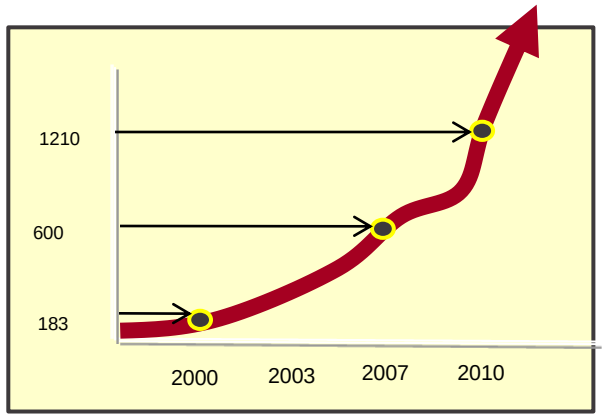
HP visoko-performantna OLTP rješenja

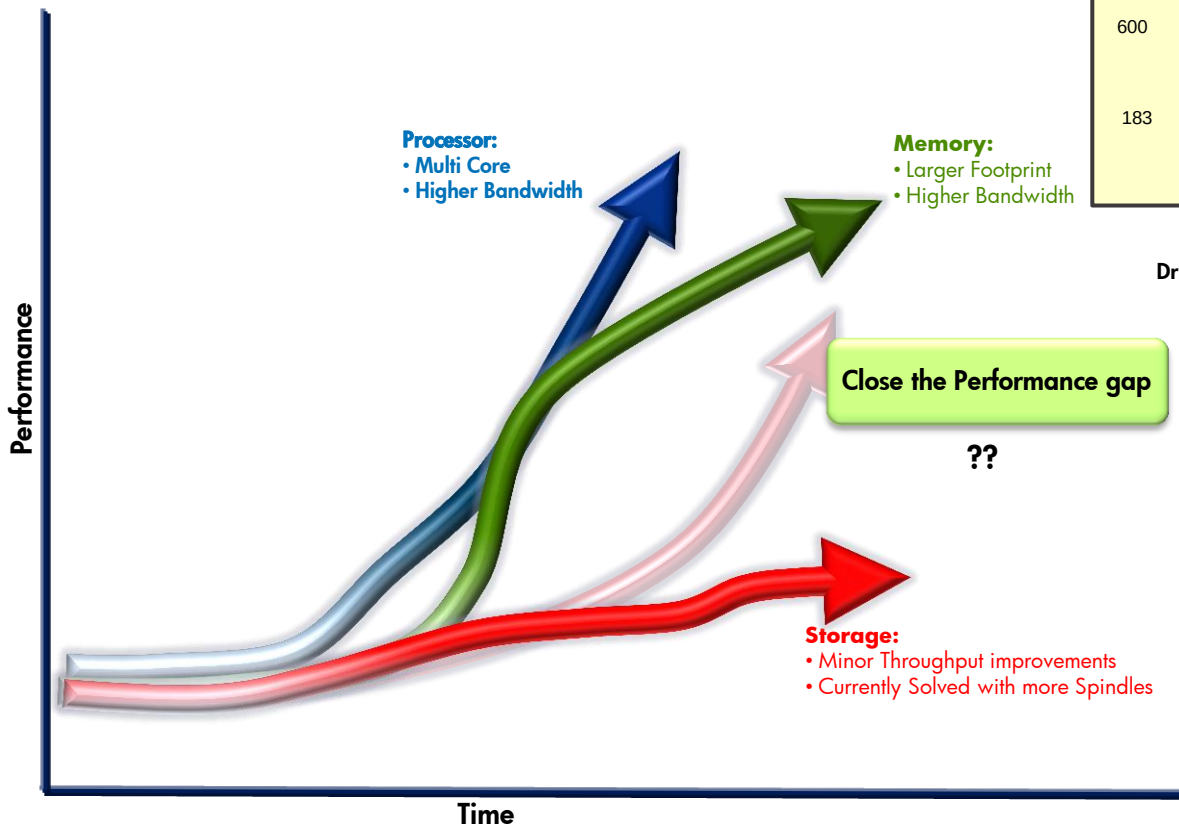
Tomislav Alpeza
Presales Consultant, BCS/SD

