X86 Database Appliance and Reference Architectures

- John Smith, District Manager, US Federal – BCS
- Alvina Nishimoto, BCS Americas Product Manager
Agenda

• Overview

• HP AppSystem for SAP HANA

• Microsoft Reference Architectures
  – HP and Microsoft Fast Track 3.0
  – HP Enterprise Transaction Processing Reference Architecture
    Optimized for Microsoft SQL Server 2008 R2

• HP Universal DB SuperSystem

• BMMSoft

• Arcsight

• Solid State Technology
DL980 unlocks new opportunities

- Gain new business with Sun and IBM customers
  - Linux and Windows server consolidation
  - Competitive Unix take outs
- Extend reach with OLTP, data analytics and data warehousing solutions
- Complete reference architectures for Linux and Windows

SCALE-UP X86 MARKET OPPORTUNITY

- Consolidation $1.2B
- Scalability $1.1B
- Migration $1.0B

- HPDBS for Oracle (VMA)
- SQL Server Fast Track Data Warehouse
- HP Scalable Warehouse for Oracle
- HP AppSystem for SAP HANA
- HP Data Accelerator for Oracle
- BMMsoft EDMT Solution

MARKET OPPORTUNITY

- CONSOLIDATION $1.0B
- SCALABILITY $1.1B
- SCALE-UP X86 MARKET OPPORTUNITY $1.2B

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### Key BCS x86 sales plays

- **Scale, migrate, consolidate database solutions**

<table>
<thead>
<tr>
<th></th>
<th>Transactional solutions (OLTP)</th>
<th>Data Warehouse solutions (DW)</th>
<th>BI Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microsoft</strong></td>
<td>• HP Enterprise Transaction Processing Solutions Optimized for SQL Server</td>
<td>• DL980 SQL Server Fast Track Data Warehouse(P2000)</td>
<td>• DL980 SQL Server Fast Track Data Warehouse(P2000)</td>
</tr>
<tr>
<td><strong>Oracle</strong></td>
<td>• High Performance Database Solution for Oracle</td>
<td>• HP Scalable Warehouse Solution for Oracle (P2000)</td>
<td>• HP Scalable Warehouse Solution for Oracle (P2000)</td>
</tr>
<tr>
<td><strong>SAP</strong></td>
<td>• Oracle</td>
<td>• HP AppSystems for SAP HANA</td>
<td>• HP AppSystems for SAP HANA</td>
</tr>
<tr>
<td></td>
<td>• IBM DB2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alternative Databases</strong></td>
<td>• EnterpriseDB (for Linux and Windows)**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Part of HP Universal DB Supersystem
** Coming soon for DL980, available for HP-UX
Accelerate

- HP AppSystem for SAP HANA
HP AppSystem for SAP HANA™
In-memory Database Optimized for SAP

• Significant opportunity for SAP refresh

• 3-5x revenue drag for ESSN/TS & Enterprise Services; high GM

• FY12 Pipeline currently ~$100M with 400+ opportunities, growing 20%/month

• Large database footprint: 10TB+

* Available to early access customers only, GA by June 2012
Introducing HP AppSystem for SAP HANA
Solutions accelerating time to application value

HP ProLiant DL580 G7

HP ProLiant DL980 G7

HP BladeSystem G7

SAP HANA
- In-Memory Computing Engine
- Calculation and Planning Engine
- Real-Time Replication Services
- Modeling Studio
- Data Services

