2006 AMD
Analyst Day

AMD
Smarter Choice

CONFIDENTIAL

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Senior VP, Commercial Segment

December 14, 2006

Products, Platforms, & Solutions Agenda

AMD
Smarter Choice

Commercial Strategy and Performance Update

2007 Commercial Platforms and Initiatives

2007 Consumer Platforms and Initiatives

Roadmaps

AMD Commercial Strategy Update

AMD Smarter Choice

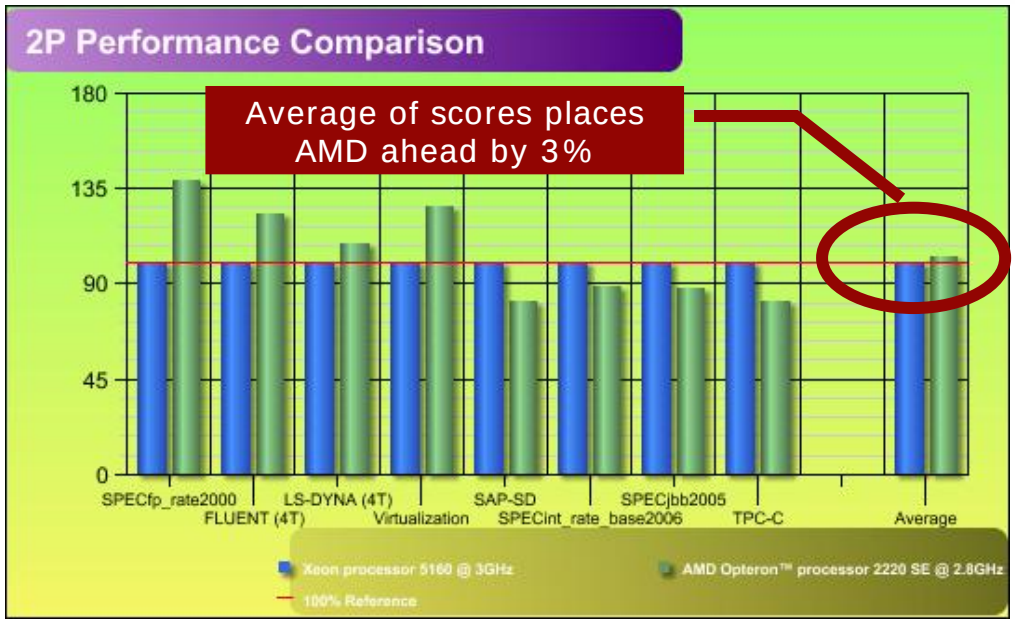
2006 Plan:

- Set the data center agenda
- Be safe choice for servers
- Leverage AMD Opteron™ processor success into commercial clients
- Define and drive new client usage models
- Drive open innovation into platforms
- Increase system channel presence

Achievements in 2006

- Performance Per Watt Leadership
- Doubled design wins for BOTH Desktop & Mobile
  - HP & Dell offer Enterprise SKUs
  - HP, Dell, Lenovo, Acer, FSC offer SMB SKUs
- New client models established
  - PC Blades available from HP
  - "Desktop as a Service" supported by AMD Opteron processor
- Trinity initiative delivering
  - Dell able to increase longevity to 18 months
  - AMD actively driving "open" DMWG
- Systems Channel
  - 20,000 IT professionals trained
  - 500 Commercial System Partners added

2P Performance Summary

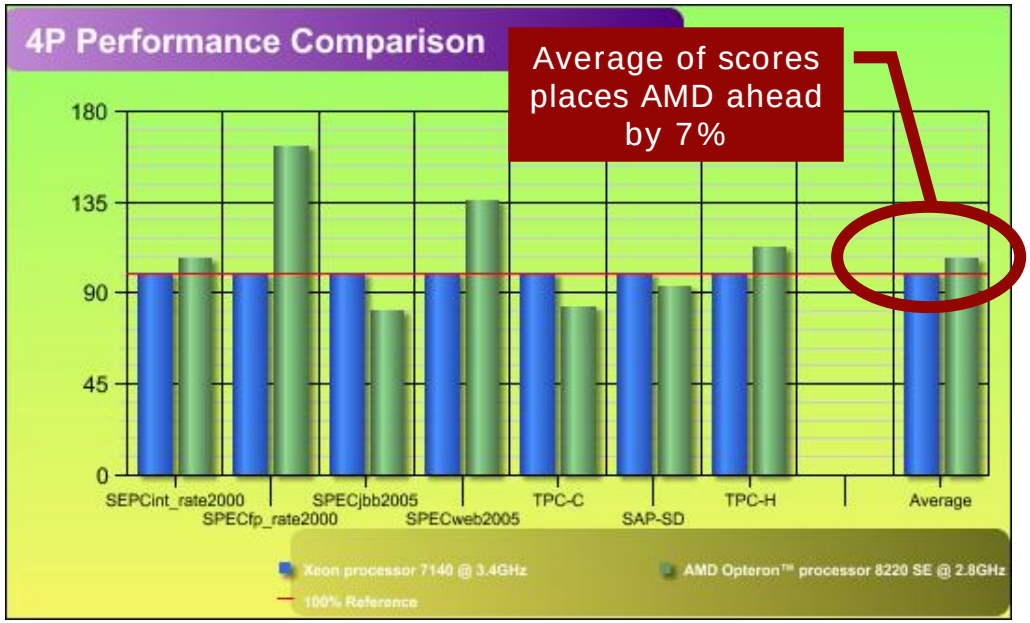


(AMD Opteron™ processor Model 2220 processor vs. Xeon processor 5160)

- AMD is very competitive on performance across a wide range of applications
- Performance depends on resource requirements of individual benchmarks
- AMD offers overall value proposition in terms of performance and power advantages

AMD Direct Connect Architecture™ extends the balanced system architecture benefits to Quad Core AMD Opteron™ processors

4P Performance Summary



(AMD Opteron™ processor Model 8220 processor vs. Xeon processor 7140)

- Bigger cache does not always translate into better performance, in fact, it consumes more power
- AMD's native Quad Core implementation overcomes the power disadvantages of MCM implementations
- Our Quad Core solution serves both 2P and 4P

AMD Opteron™ processors can help deliver outstanding performance for critical enterprise applications

Low Power Consumption Leadership

Third-party Substantiation

AMD Smarter Choice

Thomas Weisel Partners
EQUITY RESEARCH

source: http://www.tweisel.com (CPU Analysis – Volume 2, 11.14.2006)

- Notably, in idle mode, Woodcrest and Clovertown drew dramatically more power, approximately 235Wand 240W, respectively, than Opteron at 165W.

Idle Power (Watts - lower is better)

OEM	Platform	Processor	Freq	Mem	Idle	Idle w/PM
HP	DL385	Opteron 2218	2.60 GHz	8 GB	197	165
HP	DL385	Opteron 2218	2.60 GHz	4 GB	183	158
HP	DL380	Xeon 5150	2.66 GHz	8 GB	235	235
HP	DL380	Xeon 5150	2.66 GHz	4 GB	204	204
Intel	SR1550	Xeon 5150	2.66 GHz	8 GB	222	222
Intel	SR1550	Xeon 5160	3.00 GHz	8 GB	224	224
Intel	SR1550	Xeon E5345	2.33 GHz	8 GB	240	240

Xeon 42% More

Fully buffered DIMMs must go: Intel's Bensley servers utilize the high-speed, high-powered, fully buffered DIMM (FBD) technology, and as a result, have notably higher idle power levels than similarly configured AMD systems. Specifically, our measurements show that the power consumption of each FBD memory module varies from 7.75W to 8.25W, depending on the workload. By comparison, the registered DIMMs (rDIMMs) used in the Opteron-based DL385 range from 1.75W to 3.5W. The key problem with FBD lies in its advanced memory buffer (AMB). Among other functions, the AMB monitors the serial link