Server Technology evolution



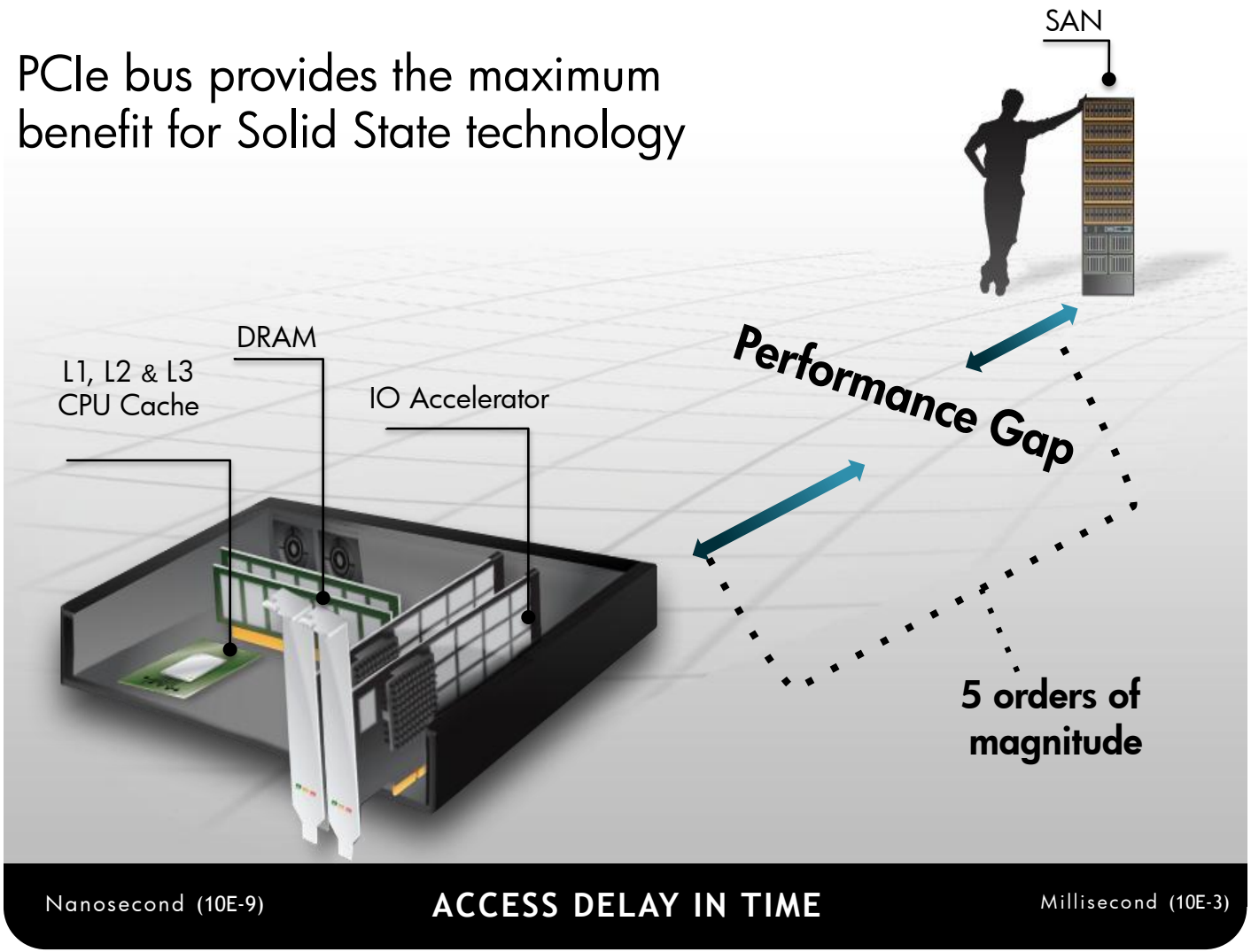
(Source: HP TPC benchmarks)

Drives required to keep up with processing bandwidth



- Moore's law: Computer technology has an exponential growth rate, doubling every 18 to 24 months
- Storage technology has a much slower pace

Move data closer to the CPU



What are Customers Looking for In OLTP Database Solutions?

- High-performance, reliable, available, manageable scale-up OLTP/application system
- Supports existing architecture - no siloed technologies for IT to support/manage
  - Converged Infrastructure
- Production database solution that is not over-engineered for their needs
- Outstanding I/O capability and enterprise-level reliability
  - Meets or exceeds the advertised performance of Oracle Exadata
- Open architecture - no lock-in to specialized hardware
- Capable of supporting various Oracle database versions
  - Choice of 10g or 11g (not just 11.2.0.2.x.y.z)
  - Including the Oracle patches you need for YOUR applications
- The choice of OS strategy (Linux, Oracle Linux, Windows)
- Reasonable and FAIR price (that is KEPT fair by competition)

HP High-Performance Solutions for Oracle database

Changing the game for database applications

- HP has the technology to make your OLTP faster
- High-performance, reliable, available, and manageable scale-up database machine for OLTP applications
  - Leverages a mission-critical design; plugs into the Converged Infrastructure
- Production database solution that integrates a single 8 socket HP ProLiant server with state-of-the-art 100% flash memory storage technology
- Delivers both outstanding I/O capability and leadership technology
  - Up to 10x OLTP performance improvement* over Oracle DB deployment without flash
- Capable of supporting previous and current versions of Oracle database, i.e., Oracle 10g and 11g (as well as other ISV databases)
- Offers customer choice of OS strategy (Linux or Windows)

*Based on internal HP testing

HP High Performance Scale-up Database Solutions

Optimized for Transactional Workloads

HP Converged Infrastructure servers

OLTP Application Servers

Examples:
- Oracle EBS
- PeopleSoft
- Other ISVs

HP ProLiant DL980 G7

FLASH database storage

HP High Performance or Accelerator Database Solution

Options:
- Oracle 9i, 10g, 11g
- Other DBs

HP Storage

HP Storage Solutions

Examples:
- Off-line store
- Backups
- High Availability
- Disaster Recovery

HP High Performance Scale-up x86 Platforms

Customizable performance and availability to match your needs

HP ProLiant DL980 G7	Workload-optimized Storage		
FlashHost Platform		**PCIe bus-based Flash** HP PCIe IO Accelerator cards	– Blazing speed: An in-memory like database. Up to 13TB raw – Small footprint in server – High-availability through DB replication/mirroring
Flash SAN Platform		**External flash storage** HP VMA3210 Memory Array	– Blazing speed: Up to 100 TB raw per rack – "Limitless" expansion – 5-9s availability: RAID, hot swap, DB replication
Disk SAN Platform		**Mixed workload flexibility** Fabric-based HP 3PAR and HP P9500	– Excellent optimized speed: Tiered storage software – SAN-based solution shared by multiple servers – Best high availability – Good performance but shared with other apps

