AMD
Smarter Choice

2007
Technology
Analyst Day

Randy Allen
Corporate Vice President,
Server and Workstation Division

July 26, 2007

Commercial Update Agenda

AMD: Earning Enterprise Business

"Barcelona" Changes the Game

AMD Commercial Ecosystem

Building on the AMD Commercial Client Foundation

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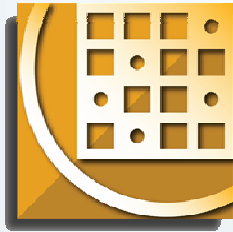
Commercial Update Agenda

AMD: Earning Enterprise Business

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Commercial Market Trends:
A Macro View

Energy-Efficient Processing

Performance and performance per watt

- Server Consolidation
- Virtualization
- Energy-Conscious PC Purchasing

Ultimate Visual Experience

Professional Workstation

- 3D Modeling
- Medical Imaging
- CAD/CAM
- Digital Animation Special Effects

AMD: Earning Enterprise Business
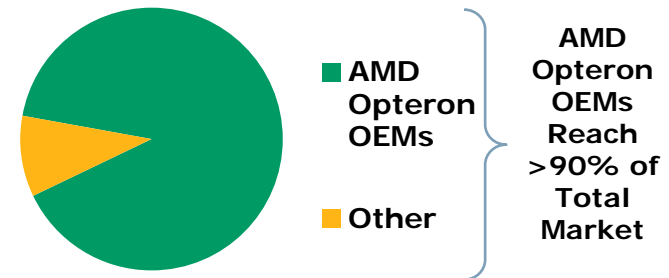
AMD Smarter Choice

AMD Opteron™ OEMs in total represent >90% of global x86 server sales

4-way servers run business critical applications; AMD is >50% of U.S. market

(Source: Mercury Research)

Commercial client design wins increased 71% since
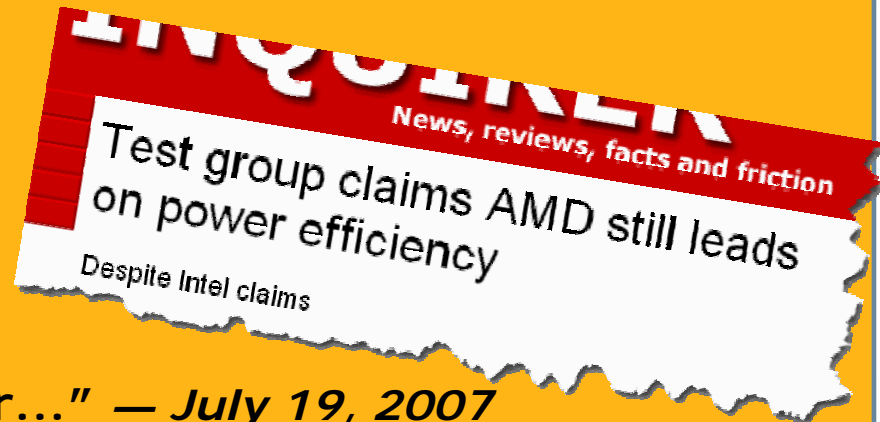Dec. 2006

x86 Server OEM Unit Share

- ■ AMD Opteron OEMs

AMD Opteron OEMs Reach >90% of Total Market

- ■ Other

(Source: IDC)

AMD Commercial Client Wins

71% Increase

36 Design Wins

21 Design Wins

Dec 2006   July 2007
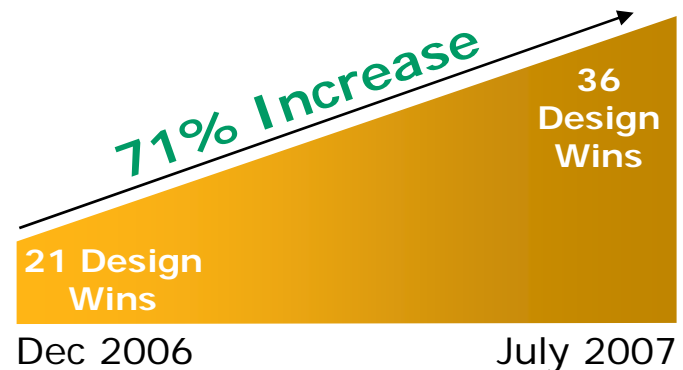
Performance-per-Watt Leadership Today

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"Based on tests at our independent lab, an AMD Opteron™ server is 7.3 to 15.2% more power efficient than a virtually identical Intel Xeon server..." — *July 19, 2007*

INQUIRER
News, reviews, facts and friction

Test group claims AMD still leads on power efficiency

Despite Intel claims

ANANDTECH

Low Power Server CPU Shoot-out

AMD
intel.

Date: July 17th, 2007
Topic: IT Computing
Manufacturer: Various
Author: Jason Clark & Ross Whitehead

"AMD is clearly the leader when it comes to performance-per-watt using the workloads in this article." — *July 17, 2007*

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Steve Rubinow
Chief Technology Officer
New York Stock Exchange

