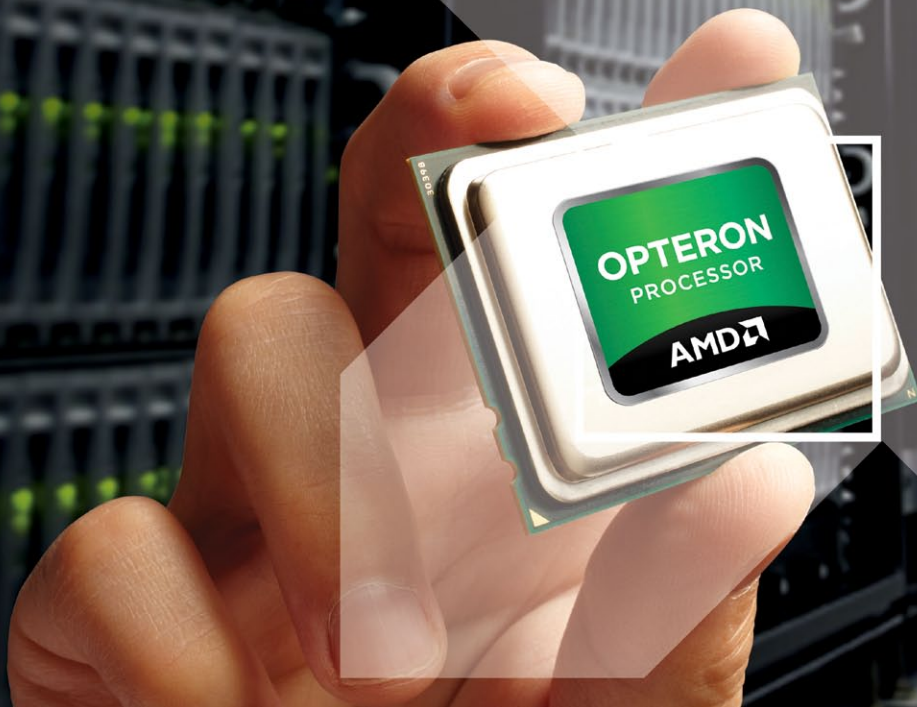# AMD and HP are proven in business.

A decade of industry-leading technology innovation

For more than a decade, AMD and HP have collaborated to deliver an outstanding technology portfolio – from the desktop to the datacenter – that continues to grow more robust every year. The product line now features an ever-broadening portfolio of trusted systems based on the entire family of AMD processors, including rack-mount servers, server blades, MicroServer, desktops, and notebooks. Together, we're delivering forward-thinking computing solutions for businesses of all sizes.

Today, HP is a leading provider of servers based on AMD Opteron™ processors. This portfolio of HP ProLiant servers based on AMD Opteron™ processors is always evolving to address the ever changing needs and challenges in the datacenter. Whether customers need performance and scalability or are focused on power and budget efficiency, together, HP and AMD deliver technology solutions that help businesses address these needs and meet their goals.

These days, doing what's comfortable with your business technology could actually be risky. All the rules have changed. "What's your advantage?" now presents a unique opportunity to one-eighty your thinking about technology investments.

Everything's going virtual, fluid, and toward the cloud, with no room for waste – budget or energy. Take servers. Ample processing muscle is the bare minimum. Efficiency – space, energy, and cost – is the new game changer. And the new kind of processing for efficiency is here: the AMD Opteron™ 6200 Series processor.

We designed AMD Opteron™ processors for this precise moment. No worries about overinvestment or underinvestment – it's the right investment. Efficiency, performance, and scalability – you know the stuff that really matters to your business – ideally balanced for competitiveness and ROI.

Shake off the mindset that you have only one choice. Expect your processor to serve your business, not the other way around. There's a better option for the new hyper-efficient, virtualized, cloud-ready world. Time to buck the status quo and join the future of server processing: the AMD Opteron™ 6200 Series processor.