PCI Flash Storage versus traditional Fabric SSD

- HP High-Performance DB Solutions are based on PCI Flash

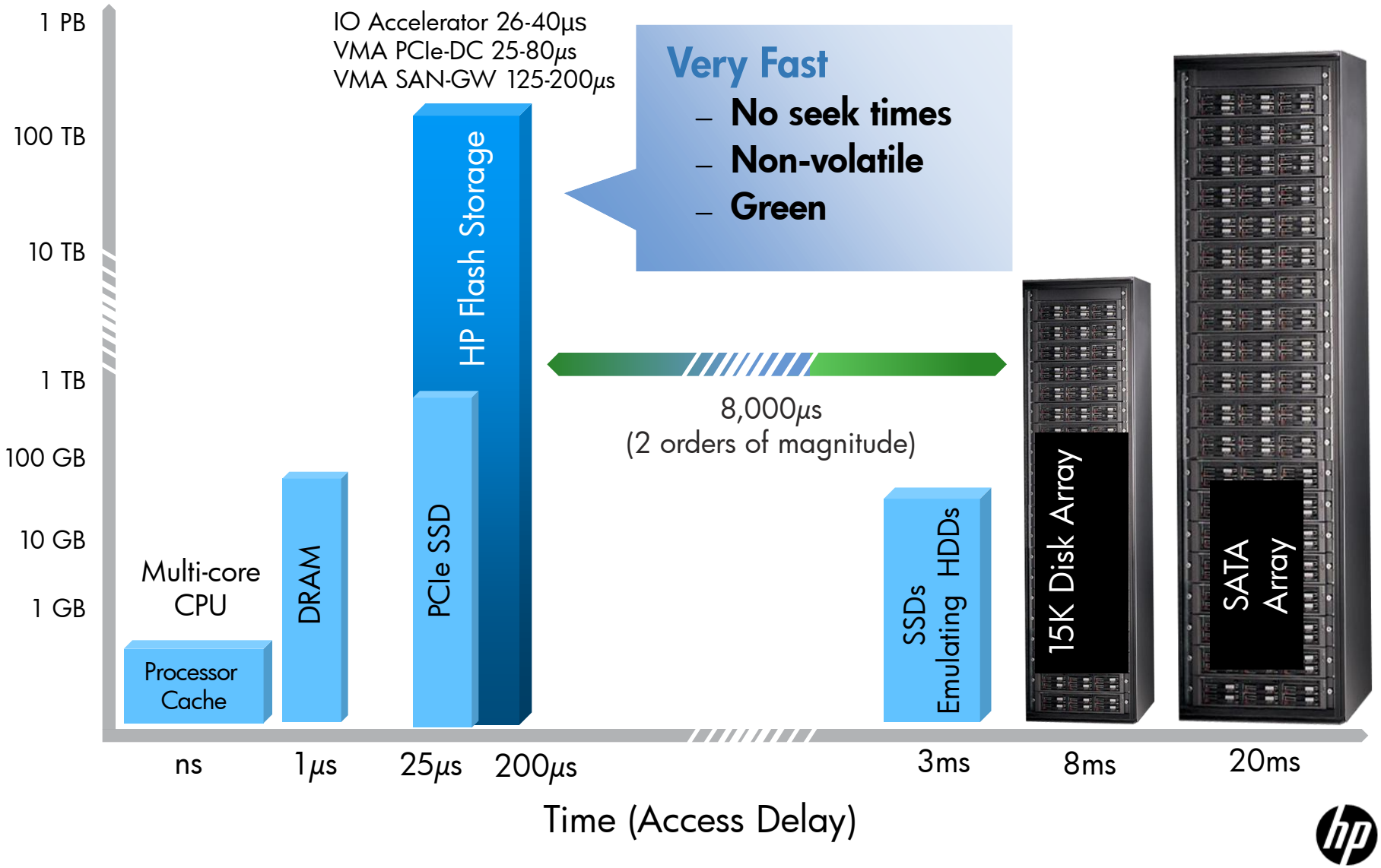
PCI-bus-based Flash Storage Solutions

- One server, typically one database
- Lowest read latencies, highest OLTP numbers (IOPS)
- Increasing densities make it possible to hold entire (small-med-large) databases
- No storage controller, no interconnect to add latency or limit throughput
- Scalability may depend on number of supported server slots
- RAID protection included, but clustering is required for failover availability