Server Penetration – Blades

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hp invent

ProLiant BL685C

IBM

LS20

Rackable systems

Scale Out Series

FUJITSU COMPUTERS SIEMENS

Primergy BX630

Sun microsystems

Sun 8000

Verari systems

Blade Rack 2

APPRO HPC Cluster Solutions

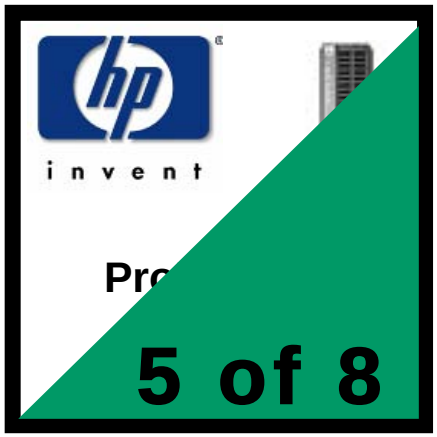
HyperBlade

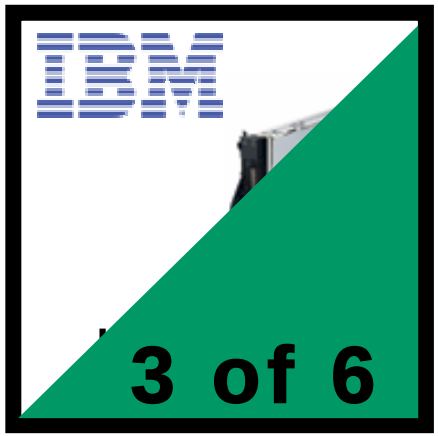
egenera

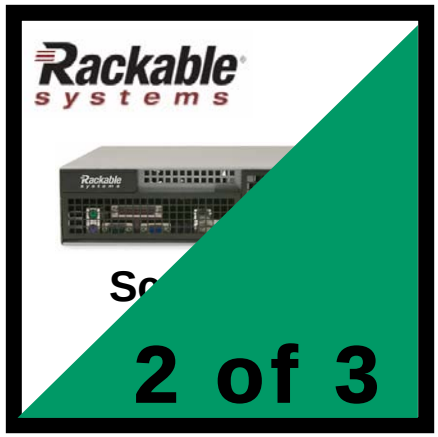
pBlade

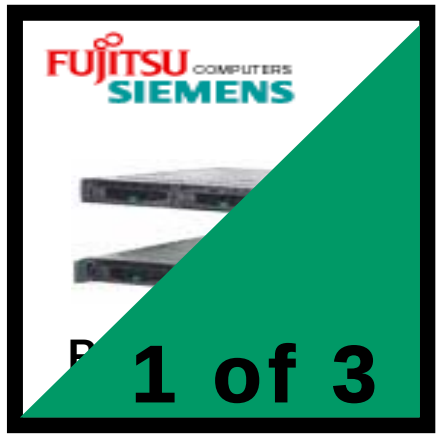
Server Penetration – Blades

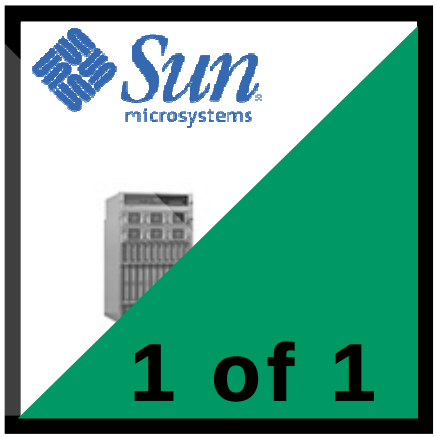
AMD Smarter Choice

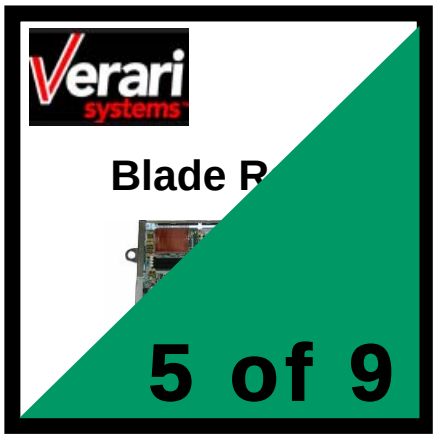


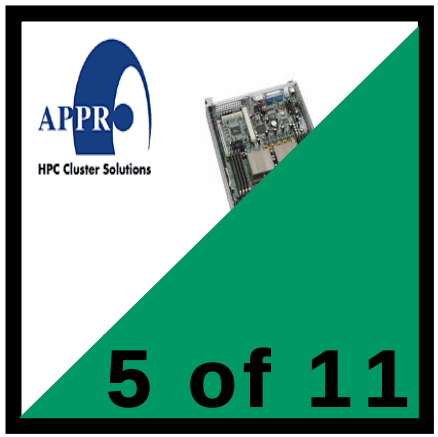


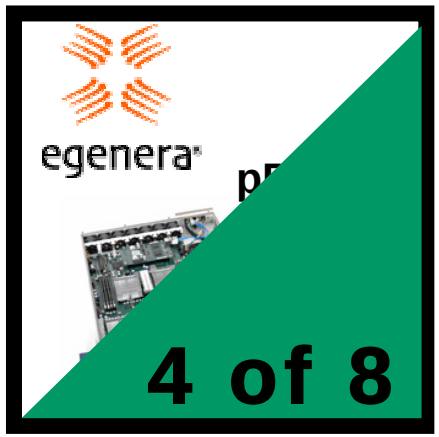






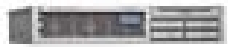






Server Penetration - Racks

4P

 DL 585 G2	 4PSystem x3755	 SunFire x4200	 PowerEdge 6950

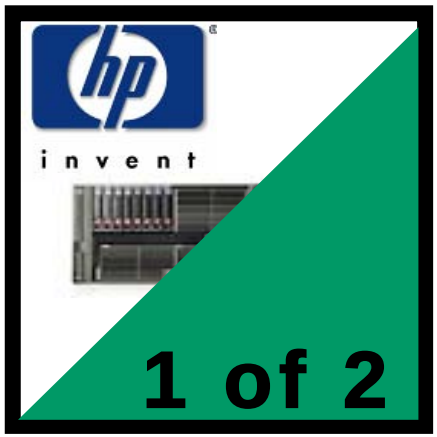
2P

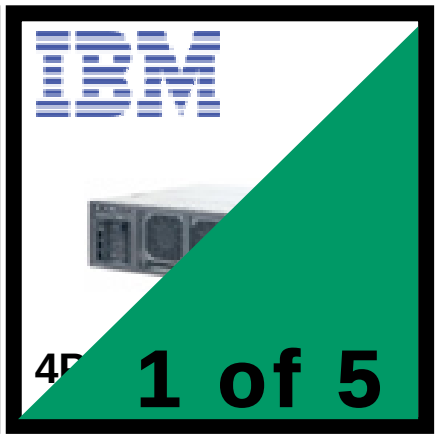
 DL 365	 2P System x3655	 SunFire x4600	 PowerEdge SC1435

