



The Future of Flash in the Data Center

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- What the analysts are saying
 - ◆ Enterprise
 - ◆ Cloud/Hyperscale
- Today's Reality—Islands of Flash
- Enterprise Use Cases
- Cloud Use Cases
- Summary

Market Update—IDC's 3rd Platform

Defined by:

Scale-out Open Source DB Software

Commodity Servers

DIY (McGuyer IT dudes)

Server-Side Flash

Software-Defined

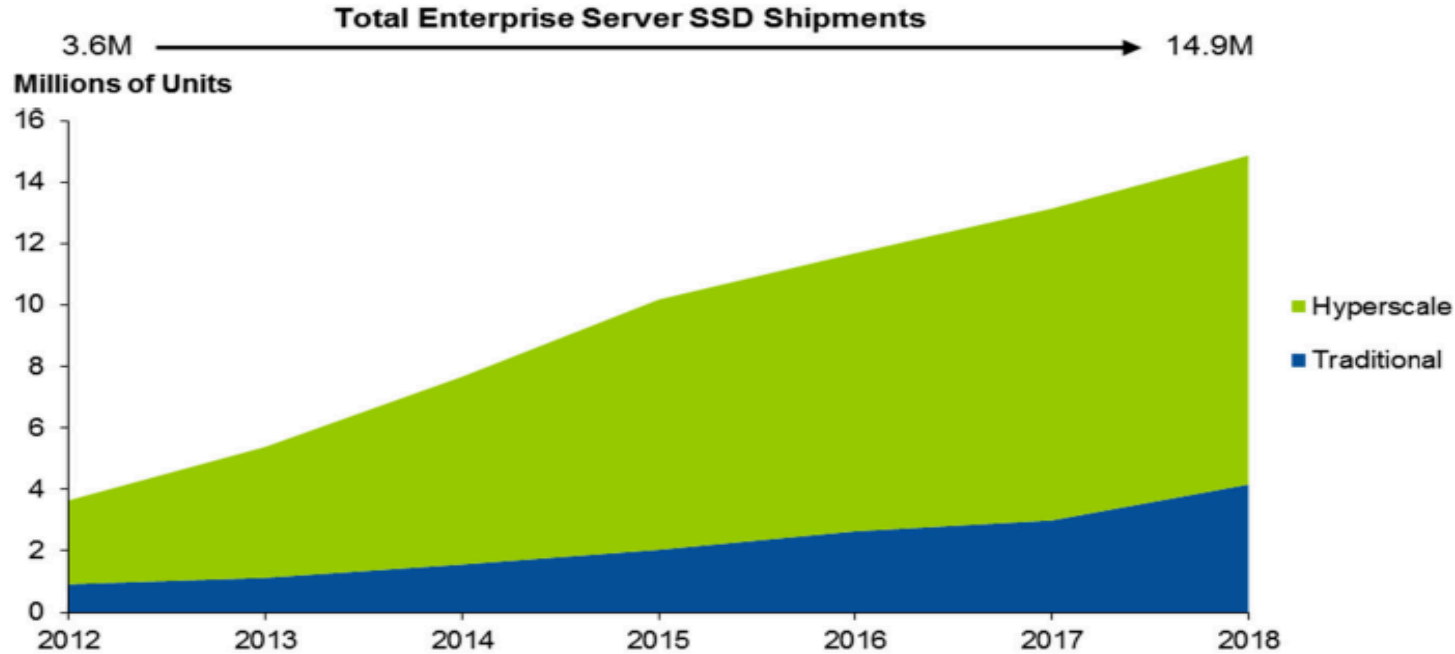
Massive Scale

Analytics



Gartner Reinforces with SSD Shipments

Figure 3. Hyperscale Versus Traditional Enterprise Storage Growth

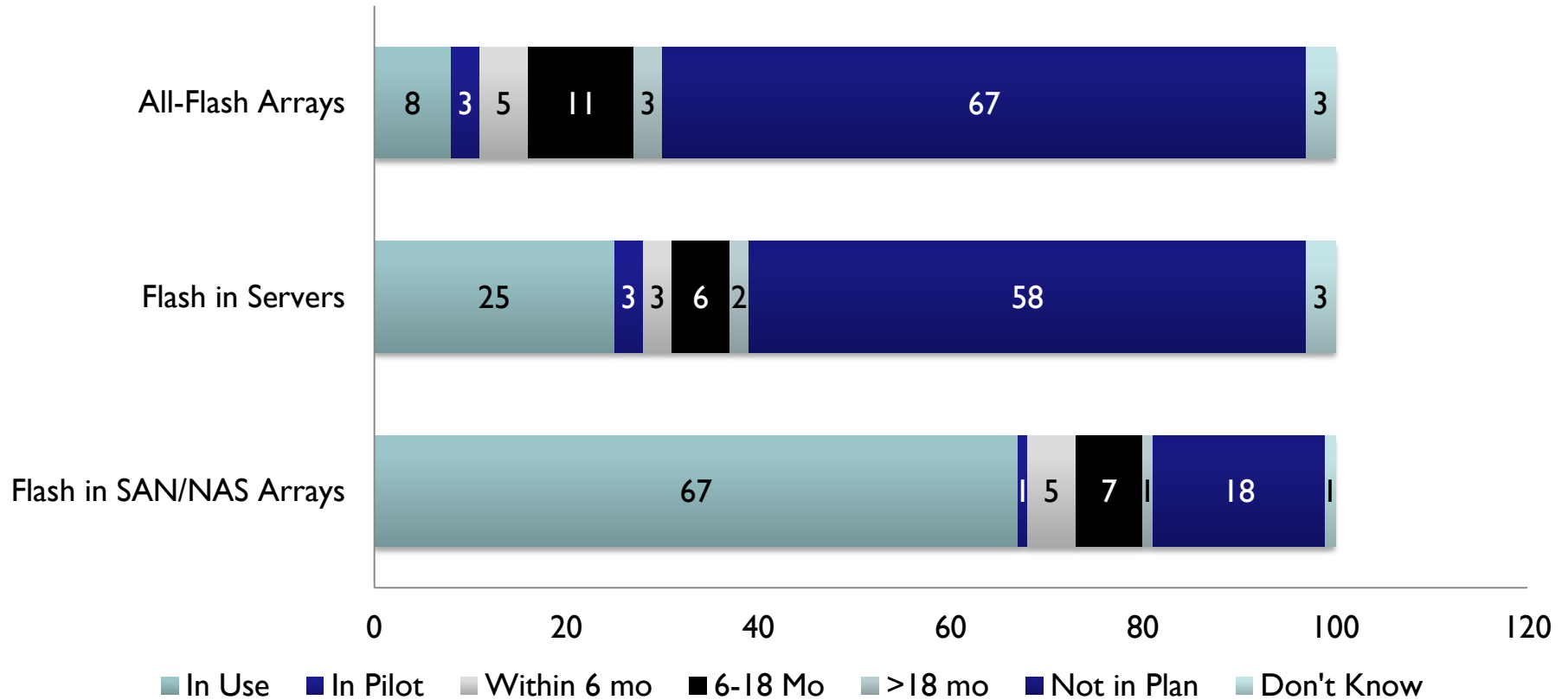


SSD = solid-state drive
Note: Hyperscale Tier 1 = ~100K+ Servers, Tier II = ~10K Servers