BICS
SQL
Other applications

SAP BusinessObjects
SAP NetWeaver BW
3rd party

SAP Business Suite
MDX

Strategize
Assess
Prepare
Implement
Support
## HP AppSystems for SAP HANA

<table>
<thead>
<tr>
<th>Scale-Out</th>
<th>Medium+</th>
<th>Large</th>
<th>XL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Est. Data(1)</td>
<td>1.25TB</td>
<td>2.5TB</td>
<td>20TB</td>
</tr>
<tr>
<td>Server</td>
<td>ProLiant DL580 G7</td>
<td>ProLiant DL580 G7</td>
<td>ProLiant DL580 G7</td>
</tr>
<tr>
<td>Processor</td>
<td>2 Intel x86-E7</td>
<td>2 Intel x86-E7</td>
<td>4 Intel x86-E7</td>
</tr>
<tr>
<td>RAM</td>
<td>128G</td>
<td>256G</td>
<td>512G</td>
</tr>
<tr>
<td>Storage</td>
<td>IO Accelerator Local Disk</td>
<td>IO Accelerator Local Disk</td>
<td>IO Accelerator Local Disk</td>
</tr>
<tr>
<td>Order</td>
<td>BOM</td>
<td>BOM</td>
<td>BOM</td>
</tr>
<tr>
<td>Revenue PL</td>
<td>ISS</td>
<td>ISS</td>
<td>ISS</td>
</tr>
<tr>
<td>BCS Product Line</td>
<td>BCS</td>
<td>BCS</td>
<td>SKU</td>
</tr>
</tbody>
</table>

**Notes:**
1. For reference only
2. SAP HANA SW loaded and delivered by Factory Express. Customer must purchase license directly from SAP.
16-node 8TB HP AppSystem for SAP
Modular Solution for Growing Database Demands

- Scalable, modular design
- 2 – 16 nodes in modular Increments:
  - 2, 3, 4 - BL680 blades
  - 2 - Ibrix Gateway
  - 1 - EVA Mass Storage
  - HP Networking
- High Availability blade fail over
- DR investment protection
- Incremental racks are added in the field

Up to 40 TB uncompressed database
SAP HANA Target Market Identification

Who is SAP HANA for?

- Financial services, consumer products, retail, manufacturing, other data intensive analytic markets
- Existing SAP ERP transactional customers
- Existing SAP Business Objects Enterprise customers looking to accelerate their analytics
- Customers aware of SAP HANA
- Customers wanting to host SAP Netweaver Business Warehouse 7.3 on SAP HANA database.

**Initial Focus**

ERP * customers without SAP NetWeaver BW (19.2K)
ERP customers with BOE (807)

*BOE: SAP BusinessObjects Enterprise BI platform*
SAP NetWeaver BW Migration Services to SAP HANA

HP will upgrade and migrate your solution for rapid BI modernization

- SAP BOE 3.x → Upgrade → SAP BO BI 4.0
- SAP Netweaver BW Accelerator → Upgrade → SAP NetWeaver BW 7.3 sp5
- SAP NetWeaver BW 7.x → Upgrade → SAP NetWeaver BW 7.3 sp5
- Enterprise DB (Oracle, DB2, etc.) → Migrate → HP AppSystem for SAP HANA SP3

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Competitive Philosophies

**HP: Mission Critical solutions with long-term investment protection**
- **Strength** – Technically superior solution driving premium pricing
  - Provide customers an entry point for PoC “kick the tires” activity
  - A technically superior solution for long-term investment protection
  - Delivers differentiation and defensible price premium
- **Weakness** – later to market & portfolio ramifications
  - First to market defines the initial terms. IBM defining price.
  - Product line discontinuity from single node to HA to Scalability

**IBM: Low entry price point and first to market**
- **Strength** – early market mover
  - Lowest entry price point. Hardware as a loss-leader for account capture and services sales.
  - Investment protection for single node early adopter customers
  - Deliver High Availability to existing single node customers
  - Rack server investment protection – grow from single node
- **Weaknesses** – delays move to long term solution
  - Scalability performance impacted by required localized storage
  - Complications with system management, system/power/cooling density, etc as clusters grow
Microsoft Reference Architectures
HP and Microsoft Data Management

**Transactionally**

- **Enterprise Database Consolidation Appliance**
  - Consolidation Solution for Tier 2/3 SQL Server databases with BL465c G7 and P2000 MSA

- **Enterprise OLTP Reference Architecture**
  - HP Enterprise Transaction Processing Reference Architecture Optimized for SQL Server R2 2008 DL980 & MSA

**Data Management**

- **Enterprise Data Warehouse Appliance**
  - DWH for mission critical environments (MPP) - SQL Server 2008 R2 & DL3xx G7 Servers

- **SQL Server Fast Track Data WH**
  - Predictable “out of box” DWH from mid-market to large enterprise (SMP) - SQL Server 2008 R2 & DL980

- **Business Data Warehouse Appliance**
  - DWH for mid-market environments (SMP) - SQL Server 2008 R2 & DL370 G6 Servers

- **Managed Self service Business Intelligence SQL Server 2008 R2 & DL360 G7 Servers**

**Analytics**

- **Business Decision Appliance**
  - Managed Self service Business Intelligence SQL Server 2008 R2 & DL360 G7 Servers

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Nov 2011
HP AND MICROSOFT INFRASTRUCTURE-TO-APPLICATIONS INITIATIVE
And HP and Microsoft Fast Track 3.0
The choice is yours!