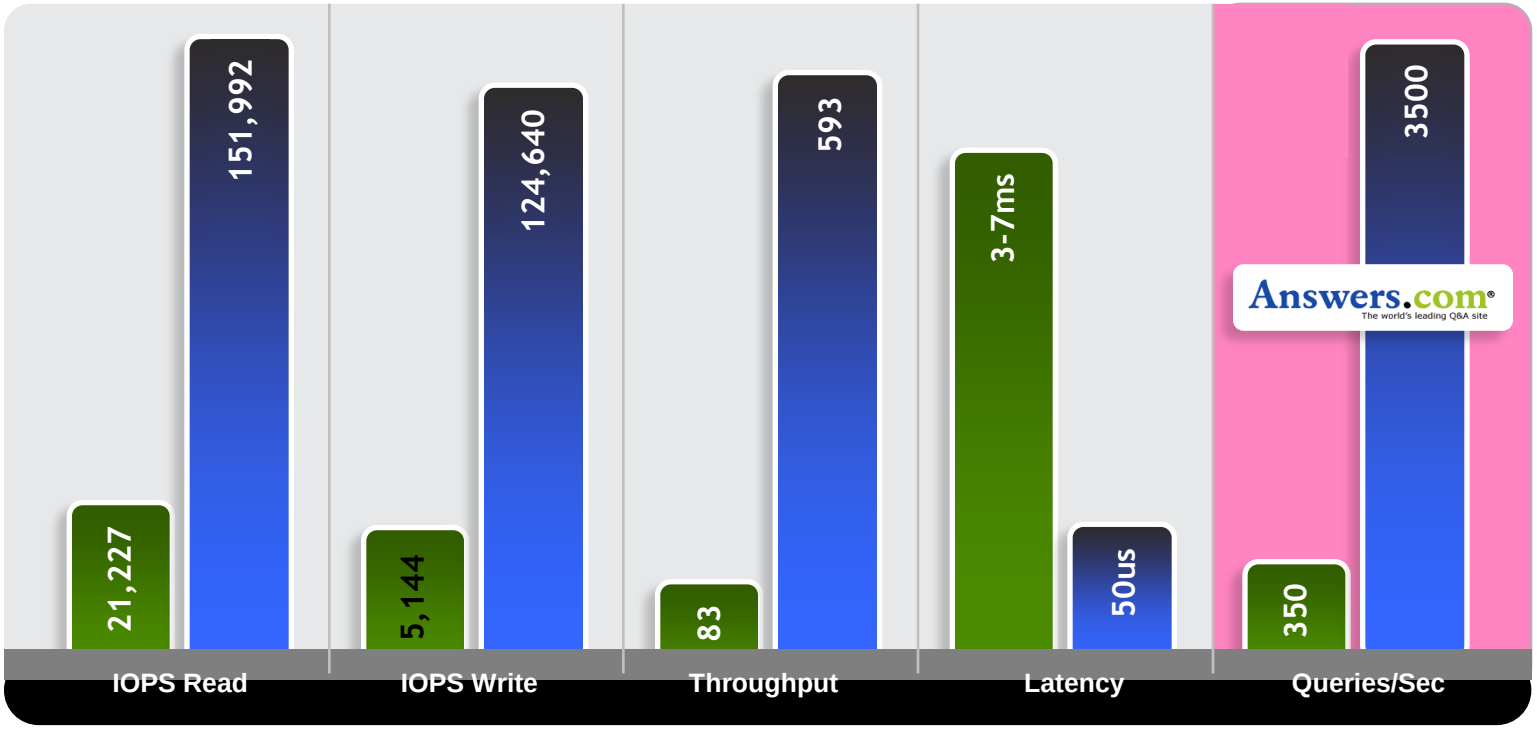
Fabric-based Solid State Storage Solutions

- Sharable - Multiple application servers using same database
- More scalability, availability, flexibility than PCI solutions
- Not as fast as PCI-based, but still good "cache-like" performance (SSD)
- Choice of storage fabrics: FC, FCoE, Infiniband (iSER), Ethernet (iSCSI),FICON
- Choice of management tools: virtualization, tiered-storage, replication

New Fully Solid-State Storage Tier



Application Acceleration – Answers.com

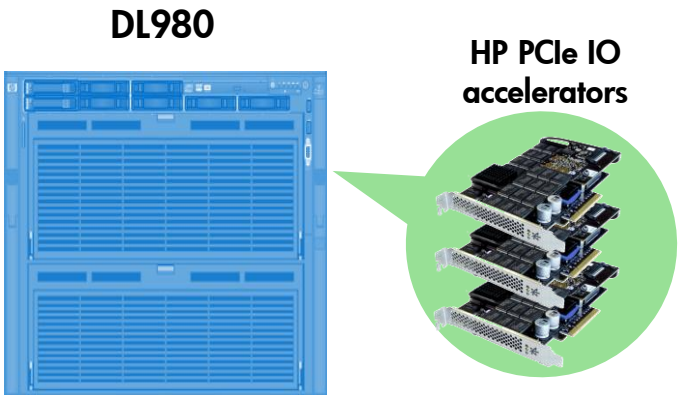


- 10x performance increase per server
  Value: greater performance density
- More efficient scaling model
- CAPEX/OPEX savings
- Faster end-user web experience

Two DL980 High-Performance OLTP Solutions

Choose the one that's best for you

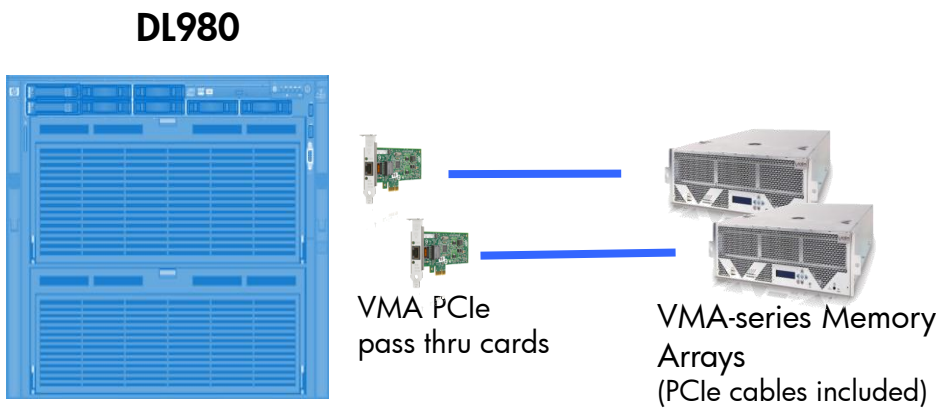
HP Data Accelerator Solution for Oracle
internal flash storage



For each IO Accelerator:
- Scalable capacity – 0.3-1.2 TB
- 150,000[1] IOPS r/w, sub-40µsec latency
- 185,000[1] IOPS read only
- 1.5 GB/sec read throughput

Up to 13 TB raw usable space

HP High-Performance Database Solution for Oracle
flash-based external array



For each VMA-series Memory Array :
- Scalable capacity – 5-40TB*
- 250,000[2] IOPS r/w, sub-80µsec latency
- 350,000 IOPS read only
- 1.4 GB/sec read throughput