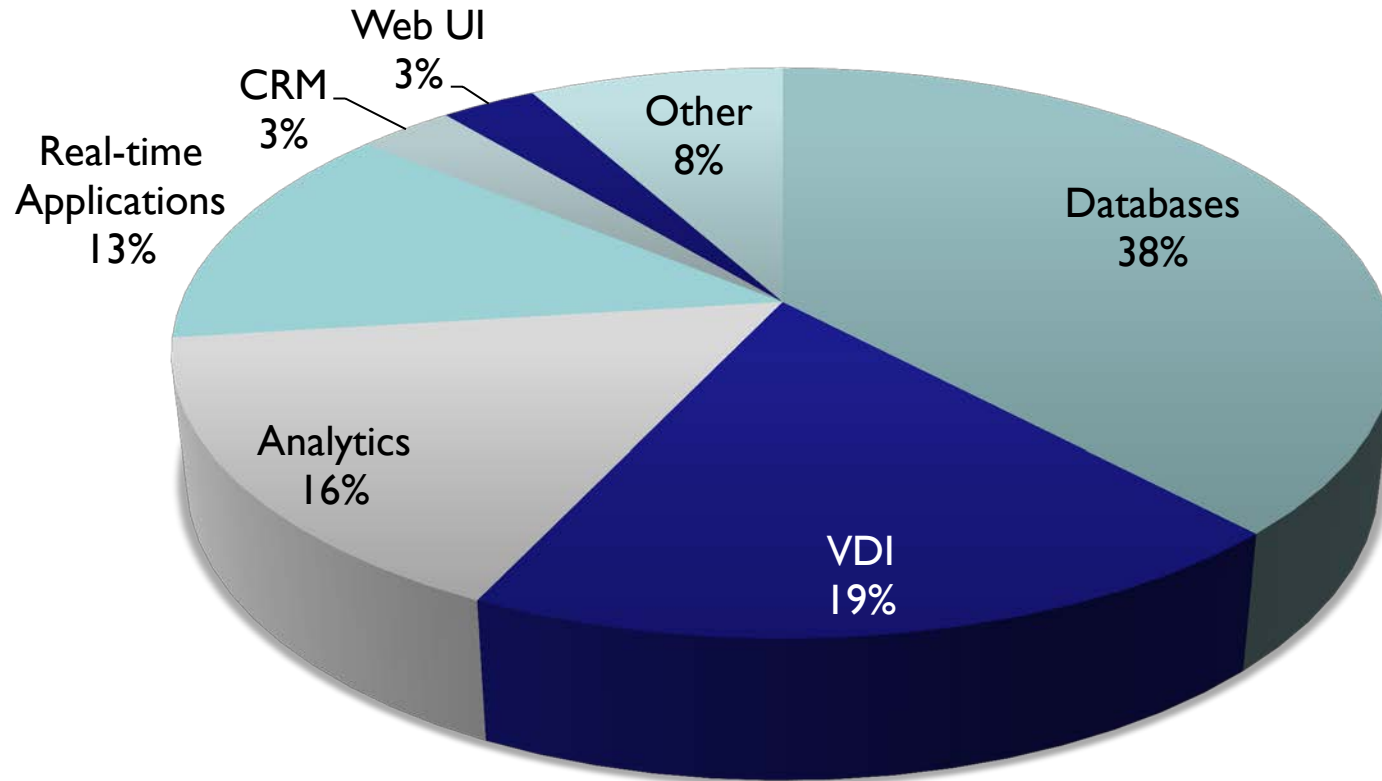
Source: Gartner (February 2015)

“Making server-side flash a global resource increases management flexibility, efficiency and broadens its use cases to include cluster support. Making server-side flash a global resource also expands available capacity, which makes its use as DAS even more attractive.”

451 Breaks It Down



451 Breaks it Down



451 Research

266 mid-sized and large enterprises
July, 2014

Today's Server-Side Flash Reality

2nd Platform



Need more IOPs for performance & headroom

Improve CPU/Core utilization—license costs

Architectural/Management “Fit”

Dominated by “Monolithic” Arrays

3rd Platform



High latency across distributed nodes

Inefficient storage utilization

Massive server sprawl

Dominated by Commodity Servers



Server-Side Flash in the Enterprise



Enterprise Use Cases—SQL Server (DAS)

Before



Monolithic Storage Arrays
Proprietary Replication
2 Days to Render Billing Reports
Annual Support Fees \$120,000

After



Server-Side PCIe Flash
Microsoft AlwaysOn Replication
2 Hours to Render Billing Reports
Annual Support Fees \$8,000

Enterprise Use Cases—VMware VDI (DAS)

Before



View Servers



Domain Controller



SAN

VDI Cluster
(& Personas)



15-18 Virtual Desktops per Hour

10-15 Linked Clones Recomposed per Hour

30 Hosts for 1000 VMs

After



View Servers



Domain Controller

Ethernet



VDI Cluster
(& Personas)

500 Virtual Desktops per Hour

500 Linked Clones Recomposed per Hour

3 Hosts for 1000 VMs

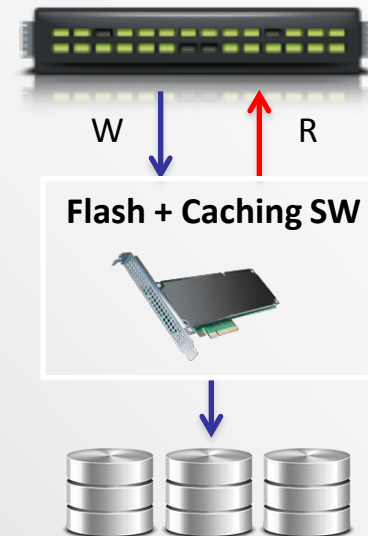
Enterprise Use Cases—SQL Server Caching

Before



Reads and Writes from Local SAN
Milliseconds of Latency
Low IOPS, thus Lower Transaction Speed