July 26, 2007

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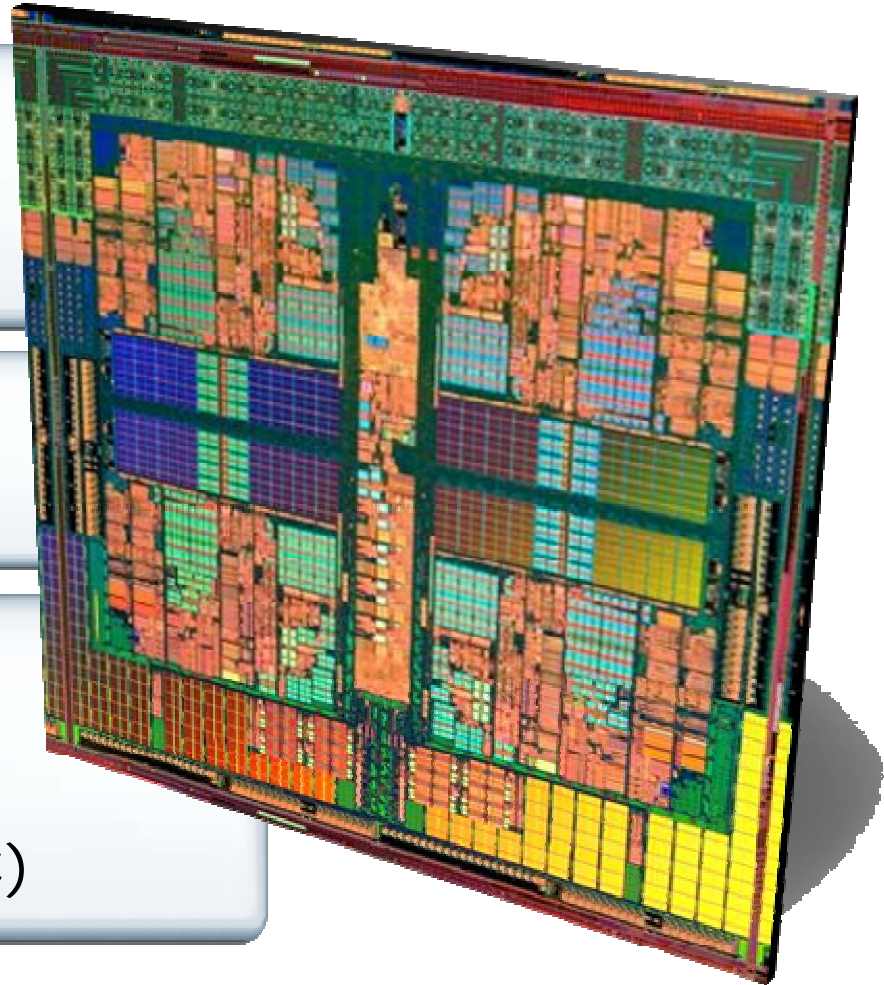
Building on the AMD Commercial Client Foundation
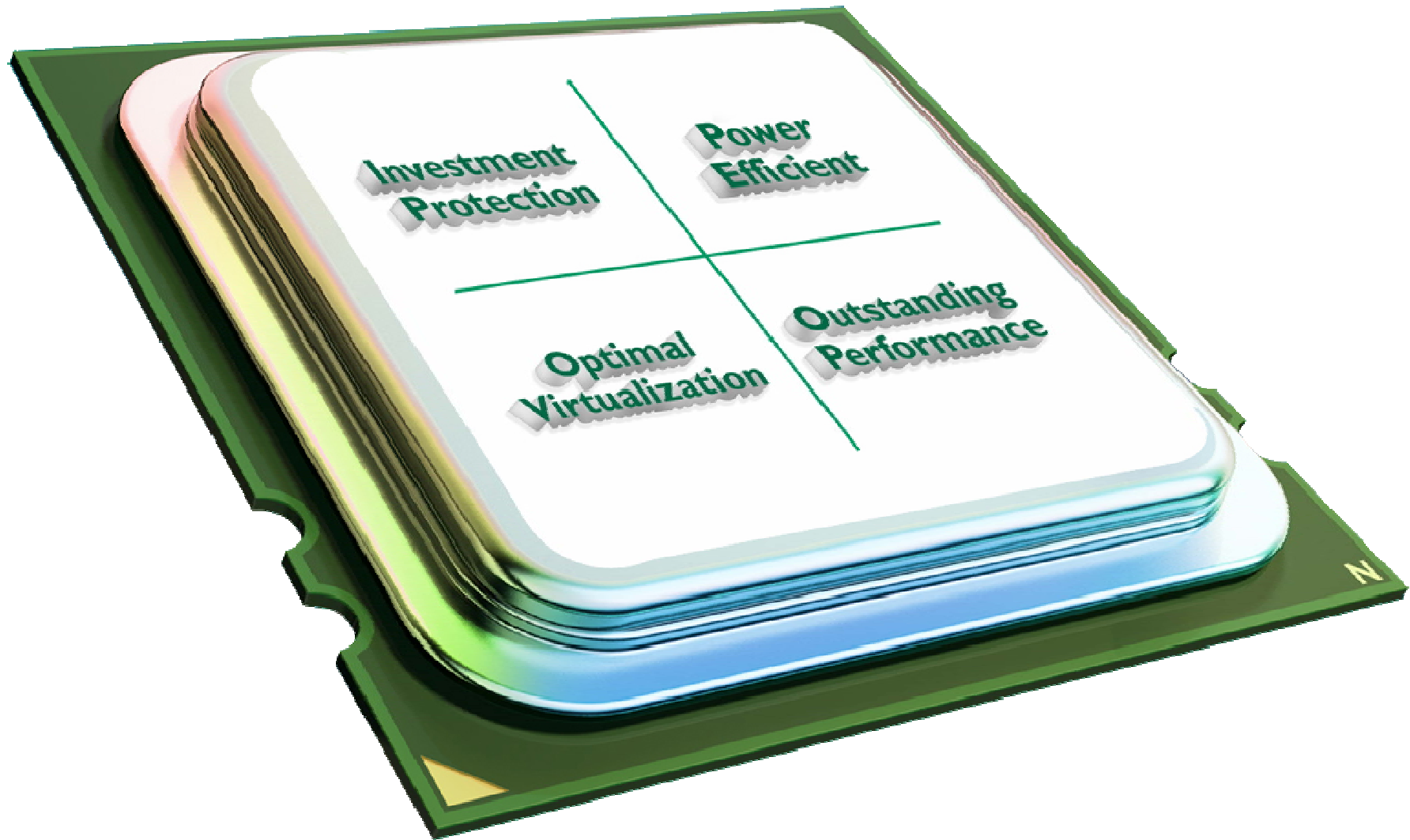
"Barcelona" Update

Production wafers out, on track to ship for revenue in Q3 2007

Wafer yields ahead of plan

Announcing our largest "Barcelona" win to-date with Texas Advanced Computing Center (TACC)

"Barcelona" Changes the Game in Four Dimensions

Investment Protection

Power Efficient

Optimal Virtualization

Outstanding Performance

Investment Protection: Stable Platform Progression

AMD Smarter Choice

Long-term success for partners and end-customers
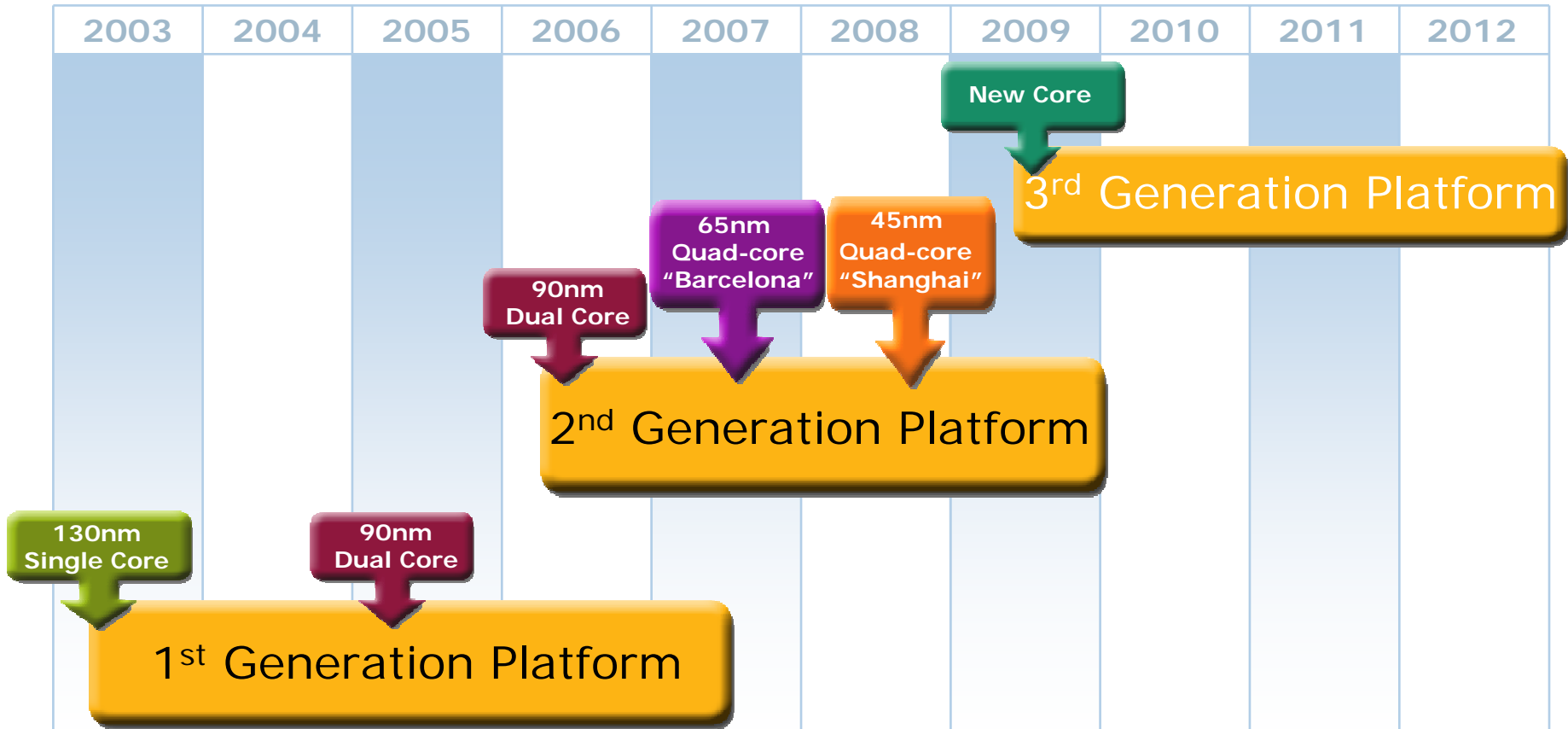
2003	2004	2005	2006	2007	2008	2009	2010	2011	2012