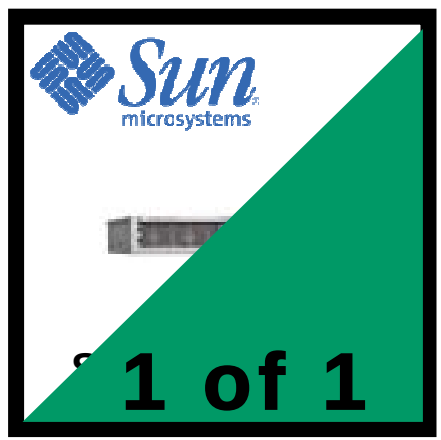
Server Penetration - Racks

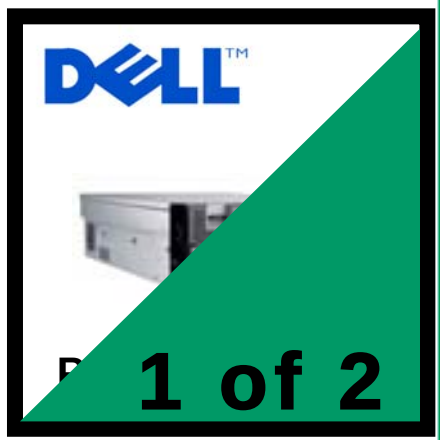
AMD Smarter Choice

4P

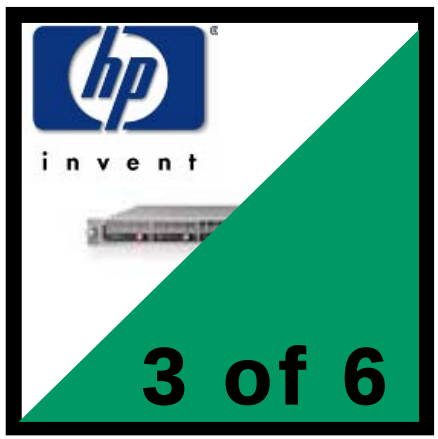


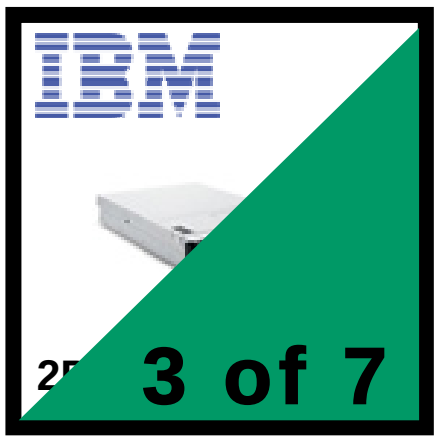


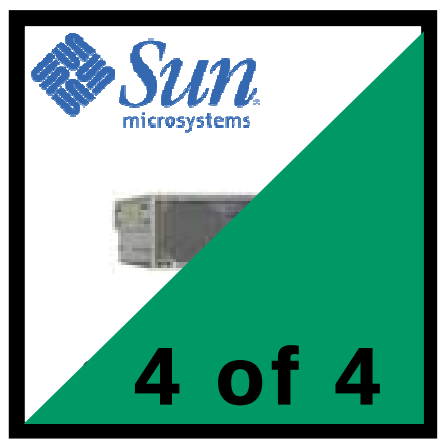


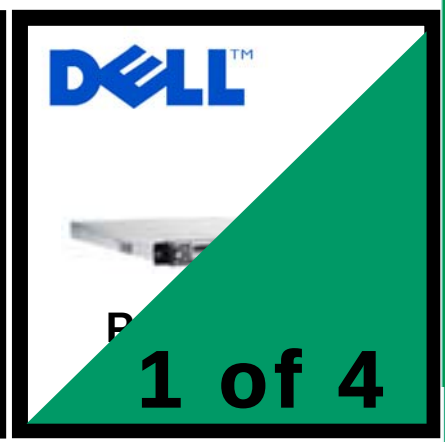


2P









Commercial Desktop Penetration

AMD Smarter Choice

hp invent

dc5750

bc1500
Blade PC

DELL™

OptiPlex
740

lenovo™

ThinkCentre A60

acer

AcerPower
1000

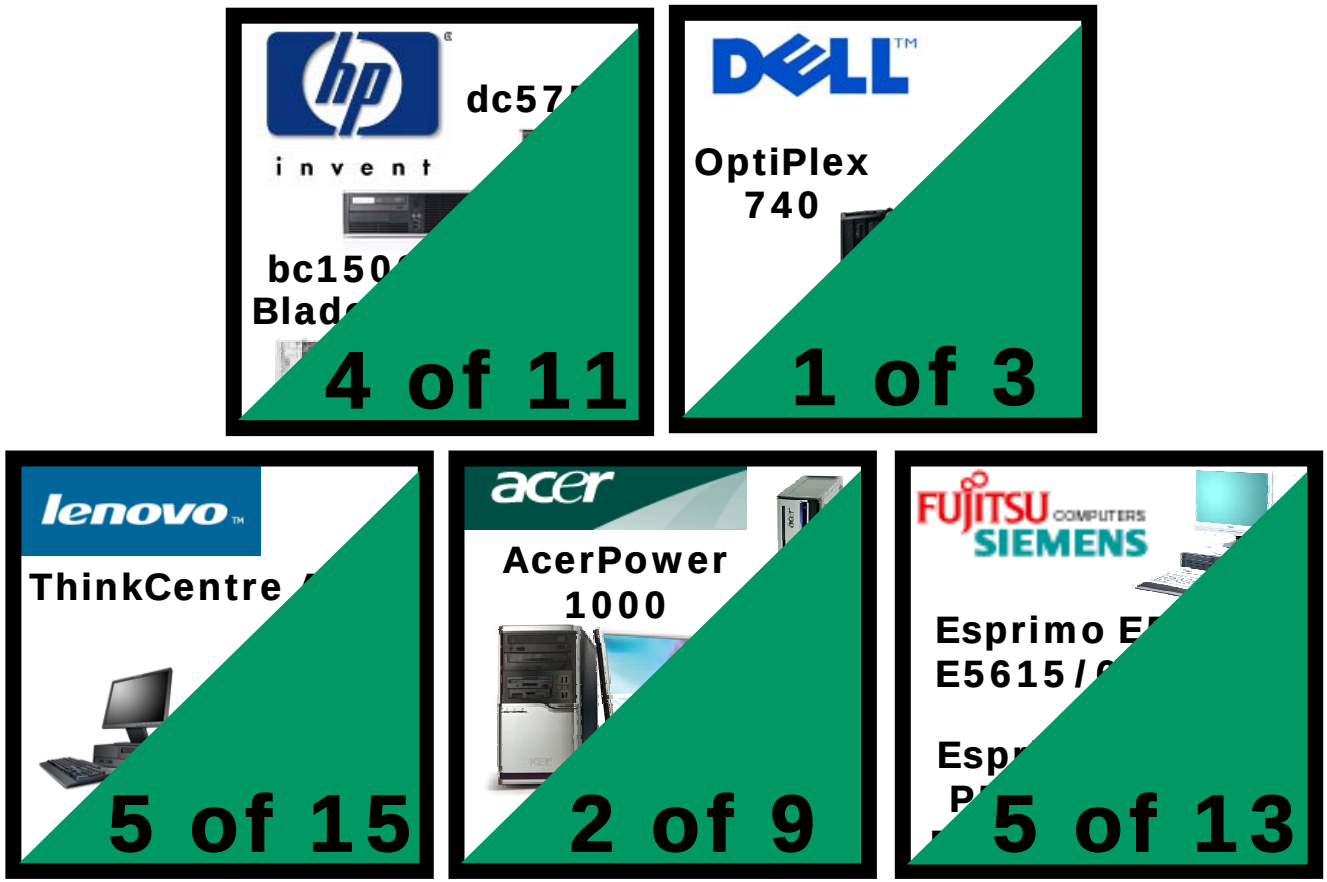
AcerPower M6

FUJITSU COMPUTERS SIEMENS

Esprimo E5600,
E5615/6

Esprimo
P5600,
P5615/6

Commercial Desktop Penetration



Commercial Mobile Penetration

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nx6325

Latitude 131L

LifeBook S2110

LifeBook S2110

Making significant progress in Commercial Mobile

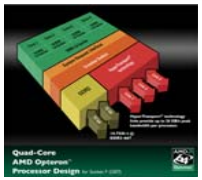
Consumer notebooks sold to SMB

SMB ~ 10-15%

2007: Continuing Commercial Momentum

Strategy	Platform
Set data center agenda	• Quad Core: Clear perf-per-watt leadership • AMD Virtualization: Chip level enhancements • Growth with new 1P servers
Be safe choice for servers	Industry Leading Stable platforms • Upgradeable to Quad Core • Ready for Virtualization & Torrenza • Stable socket over 3 years (06, 07, 08)
Leverage AMD Opteron™ processor success into commercial client	• Ready for Enterprise – HP, Dell rapid ramp • Increase number of mobile design wins • Leverage ATI synergies for DT, Mobile, W/S
Define and drive new client usage models	Raiden • Expand PC Blade models • Drive "Windows as a Service"
Drive innovation into client platforms	Trinity • Deliver industry leading longevity – 18 months • Lead industry with open management

Commercial Platforms



Quad Core

Upcoming Native Quad Core offers significant CPU core and cache enhancements

QUAD CORE – AMD LEADS AGAIN

AMD Smarter Choice

World-class performance

- **Native Quad-Core**
  - Direct Connect Architecture is superior
  - Projected ~ 40% performance increase*
- **Enhanced AMD-V™ Virtualization**
  - Accelerated virtualization in Quad-Core
- **Performance Per Watt leadership**
  - Consistent 95W & 68W thermal design
  - Projected ~60% performance per watt improvement over previous AMD product

Quad-Core Design enhancements

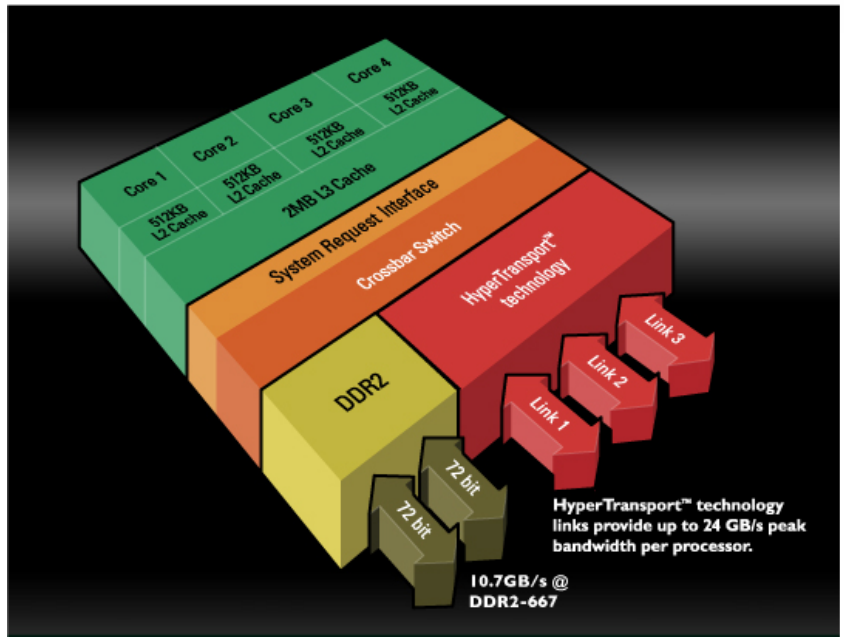
- **Significant cache enhancements**
- **Significant CPU core enhancements**

Drop-in Upgrade

- **Socket F compatibility – BIOS upgrade**

Stable Infrastructure

- **One core technology top-to-bottom, spanning multiple years**



Same power/thermal for 1/2/4-core	Low Power Registered DDR-2 Memory
3 levels of cache	Simultaneous 2P and 4P solutions

*Performance projections based on AMD internal modeling and a baseline of 2006 performance

Commercial Platforms

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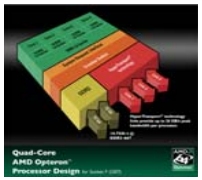

Quad Core

Upcoming Native Quad Core offers significant CPU core and cache enhancements

Torrenza Computing

Designed for discrete acceleration, such as Stream

AMD Managed Client

Desktop Mobile Working Group (DMWG) focusing on "open" client management

Raiden

Driving future commercial client architectures and usage models

Trinity

Build an ecosystem based on openness and innovation, support standards and interoperability

