropped as the mix of east-west and north-south traffic increased in load from 50 percent to 100 percent of link capacity.”
 - Lippis Report



“We are impressed with Brocade VCS Fabric built with Brocade VDX 6720 ToRs and Brocade VDX 8770 Core switches. In particular, its auto-provisioning, VM aware features plus L1, L2 and L3 multipathing options are noteworthy and competitive differentiators.”

“Brocade VCS Fabric demonstrated solid performance and ease of use during this Lippis/Ixia Active-Active Fabric Test.”

- The Lippis testing team

GET MORE INSIGHTS INTO SELECTING AN ETHERNET FABRIC

Learn more about the Lippis Test’s methodology, recommendations, and best practices for highly virtualized data centers by downloading the full 22 page report.

Visit <http://community.brocade.com/docs/DOC-3363>



ABOUT BROCADE

Brocade networking solutions help the world’s leading organizations transition smoothly to a world where applications and information reside anywhere.

www.brocade.com