New Core

3rd Generation Platform

65nm Quad-core "Barcelona"

45nm Quad-core "Shanghai"

90nm Dual Core

2nd Generation Platform

130nm Single Core

90nm Dual Core

1st Generation Platform

Stable platforms deliver better long-term value and logical transitions for partners and customers

The AMD "Pipe": Platform Innovation Progression

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Pipe Core Elements

Silicon Technology

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Processor Core Technology

Platform Technology

New Core

New Silicon Technology

Platform Generation X+1

New Core

New Silicon Technology

Platform Generation X

- **New core and new silicon technology in alternating years**
- **Platform progressions synchronized to new industry standards**
- **Result: Increased performance, optimal investment protection**

AMD Power Efficiency Innovation

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Independent Dynamic Core Technology

Native Quad-Core

| 75% IDLE MHz Core 0 | 35% IDLE MHz Core 1 |
| 10% IDLE MHz Core 2 | 1% IDLE MHz Core 3 |
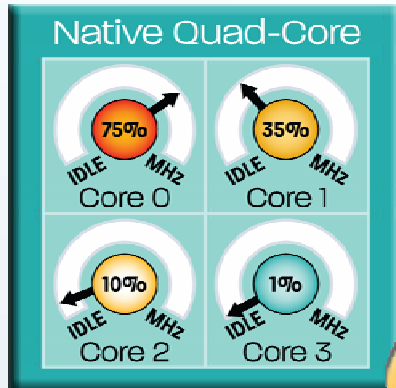
AMD CoolCore™ Technology

L1
L2
L1
L3

Same Power/Thermals As Dual-Core!
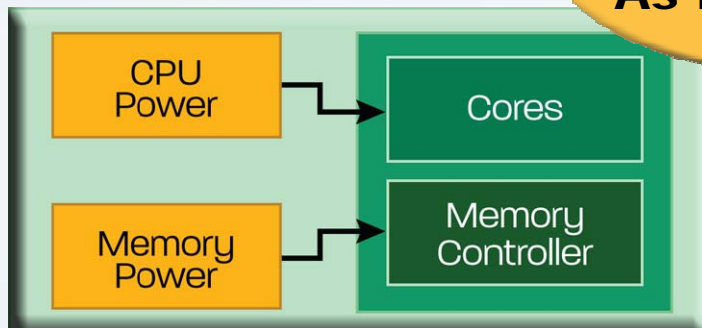
Dual Dynamic Power Management™

CPU Power → Cores

Memory Power → Memory Controller

Enhanced AMD PowerNow!™ Technology

AMD 64 Opteron

AMD Virtualization™ Leadership

Performance
- Direct Connect Architecture
- Rapid Virtualization Indexing

Security
- Device Exclusion Vector

Software Support
- AMD-V™
- Live Migration
- 64-bit Guest OS Support

2009 Enhancements
- IOMMU for Security and Performance

2007
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Analyst Day
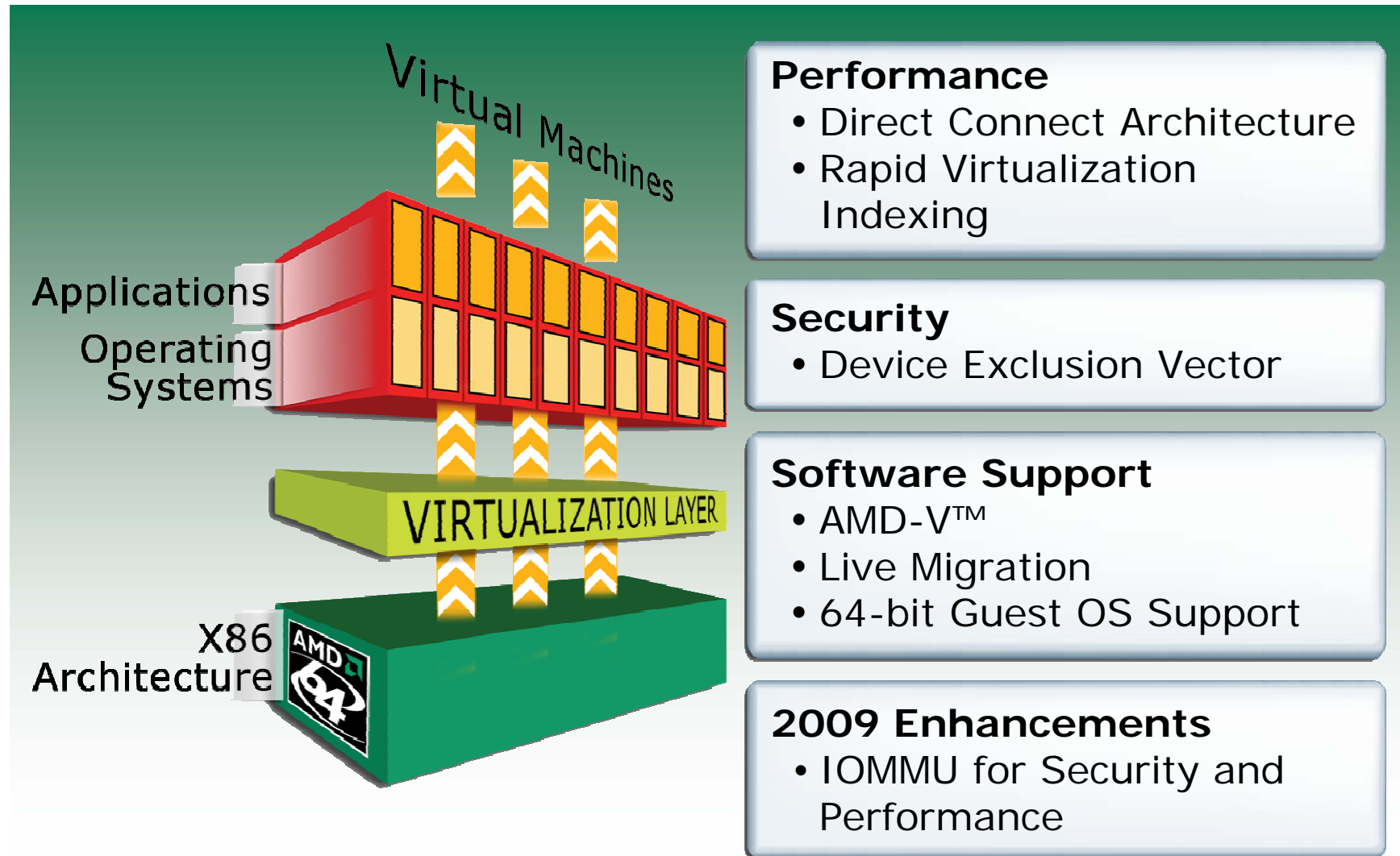
Steve Herrod
Sr. Vice President,
Technology Development
VMware

July 26, 2007

vmware®

Optimal Virtualization with VMware

79% Increase At Same Power

Legend:
- Quad-Core AMD Opteron™ (2 GHz)
- Dual-Core AMD Opteron™ (3 GHz)