Up to 80 TB raw usable space

* 5-10GB 1Sep2011; 40GB later

1. From specs, based on 512-byte blocks
2. From specs, based on 4k-byte blocks

HP Data Accelerator Solution for Oracle

– Put the database in flash

- Maximum 13 TB raw storage
  - Up to 1.2 TB per card (uses full-height PCIe slot)
  - 10 full-height slots per DL980
  - Plus 4 x 160GB or 320GB IO Accelerator cards for log files
- Substantial performance advantages over traditional architecture
  - Latency of microseconds (millionths) versus milliseconds (thousandths)
  - Up to 10x performance gains possible (depends on workload)
- Compact footprint (~70% smaller)
- Supports Oracle 9i, 10g, 11g
- Protects customer choice (could be used for other DB's/OS's, can be configured with ISS servers, other use cases)

What is the VMA-series Memory Array (VMA)

Capacity

- All Solid State external storage
- 5TB or 10TB SLC arrays
- Scalable to many Terabytes or even Petabytes using SAN connectivity

Availability

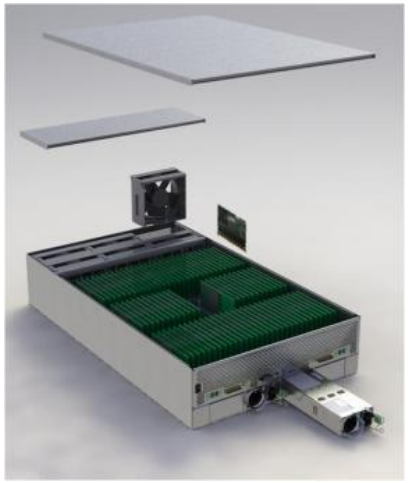
- Auto Hot Sparing of failed memory module
- Hot-swappable memory modules, fans and power supplies
- High performance built-in RAID

Connectivity

- PCIe-direct attached for a single server
- Fibre Channel SAN shared storage

Performance

- Sustainable high IOPS performance
- Spike-free sustained latency
- Advanced wear-leveling built-in
- Non-blocking flash RAID technology

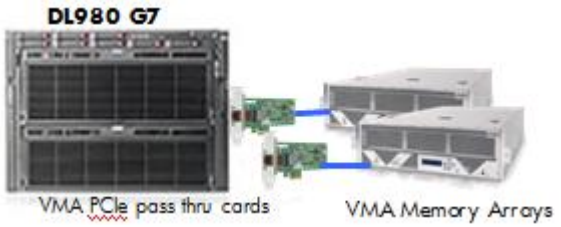


Platform Support

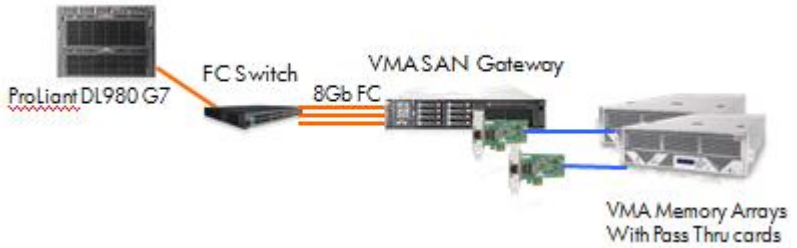
- HP ProLiant DL980 with PCIe-direct attach or SAN attach
- HP Integrity/HP-UX BL8x0c i2 blades and Superdome 2 with SAN attach

HP VMA-Series Memory Array Platform Support

– Direct Attach
  - DL980 G7
  - RH Linux 5.6, SLES 11 SP1, MS Windows 2008 R2



– SAN Gateway Attach (October 2011)
  - DL980 G7
  - RH Linux 5.6, SLES 11 SP1, MS Windows 2008 R2



– Future Supported Configurations
  - Oracle Linux
  - Oracle Real Applications Cluster (RAC)
  - MLC version of the array
  - Support for 10 VMA arrays (10 PCIe x8 cards)

– A light-weight VMA software driver must be installed in the server OS
– No current plans to support other Proliant server options

HP Solution Configuration – 13,000 users

HP High Performance Database Solution for Oracle OLTP

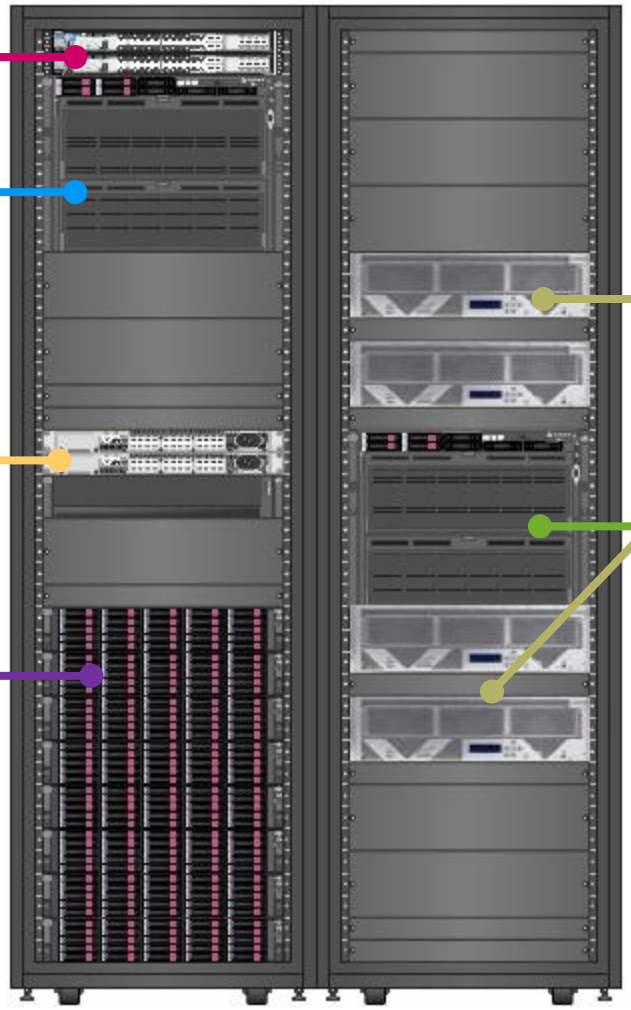
<u>Architecture view</u>
4p/40c
512GB memory
15 TB DB size
70M OLTP trans/hr

