



The Flash Based Array Market

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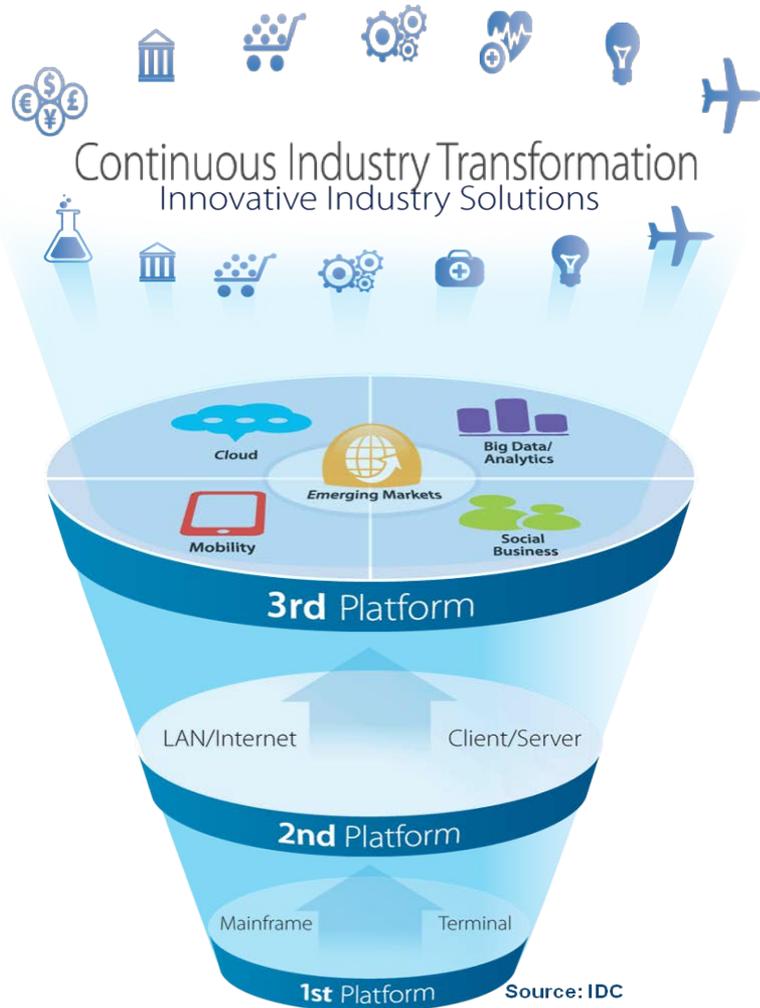
About the Analyst



Eric Burgener serves as a Research Director for IDC's Storage Practice, and his areas of coverage include flash-based arrays (all flash arrays and hybrid flash arrays) as well as storage virtualization solutions. A veteran of the storage industry for almost 30 years, he has worked with enterprise storage technologies since 1991, including both hardware and software-based solutions.

Prior to joining IDC, he held various leadership positions in product management, product marketing, business development, and technical support and worked as an Executive in Residence at Mayfield, a leading Silicon Valley-based venture capital firm.

3rd Platform Computing



- Rise of the 3rd computing platform
 - Mobility, social business, big data, cloud
- Built around new technologies
 - Virtualization, flash, cloud
- Server consolidation, new workloads drive different I/O
 - Density, randomness, variability
- Other new requirements
 - Scale, availability, agility
- Driving the need for new storage architectures

Why/How Flash Is Required



- HDDs alone can't cost-effectively meet performance requirements
 - IOPS, latency, throughput, consistency
- Flash makes sorely needed data services high performance
 - Storage efficiency technologies
- Flash needed to maintain balance as infrastructure density increases
 - Emerging memory technologies
- Flash-optimized arrays deliver the most efficient flash solutions
 - Effective \$/GB cost
- Flash persistence (not just caching) is needed for certain apps

Flash in the Data Center Taxonomy

ALL FLASH ARRAY (AFA)

Network-based storage system that can **only** use flash media to meet performance and capacity requirements

HYBRID FLASH ARRAY (HFA)

Network-based storage system that can use a combination of flash media and spinning disk to meet performance and capacity requirements