Quad-Core: 1.79
Dual-Core: 1

Normalized User Performance
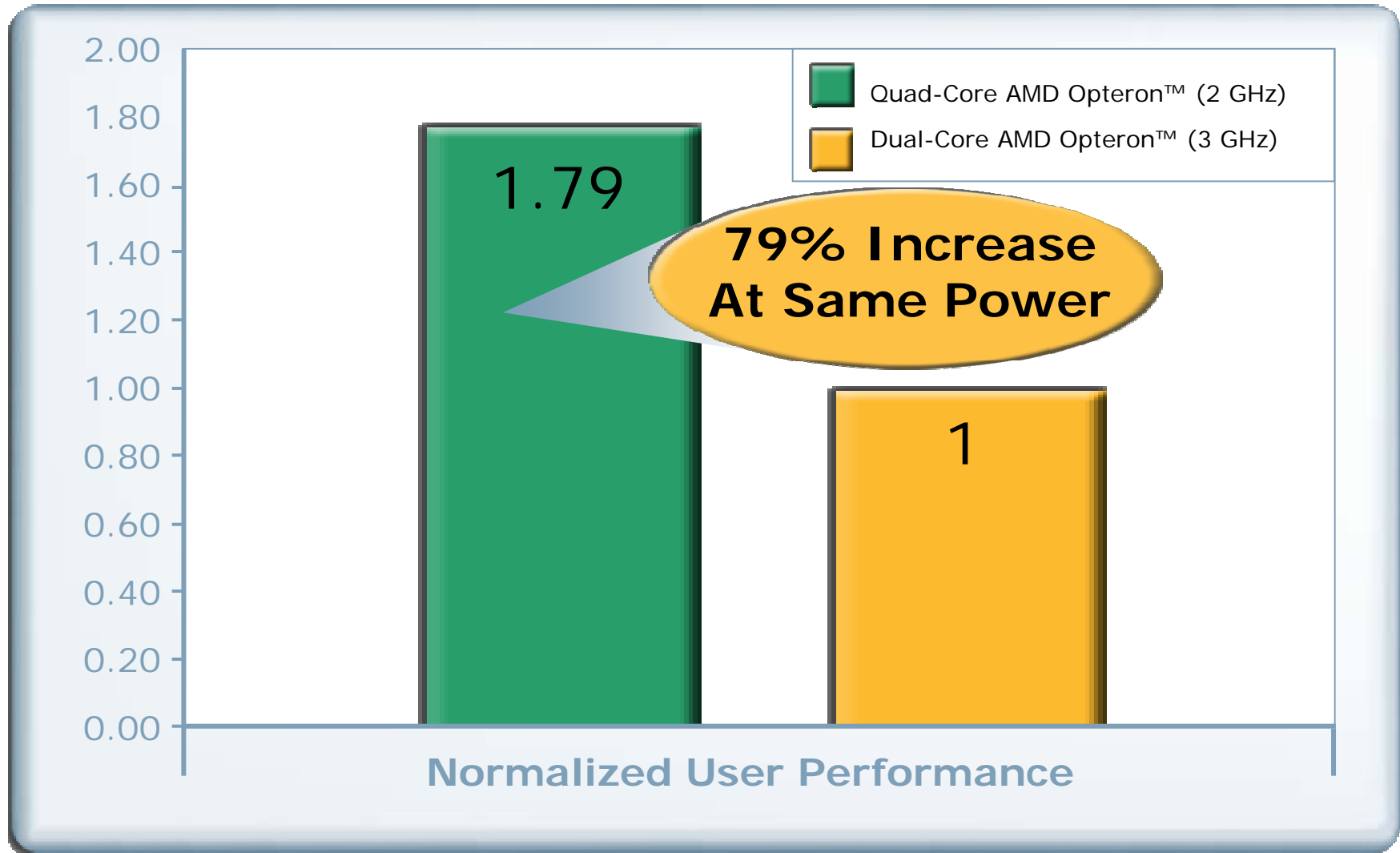
Performance-Per-Watt Scalability

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Greater Performance Same Power

Consistent power and thermals help deliver better performance per watt

Performance-Per-Watt

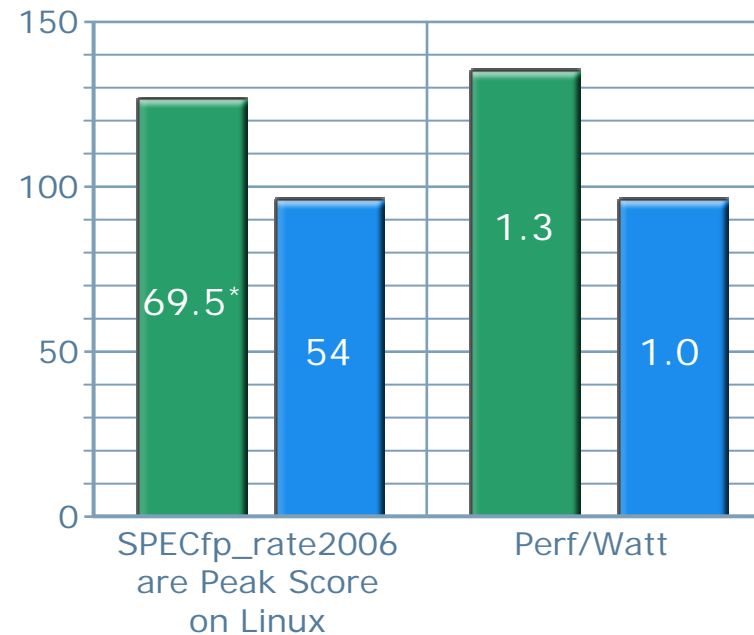| Single Core	CPU Watts	Dual Core	CPU Watts	Quad Core	CPU Watts	Power
2003		**2005**		**2007**		
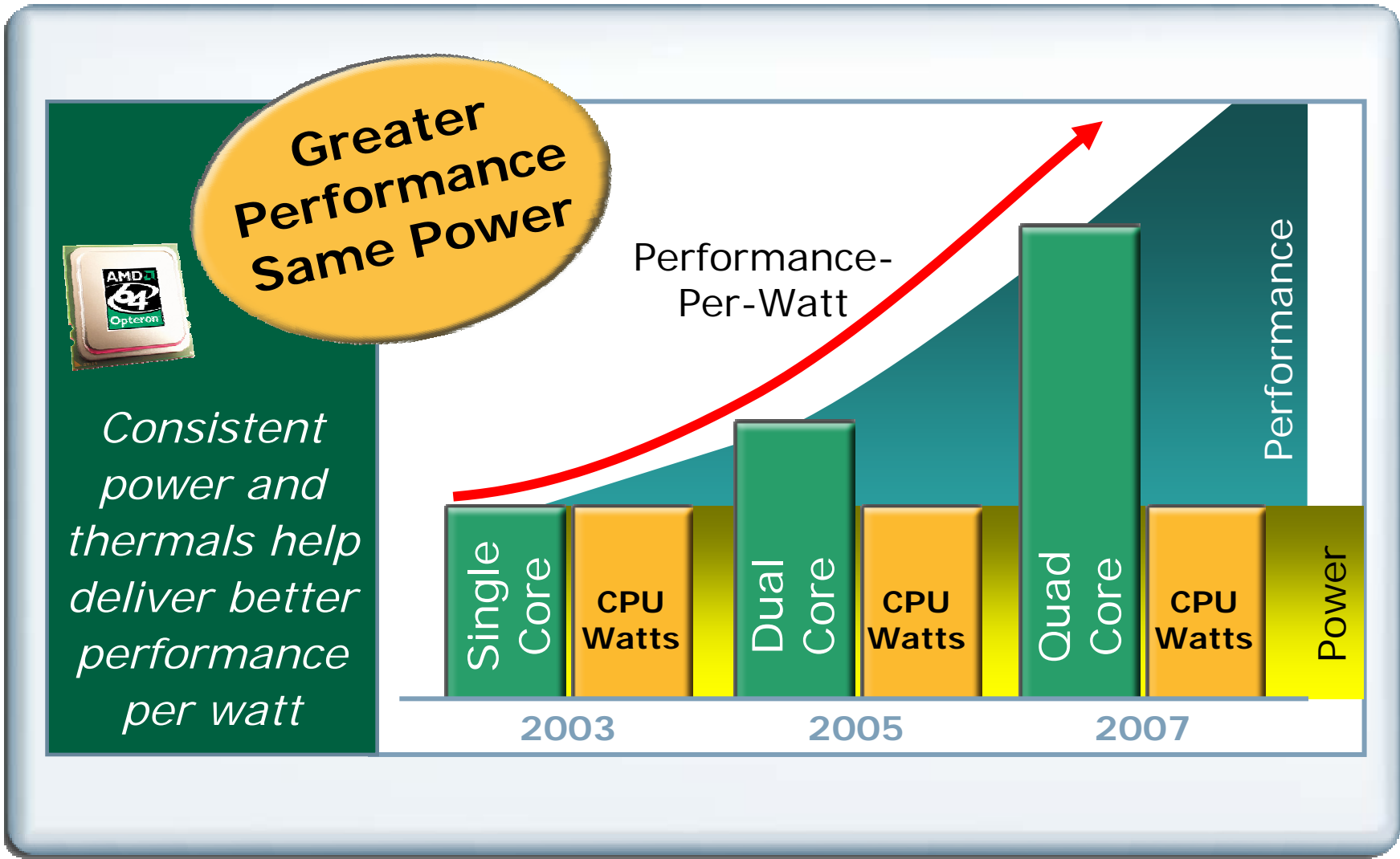
Performance

