CONSUMERIZATION, CLOUD, CONVERGENCE.

AMD 2012 Financial Analyst Day

Lisa Su,
SVP and General Manager, Global Business Units, AMD
February 2, 2012
AGENDA

Market Trends

Technology Leadership

Product Portfolio

What the Future Holds
A MAJOR SHIFT IN COMPUTING DEVICES THIS DECADE
EXPLOSIVE GROWTH OF DEVICES, DATA AND CLOUD COMPUTING

ERA OF CONVERGENCE BRINGS BIGGER MARKETS,
FOREVER ALTERS COMPETITIVE DYNAMIC

TREMENDOUS MARKET OPPORTUNITY

$ Billion

<table>
<thead>
<tr>
<th>Year</th>
<th>Media Tablet</th>
<th>Server</th>
<th>Embedded</th>
<th>Notebook</th>
<th>Desktop</th>
<th>Graphics</th>
</tr>
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<tbody>
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<td>2010</td>
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<td>2011</td>
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<td>2014</td>
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</table>

CAGR

- Media Tablet: 18.6%
- Server: 5.3%
- Embedded: 15.1%
- Notebook: 8.4%
- Desktop: 2.8%
- Graphics: 11.6%

Source: AMD Internal
EMERGING MARKETS HOLD THE NEXT BILLION PEOPLE TO CONNECT

<table>
<thead>
<tr>
<th></th>
<th>Real GDP annual growth (2011 - 2014)</th>
<th>2014 MPU Market size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature</td>
<td>1.9%</td>
<td>~$19.8B</td>
</tr>
<tr>
<td>Emerging</td>
<td>5.6%</td>
<td>~$23.7B</td>
</tr>
</tbody>
</table>

Real GDP source: Euromonitor, January 2012
CONSUMER-DRIVEN TRENDS DRIVING COMPUTING INNOVATION

Natural UI

More Pixels & Displays

Social Games

Cloud

Collaboration
AMD PRODUCT FOCUS: FULLY ALIGNED TO MARKET TRENDS

- Exceptional user experience across device categories
- Leadership Compute & Visualization at lower power and cost
- Flexible SoCs, differentiated APUs across a complete range of platforms
Leadership IP in performance-per-watt

- **AMD Graphics**: Leading the GPU industry inflection points
- **AMD Radeon™ HD 7970 GPU** (“Tahiti”) is the fastest in the world
- **AMD Eyefinity**: An immersive, exclusive multi-display technology, now with 3D
- 200+ applications are now accelerated by AMD GPUs and APUs

Source: AMD Internal
APUs BRING LEADERSHIP GRAPHICS/COMPUTE IP TO MAINSTREAM

- 2011: AMD first to introduce heterogeneous computing to mainstream applications
- "Llano" APU offers nearly 3X the performance in the same power envelope over conventional CPUs
- Fully leverages the growing ecosystem of GPU-accelerated apps

Source: AMD Performance Labs. See Appendix A for footnotes.
APU ADOPTION: RECORD DESIGN WINS, STRONG END-USER DEMAND

- Shipped > 30m APUs to date
- 11 of the world’s top 12 OEMs shipping AMD APU-based platforms
- “Brazos” APUs shipped more units in its first year than any previous mobile platform in AMD history
- “Llano” APUs ramped to represent nearly 60% of mobile processor revenue by Q4 2011
DRIVING LEADERSHIP PERFORMANCE-PER-WATT IN SERVER

Major Architectural Investment
- “Bulldozer” core is the foundation for continued performance enhancements for server workloads

Revolutionary Power Design
- Shared resources in the core for maximum power efficiency
- Full power gating and power management at the system level

Focused on TCO optimization
- Platform longevity and consistency

Source: AMD Internal
AMD PRODUCT STRATEGY

**Graphics**
- Create leadership IP and products that provide an unmatched visualization experience
- Leverage the highly parallel GPU architecture in new applications and markets

**Client**
- Deliver a compelling end user experience across device categories with our disruptive APU technology
- Propel APUs into ultra-low power and new markets

**Server**
- Focus on creating differentiated solutions in the next-generation of the cloud infrastructure
- Lead in performance & performance/watt in new workloads

