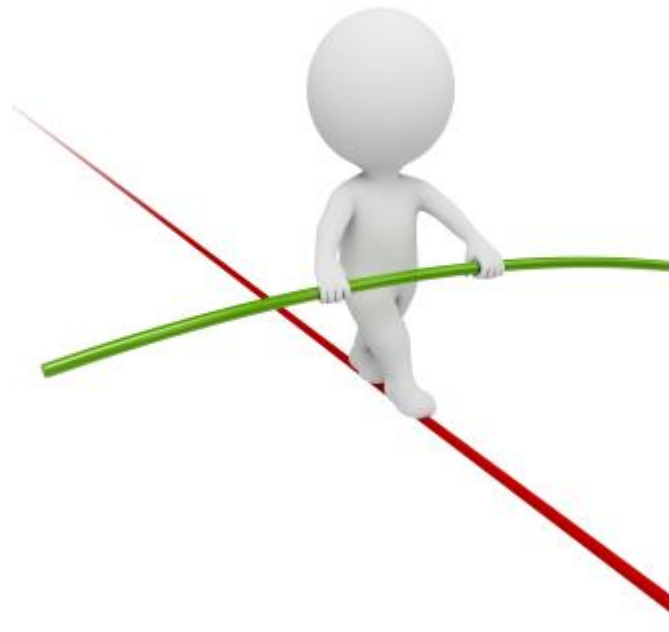




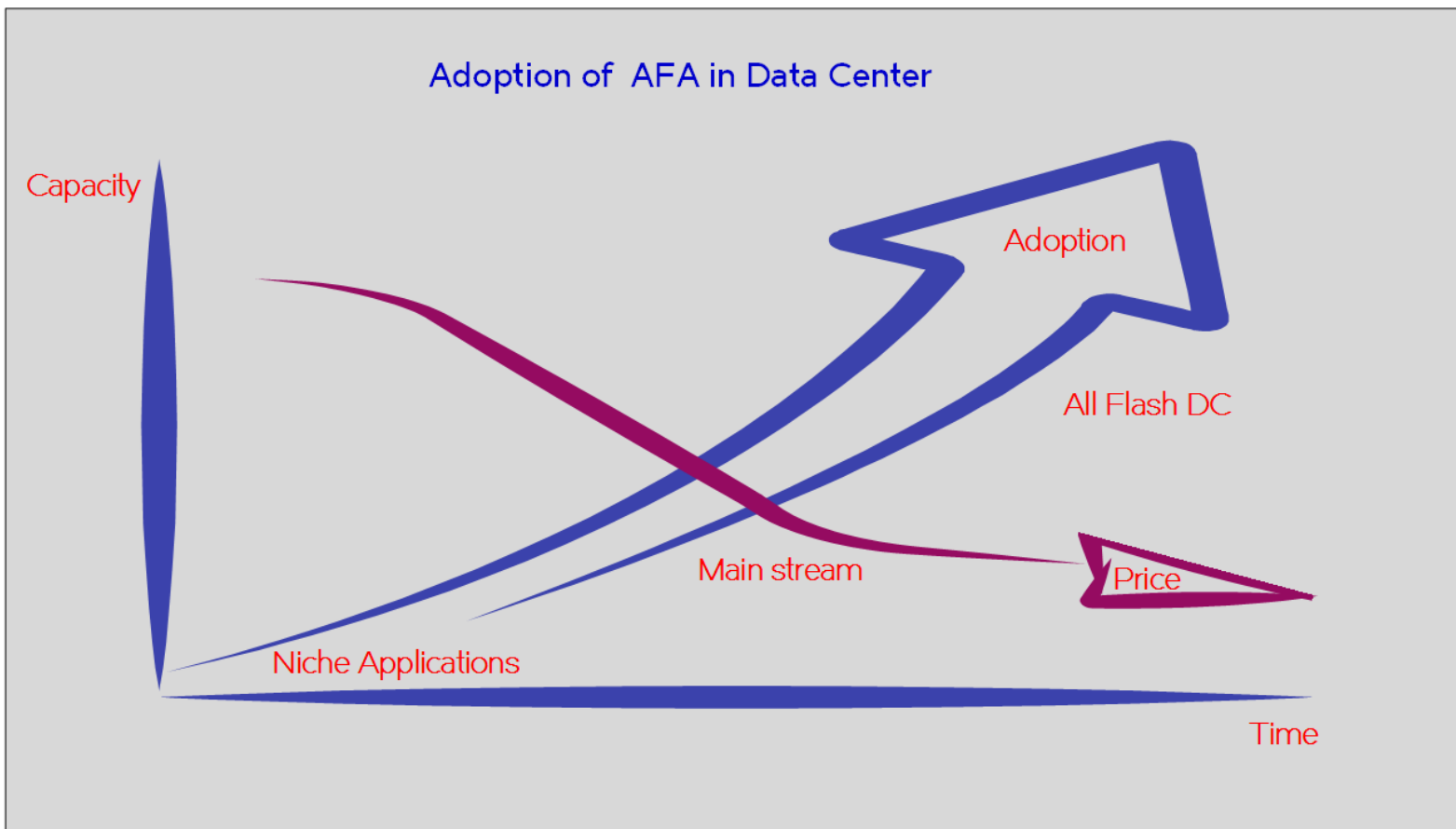
Flash Memory Summit

Maintaining the balance between FLASH & FABRIC



Marcus Thordal
Director Solutions, Brocade.

Flash Memory Summit 2017
Santa Clara, CA





Fabric Requirements for NVMe



NVMe over Fabrics Technical Characteristics

Obviously, transporting NVMe commands across a network requires special considerations over and above those that are determined for local, in-storage memory. For instance, in order to transmit NVMe protocol over a distance, the ideal underlying network or fabric technology will have the following characteristics:

✓ **Reliable, credit-based flow control and delivery mechanisms.**

This type of flow control allows the network or fabric to be self-throttling, providing a reliable connection that can guarantee delivery at the hardware level without the need to drop frames or packets due to congestion.