After

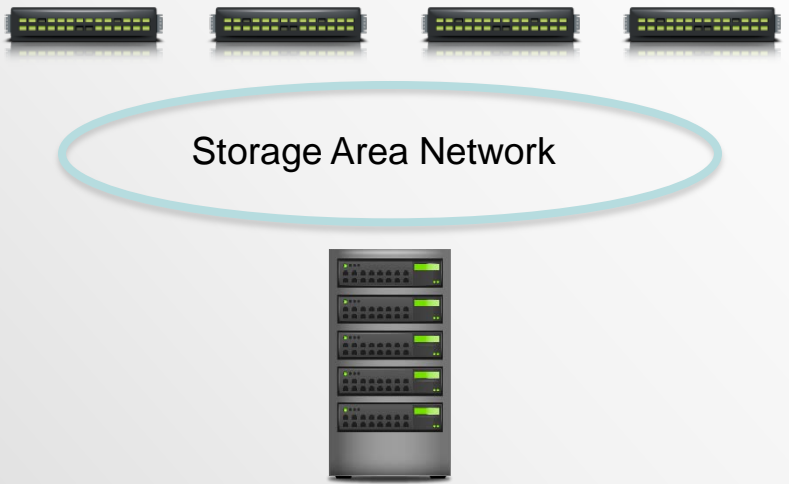


Write-Through Caching for Data
Consistency Microsecond Read Latency
No Changes to Operations or Management
7x Improvement in IOPs

Enterprise Use Cases—Shared Access to SSDs for Oracle® RAC

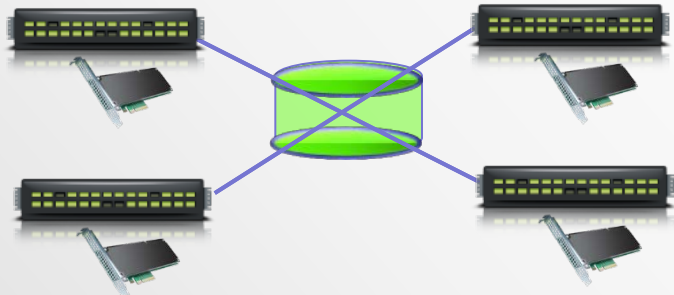


Before



Monolithic SAN Array
Poor CPU Utilization
Milliseconds of Latency
High Cost to Add IOPs

After



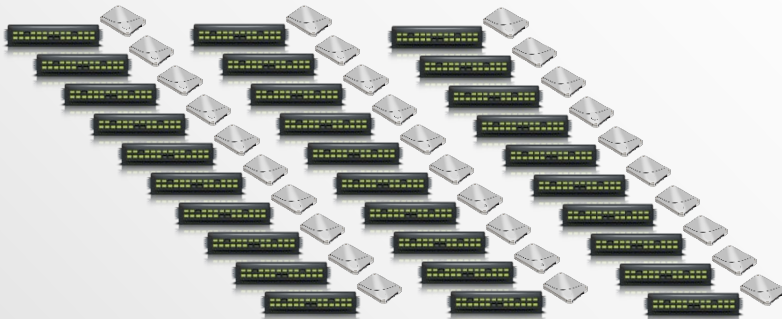
Server-Side PCIe Flash with Sharing Software
Microsecond Latency, Millions of IOPs
Optimized CPU Utilization
Repurpose Existing SAN
6x Performance at 30% Cost of AFA SAN

Server-Side Flash in The Cloud



Cloud Use Cases—PCIe SSDs vs. SATA for NoSQL & MySQL (DAS)

Before



NoSQL Using Disk Form-Factor SATA SSDs
Exponential Growth Drove Massive Server Sprawl
Escalating Space/Power and Operations Expense
Large Storage Infrastructure: High Management Costs

After



3:1 Server Consolidation & 6:1 Rack Consolidation
3x Increase in IOPs & 50% Reduction in Latency
Reduced Management Costs
60% TCO Improvement

Cloud Use Cases—Clustered Caching for MySQL

Before



All Flash Array on SAN Had Unacceptable Latency for Indexing Algorithms
Latency Measured in Milliseconds