**Execution**
- IP SoC reuse
- Improved design methodology
- Time-to-market
INDUSTRY-LEADING GRAPHICS, COMPUTE IP RAPIDLY LEVERAGED IN LOW POWER PLATFORMS VIA APUs

- 1st to Market with Next-Gen top-to-bottom discrete lineup
- 2nd Gen APU with significant performance and power improvements
- Extending APUs to the premium ultrathin and low power tablet market
- “Brazos 2.0” delivers better performance and features as upgrade path to “Brazos” platform; replaces “Krishna”

AMD roadmaps are subject to change without notice.
"SOUTHERN ISLANDS": 2012 TOP-TO-BOTTOM LEADERSHIP

**“Tahiti”**
AMD Radeon™ HD 7970

The World’s Most Powerful and Advanced GPU*

- 2,048 stream processors
- 3.79 TFLOPS of compute performance
- Support for 6 displays, and the capability to drive 3,185,049,600 pixels per second
- New Graphics Core Next Architecture (GCN): graphics and compute enhancements
- 4.3 Billion Transistors

**“Pitcairn”**
The “Sweet Spot”

**“Cape Verde”**
New Paradigm of Performance and Power

* As of November 30, 2011 the AMD Radeon™ HD 7970 Series GPU has been calculated at over 3.5 Teraflops of processing power.
### 2nd GEN APU “TRINITY”

- “Piledriver” x86 cores: up to 25 percent performance increase over “Llano”\(^3\)
- New Radeon™ graphic cores enable up to 50 percent graphics and compute uplift\(^4\)
- “All day” battery life with over 12+ hours\(^5\)
- Design wins tracking ahead of 2011 “Llano” platform

#### Double the performance per watt of “Llano”

![Graph showing double the performance per watt of “Trinity” compared to “Llano”]

- **Graphics**
- **Productivity**

#### OEM design wins at-launch

![Bar chart showing OEM design wins at-launch for “Llano” and “Trinity”]

Source: AMD Internal

See Appendix A for footnotes.
2nd GEN APU “TRINITY” BGA FOR PREMIUM ULTRATHINS

- Quad-Core APU performance in premium ultrathin designs
- Over 50% better graphics performance than the competition⁶
- Projecting better battery life than 17W competitive platforms

See Appendix A for footnotes.
"BRAZOS 2.0" ENHANCEMENTS

- Platform continuity with very successful OEM platforms
- Next gen bi-directional AMD Turbo Core technology for smart app performance through graphics and CPU boost
- Windows® 8 optimized
- Native Superspeed USB 3.0
- First introduction of ULP APU: 4.5w TDP Essential & Tablet "Hondo" APU for 2012

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"Brazos 2.0" TDPs

- E-Series: 18
- C-Series: 9
- "Hondo": 4.5

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"Brazos 2.0" Battery Life Hours (Idle)

- AMD E2-1800 APU: 12
- Intel Pentium B940: 4

Source: AMD Internal
CLIENT AND GRAPHICS ROADMAP

INDUSTRY-LEADING GRAPHICS, COMPUTE IP RAPIDLY LEVERAGED IN LOW POWER PLATFORMS VIA APUS

- Major GPU architecture enhancements for graphics, compute, HSA
- New 3rd gen APU with new x86 cores for IPC and power enhancements; Graphics Core Next and HSA enhancements
- 2nd gen low power APU with new low power x86 cores for IPC and power enhancements
- 1st gen SoC with integrated FCH

Discrete Graphics
- "Southern Islands" Graphics Core Next and DirectX® 11.1

Performance APU
- "Trinity" 2nd Gen APU
- "Kaveri" 3rd Gen APU "Steamroller" cores New HSA Features

Low Power APU
- "Brazos 2.0" Turbo Core, USB 3.0
- "Kabini" 2nd Gen Low-Power APU "Jaguar" cores New HSA Features

Ultra Low Power APU
- "Hondo" 1st Gen ULP APU
- "Temash" 2nd Gen ULP APU "Jaguar" Cores