"Barcelona" Sets New Performance-Per-Watt Standard

RESULT: 25% performance advantage; more than 30% performance-per-watt advantage

Remember, when Intel cites avg. CPU power ratings: Intel customers pay a memory controller and FBDIMM power penalty

***2P servers**: Barcelona (**2.0 GHz, 95-watt**) vs. Xeon 5345 (**2.33 GHz, 1333 MHz FSB, 80-watt**); 8 DIMMs of memory; SUSE Linux Enterprise Server 10*

SPECfp_rate2006 are Peak Score on Linux

- 69.5* (Quad-Core AMD Opteron™ Processor 2GHz)
- 54 (Xeon 5345)
- 1.3 (Perf/Watt AMD)
- 1.0 (Perf/Watt Xeon)

■ Quad-Core AMD Opteron™ Processor 2GHz   ■ Xeon 5345

SPEC and the benchmark name SPECfp_rate2006 are registered trademarks of the Standard Performance Evaluation Corporation. Results for Xeon 5345 is valid as of July 19, 2007. For latest scores visit www.spec.org

*Estimated performance based on AMD lab measurements of Quad-Core AMD Opteron™ processor at 2 GHz
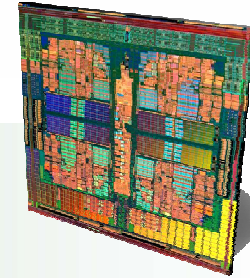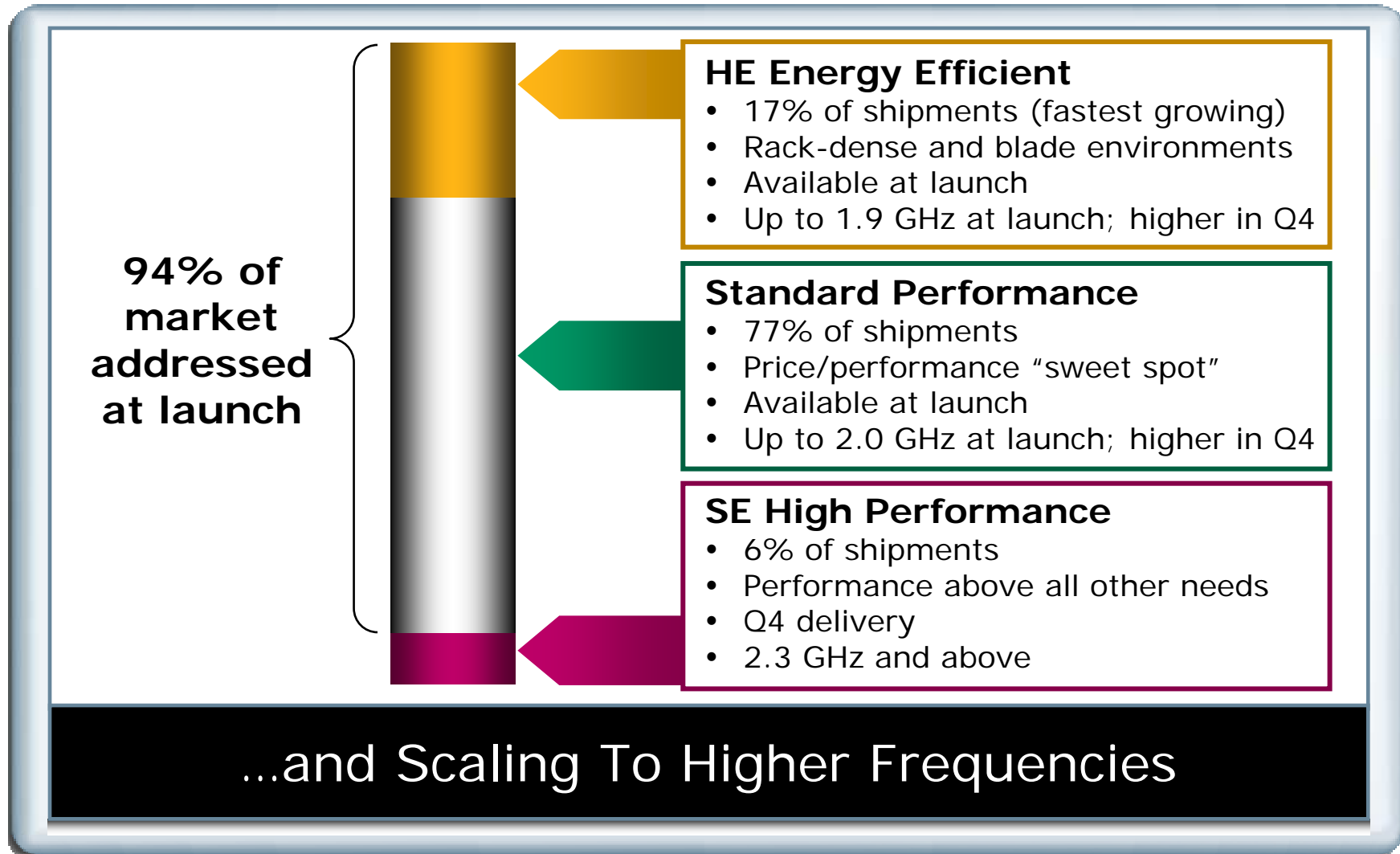
More Demos Today

"Barcelona"-based Dell server with Microsoft Windows Server 2003 with Virtual Server

- Tier One platform running mainstream server OS with virtualization
- Supports Enhanced AMD PowerNow!™ Technology with simple driver update
- Enables a flexible migration to Windows Server 2008

"Barcelona": Highly Efficient at Launch...