ALL FLASH CONFIGURATIONS OF HYBRID FLASH ARRAYS (HFA/A)

A network-based storage system built around an HFA but configured from the factory with all flash media

Flash Optimized Storage Architectures



- Flash optimized bandwidth
- Endurance optimization
 - Write minimization, wear-leveling, in-line data reduction
- Predictable performance even as configuration scales
 - 10x – 100x the IOPS
 - Flash-first write designs
 - Configurable flash persistence
 - Free space management
- There's "flash optimized" and then there's "enterprise flash optimized"
- See IDC #249295

Storage Architecture Designed With Flash In Mind

Enterprise Flash Optimized



- Enterprise-class endurance
 - 5 years plus
- Effective capacity in the hundreds of TBs range
- Five nines plus availability
 - Failure, replacement, expansion
- Storage efficiency technologies
 - Thin provisioning
 - In-line data reduction
- Enterprise-class data services
 - Snapshots, clones
 - Encryption, replication
 - Integration
- QoS to solve the “noisy neighbor” problem

Important Developments

- Widespread availability of all-flash configurations of HFAs
- AFA vendors pursuing lower entry price points
 - Shorten sales cycles, new customers
- HP shows flash-optimized HFAs can outperform some AFAs
- Breaking the “effective \$2/GB” barrier
- Customers want to add more apps onto their AFAs
- AFA vendors focusing on mixed workload consolidation
- SanDisk introduces “Big Data Flash” at \$.50/GB effective →



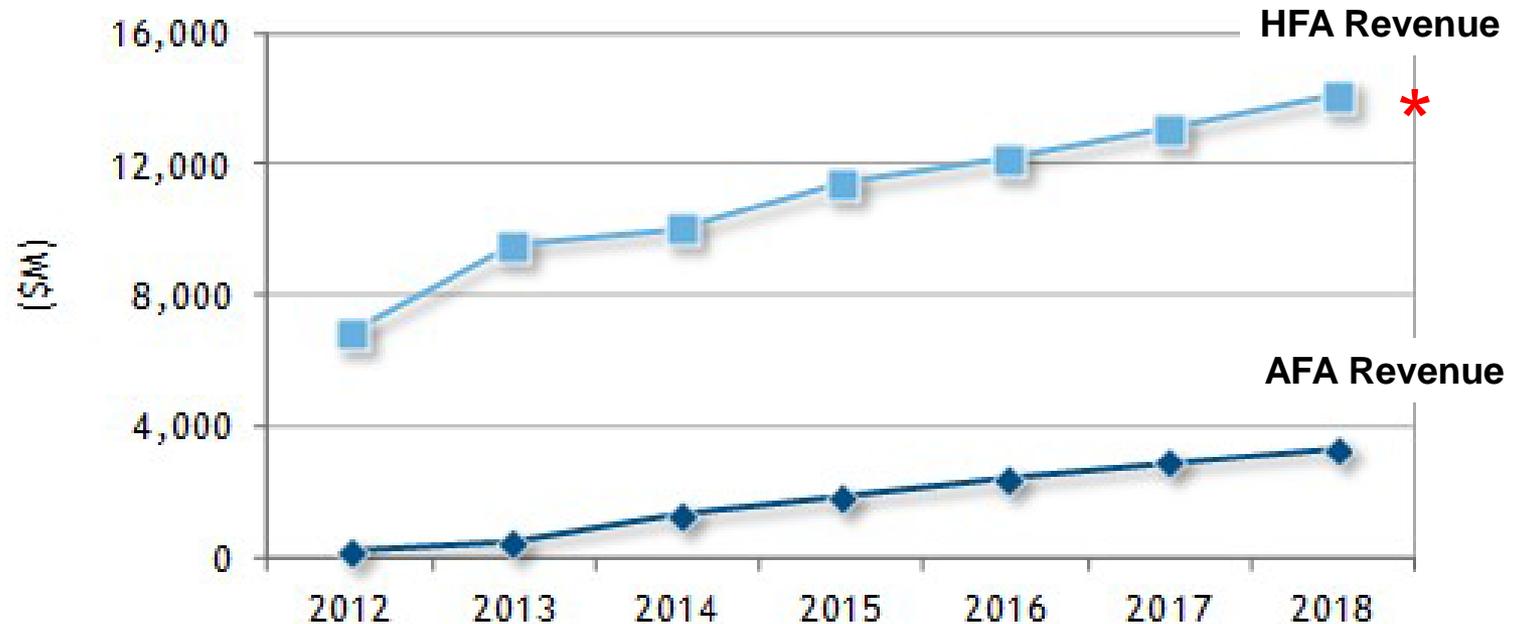
**COULD DISRUPT
THE SECONDARY
STORAGE MARKET**