AMD roadmaps are subject to change without notice.
SERVER GROWTH STRATEGY

Deliver leading value and price/performance
- Change data center economics

Focus on heavily threaded workloads
- Cloud, Virtualization, HPC

Leverage our industry-leading IP
- APU, HSA, Direct Connect Architecture

A BETTER OPTION FOR THE HYPER-EFFICIENT, VIRTUALIZED, CLOUD-READY WORLD
THE CHANGING FACE OF THE DATA CENTER

Source: IDC Server Forecast, Q4 2011

- Traditional IT: Shrinking as cloud and virtualization grow (-1.2%)
- HPC: Market-rate growth (+7.3%)
- Virtualization: The quest for greater data center efficiency (+13%)
- Cloud: New business models, growth of tablets/smartphones (+15%)

X86 Server CPUs

Source: IDC Server Forecast, Q4 2011
AMD OPTERON™ 6200 SERIES PROCESSORS

**Greater Performance**

- World’s first 16-core x86 processor\(^1\)
- First processor with up to 1GHz boost over base frequency\(^2\) using AMD Turbo CORE Technology
- 20% faster memory access\(^3\)
- Up to 84% more throughput\(^4\) on HPC workloads

**Greater Efficiency**

- First and only processor with TDP Power Capping for maximize power budgets and floor space\(^5\)
- C6 power state enables ultra low power by gating power to idle cores
- As low as 5.3 W/core\(^6\), reduced processor power at idle by up to 46%\(^7\)

See Appendix B for footnotes.
OUTSTANDING SERVER LEADERSHIP
VISIT www.amd.com/benchmarks

AMD Opteron™ 6200 Series
Performance Records

- Best 2P TPC-C® database performance
- Best 2P TPC-C database price/performance
- Best 2P TPC-H® price/performance
- Best 2P SAP two tier performance
- Best blade VMmark virtualization performance

- Best 4P blade power/performance efficiency

AMD Opteron™ processors power 32% of the world’s 50 fastest supercomputers
### 2012 – 2013 SERVER ROADMAP

#### 2P and 4P enterprise, mainstream platform

<table>
<thead>
<tr>
<th>CPU Type</th>
<th>Cores</th>
<th>HT</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Interlagos” CPU</strong></td>
<td>4/8/12/16</td>
<td>4x</td>
<td>DDR3 (quad-channel)</td>
</tr>
<tr>
<td><strong>“Abu Dhabi” CPU</strong></td>
<td>4/8/12/16</td>
<td>4x</td>
<td>DDR3 (quad-channel)</td>
</tr>
</tbody>
</table>

#### 1P and 2P cost-optimized, energy-efficient platform

<table>
<thead>
<tr>
<th>CPU Type</th>
<th>Cores</th>
<th>HT</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Valencia” CPU</strong></td>
<td>6/8</td>
<td>2x</td>
<td>DDR3 (dual-channel)</td>
</tr>
<tr>
<td><strong>“Seoul” CPU</strong></td>
<td>6/8</td>
<td>2x</td>
<td>DDR3 (dual-channel)</td>
</tr>
</tbody>
</table>

#### 1P Web Hosting/ Web Serving and Microserver platform

<table>
<thead>
<tr>
<th>CPU Type</th>
<th>Cores</th>
<th>HT</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Zurich” CPU (Q1)</strong></td>
<td>4/8</td>
<td>1x</td>
<td>DDR3 (dual-channel)</td>
</tr>
<tr>
<td><strong>“Delhi” CPU</strong></td>
<td>4/8</td>
<td>1x</td>
<td>DDR3 (dual-channel)</td>
</tr>
</tbody>
</table>

- “Piledriver” cores and process enhancements deliver more performance at the same power.
- New lineup delivers better performance in the same infrastructure; replaces “Terramar” and “Sepang.”

AMD roadmaps are subject to change without notice.
AMD OPTERON™ FUTURE TECHNOLOGY

Delivering multiple generations of greater functionality and improved performance

“Bulldozer”
1st generation modular core
  • Flex FP
  • 128/256-bit AVX, XOP and FMA4

“Piledriver”
2nd generation modular core
  • Improved IPC and frequency

“Steamroller”
3rd generation modular core
  • Greater parallelism

“Excavator”
4th generation modular core
  • Greater performance
FUTURE DIRECTIONS

Leadership IP

HSA

Low Power

Ambidextrous Architectures

Product Growth Vectors

- Extend AMD’s Product Roadmap into Ultra-Low Power (sub 2 watts)
- Enable new capabilities and User Interfaces (HSA)
- Exploit APUs in every market client-server-embedded
- Create innovative cloud and mega data center solutions
MOBILE MARKET PROJECTIONS

