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

What’s the best way to evaluate AFA value?

- It’s NOT $/GB
- TCO, $/IOPS

Which of my apps really needs sub millisecond performance?

- 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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