Consumer Momentum: Desktop

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HP Pavilion d4650e series

Fengxing K6090A

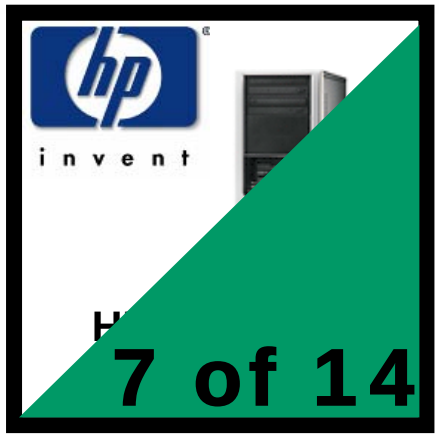
Dimension C512

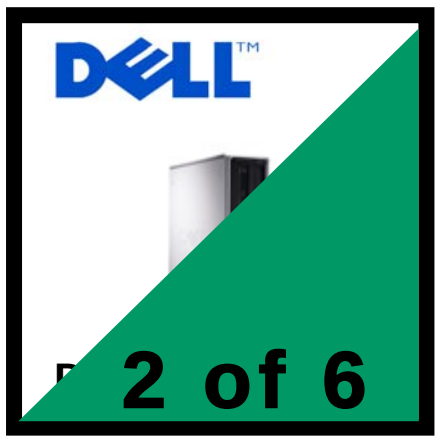
Aspire L100

November 2006 US Retail Shelf Share ~ 40%*

***Source – Current Analysis – represents top consumer electronics and office superstores (70% of market)**

Consumer Momentum: Desktop





November 2006 US Retail Shelf Share ~ 40% *

***Source – Current Analysis – represents top consumer electronics and office superstores (70% of market)**

Consumer Momentum: Mobile

AMD Smarter Choice

November 2006 US Retail Shelf Share ~ 23%*

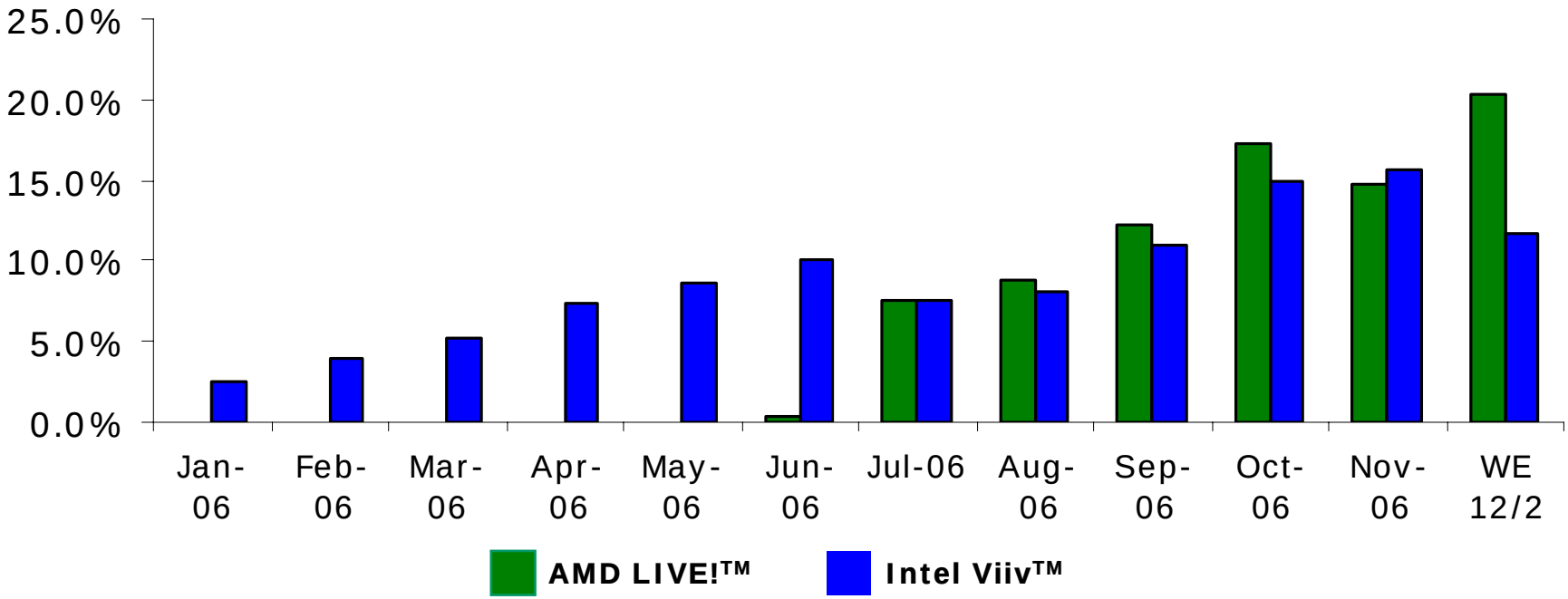
***Source – Current Analysis – represents top consumer electronics and office superstores (70% of market)**

Consumer Momentum: Mobile

November 2006 US Retail Shelf Share ~ 23%*

***Source – Current Analysis – represents top consumer electronics and office superstores (70% of market)**

Consumer momentum: AMD LIVE!™ Outselling Viiv



Current Analysis October 2006 - "AMD LIVE! PCs are positioned as enabling devices for digital media access and distribution, whereas Intel Viiv PCs strive to be the central digital media manager complete with premium content. Both digital home scenarios are expected to play central roles in the forthcoming holiday shopping season, with this recent alliance giving AMD LIVE! a slight advantage."

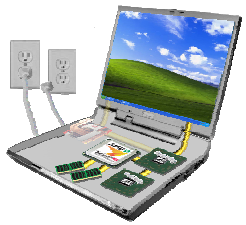
*Source – Current Analysis, represents top Consumer Electronics and Office Superstore retailers (approx. 70% of market)

2007: Continuing Consumer Momentum

AMD Smarter Choice

Strategy	Platform
Expand the Mobile SKU Line-up	• Leverage strong AMD chipset presence in mobile to drive new OEM design wins • Launch Dynamic Graphic Mode
Reinforce AMD as a "Smarter Choice"	• Market AMDLIVE!™ as a better media experience • Demonstrate that open design enables the ultimate Windows VISTA experience
Drive innovation in next generation PCs	• Lead the race with AMD QuadFX™ Platform with Dual Socket Dual Core Architecture • Create new media-oriented PC's such as Home Cinema, Streaming Media Server
Invest in Digital Home Solutions for future revenue growth	• Enhance AMD LIVE! with new technologies • Drive partnerships for HD content delivery with existing and new ecosystem partners

Consumer Platforms

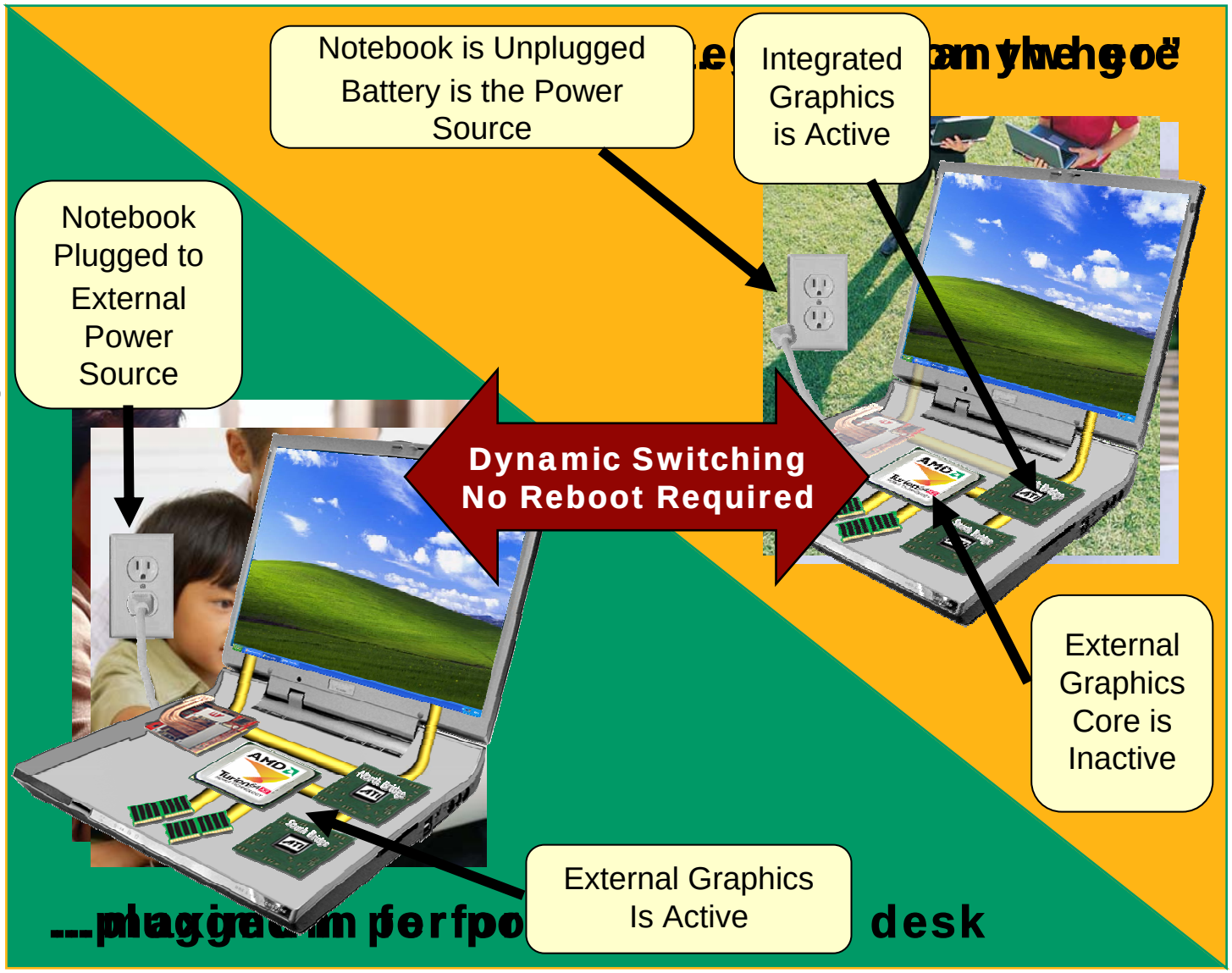


Dynamic Graphics Power Switching

DC mode maximizes battery life, AC mode maximizes performance - external graphics core activates and deactivates dynamically with no re-boot required

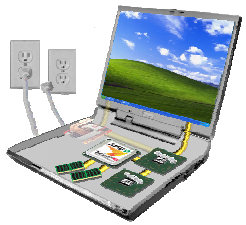
Imagine…The Best of Both Worlds

AMD Smarter Choice



Consumer Platforms

AMD Smarter Choice



Dynamic Graphics Power Switching

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AMD LIVE!™

Full-featured, easy-to-use media center PC
Organize, distribute, share, and enjoy content collection throughout the home and "on the go"