Deploying Flash At Scale



- Dedicated application deployments quickly becoming a niche market
- Mixed workload consolidation is the AFA competitive battleground
- Sets new AFA requirements
 - Flash performance
 - All the other features of enterprise arrays
- Flash at scale delivers significant secondary economic benefits
 - Fewer devices
 - Reduced energy/floor space consumption
 - Fewer servers
 - Lower software licensing costs
- Makes AFAs effective replacements for today's enterprise storage arrays

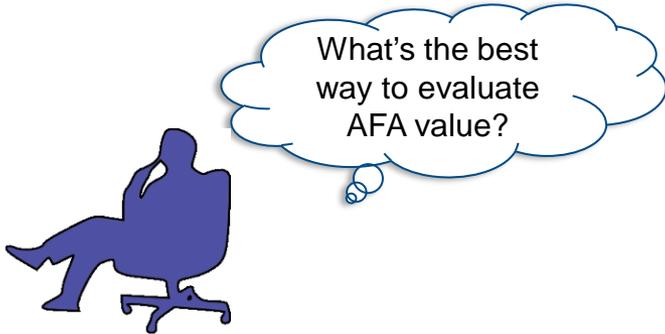
The Flash-Based Array Market



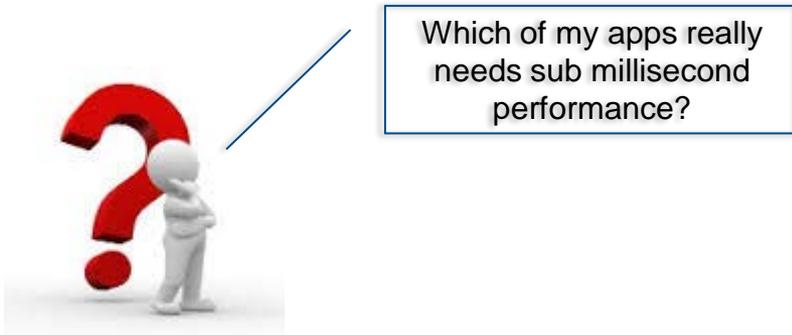
- HFAs can cost-effectively meet storage requirements for primary and secondary applications
- AFAs can offer significantly better TCO at scale than HFAs for primary storage environments

* Does not take possible success of Big Data Flash market into account

Strategic Questions



- It's NOT \$/GB
- TCO, \$/IOPS



- Consistent performance
- Infrastructure density



OR



- Granular scalability
- I/O parallelization

INFRASTRUCTURE CONSUMPTION MODELS

- Cloud-based services
- Converged
- Hyper-converged
- Storage appliances
- Software-defined

Putting AFAs in a Wider Market Context

- AFAs will dominate primary storage by 2018-2019
 - Secondary economic benefits for performance intensive 3rd platform computing environments
- HFAs will dominate the external storage market overall
 - Secondary storage will remain 2 – 4x the size of primary storage
 - HDDs will still dominate in backup, archive, content repositories
- Vendors that only sell AFAs could be at risk, but all vendors should offer AFAs
- There are Fortune 1000 enterprises that have already committed to “all flash” for primary storage

Future Outlook

- Mixed workload consolidation is the competitive battleground for AFAs for 2015 and beyond
- ISVs will develop primary storage applications assuming all-flash configurations
 - Will hasten flash adoption for primary workloads
- Storage performance testing will move beyond legacy “hero” tests
- VM-level storage management will become a way of life for most arrays by 2017

IDC #251951

Questions?

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