2 x 10GbE Switches

App/Test/Dev Server
DL980 G7 4P Database Server
Running Linux

2 x 8Gb/s Fibre
Channel Switches

HP P6300 EVA
Non-production environments (e.g. development, test, training, backups, and recovery area)
(over 40 TB usable)

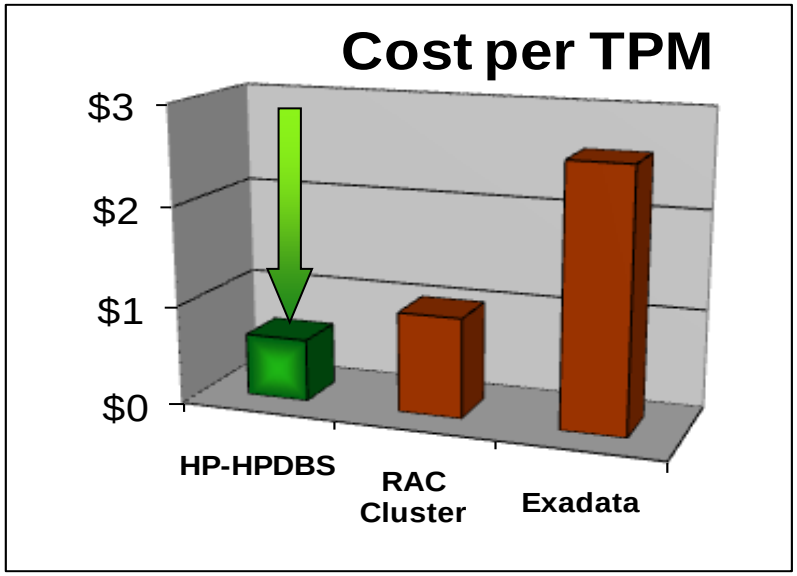


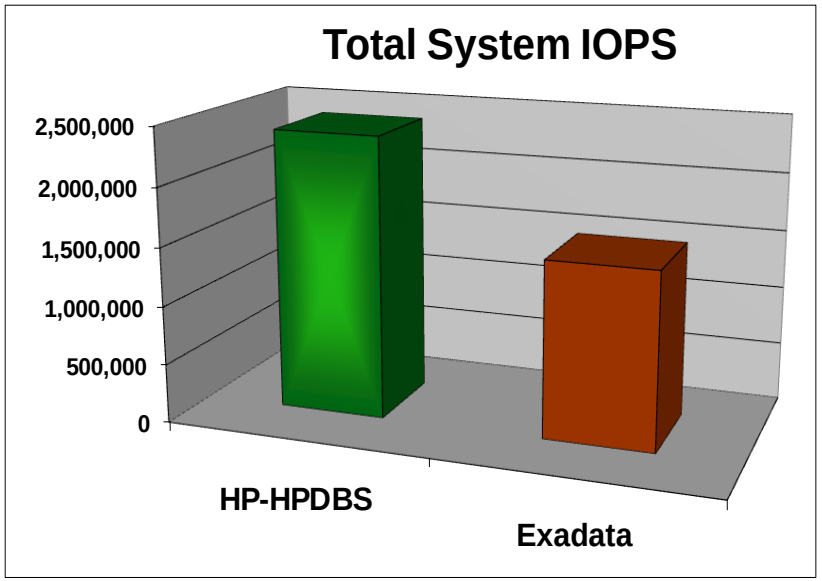
Production Database
(4) HP VMA3210 Chassis
PCIe 20 Gb/s Interface
10TB Flash Memory Each
(40TB RAW / 24TB Useable)

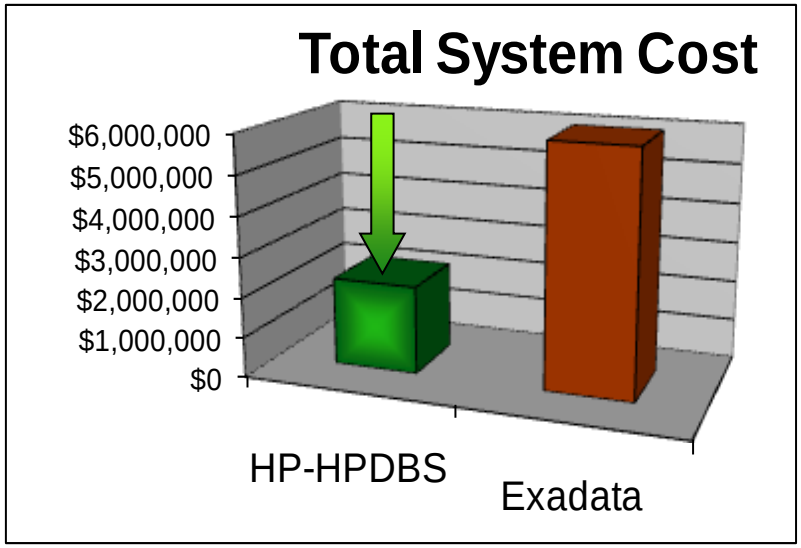
Production Server
DL980 G7 4P Database Server
Running Linux