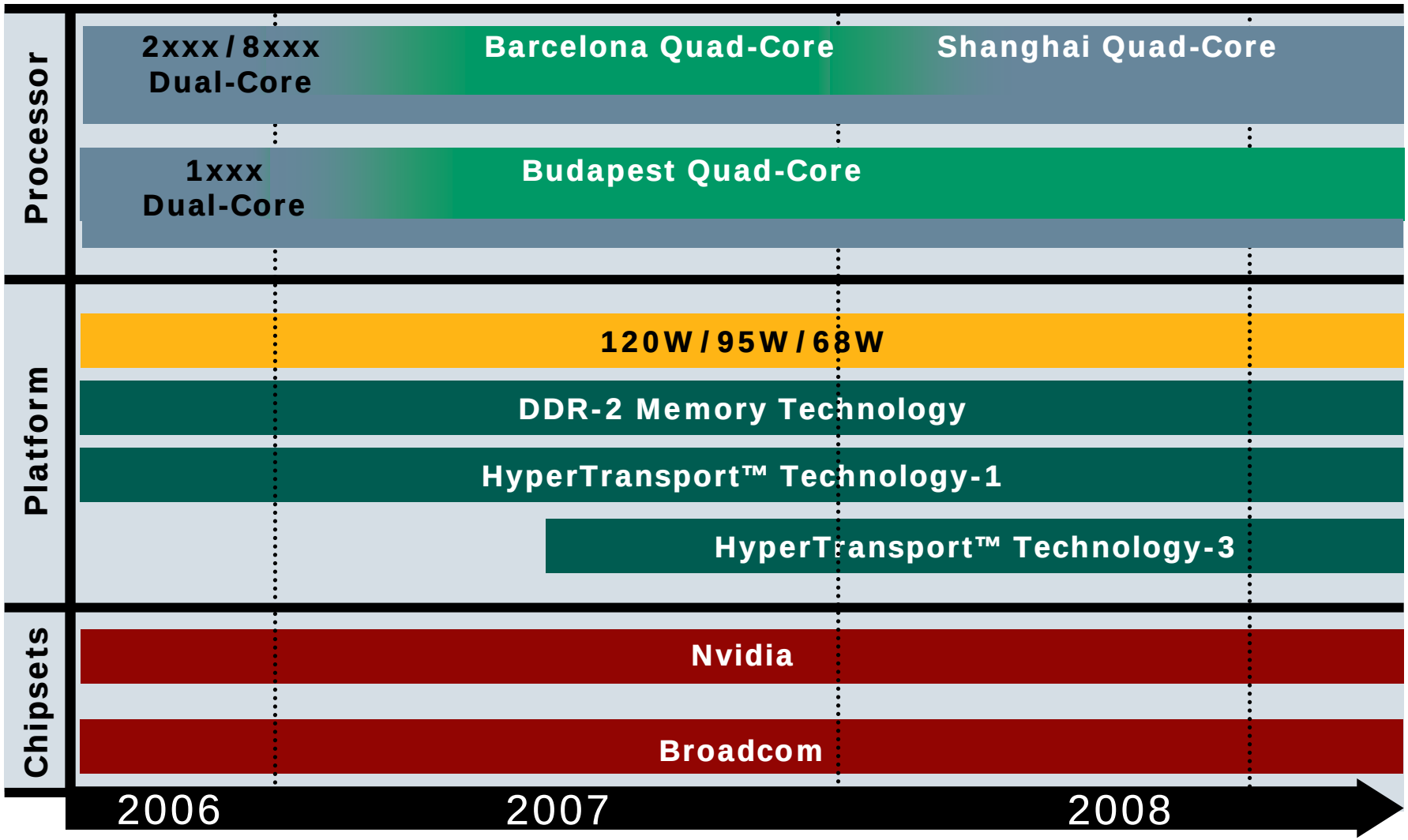
Desktop AMD Quad FX™ Platform

Dual-socket dual-core processor configuration uniquely designed with Dual Socket Direct Connect Architecture
Matched pairs of AMD Athlon™ 64 FX-70 series processors

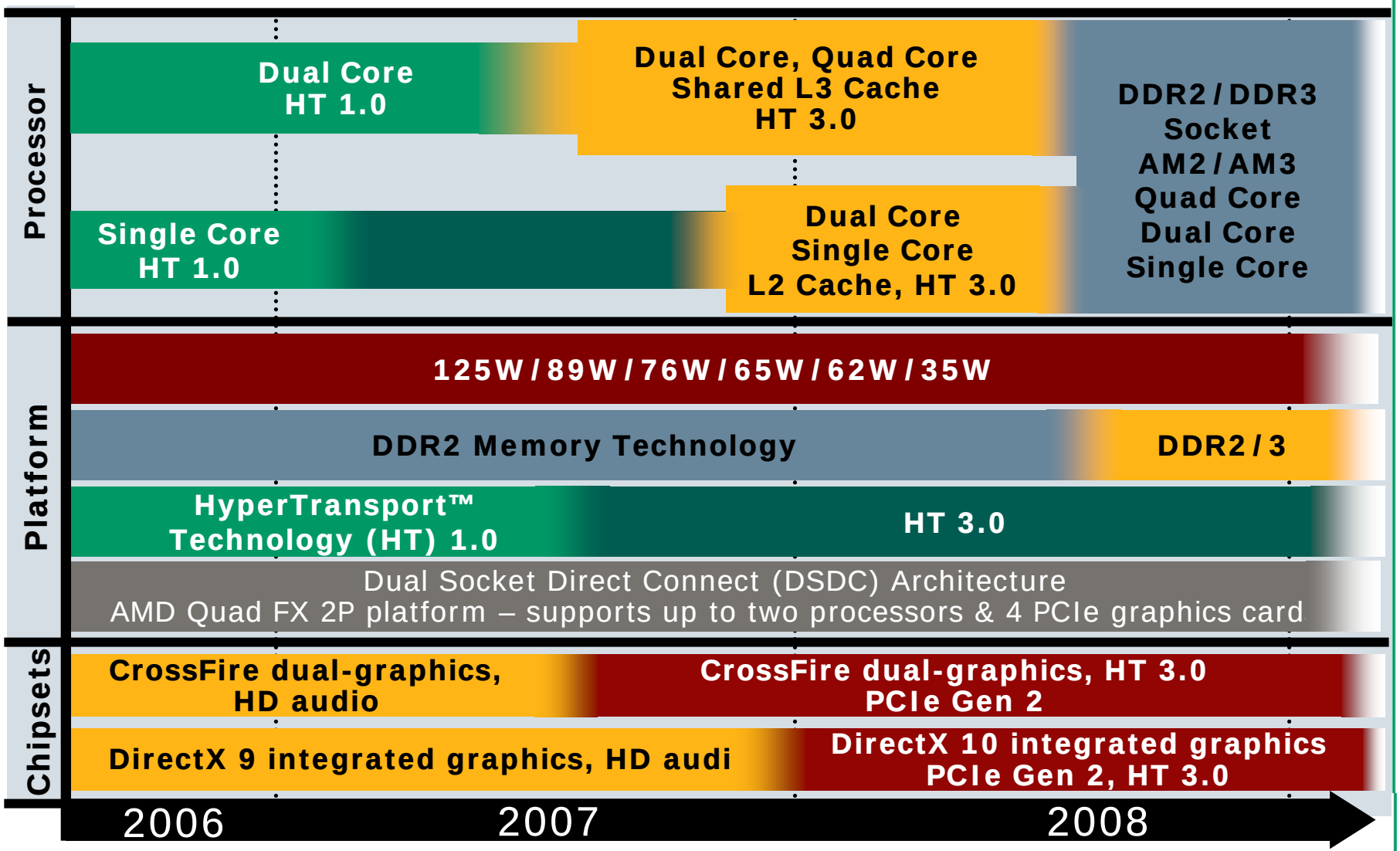
Open Platform Strategy

Customer-centric, open platform approach enables PCs that meet customer demands through the use of industry-leading, superior technologies