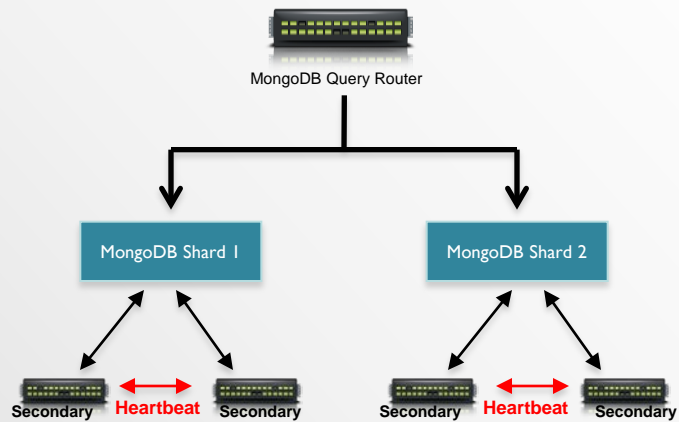
After



Transparent Acceleration for AFA SAN
Latency of 40 uSec

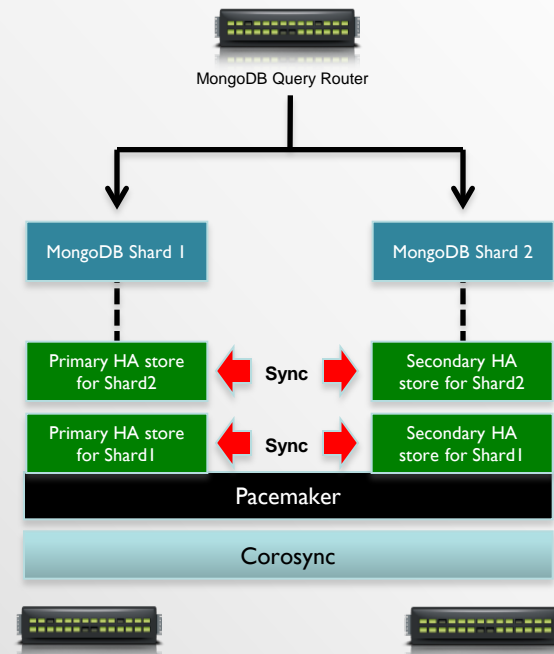
Cloud Use Cases—HA Software for NoSQL (MongoDB)

Before



“Eventual Consistency” Compromises RPO/RTO
Read Preferences Off-loaded to Secondary
Double the Server Count (Server Sprawl)

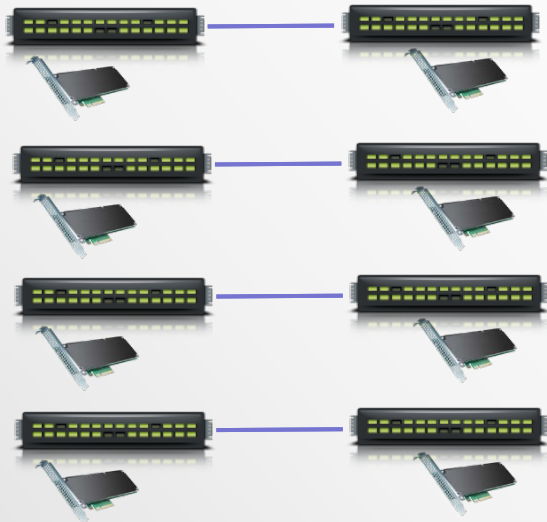
After



“No Compromise” Synchronous Replication
2:1 Server Consolidation, 50% TCO Savings
Flash Removes Need to Off-load Reads

Cloud Use Cases—SSD Clustering for MySQL

Before



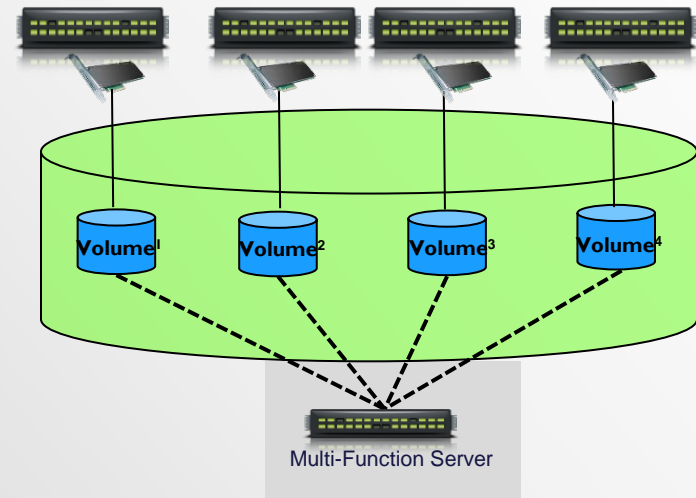
Dedicated Asynchronous Replication Pairs

Slaves for Read Off-load

Inefficient Server Utilization

Server Sprawl

After



Shared, Clustered “Multi-Function” Server

8 Servers to 5, 38% Consolidation

Fully Mirrored Pool of Flash

Any Server to Any Volume

- Flash is now mainstream
- Server-Side Flash is growing rapidly
- Many different high-value Use Cases
 - ◆ Cloud
 - ◆ Enterprise
- Server-Side Software is the key to enabling new use cases