Credit-based flow control is native to Fibre Channel, InfiniBand and PCI Express® transports.

- ✓ **An NVMe-optimized client**
- ✓ **Reduced latency and CPU utilization adapters or interface cards**
- ✓ **Fabric scaling**
- ✓ **Multi-Host support**
- ✓ **Multi-port support**
- ✓ **Multi-path support**

Source: http://www.nvmexpress.org/wp-content/uploads/NVMe_Over_Fabrics.pdf (page 3 & 4)



IO Monitoring Challenges

Lack of IO visibility impedes optimal performance



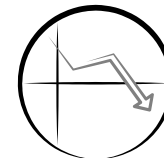
Poor visibility into the performance of storage IO workloads between host and storage devices



Lack of proactive monitoring ensuring consistent storage performance



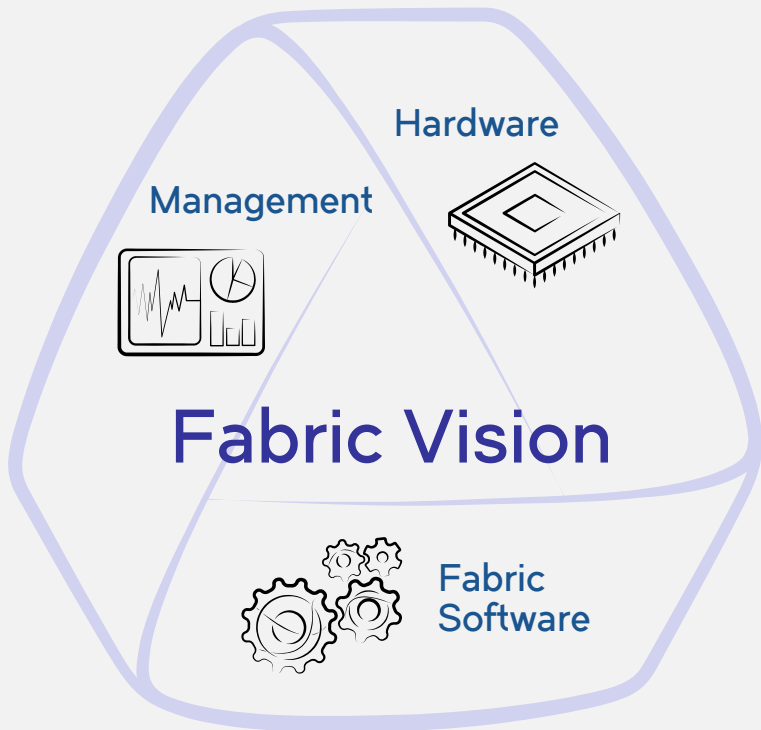
Inability to locate IOPS and latency issues that create storage-related performance problems