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94% of market addressed at launch

HE Energy Efficient
- 17% of shipments (fastest growing)
- Rack-dense and blade environments
- Available at launch
- Up to 1.9 GHz at launch; higher in Q4

Standard Performance
- 77% of shipments
- Price/performance "sweet spot"
- Available at launch
- Up to 2.0 GHz at launch; higher in Q4

SE High Performance
- 6% of shipments
- Performance above all other needs
- Q4 delivery
- 2.3 GHz and above

...and Scaling To Higher Frequencies

Source: AMD
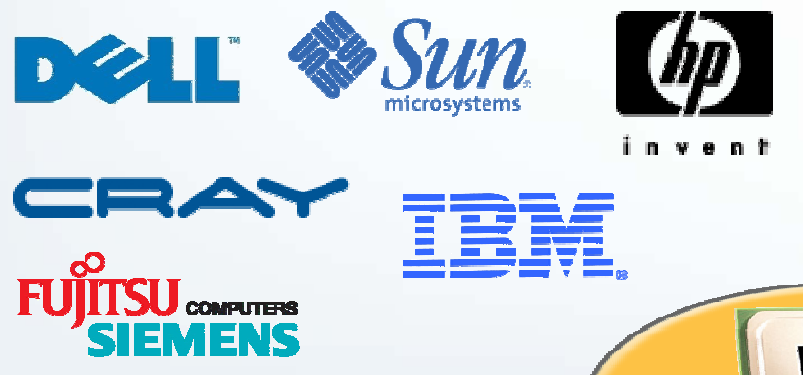
Commercial Update Agenda

AMD: Earning Enterprise Business

"Barcelona" Changes the Game

AMD Commercial Ecosystem

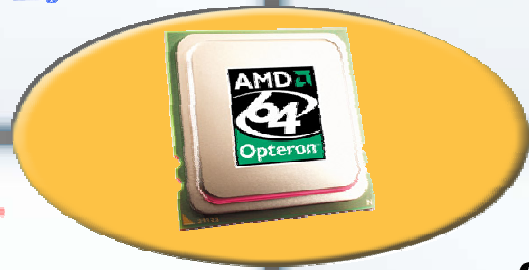Building on the AMD Commercial Client Foundation

Expanding Ecosystem

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Leading OEM Platforms...

DELL · Sun microsystems · hp invent · CRAY · IBM · FUJITSU COMPUTERS SIEMENS

...regional choices...

APPR · eslim · 曙光 DAWNING · HUAWEI · transtec · Rackable systems · Verari systems · ARMARI

AMD 64 Opteron

...the best in software partners...

solaris · ORACLE · Microsoft · Novell · redhat · vmware

...and integration partners to put it all together

PC Connection · AVNET Applied Computing Solutions · accenture · Insight · Tech Data · EDS · SYNNEX · CDW · INGRAM MICRO

Network of AMD Opteron™ Platforms

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2003 vs. **2007**

IBM eServer 325

1st Generation AMD Opteron™

SC 1435

PowerEdge 2970

PowerEdge 6950

DL585

DL385

DL365

DL145

BL465c

BL685c

xw9400

X4600

X2200

X4500

X4200/4100

X2100

U20 & U40 WS

Blade X6220

Blade X8420

Sun microsystems

DELL™

hp®

E-9422R

E-9522R

E-9722R

E-9222T

Gateway

X3455

X3655

X3755

LS21

LS41

IBM

AMD 64 Opteron

XT3™

XT4

CRAY

egenera®

acer.

AMD Validated Solutions

BladeFrame ES and EX

G5450

FUJITSU SIEMENS

X630 S2

Engaging the AMD Software Ecosystem

AMD collaborates to ensure "Barcelona" compatibility at launch...

AMD works with 300+ software and open source providers to develop compilers, tools and OSes optimized for our new generation of processors, and optimized drivers for our new commercial graphics

~

Hundreds of software infrastructure providers now plan product roadmaps in collaboration with AMD
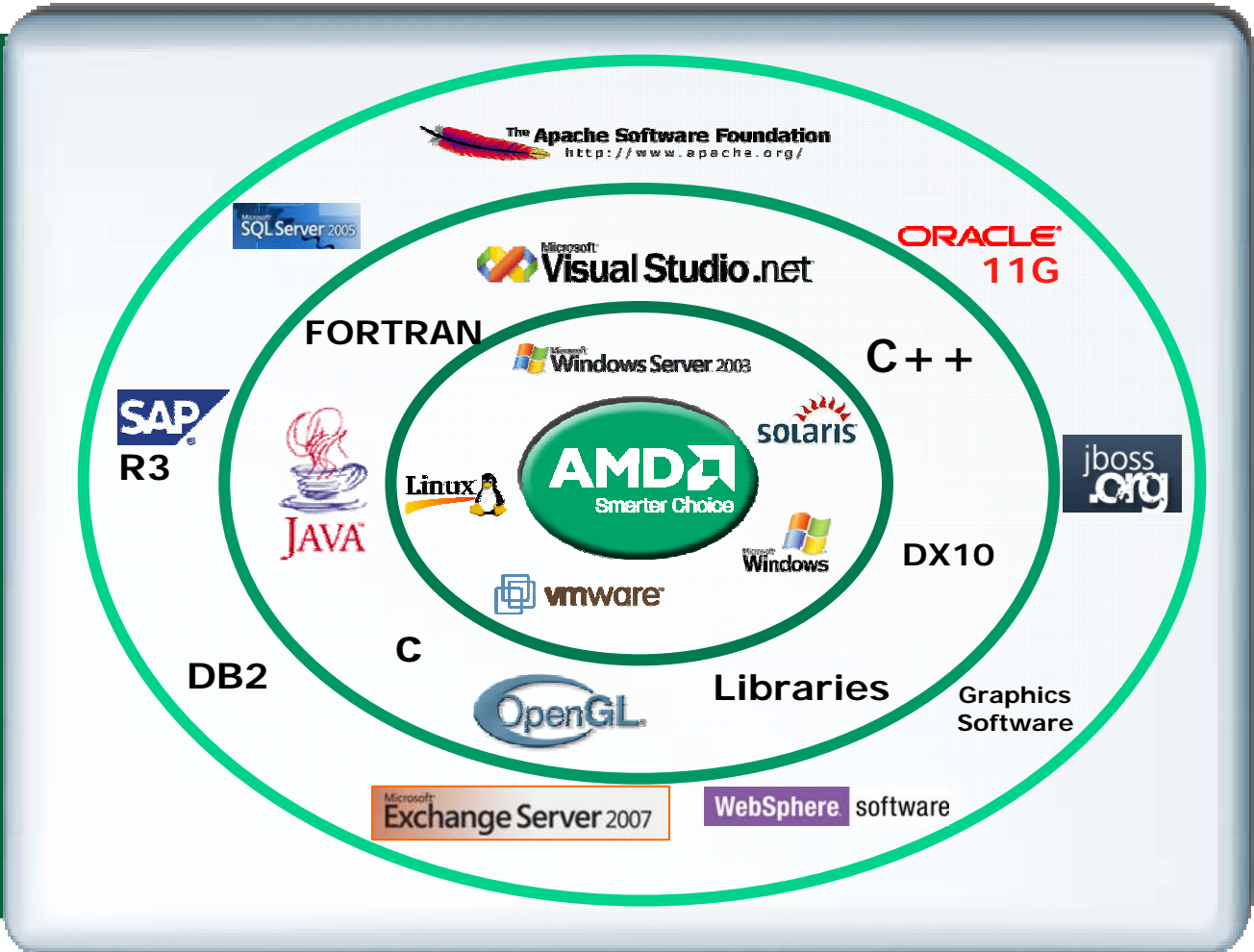
...while making it easy to optimize for full "Barcelona" benefit

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Marc Hamilton
Vice President, Solaris Marketing
SUN Microsystems

July 26, 2007

Creating the Ultimate Visual Experience
AMD Workstation Update

AMD Professional Graphics
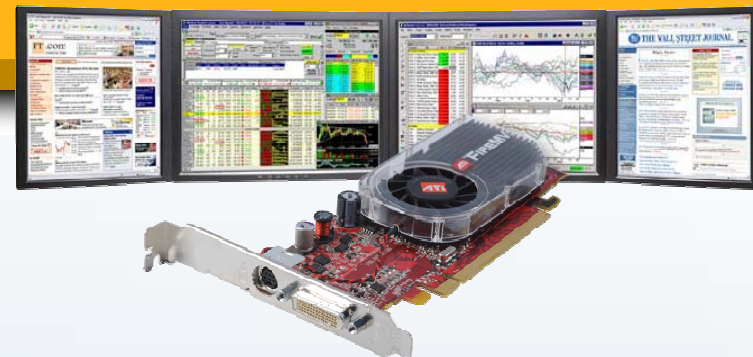
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ATI FireGL™