**AMD Direction:**

- Focus on true productivity and user experience in ultra-low power devices
- Leadership graphics, web applications and video processing leveraging APUs
- Agile, flexible SoC designs
- Ambidextrous solutions across ISAs and ecosystems
- Fanless, sealed designs

Source: AMD Internal Estimates
DISRUPTIVE APU CAPABILITIES ENABLED BY HSA

- Nearest Available Screen
- Augmented Reality
- Beyond HD Video Experiences
- Security
- Biometric Recognition
- User Generated 3D Content
- Multi-point HD Video Conferencing
- Natural UI & Gestures
ACCELERATING GROWTH IN THE DATA CENTER

**X86 Server CPUs**

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>(Millions)</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
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</table>

**Source:** IDC Server Forecast, Q3 2011

**Specialty Hardware and stacks**
- Object caching
- Virtual infrastructure
- Big data/analytics
- HPC
- Streaming media

**Traditional hardware and stacks**

**AMD Direction:**
- Optimization of new workloads where heterogeneous computing brings huge advantages (APUs, GPUs, and accelerators)
- Agile, flexible SoC designs
- Ambidextrous solutions across ISAs and ecosystems
- System-level optimization including I/O and storage virtualization

### X86 Server CPUs

- **2012:** 6 (Millions)
- **2013:** 8 (Millions)
- **2014:** 10 (Millions)
- **2015:** 12 (Millions)

### Specialty Hardware and stacks

- **Object caching**
- **Virtual infrastructure**
- **Big data/analytics**
- **HPC**
- **Streaming media**

### Traditional hardware and stacks

- **2012:** 6 (Millions)
- **2013:** 8 (Millions)
- **2014:** 10 (Millions)
- **2015:** 12 (Millions)
EMBEDDED MARKET GROWTH OPPORTUNITIES

**Industry Projections for Embedded MPUs**

<table>
<thead>
<tr>
<th>Year</th>
<th>($) Million</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>$5,329</td>
</tr>
<tr>
<td>2012</td>
<td>$6,171</td>
</tr>
<tr>
<td>2013</td>
<td>$7,023</td>
</tr>
<tr>
<td>2014</td>
<td>$8,135</td>
</tr>
</tbody>
</table>

- Embedded sub-segments that are high growth and where APUs can be differentiating:
  - Digital signage, medical, gaming, communications and storage

**AMD Direction:**

- Exploit derivative APUs in fast-growing sub-segments
- Grow embedded ecosystem and enablement

Source: VDC 2011, IDC Intelligent Systems report
SUMMARY

- Unmatched product and IP portfolio
- Strong roadmap with focus on execution
- Opportunity to change the game at these market inflection points
APPENDIX A

1. Testing performed by AMD Performance Labs. Calculated compute performance or Theoretical Maximum GFLOPS score for 2013 Kaveri (4C, 8CU) 100w APU, use standard formula of (CPU Cores x freq x 8 FLOPS) + (GPU Cores x freq x 2 FLOPS). The calculated GFLOPS for the 2013 Kaveri (4C, 8CU) 100w APU was 1050. GFLOPs scores for 2011 A-Series “Llano” was 580 and the 2013 A-Series “Trinity” was 819. Scores rounded to the nearest whole number.

2. Testing performed by AMD Performance Labs. Calculated compute performance or Theoretical Maximum GFLOPS score (use standard formula of CPU Cores x freq x 8 FLOPS) for conventional CPU alone in 2011 was 210 GFLOPs while the calculated GFLOPs for the 1st Gen APU using standard formula (CPU Cores x freq x 8 FLOPS) + (GPU Cores x freq x 2 FLOPS) was 580 or 2.8 times greater compute performance.

3. Projections and testing developed by AMD Performance Labs. Projected score for 2012 AMD Mainstream Notebook Platform “Comal” on the “Pumori” reference design for PC Mark Vantage Productivity benchmark is projected to increase by up to 25% over actual scores from the 2011 AMD Mainstream Notebook Platform “Sabine”. Projections were based on AMD A8/A6/A4 35w APUs for both platforms.