Broader range of solutions to meet your data warehousing needs

Configurations to scale from 1TB to 80 TBs

- Prescriptive guidance and optimized methodology for deployment
  - Targeted at query workloads patterned for large sequential data reads
- Balanced HW approach ideal for data marts
  - Fast Track Reference Architectures: 1–80TB
- Leading price/performance metrics
- Configurations, tested performance guidance, and best practices
  - HP Sizer for Microsoft SQL Server Fast Track Data Warehouse
- Custom support

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>ProLiant DL370 (2P)</td>
<td>ProLiant DL38x (2P)</td>
<td>ProLiant DL58x (4P)</td>
<td>ProLiant DL980 (8P)</td>
</tr>
<tr>
<td>Expansion (14 TB*)</td>
<td></td>
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</tbody>
</table>

* recommended data capacity with a 3:1 compression

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V 3.0 HP SQL Server DL980 Fast Track DW

The DL980 represents the premier position in the data warehouse stable of solutions

- Scalable, pre-tested, cost-effective and balanced model for (SMP) SQL Server 2008 Data Warehouse 1 - 95TBs
- Appliance-like ease of deployment for small to large DW
- Predictable “out-of-box” scalable performance
- Exclusively designed for sequential data workloads
- Reduce costs, risks, and time to implement
- Scale-up today with SMP
- Surrounded with implementation services from design to acceptance and collaborative SW technical support delivered jointly by HP and MS
- Customized at the factory, surrounded by implementation services
- Customers will have option to purchase SQL Server Fast Track with SQL Server 2008 R2 or SQL Server 2012

Fast Track Reference Architecture

- Prescriptive configuration and component guidance
- Can be assembled at the factory
- Consulting services

- Time savings and reduced costs and risk with reliable reference architectures

Scale-up
V3 SQL Server Fast Track DW essentials

$6.6 K Per Terabyte at 95 TB!

- DL980G7 E7 (replaces DL980G7 x75xx)
- 16 x P2000 G3 8GB FC arrays
- Storage with 322 SFF Drives
- Optimized for up to 95 TB Data Warehouse
- New 600GB 6GB Small Form Factor Drives
- 19 GB/sec Scan Rate @ $6.6k per TB!
- 11 x HP 82E 8 Gb/s Dual Port PCIe FC HBAs
- 768 GB RAM – can accommodate 2 TB RAM
- Most popular models are ProLiant DL38x (2P) and ProLiant DL58x (4P)
- V4 H2 SQL Server 2012

HP Sizer for Microsoft SQL Server Fast Track Data Warehouse
Fast Track component architecture
Tested and performance-validated

BALANCED DATA WAREHOUSE COMPONENTS

SERVER

- Windows Server OS
- SQL Server
- CPU
- Host Bus Storage Adaptor (HBA)

STORAGE ENCLOSURE

- Storage Processor
- Disk Array
- Storage Interconnect (Switch)
Reference Architecture for OLTP

HP Enterprise Transaction Processing Reference Architecture

Optimized for Microsoft SQL Server 2008 R2
Introducing: HP Enterprise Transaction Processing RA Optimized for Microsoft SQL Server 2008 R2

Combining the power of HP Converged Infrastructure and Microsoft SQL Server

- **Up to 1,000,000 sustained** IOPS
- **10x Faster** Time to DB Production: with faster Warm-up, reduced Back-up and Re-indexing times
- **Leadership TCO** compared to Proprietary ‘One-size-fits-all’ offerings from other vendors

- **Tier 1 SQL Database features** optimized for OLTP workloads
- **100% flash-based storage** for the SQL Database
Performance characteristics:

- 500,000 *sustained* IOPS (two arrays)
- 1,000,000 *sustained* IOPS (four arrays)
- 2.4 GB/sec throughput from array flash
- 5-20TB Database size
- Up to 2TB RAM
- 10g Network/8g SAN
- Key components: DL980+VMA 3210+D2D4324
- **Flexible options** (SAN or Direct Attached arrays)
Benefits of implementing Reference Architecture