- Price Performance Leadership
- Certified Application Performance
- Top to bottom solutions for Enterprise wide deployment
- Expanded features for high-end segments
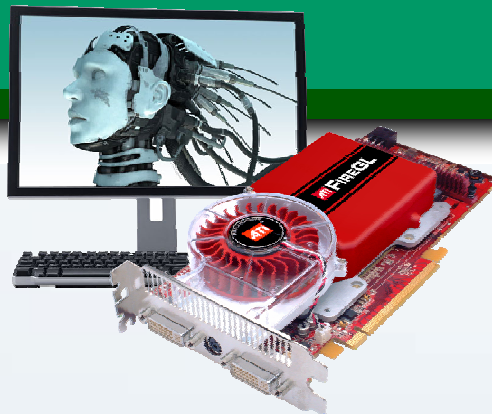
ATI FireMV™

- Versatile dual and quad output
- Flexible form factor design
- Cooler and quieter operation

Next-Generation AMD Professional Graphics: Q3 2007 Launch

ATI FireGL™

- Powerful 3D application performance

- CAD, DCC, medical, oil & gas, research, GIS

ATI FireMV™

- Dual and quad output

- Financial traders, control centers, public information displays

Preview:
ATI FireGL™ R600

- Innovation Accelerates Application Performance
  - Unified Shaders
  - Auto Detect
  - Industry's Largest Framebuffer
  - Stream Computing

- Innovation Maximizes Productivity
  - Multi-Card
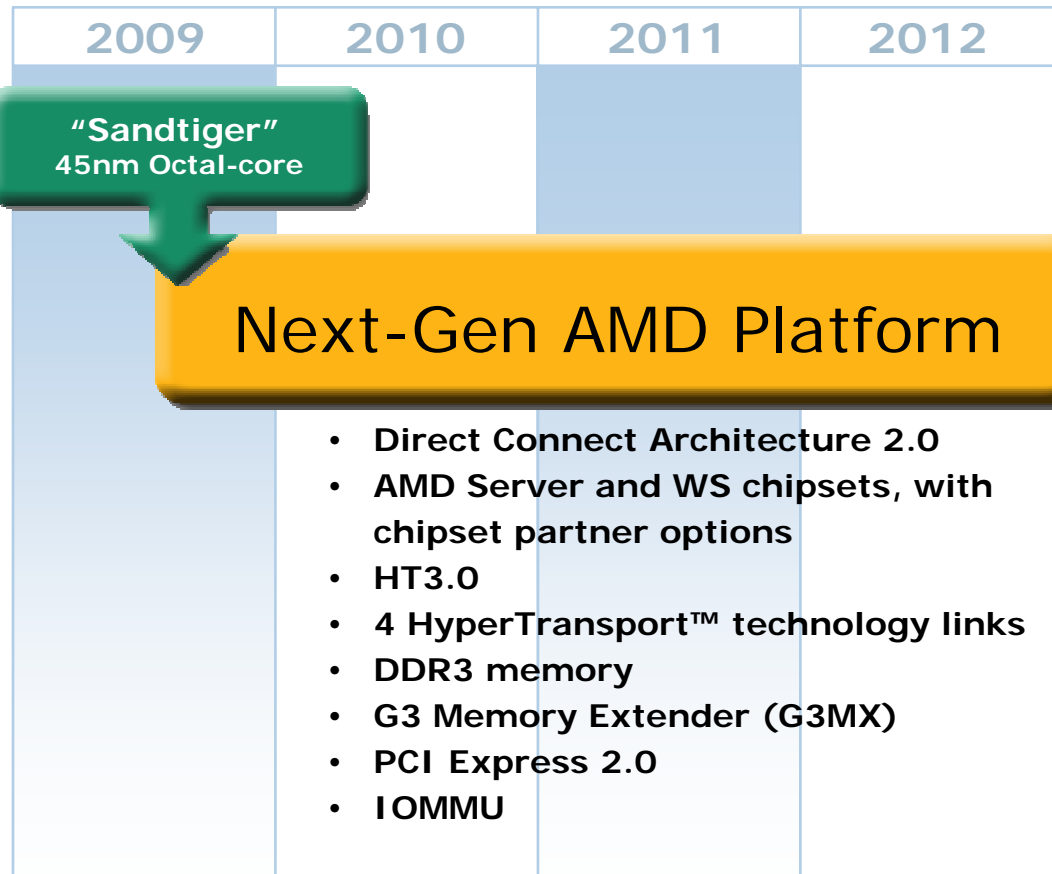 - ISV Certification
  - Unified Driver

AMD Server and Workstation Roadmap '07-'08

AMD Smarter Choice

Platform Segment	2H 2007		2008
CPU	**"Barcelona"** **65nm** **Native Quad-Core*** • 512KB L2/core • 2MB L3 • RDDR2 { 667 at launch; 800 max 1H'08 • 3x HT1.0 • AMD-V • Socket F (1207)	**"Budapest"** **65nm** **Native Quad-Core*** • 512KB L2/core • 2MB L3 • UDDR2 { 800 max • 1x HT1.0 or 1x HT3.0 • AMD-V • Socket AM2	**"Shanghai"** **45nm** **Native Quad-Core*** • 512KB L2/core • 6MB L3 • RDDR2 • 3x HT1.0 • AMD-V • Socket F (1207) • **Continued IPC Improvements**
Chipset	nForce Professional 3600 Broadcom HT-2100	nForce Professional 3600 Broadcom HT-2100	Continued collaboration with industry-leading chipset partners
Pro Graphics	R600 Generation FireGL and FireMV professional graphics	R600 Generation FireGL and FireMV professional graphics	R700 Generation FireGL and FireMV professional graphics **DisplayPort**

* In the 2P and 1P product lines, we will also offer dual-core variants.

Announcing Next-Generation
AMD Server and Workstation Platforms

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2009	2010	2011	2012

"Sandtiger"
45nm Octal-core

Next-Gen AMD Platform

- **Direct Connect Architecture 2.0**
- **AMD Server and WS chipsets, with chipset partner options**
- **HT3.0**
- **4 HyperTransport™ technology links**
- **DDR3 memory**
- **G3 Memory Extender (G3MX)**
- **PCI Express 2.0**
- **IOMMU**