AMD Opteron™ Platforms

Processors delivering efficiency, performance, and scalability

The AMD Opteron™ 6000 Series Platform

The AMD Opteron™ 6000 Series platform is the server platform you can count on as real-world workloads become increasingly complex and demanding. Featuring the world's first 16-core x86 processor, the AMD Opteron™ 6200 Series processors deliver a rich mix of performance, scalability, and efficiency for today's highly threaded computing environments. The modular design features up to 33% more cores[1] and up to 56% greater performance,[2] bringing high-performance throughput for scalable computing environments such as virtualization, database applications, web 2.0/cloud computing and high-performance computing (HPC).
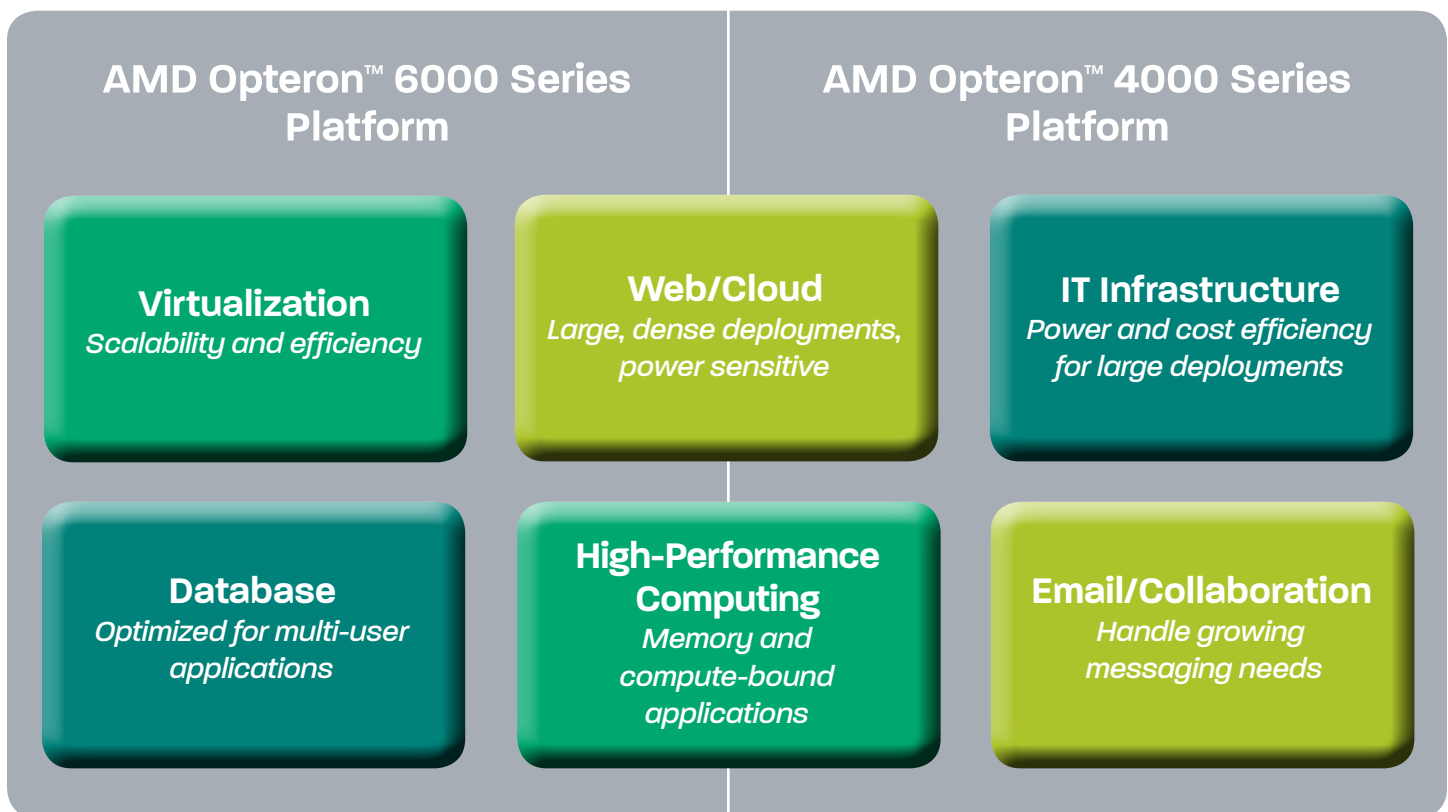
The AMD Opteron™ 4000 Series Platform

The AMD Opteron™ 4100 Series processor allowed you to double the number of servers within the same power budget, compared to previous generations.[3] With the AMD Opteron™ 4200 Series processor, AMD has leapfrogged its own leading-edge, power-efficient server processor designs by being the first to break the five watt/core barrier.[4]

The AMD Opteron™ 6200 Series Processor

The AMD Opteron™ 6200 Series processor delivers the world's highest core density, lets users host more virtual machines per server, handles more database users, and solves more complex HPC applications with fewer nodes and less power.