- Available now using SQL 2008R2
- Excellent value from evaluation/POC to production platform
- Balanced and scalable hardware
  - CPU to handle processing – 80 cores!
  - Flash and ram to speed up data access – 2TB ram!
  - Scalable IO with 11 8x PCI slots!
- HA Options to evaluate
- Dedicated D2D backup device minimizes workload impact
- Backups easily offloaded via FC to other site devices
Optimized for SQL Server 2008 R2:

- Up to 12x time faster to Production than magnetic media (Fast buffer cache warm-up)
- **NUMA architecture** allows instances or databases to be deployed in NUMA nodes
- Sufficient CPU power to handle VLDB Compression and large re-indexing jobs
- **HA options** include Clustered SAN or Mirrored DAS pair configurations
- No single points of failure!
Building Block approach: Designed to grow with transactions

- **Base Configuration:** 16TB, 1,000,000+ IOPs Sustained
  - 2x 4-proc DL980s with 512GB RAM ea (80 cores, 1TB RAM total)
  - 4 x 24-port 10GbE Network Switch (Storage Fabric + External)
  - 8-per-DL980 FC or FCoE connections to Storage Fabric
  - 2x 8TB-Usable Flash-based Storage Arrays (w/ GWs & Spares)
  - Full-size rack plus PDUs

- **Expanded Configuration:** 32TB, 2,000,000+ IOPs Sustained
  - Add 2x 8-proc DL980s with 1TB RAM ea (160 cores, 2TB RAM total)
  - Use existing switches and connections
  - Add 16TB-Usable Flash Storage to existing arrays
  - Use existing rack and PDUs

- **Optional Elements:**
  - 3rd Server (Multiple Secondaries) & Storage
  - Disk Backup Subsystem
POLTP Flash-based Storage Proposal – Super-HA

‘An extra 9 at no extra cost’

Building Block Config: 16TB, 500,000+ IOPs Sustained
- 1x 4-proc 980s with 512GB RAM ea (40 cores/Server)

SQL Server 2012 Super-HA Configuration: 1,500,000+ IOPs Sustained
- 3x 4-proc 980s with 512GB RAM ea (120 cores/1.5TB)
- Primary – all writes – limited reads
- Secondary1 – additional reads, reporting, BI queries
- Secondary2 – ETL feed to DW, continuous backup

When running multiple Tier-1 Apps
- Allow Writes to all servers (Primaries)
- Allow Reads from all servers (Primary and Secondary)
- Server 1 – A Primary, B Secondary, C Secondary
- Server 2 – A Secondary, B Primary, C Secondary
- Server 3 – A Secondary, B Secondary, C Primary
- Competitive story against Oracle RAC
HP Universal DB SuperSystem
HP Universal DB SuperSystem
Common foundation — optimized for the HP ProLiant DL980

Scale-up, resilient, x86 servers designed to take full advantage of the latest 10-core Intel® Xeon® processor E7-4800/2800 product families with Intel® Quick Path Interconnect technology (QPI)

PREMA Architecture – Node Controller chipset design
• Smart CPU caching
  – Reduces overhead
  – Frees up memory bandwidth
  –Eliminates performance bottlenecks
• Resilient system fabric
  – Improved system availability, minimized down time
  – Improved system reliability and performance
  – Improved error logging and diagnostics information
• HP ProLiant innovations
  – iLO3, Insight Software, Thermal Logic, Sea of Sensors, and Dynamic Power Capping
HP Universal DB SuperSystem
Common foundation — advanced data integrity and resiliency

Intel® Xeon® processor E7-4800/2800 product families
• Delivering record-breaking performance and scalability for mission-critical challenges
• Top-of-the-line performance, up to 10 cores
• Scalability to enable an entire in-memory database or to run queries in real-time
• Reliability, security and availability to meet the most demanding workloads
• More than 20 new, mainframe-inspired RAS features

Support up to twice the memory capacity with breakthrough support for data integrity and high availability
HP Universal DB SuperSystem
Common foundation — collaborative hardware-software error recovery

Gaining the full benefits of the RAS feature set included in the and Intel® Xeon® processor E7-4800/2800 product families and the PREMA Architecture