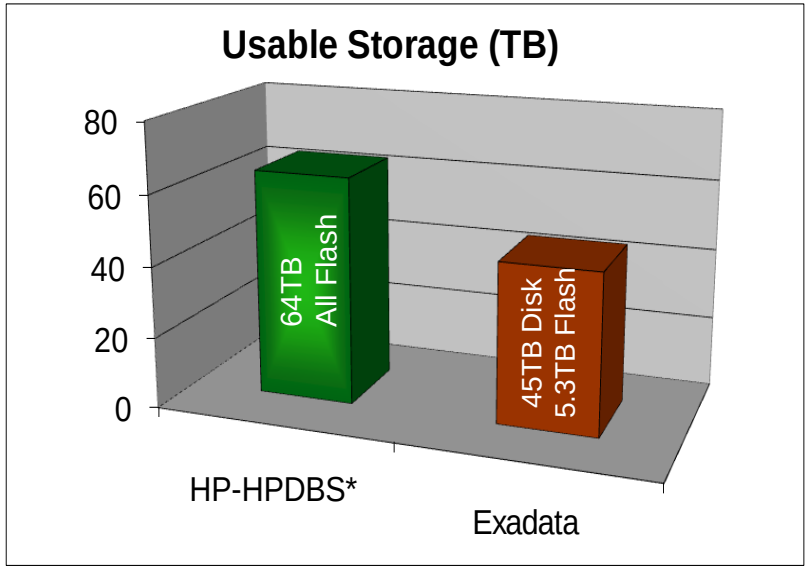
Software
Oracle 11g R2 Database
Linux (RHEL, SLES)*
HP Insight Control for Linux
HP Storage Essentials
HP Command View EVA

HP HPDBS versus Oracle Exadata









*Using (8) VMA3210 Arrays

HP ProLiant DL980 World Record Performance

Enabled by HP PREMA Architecture

TPC Transaction Processing Performance Council

spec

HP ProLiant DL980 G7

SAP

Microsoft

#1 Microsoft Windows and SQL Server for two-tier SAP Sales and Distribution (SD) standard application benchmark

#1 Eight processor x86 single-node for SPEC CPU2006

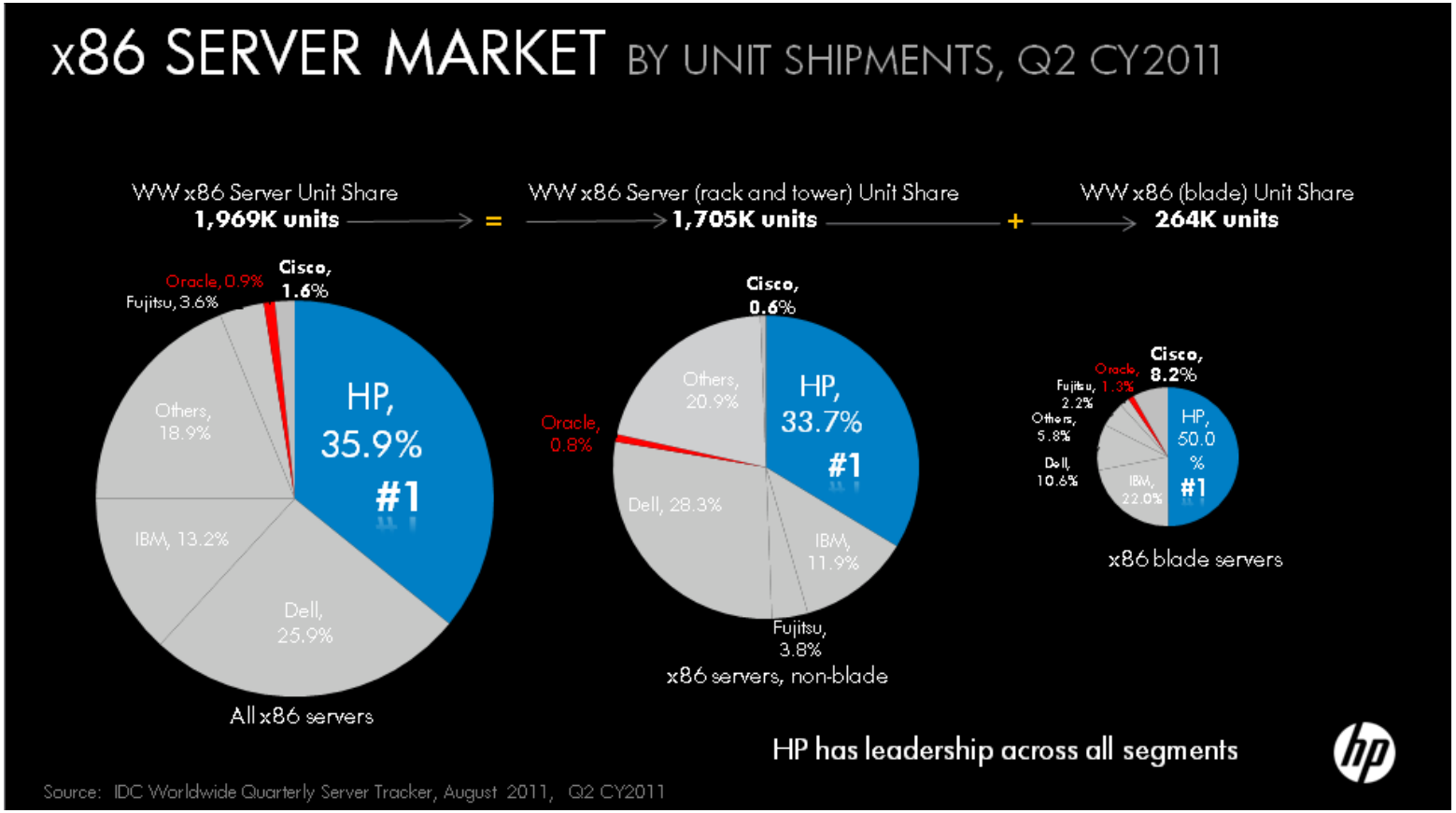
#1 overall virtualization performance on 6 SPECvirt_sc2010 with RHEL 6.1/KVM