Brocade Fabric Vision Technology

Architecture



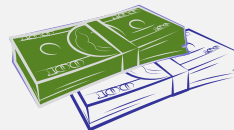
Benefits



Deploy 20 years of best practices in one click



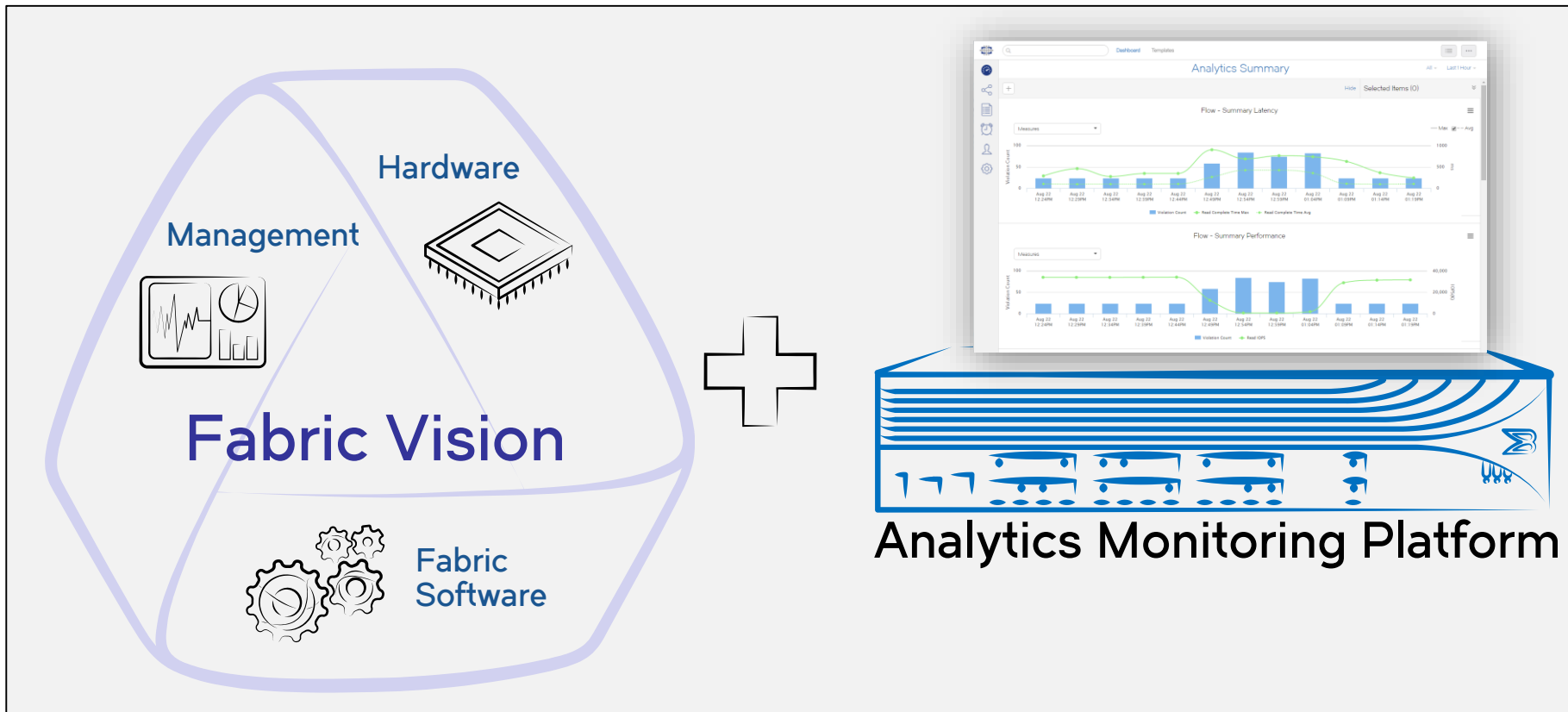
Reduce common network problems



Eliminate 48 percent of maintenance costs



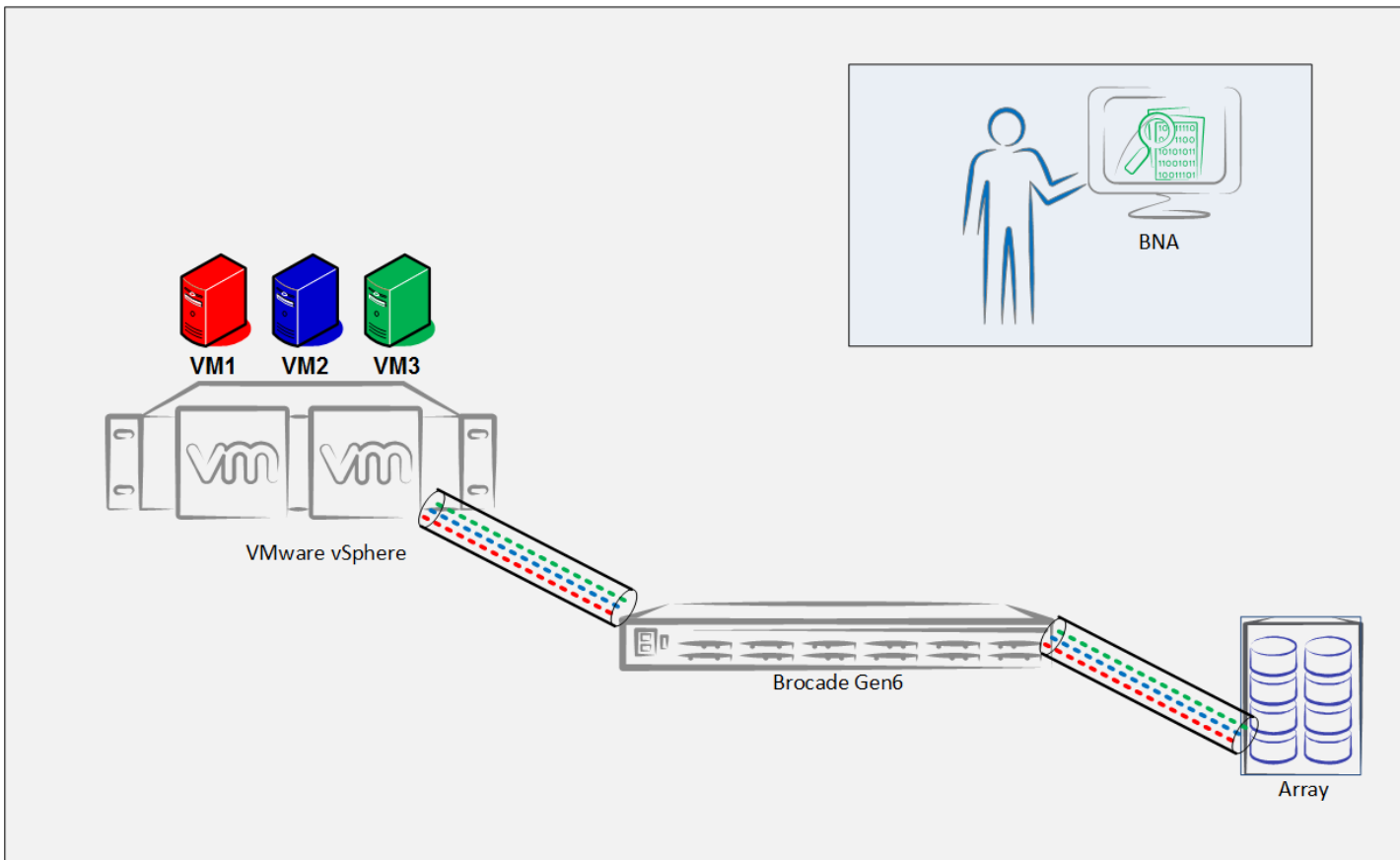
Measuring Application Performance





VM Insight

-visibility at a VM Level





FC-NVMe Timeline

2015

2016

2017

Today

December
FC-NVMe
Brocade Gen 5
Gartner Data
Center

May
FC-NVMe
Brocade Gen 5/6
EMC World

August
FC-NVMe
Brocade Gen 5/6
VMworld

May
FC-NVMe
Brocade Gen 6
DELL-EMC World

May
FC-NVMe