Collaboration with the OS and software stack

- Microsoft® Windows Server® 2008 R2
- Red Hat® Enterprise Linux® (RHEL) 5
- Novell® SUSE® Linux Enterprise Server (SLES) 11 SP1
- Oracle Linux

Intel® Xeon® processor E7-4800/2800 product families
HP PREMA Architecture
### Storage flexibility of HP Universal DB SuperSystem

<table>
<thead>
<tr>
<th>HP PCIe IO Accelerator</th>
<th>HP VMA-series Memory Arrays</th>
<th>HP 3PAR</th>
<th>HP P9500</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.6TB or 1.2TB PCIe card, # of slots avail limits TB</td>
<td>10TB, 20TB, or 40TB chassis in 3U rack</td>
<td>50GB SSDs, 8 to 32 SSDs per controller pair, 128 per array, 6.4 TB max</td>
<td>200, 400 GB SSDs, 5 to 128 SSDs per array, up to 51 TB in SSD</td>
</tr>
<tr>
<td><strong>Attach</strong></td>
<td>PCIe plug in card</td>
<td>FC, Enet network or PCIe plug-in</td>
<td>FC Array attach</td>
</tr>
<tr>
<td><strong>IOPS, Random Reads</strong></td>
<td>185K per card</td>
<td>400K per shelf</td>
<td>3.9K per SSD</td>
</tr>
<tr>
<td><strong>Throughput</strong></td>
<td>1.4GB/s per card</td>
<td>1.4GB/sec per shelf</td>
<td>3.9MB/sec FC connect</td>
</tr>
<tr>
<td><strong>Relative Price</strong></td>
<td>$26.6k for 1.2TB</td>
<td>$150k for 5TB</td>
<td>$23.7K for 4 X 50GB (min of 8 required)</td>
</tr>
<tr>
<td>(US List Feb 2011)</td>
<td></td>
<td></td>
<td>$95K for 5 X 200 GB drives</td>
</tr>
</tbody>
</table>
### HP Universal DB SuperSystem (VMA3210) vs. Oracle Exadata X2-2 (Half Rack)

TCO comparison cumulative three-year

<table>
<thead>
<tr>
<th>IT costs</th>
<th>Solution A: Exadata X2-2 48c (Half Rack)</th>
<th>Solution B: HP UDB 40c (8 VMA3210)</th>
<th>Difference (A - B)</th>
<th>Difference (A - B)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server hardware</td>
<td>$571,335</td>
<td>$1,418,991</td>
<td>($847,656)</td>
<td>(148.4%)</td>
</tr>
<tr>
<td>Server software</td>
<td>$2,808,000</td>
<td>$1,180,000</td>
<td>$1,628,000</td>
<td>58.0%</td>
</tr>
<tr>
<td>IT operations and administrative staff</td>
<td>$760,320</td>
<td>$633,600</td>
<td>$126,720</td>
<td>16.7%</td>
</tr>
<tr>
<td>Facilities</td>
<td>$47,627</td>
<td>$38,273</td>
<td>$9,354</td>
<td>19.6%</td>
</tr>
<tr>
<td>Change costs</td>
<td>–</td>
<td>$50,000</td>
<td>($50,000)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Hardware and software support and maintenance</td>
<td>$2,216,280</td>
<td>$1,091,358</td>
<td>$1,124,922</td>
<td>50.8%</td>
</tr>
<tr>
<td><strong>Total IT costs</strong></td>
<td><strong>$6,403,562</strong></td>
<td><strong>$4,412,222</strong></td>
<td><strong>$1,991,340</strong></td>
<td>31.1% loss</td>
</tr>
</tbody>
</table>

*All costs are at List Price


(4) Oracle Fire X4270M2
Intel® Xeon® processor X5675 3.06 GHz
Sun Solaris
Oracle EE Database

(1) HP ProLiant DL980 G7
Intel® Xeon® processor E7-2850 2.0 GHz
Red Hat Enterprise Linux
Oracle EE Database
Other solutions

• BMMSof EDMT
• Arcsight
EDMT® Solution on DL 980

• Pragmatic Approach to Big Data – Available NOW

Store Big Data

EDMT® Solution stores Emails, Documents, Multimedia and DB Transactions (“EDMT®”) for data compliance, retention and analysis