- Up to 160% more cores to handle more virtual machines per platform and minimize datacenter space[5]

- Up to 73% more memory throughput to scale as your workloads grow[6]

- Low cost per VM,[7] deploy fewer physical servers as business needs scale up

- No compromise on feature set – every AMD Opteron™ processor features high memory speed and I/O throughput, regardless of the price

AMD Opteron™ 6000 Series Platform

Virtualization
Scalability and efficiency

Web/Cloud
Large, dense deployments, power sensitive

Database
Optimized for multi-user applications

High-Performance Computing
Memory and compute-bound applications

AMD Opteron™ 4000 Series Platform

IT Infrastructure
Power and cost efficiency for large deployments

Email/Collaboration
Handle growing messaging needs

HP ProLiant Servers Featuring AMD Opteron™ 6200 Series Processors

Since 1996, HP and AMD have been delivering superior quality, variety, and value in computing technology. This collaboration provides end customers with technology innovation and outstanding performance-per-watt competitiveness, while also offering one of the best total cost of ownership profiles available.

The arrival of the HP ProLiant Gen8 servers raises this technology partnership to a new level, delivering exceptional solutions for a range of server customers, datacenter environments and compute workloads.

The new HP ProLiant Gen8 servers with AMD Opteron™ 6200 Series processors offer more price/performance, efficiency, and scalability for today's demanding datacenter. Maximize your investment with up to 160% more cores[1] and greater memory density[8] without expanding your datacenter or increasing your power footprint. HP's next-generation ProLiant Gen8

servers control and automate energy use with intelligent power discovery, dynamic power capping, and thermal visualization. It's the ideal platform for demanding environments like virtualization, database, web 2.0/cloud and high-performance computing applications.

HP ProLiant G7 servers with AMD Opteron™ 6200 Series processors help customers improve business efficiency and have a compelling consolidation ratio – could reduce ROI down to months.[9]

HP provides unique capabilities and technologies such as Thermal Logic, Common Power Supplies, Smart Arrays, and HP ProLiant Insight Control to deliver servers that meet customers' ever-changing business demands. HP ProLiant G7 servers based on AMD Opteron™ 6200 Series processors deliver the key technology advancements that customers can use to take control of their business.

HP ProLiant Rack-Mount Servers

HP ProLiant DL165 G7 Server

The HP ProLiant DL165 G7 is a high-performance, low-cost, ultra-dense rack server designed for memory-intensive high-performance computing environments, web serving, and memory-intensive applications.

- Form factor: 2P; 1U rack optimized
- Powered by up to two eight-, twelve- or sixteen-core AMD Opteron™ 6200 Series processors
- (24) DIMM sockets – Up to 256GB of DDR3 memory; 16MB L3 cache (per socket)

HP ProLiant DL385p Gen8 Server

With enhanced innovations in performance, feature flexibility, and management capabilities, the DL385p Gen8 server is the price/performance choice for your virtualization, database, and high-performance computing workloads.

- Form factor: 2P; 2U rack optimized
- Powered by up to two eight-, twelve- or sixteen-core AMD Opteron™ 6200 Series processors
- (24) DIMM sockets – Up to 768GB of DDR3 memory; 16MB L3 cache (per socket)
- iLO Management Engine (iLO4) with active health system

HP ProLiant DL585 G7 Server

The HP ProLiant DL585 G7 server provides outstanding performance and reliability as well as industry-leading management solutions, making it an ideal solution for virtualization/consolidation environments and corporate datacenter infrastructure.

- Form factor: 4P; 4U rack optimized
- Powered by up to four eight-, twelve- or sixteen-core AMD Opteron™ 6200 Series processors
- (48) DIMM slots – Up to 1TB of DDR3 memory; 16MB L3 cache (per socket)

HP ProLiant Server Blades

HP ProLiant server blades feature the latest eight-, twelve- and sixteen-core AMD Opteron™ 6200 Series processors, integrated HP Virtual Connect FlexFabric architecture, and HP Integrated Lights-Out 4 (iLO4) remote management, helping to simplify network connections, minimize infrastructure costs, and deliver the performance that you expect for demanding application workloads.