4. Projections and testing developed by AMD Performance Labs. Projected score for the 2012 AMD Mainstream Notebook Platform “Comal” the “Pumori” reference design for 3D Mark Vantage Performance benchmark is projected to increase by up to 50% over actual scores from the 2011 AMD Mainstream Notebook Platform “Sabine”. Projections were based on AMD A8/A6/A4 35w APUs for both platforms.

5. Testing performed by AMD Performance Labs. Battery life calculations using the “Pumori” reference design based on average power draw based on multiple benchmarks and usage scenarios. For Windows Idle calculations indicate 732 minutes (12:12 hours) as a resting metric; 421 minutes (7:01 hours) of DVD playback on Hollywood movie, 236 minutes (3:56 hours) of Blu-ray playback on Hollywood movie, and 205 minutes (3:25 hours) using 3D Mark ‘06 as an active metric. Projections for the 2012 AMD Mainstream Platform Codename “Comal” assume a configuration of “Pumori” reference board, Trinity A8 35W 4C – highest performance GPU, AMD A70M FCH, 2 x 2G DDR3 1600, 1366 x 768 eDP Panel / LED Backlight, HDD (SATA) – 250GB 5400rpm, 62Whr Battery Pack and Windows 7 Home Premium.

6. Testing done by AMD Performance Labs based on a 2012 Comal Reference Design Pumori. Results show 3D Mark Vantage for the A6 ULV 17W "Trinity" to score 2355 3D marks. Testing on a Core i5 ULV 2537M (17W) measured 1158 3D marks. With an assumed 30% increase for the Ivy Bridge architecture, the projected competitive score would be 1505 3D Marks. This provides the A6 ULV a 56% performance advantage over the projected Intel Ivory Bridge score. The 3D Mark Vantage score for the A10 LV 25W APU is 3600. This is 139% better than the projected Ivy Bridge score.
APPENDIX B

2. Intel’s turbo boost is limited to 400MHz as of 2/1/11 on pg 147 at http://www.intel.com/Assets/PDF/datasheet/325119.pdf. AMD Turbo CORE technology claims based on internal AMD engineering projections of AMD Opteron 6200 Series processors with up to 500 MHz in P1 boost state and up to 1.4 GHz in P0 boost state over base P2 clock frequency.
3. Based on a maximum 1600MHz DDR3 memory speed support for AMD Opteron 6200 Series processors vs. Intel Xeon 5600 Series maximum 1333MHz DDR3 memory speed support: http://ark.intel.com/products/series/47915
4. 84% higher performance: LINPACK (2P) AMD Opteron processor Model 6276 generates 84% more FLOPS than Intel Xeon processor Model X5670
   239.1 FLOPS, 2 x AMD Opteron™ processors Model 6276 in Supermicro H8DGT server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit, gfortran compiler v4.6, OMPI 1.5.3, AMD Core Math Library 5.0.0.0
   Compiler Flags: -fomit-frame-pointer -O3 -funroll-loops -W -Wall -mavx -mfma4 -fopenmp
   130.1 FLOPS, 2 x Intel Xeon processors Model X5670 in Supermicro 6026TT-BIBQF server, 24GB (6 x 4GB DDR3-1333) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit, Intel Professional Compiler v11.1, OMPI 1.5.1, Intel Math Kernel Library 10.3, Hyper-Threading disabled, Turbo Boost Technology enabled
   Compiler Flags: -O3 -w -ansi-alias -i-static -openmp -nocompchk
5. Not listed as a feature in Intel Xeon 5600 product brief.
6. AMD Opteron 6200 Series “HE” processors will be as low as 85W with 16 cores for 5.3 W/core.
7. (46%) - Based on testing in AMD Performance Labs as of August, 2011, an AMD Opteron™ processor model 6174 (12-core 2.2GHz) consumes 11.7W in the active idle C1E power state while an AMD Opteron™ processor model 6276 (16-core 2.3GHz) consumes only 6.4W in the active idle C1E power state with new C6 power gating employed. System configuration: "Drachma" reference design kit, 32GB (8 x 4GB DDR3-1333) memory, 500GB SATA disk drive, Microsoft® Windows Server® 2008 x64 Enterprise Edition R2. SVR-60
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