



Optimizing the IT/Server Ecosystem for Cloud Computing

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SanDisk | Enterprise Storage Solutions

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Tomorrow's Cloud Isn't Yesterday's Data Center

Essential Elements of Success:

- Virtualized server for high performance environments
 - Efficient and multi-purpose environment
 - Scalable and adaptable
- Predictable and sustainable performance during peak times
- Cost effective and easy to maintain
 - Reliability and data integrity
 - Green IT



CIO Storage Value Perspective

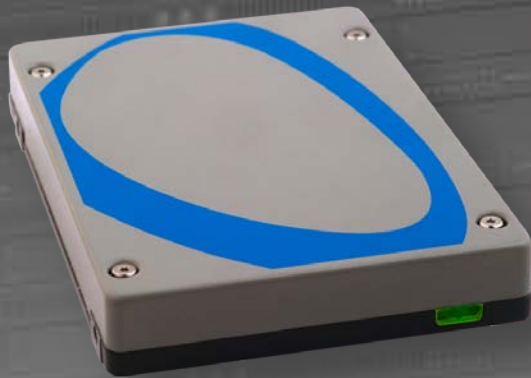
Critical Questions for Cloud Storage Solutions:

- How much information does it hold?
- How much work does it do?
- Does it meet my 'response time' requirements?
- Does it scale to meet my changing requirements?
- How much value is provided?



SIMPLISTIC:

- Customers only care about \$/GB



CIO REALITY:

- Yes, \$/GB is an important metric, but at the system level
- Provide the most cost effective solution
- Emerging Hybrid systems (SSD+HDD) lower the system level \$/GB

Peak Times Need More Drives

SIMPLISTIC:

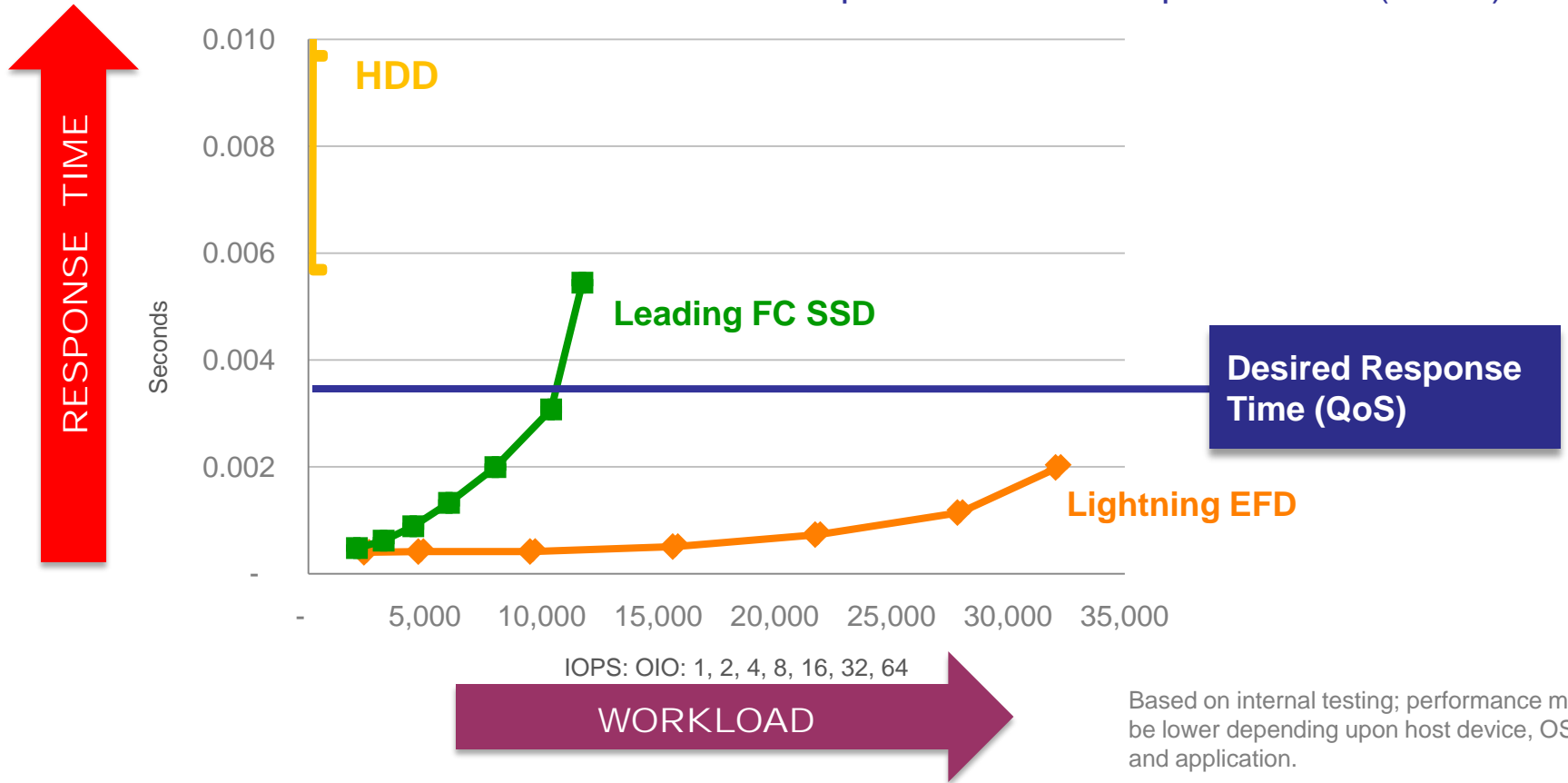
- Peak performance requires more drives
- Scalability requires more drives