Stable platforms deliver better long-term value and
logical transitions for partners and customers
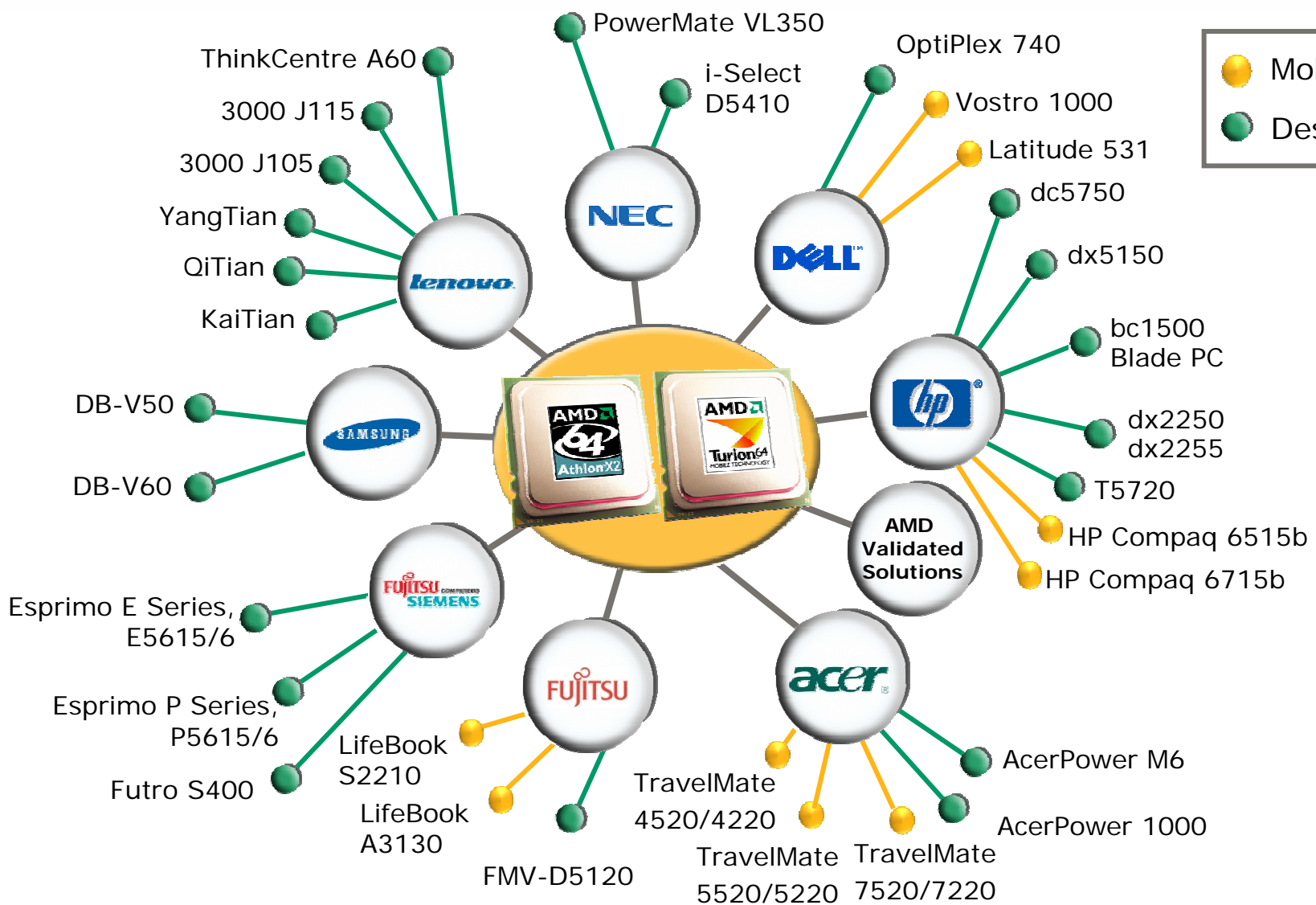
Commercial Update Agenda

AMD: Earning Enterprise Business

"Barcelona" Changes the Game

AMD Commercial Ecosystem

Building on the AMD Commercial Client Foundation

Commercial Client Platforms

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PowerMate VL350

ThinkCentre A60

OptiPlex 740

i-Select D5410

Mobile

Vostro 1000

Desktop

3000 J115

Latitude 531

3000 J105

dc5750

YangTian

NEC

QiTian

DELL

dx5150

KaiTian

lenovo

bc1500 Blade PC

DB-V50

AMD 64 Athlon X2

AMD Turion 64 MOBILE TECHNOLOGY

hp

dx2250 dx2255

SAMSUNG

DB-V60

T5720

AMD Validated Solutions

HP Compaq 6515b

Esprimo E Series, E5615/6

FUJITSU SIEMENS

HP Compaq 6715b

Esprimo P Series, P5615/6

FUJITSU

acer

AcerPower M6

Futro S400

LifeBook S2210

TravelMate 4520/4220

AcerPower 1000

LifeBook A3130

FMV-D5120

TravelMate 5520/5220

TravelMate 7520/7220

Commercial Client Momentum Building

Gartner: Desktop Recommended Configurations, April 2007

"With AMD now available from Dell, HP and Lenovo, enterprise customers have choice between AMD and Intel. Those options, plus the availability of Windows Vista, give reason for enterprise customers to re-evaluate their PC configurations for 2007."

Select Key Findings

- "AMD has partnered with major OEMs to build enterprise-class PCs with AMD Athlon 64 microprocessors. With appropriate image stability commitments and warranty, AMD based systems are as viable as Intel-based systems."

- "The availability of Microsoft Vista may change how organizations choose their configurations."

Publication Date: 30 April 2007 ID Number: G00147770

AMD "Hardcastle" Business Class Solutions

AMD
Smarter Choice

Notebook Battery Life / Desktop Energy Efficiency	Power-optimized CPU and chipset for longer battery life Low idle power to meet new Energy Star requirements Industry's 1st 45-watt desktop processor product line
Stability & Consistency	Best-in-class stability for full set of platform components Existing design wins on stable AMD platforms via 690 chipsets include HP, Dell and Acer commercial SKUs
Security & Manageability	Open industry standard solution set and silicon level enablement
Thinner & Lighter Notebooks SFF Desktops	Competitive platform performance within existing thermal budgets

Open Platform Approach

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Standards and innovation together deliver best-in breed platform-level solutions

DMTF
distributed management task force, inc.

- Leadership member
- Developing management standards
- Promoting interoperability for enterprise and Internet environments

HyperTransport™
CONSORTIUM

- Founding member
- Developing industry standard specifications for low latency, high-performance interconnects

TRUSTED COMPUTING GROUP™

- Founding member
- Developing industry standard specifications for trusted computing

AMD Commercial Client Platforms

AMD Smarter Choice

Platform Segment	2007	2008 "Hardcastle" Platforms

Desktop

CPU

"Burbidge"
Native Single & Dual-Core
- Dedicated L2
- DDR2
- HT1.0
- AMD-V
- EVP
- Cool'n'Quiet
- Digital Media Xpress
- AM2 Package
- 65nm

"Perseus"
Native Quad-Core/
Single- & Dual-Core
- 2MB Shared L3
- HT3.0
- AM2+ Package

Chipset

AMD 690 Series Chipsets
DirectX9, UVD, RAID 0,1,10, ASF2.0, DVI/HDMI, Display Cache, ATI Avivo, ATI PowerPlay, PCIe Gen1, TPM Compliant

SB700 Series Chipset
Energy Cache & ATI PowerPlay
DirectX10, DASH 1.0, RAID 0,1,5,10, DVI/HDMI/DisplayPort, PCIe Gen2

Mobile

CPU

"Kite" Refresh
Single & Dual-Core
- 1MB Total Dedicated L2
- DDR2
- HT1.0
- AMD-V
- EVP
- PowerNow!
- Digital Media Xpress
- S1g1 Package
- 65nm

"Puma"
"Griffin" Processor Family
Single & Dual-Core
- 2MB Total Dedicated L2
- Power-Optimized HT3.0
- Split Power Planes
- Dynamic Performance Scaling
- Mobile-Optimized Memory Controller
- S1g2 Package

Chipset

AMD M690 w/SB600
DirectX9, UVD, ATI Avivo, ATI PowerPlay, DVI/HDMI, Display Cache, PCIe Gen 1, ASF2.0, PowerXpress, TPM Compliant, Hybrid Hard Disk Drive

RS780M & SB700
DirectX10, DVI/HDMI/DisplayPort, HyperFlash, PCIe Gen 2, DASH

Wireless

WLAN: 802.11 a/b/g/draft n; WWAN: 3G

WLAN: 802.11 a/b/g/n; WWAN: 3G

Commercial Update Summary

AMD *Smarter Choice*

AMD: Earning Enterprise Business

- Multiple AMD Opteron platforms from the top OEMs
- Share is highest on MP servers for mission critical apps
- Commercial client design wins increased 71% in 7 months

"Barcelona" Native Quad-core Changes the Game

- Investment Protection: Synchronized Platform Progression
- Power Efficiency Innovation
- AMD Virtualization™ Leadership
- HE available at launch with performance scaling

AMD Collaborates with the Full Commercial Ecosystem

- OEM platforms for server and client growing
- Software ecosystem primed for "Barcelona", next-generation ATI FireGL

Building on the AMD Commercial Client Foundation

- Unabated growth in design wins
- Open approach to manageability and security
- Platform value proposition taking root

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