Cross-Analyze Big Data using Mixed SQL+Text Analysis

Multiple applications (i.e. Social Network Analysis, Fraud Detection, e-Discovery, CRM, Audit, GRC, BI Reporting) can do SQL, Text or combined SQL/Text analysis of the data in the EDMT® Solution and do it 1,000 times faster than before

EDMT® Solution is Horizontal, Geo-agnostic Solution for Big Data
ArcSight Does Three Things Better Than Anyone

Universal Data Collection

- Collect events from any device on the network
- Raw, or categorized for better analysis
- Extend to new data types whenever needed, without ArcSight involvement

Today’s choices will not limit tomorrow’s strategy
ArcSight Does Three Things Better Than Anyone

**Enterprise Log Management**

- Complete management of any data to support security, compliance and IT operations
- Search + report on years’ of data to investigate outages and incidents quickly and easily
- Cut SAN/storage cost with cheap simple management of petabytes of log data

*Deploy one solution to manage enterprise-wide log data*
ArcSight Does Three Things Better Than Anyone

Cutting-edge Threat Analysis

- ThreatDetector – Pattern recognition and anomaly detection to identify modern threats
- Analyze roles, identities, histories and trends to detect business risk violations
- The more you collect, the smarter it gets

Detect and then prevent attacks you can’t predict
Solid State Technology
Why is Solid State Storage needed now?

Solid State Storage is needed for faster Application performance:

- Adding SST to critical storage segments can achieve speedups from x2 to x50.
- SST devices can deliver more than 1,000 times the random access speed of HDD Systems.
SSD pricing is becoming very attractive

HDD vs. SSD $/GB Price Trends
(System $/GB)

IDC HDD: High-end
IDC SSD 2009 Forecast
IDC SSD 2010 Actuals
SSD Continued erosion

3x multiplier: Raw $/GB/MB/s
First, an HP vocabulary lesson

Solid State Disks

Solid State Array

Note: VMA is an All-Flash-Memory Array
HP Solid State directions

How Customers use SSDs today

- Tiers
- Array
- Cache

HP is investing in all three of these areas with SSD-based solutions
HP Solid State offerings

IO Accelerators and VMA fill gaps in the HP solid state strategy

Lowest price… …Footprint & max performance… …High performance & Highest Availability

All solid state

| SSD | SAS | D2700 JBOD | 200-800 GB | SATA & SAS | up to 3 TB |
| IO Accelerator PCIe | In-server Smaller capacities | | | | |
| VMA PCIe/SAN 5/10TB | More HA Larger capacities | | | | |

Tiered solid state

| Lefthand P4900 6.4TB iSCSI dual node | 3PAR Arrays FC attach 1.6 – 25.6TB dual node | P9500 Arrays FC attach 2 - 51TB |
How to choose?
Choosing a solid state solution

Traditional storage arrays
- All servers supported
- Scale-out IOPS
- SSD Tiers with s/w support
- SAN Shared data
- Built-in availability
- Built-in management tools i.e. replication, snapshots, thin provisioning

3PAR Storage Systems

In-server solutions
- HP Servers only
- Lower latencies
- Lower IOPS
- 1 – 5 TB flash typical
- Data not sharable
- SAS RAID or s/w mirror
- Add-on mgmt tools

Smart Array/SSDs IO Accelerators

External all-flash
- DL980 or Integrity only
- Very low latencies
- More capacity, SAN
- 5 or 10TB flash increments
- Data may be SAN shared
- RAID, clustering
- Add-on mgmt tools

VMA-series

More Manageability

Lower latency IOPS

More capacity, SAN
BCS Solid State Roadmap
SSD and IO Accelerator roadmap
For ProLiant DL980 and Integrity i2 servers

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>H2 2012</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO Accelerator</td>
<td>160GB SLC ioDrive</td>
<td>365/785/1205GB MLC ioDrive</td>
<td>400/600GB SLC ioDrive</td>
</tr>
<tr>
<td>(stand-up) DL980</td>
<td>320GB MLC ioDrive</td>
<td>2410GB MLC ioDuo</td>
<td>1205GB SLC ioDuo</td>
</tr>
<tr>
<td></td>
<td>320GB SLC ioDuo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>640GB MLC ioDuo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1205GB MLC ioDuo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance SSD</td>
<td>200/400GB 6G SAS SLC</td>
<td></td>
<td>200-800GB 6/12G SAS SLC*</td>
</tr>
</tbody>
</table>