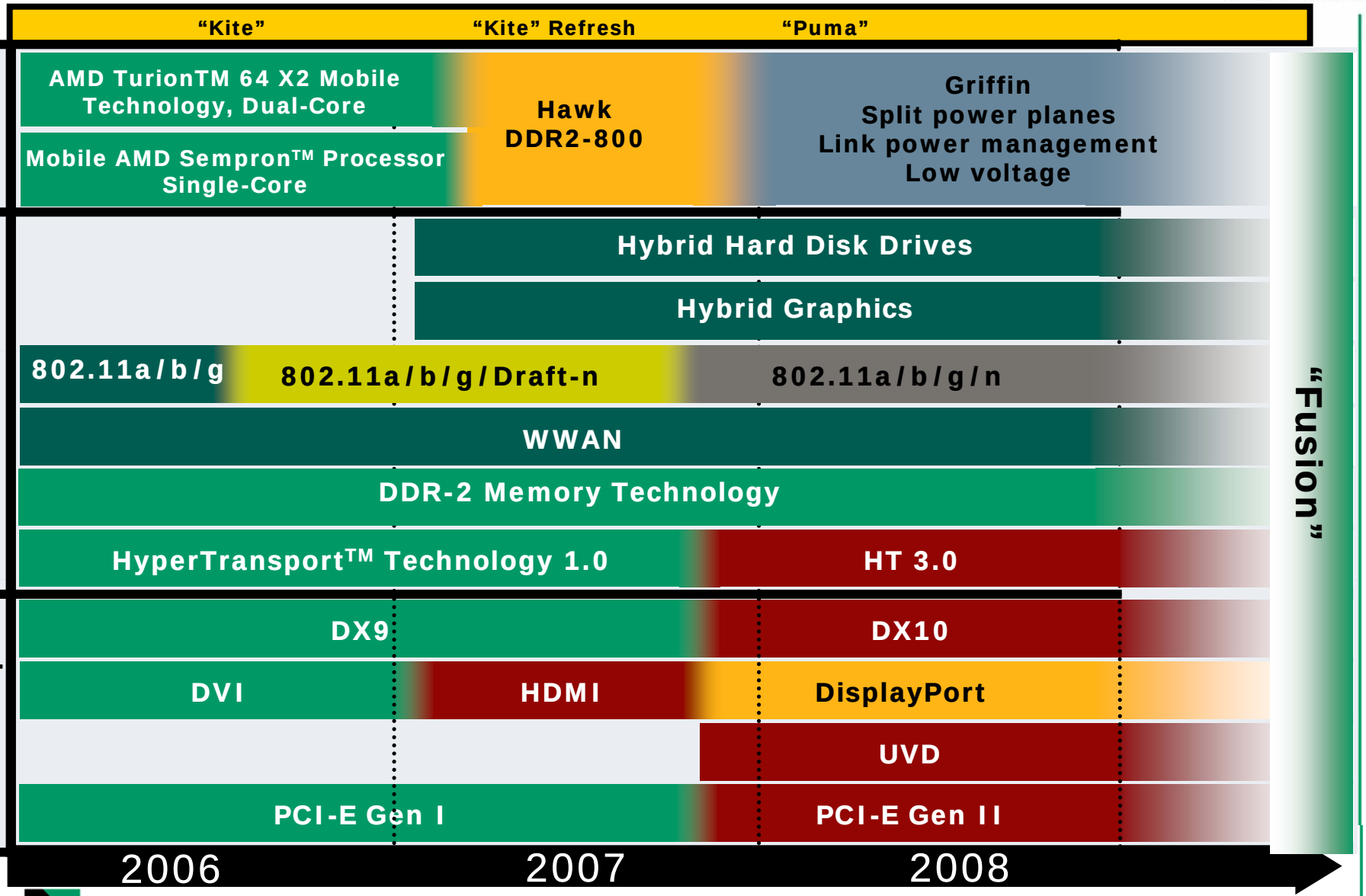
AMD Opteron™ Processor Platform Roadmap



AMD Desktop Platform Roadmap



AMD Mobile Platform Roadmap



Open Platform Approach

Delivers a better solution

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AMD enables a best-in-class ecosystem to deliver superior solutions

AMD Turion 64 Mobile Technology

GRAPHIC/CHIPSET

AMD Smarter Choice · NVIDIA · SiS · VIA we connect

LAN

BROADCOM · MARVELL · REALTEK

WIRELESS

airgo · Atheros Communications · BROADCOM

E.g. Winning Mobile Solution

- Long battery life
- Compatibility with the latest wireless and graphics technologies
- AMD64 performance
- Enhanced Security

The New AMD in 2007

- Quad Core: Raising the bar
- Enterprise desktop ramp
- AMD enables more mobile and desktop design wins
- AMD LIVE!™ continues to win

A Processing Powerhouse!!!

Trademark Attribution

BACKUP

System Configurations

SPECfp®_rate2000 2P Servers Microsoft Windows®

AMD Smarter Choice

2 AMD Opteron™ processors Model 2220SE with 2x1MB L2 cache in Tyan Thunder K9HM (S3992) motherboard, 4GB memory, 1x120GB IDE disk drive, Microsoft® Windows® Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06569.html

2 Dual-Core Xeon processors 5160 with 4MB L2 cache in FSC CELCIUS R640, 8GB memory, Serial ATA disk, Microsoft Windows XP 64-bit Edition
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060821-07094.html

2 AMD Opteron processors Model 2218 with 2x1MB L2 cache in Tyan Thunder K9HM (S3992) motherboard, 4GB memory, 1x120GB IDE disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06597.html

2 Dual-Core AMD Opteron processors Model 285 with 2 x 1MB L2 cache in HP Proliant DL145 G2, 16GB memory, 1 x 36.4GB SCSI disk drive, Microsoft Windows 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q1/cpu2000-20060306-05701.html

2 Dual-Core Xeon processors 5080 with 2x2MB L2 cache in HP Proliant DL380 G5, 8GB memory, 1 x 26GB SAS disk drive, Microsoft Windows 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060626-06373.html

2 Dual-Core Xeon processors 3GHz with 2x2MB L2 cache in HP ProLiant ML370 G3, 16GB memory, 1 x 36GB SCSI disk drive, Microsoft Windows 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2005q4/cpu2000-20051003-04868.html

2 Dual-Core Xeon processors 2.8GHz, 2x2MB L2 cache in HP ProLiant DL380 G4, 8GB memory, 1 x 72.8GB SCSI disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2005q4/cpu2000-20051003-04876.html

SPECfp®_rate2000 2P Servers Linux®

AMD Smarter Choice

2 AMD Opteron™ processors Model 2220SE with 2x1MB L2 cache in Tyan Thunder K9HM (S3992) motherboard, 4GB memory, 1x120GB IDE disk drive, SuSE Linux® Enterprise Server 9 SP3 for AMD64
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06583.html

2 AMD Opteron processors Model 2218 with 2x1MB L2 cache in Tyan Thunder K9HM (S3992) motherboard, 4GB memory, 1x120GB IDE disk drive, SuSE Linux Enterprise Server 9 SP3 for AMD64
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06613.html

2 Dual-Core Xeon processors 5160 with 4MB shared L2 cache in HP ProLiant 460c, 8GB memory, 1x36GB SAS disk drive, Red Hat Enterprise Linux 4.0 Advanced Server
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060626-06329.html

2 Dual-Core AMD Opteron processors Model 285 with 2 x 1MB L2 cache in Sun Ultra 40, 16GB memory, 1x250GB SATA disk drive, SUSE Linux® Enterprise Server 9 SP3 forAMD64
http://www.spec.org/osg/cpu2000/results/res2006q1/cpu2000-20060306-05758.html

2 Dual-Core Xeon processors 5080 with 2x2MB L2 cache in HP ProLiant DL360 G5, 8GB memory, 1x36GB SAS disk drive, Red Hat Enterprise Linux 4.0 Advanced Server
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060626-06384.html

2 Itanium 2 1.6GHz processors with 6MB L3 cache in HP Integrity rx2620-2, Red Hat Linux Advanced Server release 3.0AS (Update 3).
http://www.spec.org/cpu2000/results/res2005q1/cpu2000-20041224-03675.html

SPECfp®_rate2000 4P Servers Microsoft Windows®

AMD Smarter Choice

4 AMD Opteron™ processors Model 8220SE with 2x1MB L2 cache in HP Proliant™ DL585 G2, 32GB memory, 1x36GB SAS disk drive, Microsoft® Windows® Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q4/cpu2000-20060918-07373.html

AMD Opteron processors Model 8218 with 2x1MB L2 cache in Tyan Thunder K9QE (S4985) motherboard, 8GB memory, 1x74GB SATA disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06575.html

4 AMD Opteron processors Model 880 with 2 x 1MB L2 cache in HP ProLiant DL585, 32GB memory, 1 x 36GB SCSI hard disk, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2005q3/cpu2000-20050902-04582.html

4 Xeon processors 7140 with 16MB L3 cache in Acer Altos R910, 16GB memory, 1x73GB disk drive, Microsoft Windows Server 2003 Enterprise Edition SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060904-07189.html

4 Xeon processors 7041 with 2x2MB L2 cache in HP ProLiant ML570 G4, 32GB memory, 1x36GB SAS disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q2/cpu2000-20060515-05989.html

4 Xeon MP 3.33GHz processors with 8MB L3 cache in FSC Primergy RX600 S2, 16GB memory, Microsoft Windows Server 2003 Standard.
http://www.spec.org/cpu2000/results/res2005q2/cpu2000-20050511-04083.html

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4 AMD Opteron™ processors Model 8220SE with 2x1MB L2 cache in Tyan Thunder K9QE (S4985) motherboard, 8GB memory, 1x74GB SATA disk drive, SuSE Linux® Enterprise Server 9 SP3 for AMD64
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06585.html

4 AMD Opteron processors Model 8218 with 2x1MB L2 cache in Tyan Thunder K9QE (S4985) motherboard, 8GB memory, 1x74GB SATA disk drive, SuSE Linux Enterprise Server 9 SP3 for AMD64 http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06589.html

Dual-Core AMD Opteron processors Model 885 with 2 x 1MB L2 cache in Tyan Thunder K8QSD Pro (S4882D) motherboard, 4GB memory, 250GB SATA disk drive, SUSE Linux® Enterprise Server 9 SP3 forAMD64
http://www.spec.org/osg/cpu2000/results/res2006q1/cpu2000-20060220-05640.html

4 Xeon 7140 processors with 16MB L3 cache in HP Proliant DL580 G4, 32GB memory, 1x36GB SAS disk, SuSE Linux Enterprise Server 9 SP3 for AMD64
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060818-07047.html

4 Xeon processors 7041 with 2x2MB L2 cache in HP ProLiant ML570 G4, 32GB memory, 1x36GB SAS disk drive, SuSE Linux Enterprise Server 9 (x86_64) SP3
http://www.spec.org/osg/cpu2000/results/res2006q2/cpu2000-20060612-06153.html