CIO VIEW:

- 90/10 Rule is True
- 90/10 can also be 80/20 or 95/5
- SSDs can offer increased output without adding additional drives

Workload Under Stress = Saturation Curve

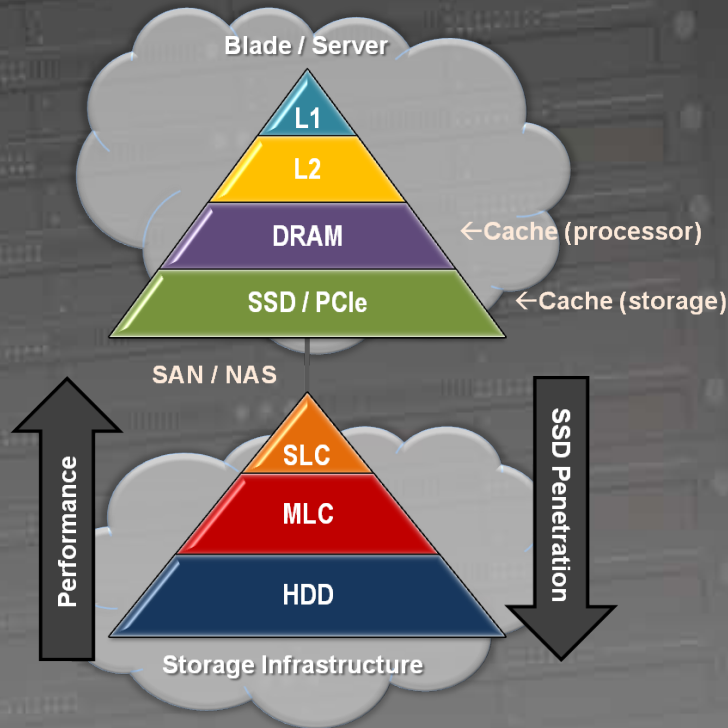
Saturation Curve for 8KB Enterprise Profile - Multiple Threads (QD=1)



Based on internal testing; performance may be lower depending upon host device, OS and application.

SIMPLISTIC:

- SSD are only for Tier 0



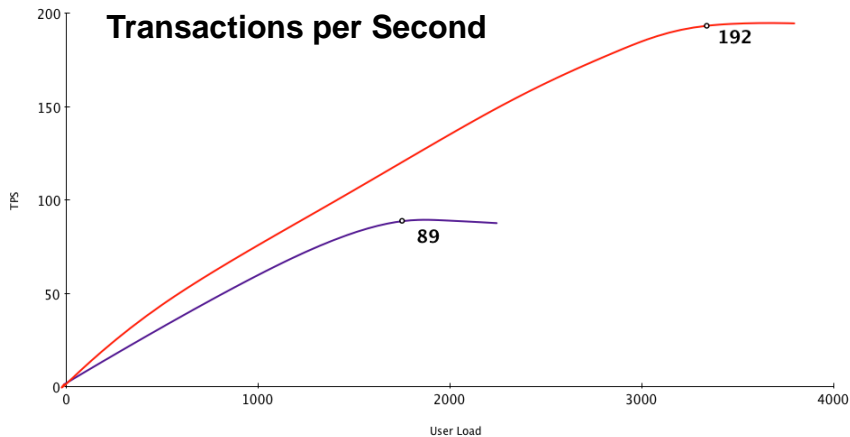
CIO VIEW:

- Tiers exist with HDDs today
- SSDs simply add additional performance tiers
- SLC and MLC will be tiered to optimize performance and \$/GB
- Not all SSDs are created equal