Support for HP-UX driver is under investigation, available now directly from Fusion-io

*All new SSD capacities will launch in both Gen8 carrier and pre-Gen8 carrier.
# VMA-series Roadmap

For ProLiant DL980 and Integrity i2 servers

<table>
<thead>
<tr>
<th>2011</th>
<th>H2 2012</th>
<th>Future</th>
</tr>
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<tbody>
<tr>
<td><strong>Initial Release</strong></td>
<td><strong>Gateway Redundancy Release</strong></td>
<td><strong>Subject to Change</strong></td>
</tr>
<tr>
<td><strong>Platforms</strong></td>
<td><strong>Array A5.1 f/w</strong></td>
<td>NAND flash refresh</td>
</tr>
<tr>
<td>- VMA3205 5TB SLC</td>
<td></td>
<td>PCIe card refresh</td>
</tr>
<tr>
<td>- VMA3210 10TB SLC</td>
<td><strong>Gateway G5.1 s/w</strong></td>
<td>Gateway platform refresh</td>
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<td>- PCIe card</td>
<td><strong>Linux driver D5.1</strong></td>
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<tr>
<td><strong>Gateway</strong></td>
<td><strong>OS Support</strong></td>
<td></td>
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<tr>
<td>- FC SAN</td>
<td>- RHEL 5.7</td>
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<tr>
<td><strong>OS drivers (direct attach)</strong></td>
<td>- Win 2008 R2 SP1</td>
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<tr>
<td>- Windows</td>
<td>- SLES 11 SP1</td>
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<tr>
<td>- Linux</td>
<td>- OL 6.x</td>
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<tr>
<td><strong>OS Support</strong></td>
<td>- (HP-UX for redund gateway)</td>
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<tr>
<td>- RHEL5.6, 5.7, 6.1 Direct Conn</td>
<td><strong>HP-UX 11iv3 1109</strong></td>
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<td>- SLES 11</td>
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<td>- Win 2008 R2</td>
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<td>- OL 5.7, 6.1: Direct Conn</td>
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Subject to Change

- RHEL 6.x
- Win 2008 R2
- SLES 11 SP1
- OL 6.x
- HP-UX 11iv3

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What about the V6000?

“It’s a Zamboni” It does one thing very well - extreme IOPS for a very specific need

Huge capacity and very expensive – it’s a “storage sale”, not a “DL980 + accessory”

Same IOPS and Availability can be met with current VMA products + redundant gateway

Current VMA products have more price/capacity options, are better fit for DL980 and servers sales specialists
VMA Extreme IOPS and Availability Options

HP VMA Solution ~$360K - $670K
- 10TB or 20TB (SLC) raw
- 6TB or 12TB usable (RAID)
- 700K IOPS (SAN, aggregated Read)
- Fully redundant, no SPOFs
- HP tested, meets HP quality standards
- Backed by World-class HP Sales and Support

V6000 Solution ~$650K+
- 16TB (SLC) or 32TB (MLC) raw
- 11TB or 22TB usable (RAID)
- 800K IOPS (SAN, Read)
- Fully redundant, no SPOFs
Solid State Resources

www.hp.com/go/solidstate

Solid state storage technology for ProLiant servers

Solid State Drives Go Universal

Compete against Oracle Exadata
http://intranet.hp.com/tsg/WW2/hpcompetition/sun/Pages/exadata2.aspx
Appliances and Reference Architecture Resources

SAP HANA
Contact the HP SAP Competency Center: SSA@HP.COM
Download information for SAP HANA: www.hp.com/go/SAP/HANA

Microsoft Fast Track Data Warehouse White Paper

HP Universal DB SuperSystem

EnterpriseDB Postgres Plus
http://intranet.hp.com/tsg/WW3/BCSSolutions/Pages/EntDB-PPAS.aspx

BMMSofT EDMT
http://intranet.hp.com/tsg/WW3/BCSSolutions/Pages/BMMSofT-EDMT.aspx
Partner Portal Vanity URLs

BCS Home

- www.hp.com/partners/bcs/na
- www.hp.com/partners/bcs/lar

BCS Solutions

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