Brocade Gen 6
NVMe Plugfest #7

FCIA
FIBRE CHANNEL INDUSTRY ASSOCIATION

NVMe over Fibre Channel
FCIA Technology Demonstration

- Brocade \geq G620
- cisco MDS 9706
- Emulex Gen 6 LPe32000
- QLogic QLE2700 HBAs
- TELEDYNE LECROY Everywhereoutlook SierraNet T328 Analyzer
- Xgig for FC-NVMe Analysis
- SANBlaze Target



Remember the Network for your FLASH

The network matters

- You are not going to get maximum performance if it's not running in the right environment.

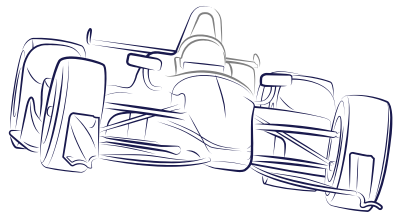




Why Fibre Channel is the best Fabric for NVMe

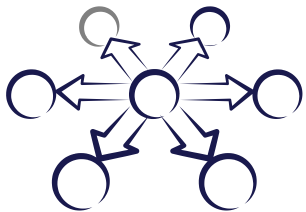
The only purpose-built fabric for storage

Low Latency
Networking



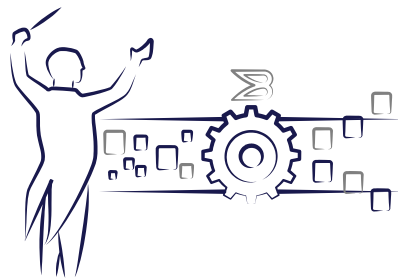
NVMe over Fibre
Channel yields 55%
latency reduction

Scalability Beyond the Rack



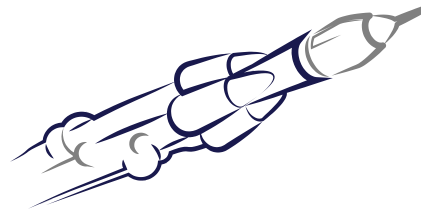
Optimized for heavy
storage workloads

Low Risk Deployment



Leverages existing FC
infrastructure and
Concurrently run NVMe

Faster than
25/50/100Gb Ethernet



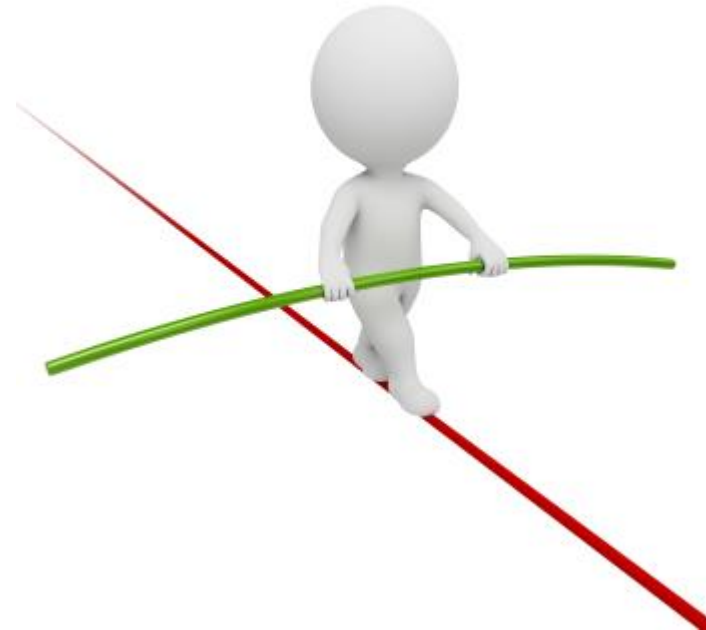
Gen 6 supports 32Gb
and 128Gb today

Brocade Fibre Channel is NVMe-Ready Today



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Thank You



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