4 Xeon MP 3.33GHz processors with 8MB L3 cache in Dell Power Edge 6800, 16GB memory, 1 x 18.2GB SCSI, Red Hat Enterprise Linux3 Update 2.
http://www.spec.org/cpu2000/results/res2005q2/cpu2000-20050321-03940.html

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AMD Smarter Choice

4 AMD Opteron™ processors Model 8220SE with 2x1MB L2 cache in HP Proliant™ DL585 G2, 32GB memory, 1x36GB SAS disk, Microsoft® Windows® Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q4/cpu2000-20060918-07377.html

4 Xeon processors 7140 with 16MB L3 cache in HP Proliant ML570, 32GB memory, 1x36GB SAS, Microsoft Windows Server 2003 Enterprise Edition SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060818-07059.html

4 AMD Opteron processors Model 8218 with 2x1MB L2 cache in Tyan Thunder K9QE (S4985) motherboard, 8GB memory, 1x74GB SATA disk drive, Microsoft Windows Server 2003 Enterprise SP1 http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06576.html

4 AMD Opteron processors Model 885 with 2 x 1MB L2 cache in FSC Primergy BX630, 32GB memory, 1 x SAS disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060710-06472.html

4 Xeon processors 7041 with 2x2MB L2 cache in HP ProLiant DL580 G4, 16GB memory, 1x36GB SAS disk drive, Microsoft Windows Server 2003 Enterprise SP1
http://www.spec.org/osg/cpu2000/results/res2006q2/cpu2000-20060515-05979.html

4 Xeon MP 3.33GHz processors with 8MB L3 cache in FSC Primergy RX600 S2, 16GB memory, Microsoft Windows Server 2003 Standard.
http://www.spec.org/osg/cpu2000/results/res2005q2/cpu2000-20050511-04084.html

TPC-H 100GB Database Performance

4 AMD Opteron™ processors Model 8220SE with 2x1MB cache per processor in HP Proliant™ DL585 G2 server, 128GB memory, Microsoft® Windows® Server 2003 Enterprise Edition SP1
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106092501

4 AMD Opteron processors Model 8220SE with 2x1MB cache per processor in Dell PowerEdge 6950 server, 64GB memory, Microsoft Windows Server 2003 Enterprise Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106102304

4 Dual-Core Xeon processors 7140 with 16MB L2 cache in HP Proliant DL580 G4 server, 64GB memory, Microsoft Windows Server 2003 Enterprise Edition SP1
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106090501

4 Dual-Core Xeon processors 7140 with 16MB L2 cache in Dell PowerEdge 6800 server, 64GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106080102

4 Dual-Core Xeon processors 7041 with 2x2MB L2 cache in HP Proliant ML570G4 server, 64GB memory, Microsoft Windows Server 2003 Enterprise Edition SP1
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106052201

TPC-H 100GB Database Price/Performance

AMD Smarter Choice

2 AMD Opteron™ processor Model 256 with 1 x 11MB L2 cache in Sun Fire™ X4100 server, 16GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106062602

4 AMD Opteron processors Model 8220SE with 2x1MB cache per processor in Dell PowerEdge 6800 server, 32GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106102303

4 Dual-Core Xeon processors 7041 with 2x2MB cache per processor in Dell PowerEdge 6800 server, 32GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106051801

4 Dual-Core AMD Opteron processors Model 880 with 2 x 1MB cache per processor in HP Proliant DL585 G1 server, 64GB memory, Microsoft Windows Server Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105110403

4 Dual-Core Xeon processors 7140 with 16MB L2 cache in HP Proliant DL580 G4 server, 64GB memory, Microsoft Windows Server Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106090501

TPC-H 100GB Database Price/Performance 4P Servers

AMD Smarter Choice

4 AMD Opteron processor Model 8220SE with 2x1MB cache per processor in Dell PowerEdge 6800 server, 32GB memory, Microsoft® Windows® Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106102303

4 Dual-Core Xeon processors 7041 with 2x2MB cache per processor in Dell PowerEdge 6800 server, 32GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106051801

4 Dual-Core AMD Opteron processors Model 880 with 2 x 1MB cache per processor in HP Proliant DL585 G1 server, 64GB memory, Microsoft Windows Server Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105110403

4 Dual-Core Xeon processors 7140 with 16MB L2 cache in HP Proliant DL580 G4 server, 64GB memory, Microsoft Windows Server Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106090501

4 Dual-Core Xeon processors 7040 with 2x2MB cache per processor in Dell PowerEdge 6800 server, 32GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106011202

TPC-H 300GB Database Price/Performance

AMD Smarter Choice

2 AMD Opteron™ processors Model 256 with 1MB cache in Sun Fire X4200 server, 16GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106062601

2. 4 Dual-Core AMD Opteron processors Model 880 with 2 x 1MB cache per processor in HP Proliant DL585G1 server, 64GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106012601

3. 2 Xeon 5160 processors with 4MB L2 cache in IBM System x 3650 server, 8GB memory, SUSE Linux Enterprise Server 9 SP3
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106100602

4. 4 Xeon MP processors 3.33GHz with 8MB L3 cache in Dell PowerEdge 6800 server, 16GB memory, Red Hat Enterprise AS v3.0
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105070801

5. 4 UltraSPARC IIIi 1.6GHz in Sun Fire V440 server, 32GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105051006

TPC-H 1000GB Database Performance

32 Dual-Core AMD Opteron™ processors Model 875HE with 2x1MB cache per processor in PANTA Systems PANTAmatrix server, 32GB memory, Red Hat Enterprise Linux® 4 AS
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106102302

64 Xeon 3.6GHz processors with 2MB cache in IBM eServer xSeries 346 server, 8GB memory per node, SUSE Linux Enterprise Server 9
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105021401

48 AMD Opteron processors Model 848 with 1MB cache in HP Proliant DL585, 8GB memory per node, Red Hat Enterprise Linux AS3
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=104102501

TPC-H 1000GB Database Price/Performance

AMD Smarter Choice

4 Dual-Core AMD Opteron™ processors Model 880 with 2x1MB cache in HP Proliant™ DL585G1 server, 64GB memory, Microsoft® Windows® Server 2003 Enterprise x64 Edition
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106030201

32 Dual-Core AMD Opteron™ processors Model 875HE with 2x1MB cache per processor in PANTA Systems PANTAmatrix server, 32GB memory, Red Hat Enterprise Linux® 4 AS
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106102302

16 Itanium2 1.6GHz with 6MB L3 cache in Bull Novascale 5160 server, 64GB memory, Microsoft Windows Server 2003 Datacenter Edition 64-bit
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105110701

16 Itanium2 1.6GHz processors in HP Integrity rx8640 server, 128GB memory, Microsoft Windows Server 2003 Datacenter Edition SP1 64-bit
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106071801

4 UltraSPARCIV 1.5GHz processors in Sun Fire V490 server, 32GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106010501

TPC-H 3000GB Database Performance

Dual-Core AMD Opteron™ processors Model 285 with 2x1MB L2 cache in HP Proliant server blade BL25p, 12 GB memory, Red Hat Enterprise Linux 4
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106060801

UltraSPARC IV+ 1.5Ghz processors in Sun Fire E25K server, 288GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106012701

Power 5 1.9GHz processors with 36MB L3 cache in IBM eServer p5 595, 256GB memory, AIX 5L V5.3
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105091901

Itanium2 1.6GHz with 9MB L3 cache in HP Integrity Superdome Enterprise Server, 256GB memory, HP-UX 11i V2 64-bit
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105071802

UltraSPARC IV 1.2GHz processors in Sun Fire E25K server, 288GB memory, Solaris 10
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105071802

2P Comparison – System Configuration

SPECfp_rate2000

2 Dual-Core Xeon processors 5160 with 4MB shared L2 cache in HP ProLiant 460c, 8GB memory, 1x36GB SAS disk drive, Red Hat Enterprise Linux® 4.0 Advanced Server
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060626-06329.html

2 AMD Opteron™ processors Model 2220SE with 2MB cache per processor in Sun Fire X4200 M2, 16GB memory, 1x72Gb SAS disk drive, Solaris 10 6/06 http://www.spec.org/osg/cpu2000/results/res2006q4/cpu2000-20061016-07636.html

FLUENT and LS-DYNA

2 x Xeon processors 5160 in SuperMicro X7DAE, BIOS rev. 1.0b, Memory: PC2-5300/DDR2 667, Crucial CT6472AF667, Qty. (8) 512MB, 240-pin Fully Buffered DIMM, 4GB total, 1) Western Digital WD1500ADFD Raptor 150GB 10k RPM, SuSe SLES9 64-bit, SP3

2 x AMD Opteron™ processors Model 2220SE in Tyan S2915, BIOS rev. 1.00, Memory: PC2-5300R/DDR2-667, Infineon HYS72T64020HR-3-A, Qty. (8) 512MB DIMM Modules, 4GB total, (1) Western Digital WD1500ADFD Raptor 150GB 10k RPM, SuSe SLES9 64-bit, SP3

Virtualization

http://www.lionbridge.com/lionbridge/en-US/services/outsourced-testing/competitive-analysis/amd.htm

2 Xeon processors 5150 with 16GB memory (PC2-5300 DDR2 FBDIMM), 2 Intel Pro/1000PT Dual Port Server Adapter, 63GB SAS Drive with VMware ESX Server 3.0

2 AMD Opteron processors Model 2218 with 16GB memory (PC2-4200 DDR2 RDIMM), 2 Intel Pro/1000PT Dual Port Server Adapter, 63GB SAS Drive with VMware ESX Server 3.0

2P Comparison – System Configuration Contd.