OLTP Benchmark Test

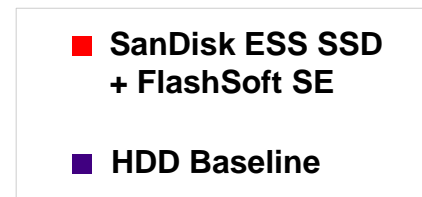
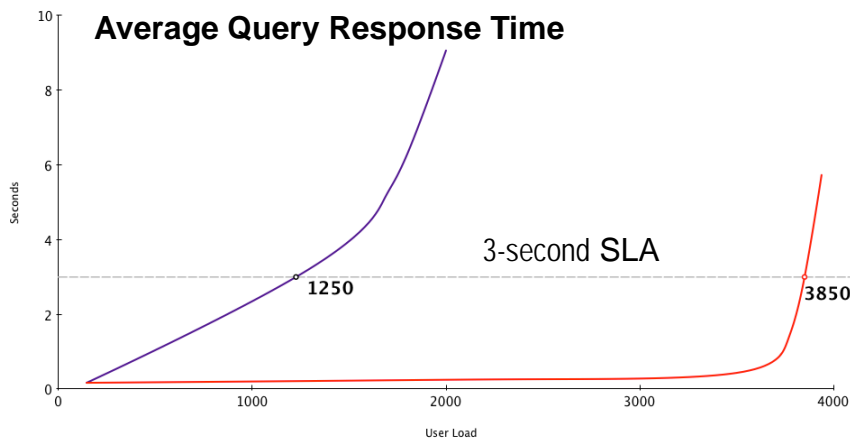
Increased Maximum Performance



The accelerated system delivered more than 2x TPS, supporting nearly double the number of concurrent clients.

Within a 3-second SLA, the accelerated system supported more than 3x the number of concurrent users.

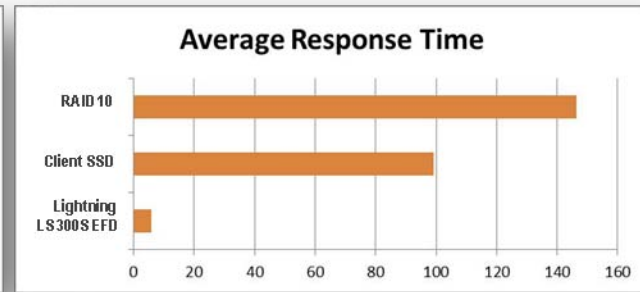
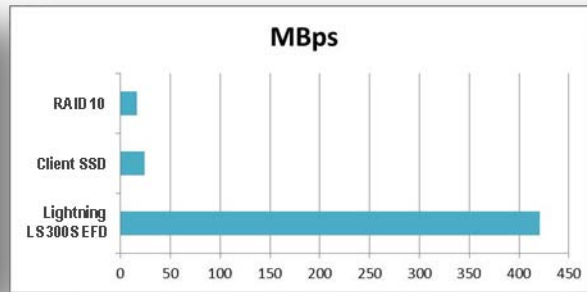
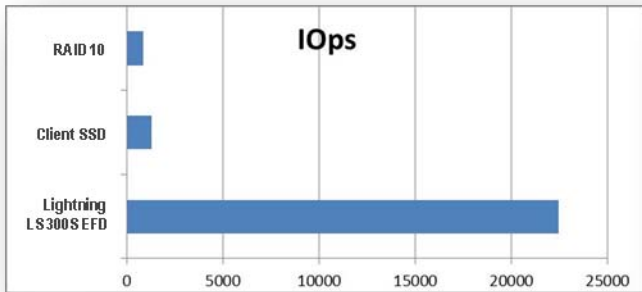
The accelerated system would have shown even greater performance, but was constrained by CPU saturation.



Source: Independent third-party testing commissioned and performance numbers provided by FlashSoft.



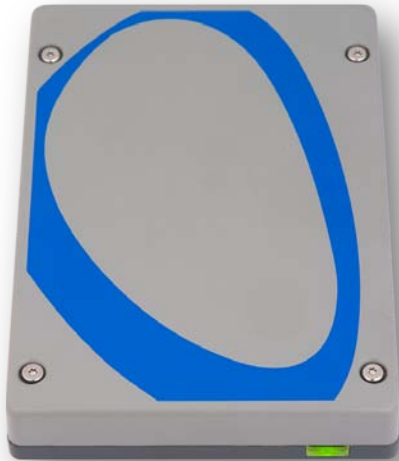
OLTP Moderate Read at a Queue Depth of 128



Average Response Time is in milliseconds (ms).

Source: Independent real-world workload test by SQLServerCentral.com published on 07/06/2011 at http://www.sqlservercentral.com/blogs/sqlmanofmystery/archive/2011/07/06/pliant-technology_2C00_-enterprise-flash-drives-for-your-sql-server_3A00_-part-2.aspx

Do **MORE**
For Less



ESSENTIAL ELEMENT IN THE CLOUD!

- More Performance = Lower Cost
- More Reliability = Lower TCO
- No Changes Required = Easy Adoption
- OEM Tested and Approved



ANY QUESTIONS?

Thank you!

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