#1 Microsoft Windows/SQL Performance non-clustered @ 1000GB and 3000GB for TPC-H

#1 Single-node J2EE/Java App Server for SPECjAppServer2004

1. HP ProLiant DL980 G7 results at http://h18004.www1.hp.com/products/servers/benchmarks/index.html#8P as of 8/25/11
2. The SPEC logo is register trademark and © 2011 Standard Performance Evaluation Corporation (SPEC), reprinted with permission

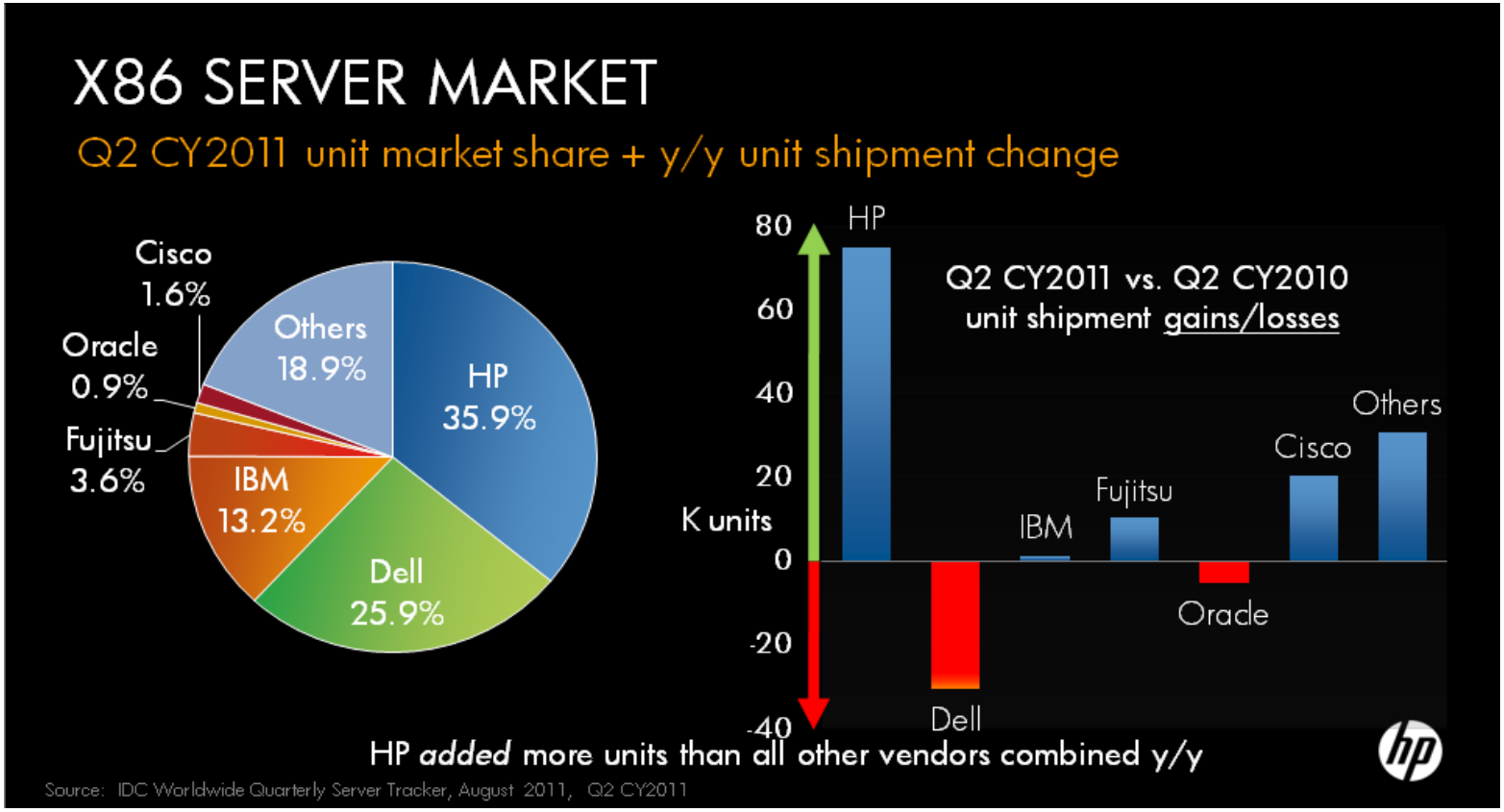
x86 Server Market (1)



"I don't care if our commodity x86 business goes to zero. We don't make any money selling those things. We have no interest in selling other people's (intellectual property). Commodity x86 includes Intel IP, Microsoft. We don't make money selling that. Sun sold that stuff. And **we are phasing out that business.**

Source: On the Call: Oracle CEO Larry Ellison: http://abcnews.go.com/Technology/wireStory/call-oracle-ceo-larry-ellison-14567669

x86 Server Market (2)



Q & A