SAP-SD

2 Xeon processors 5160 in IBM System x3650, 24GB memory, Microsoft® Windows® 2003 Enterprise Edition (64-bit), DB2 9 (64-bit), Microsoft Windows 2003 Enterprise Server (64-bit), DB2 8.2.2 (64-bit), Cert # 2006043 http://www.sap.com/solutions/benchmark/index.epx

2 AMD Opteron™ processors Model 2218 in HP Proliant BL25p, 16GB memory, Microsoft Windows 2003 Enterprise Server (64-bit), SQL Sever 2005 (64-bit), Cert # 2006064 http://www.sap.com/solutions/benchmark/index.epx

SPECint_rate_base2006

2 Xeon processors 5160 in Supermicro X7DBE motherboard , 8GB memory, 250GB SATA disk drive, SuSE Linux 10.1 (for x86_64) http://www.spec.org/cpu2006/results/res2006q4/cpu2006-20060918-00111.html

2 AMD Opteron processors Model 8220SE in Tyan Thunder n4250QE motherboard, 8GB memory, 250GB SATA disk drive, SuSE Linux 10.1 (for x86_64) http://www.spec.org/cpu2006/results/res2006q4/cpu2006-20060918-00110.html

SPECjbb2005

2 Xeon processors 5160 in Supermicro X7DBE motherboard, 8GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition SP1 (64-bit) , IBM J9 VM (build 2.3, J2RE 1.5.0 IBM J9 2.3 http://www.spec.org/jbb2005/results/res2006q4/jbb2005-20061024-00201.html

2 AMD Opteron processors Model 8220SE in Tyan Thunder K9QE(S4985) motherboard, 8GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition SP1 (64-bit) , IBM J9 VM (build 2.3, J2RE 1.5.0 IBM J9 2.3 http://www.spec.org/jbb2005/results/res2006q4/jbb2005-20061024-00203.html

TPC-C

2 Xeon processors 5160 in HP ProLiant ML370 G5, 64GB memory, Microsoft Windows Server 2003 Enterprise x64, SQL Server 2005 Enterprise x64 SP1 http://www.tpc.org/tpcc/results/tpcc_result_detail.asp?id=106052202

2 AMD Opteron processors Model 2220SE in HP ProLiant DL385 G2, 32GB memory, Microsoft Windows Serer 2003 Enterprise x64 SP1, SQL Server 2005 Enterprise x64 SP1 http://www.tpc.org/tpcc/results/tpcc_result_detail.asp?id=106110901

4P Comparison - System Configuration

AMD Smarter Choice

SPECint_rate2000

4 AMD Opteron™ processors Model 8220SE with 2x1MB L2 cache in HP Proliant DL585 G2, 32GB memory, 1x36GB SAS disk, Microsoft® Windows® Server 2003 Enterprise SP1

http://www.spec.org/osg/cpu2000/results/res2006q4/cpu2000-20060918-07377.html

4 Xeon processors 7140 with 16MB L3 cache in HP Proliant ML570, 32GB memory, 1x36GB SAS, Microsoft Windows Server 2003 Enterprise Edition SP1 http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060818-07059.html

SPECfp_rate2000

4 AMD Opteron processors Model 8220SE with 2x1MB L2 cache in Tyan Thunder K9QE (S4985) motherboard, 8GB memory, 1x74GB SATA disk drive, SuSE Linux® Enterprise Server 9 SP3 for AMD64
http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060721-06585.html

4 Xeon 7140 processors with 16MB L3 cache in HP Proliant DL580 G4, 32GB memory, 1x36GB SAS disk, SuSE Linux Enterprise Server 9 SP3 for AMD64 http://www.spec.org/osg/cpu2000/results/res2006q3/cpu2000-20060818-07047.html

SPECjbb2005

4 Xeon processors 7140 in FSC Primergy TX600 S3 server, 32GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition + SP1 (64-bit), BEA JRockit(R) 5.0 P26.4.1 (build P26.4.1-5-64782-1.5.0_06-20060726-0014-win-x86_64) http://www.spec.org/osg/jbb2005/results/res2006q3/jbb2005-20060905-00189.html

4 AMD Opteron processors Model 8220SE in Tyan Thunder K9QE (S4985), 16GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition SP1 (64-bit) , IBM J9 VM (build 2.3, J2RE 1.5.0 IBM J9 2.3 Windows Server 2003 x86-32 j9vmwi3223-20060919 (JIT enabled)
http://www.spec.org/osg/jbb2005/results/res2006q4/jbb2005-20061024-00204.html

4P Comparison - System Configuration (contd.)

SPECweb2005

4 Xeon processors 7140 in FSC Primergy RX600 S3, 32GB memory, RHEL 4 U3 (2.6.9-34 ELsmp x86_64)
http://www.spec.org/osg/web2005/results/res2006q3/web2005-20060911-00039.html

4 AMD Opteron™ processors Model 8220SE in HP ProLiant DL585 G2, 64GB memory, RedHat Enterprise Linux ® 4 Update 4 (2.6.9-42.ELsmp), http://www.spec.org/osg/web2005/results/res2006q4/web2005-20061023-00053.html

TPC-C

4 Xeon processors 7140 in HP ProLiant ML570 G4, 64GB memory, Microsoft® Windows® Server 2003 Enterprise x64 Edition SP1, Microsoft SQL Serer 2005 Enterprise x64 Edition SP1
http://www.tpc.org/tpcc/results/tpcc_result_detail.asp?id=106101901

4 AMD Opteron processors Model 8220SE in HP ProLiant DL585 G2, 128GB memory, Microsoft Windows Server 2003 Enterprise x64 Edition SP1, Microsoft SQL Serer 2005 Enterprise x64 Edition SP1
http://www.tpc.org/tpcc/results/tpcc_result_detail.asp?id=106092601

SAP-SD

4 Xeon processors 7140 in HP ProLiant DL580 G4 server, 32GB memory, Microsoft Windows Server 2003 Enterprise Edition (64-bit) and SQL Server 2005 (64-bit), Cert # 2006060
http://www.sap.com/solutions/benchmark/index.epx

4 AMD Opteron processors Model 8220SE in HP Proliant DL585 G2 server, 32GB memory, Microsoft Windows Server 2003 Enterprise Edition (64-bit) and SQL Server 2005 (64-bit), Cert # 2006067
http://www.sap.com/solutions/benchmark/index.epx

TPC-H

4 Xeon processors 7140 with 16MB L2 cache in HP Proliant DL580 G4 server, 64GB memory, Microsoft Windows Server 2003 Enterprise Edition SP1 http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106090501

4 AMD Opteron processors Model 8220SE with 2x1MB cache per processor in HP Proliant DL585 G2 server, 128GB memory, Microsoft Windows Server 2003 Enterprise Edition SP1
http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=106092501

AMD
Smarter Choice

-CONFIGURATION DETAILS-

Low Power Consumption Leadership
Third-party Substantiation (Configurations)

AMD Smarter Choice

HP DL380 (Xeon 5150)

Source: Thomas Weisel Partners LLC

HP DL385 (Opteron 2218)

Source: Thomas Weisel Partners LLC

Server similarities: By running our experiments with 2U servers coming from the same product family (ProLiant DL) from the same vendor (HP), we believe we addressed any structural or macro differences between the test systems. For example, the two servers use redundant power supplies, interchangeable HDDs, comparable CD-RW/DVD drives, etc. Most important, the systems employ the same air-flow techniques and utilize the same model fans in the same quantity (see above). Other than the different stickers on the front of the boxes, one saying "Intel Xeon" and the other "AMD 64", the primary differences between the systems are platform specific (i.e., CPU, memory and motherboard).

Low Power Consumption Leadership
Third-party Substantiation (Configurations)

AMD Smarter Choice

We tested multiple processors on several configurations: We set out to understand the key performance and power differences between comparable processors from Intel and AMD. To conduct the tests in a controlled environment, we used a pair of HP ProLiant servers, one with Xeon 5150 (Woodcrest 2.66GHz) on a HP DL380 and the other with Opteron 2218 (Rev F 2.60GHz) on a HP DL385. We carefully chose these particular processors because they resulted in systems with the closest costs. Configuring both systems similarly in a dual-processor setup with 8GB of memory, a 72GB SAS HDD and other peripherals, the price of the DL380 came to $6,822 and the DL385 came to $6,566, a mere $256 difference. In addition to the similarities in cost, the processors also provide a good comparison since they are specified at bin minus one (or, one bin level below the top bin). The Xeon 5150 CPU is rated at 65W and the Opteron 2218 at 95W, both one level below the top bins of 80W and 125W, respectively.

We ran the HP servers in two memory configurations, 4GB and 8GB, to evaluate the differences that four DIMMs would make. In addition, we obtained the Intel server chassis SR1550, named Petrof Bay. Often used for evaluation and testing purposes, we utilized the server to test and evaluate the differences between current Woodcrest chips and a pre-release sample of Clovertown. The seven configurations we tested are summarized in the following table.

Systems Under Test

OEM	Platform	Vendor	Processor	Freq	Mem
HP	DL385	AMD	Opteron 2218	2.60 GHz	8 GB
HP	DL385	AMD	Opteron 2218	2.60 GHz	4 GB
HP	DL380	Intel	Xeon 5150	2.66 GHz	8 GB
HP	DL380	Intel	Xeon 5150	2.66 GHz	4 GB
Intel	SR1550	Intel	Xeon 5150	2.66 GHz	8 GB
Intel	SR1550	Intel	Xeon 5160	3.00 GHz	8 GB
Intel	SR1550	Intel	Xeon E5345	2.33 GHz	8 GB

Source: Thomas Weisel Partners LLC

- AMD PowerNow!™ Technology Enabled on DL385
- Demand Based Switching Enabled on DL380