These enhanced server blades come with an HP Smart Array Controller, support for hot-plug drives, and Virtual Connect FlexFabric networking. The servers deliver an ideal combination of performance, networking capability, and memory capacity – all while providing great value for your money – giving you and your business a competitive advantage.

HP ProLiant BL465c Gen8 Server Blade

With enhanced innovations in performance, flexibility in networking options, and robust management features, the BL465c Gen8 is the price/performance choice for virtualization, database, and high-performance computing workloads.

- Form factor: 2P half-height server blade
- Powered by up to two four-, eight-, twelve- or sixteen-core AMD Opteron™ 6200 Series processors
- (16) DIMM slots – Up to 512GB of DDR3 memory; 16MB L3 cache (per socket)

HP ProLiant BL685c G7 Server Blade

The HP ProLiant BL685c G7 is a dense four-processor server blade with the processing power needed to drive virtualization and compute-intensive database workloads with up to 32 DIMMs and four 10Gb Ethernet ports with converged network support.

- Form factor: 4P full-height server blade
- Powered by up to four four-, eight-, twelve- or sixteen-core AMD Opteron™ 6200 Series processors
- (32) DIMM slots – Up to 1TB of DDR3 memory; 16MB L3 cache (per socket)

For more information visit www.amd.com/hp or www.hp.com/go/proliant/amd

1 Comparison of 12-core AMD Opteron™ processor Model 6234 ($377) with lowest price per core 2P Intel Xeon processor (4-core Intel Xeon E5603 price of $188) according to 1kU tray pricing at www.intel.com and www.amd.com as of 11/15/11. SVR-75

2 Based on High Performance Linpack (HPL) results measured in AMD labs as of May 21, 2012. The comparison presented above is based on two-socket servers using AMD Opteron™ processor Models 6176 SE and 6284 SE. Configuration Information: 180 GFlops using 2 x AMD Opteron™ processors Model 6176 SE in "Dinar" reference design kit, 32GB (8 x 4GB DDR3-1333) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit. 281 GFlops using 2 x AMD Opteron™ processors Model 6284 SE in "Dinar" reference design kit, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit. SVR-174

3 Based on AMD internal measurements as of March 15, 2010 comparing Supermicro 2021M-UR with 2x Quad-Core AMD Opteron™ processor Model 2380, 500 GB WD5000ABPS, 8x 2GB RDDR2 667 DIMMs (drawing 269W) vs. 2x Tyan 8228 each with 2x AMD Opteron™ Processor Model 4162 EE (pre-production EVT), 128 GB MMCRE28G5MXP-0VB SATA SSD, 4x 4GB 1.5v RDDR3 1066 DIMMs (drawing a total of 262 W) running server-side java business operations at 100% load point. Power measurements taken at the wall. Any difference in system hardware or software design or configuration may affect actual performance. SVR-18

4 As of March 16, 2012 AMD Opteron™ processor Models 4200 EE have the lowest known power per core of any x86 server processor, at 35W TDP (35W/8 = 4.375W/core). Intel's lowest power per core server processor, Intel Xeon E5-2650L, is 70W TDP (70W/8 = 8.75W/core). See www.intc.com/pricelist.cfm as of 3/16/12. Previous record held by AMD Opteron™ processor Models 4100 EE at 35W TDP / 6 cores = 5.83 W/core. SVR-58

5 Comparison of 16-core AMD Opteron™ 6200 Series processor with 6-core Intel Xeon 5600 Series processor. SVR-73

6 STREAM: 73 GB/s, 2 x AMD Opteron™ processors Model 6276 in Supermicro H8DGT, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit, x86 Open64 4.2.5-1 Compiler Suite 42 GB/s, 2 x Intel Xeon processors Model X5670 in Supermicro X8DTT server, 24GB (6 x 4GB DDR3-1333) memory, SuSE Linux® Enterprise Server 11 SP1 64-bit, Intel Compiler v11.1.064 SVR-83

7 SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. The results stated above comparison reflects results published on http://www.spec.org/cpu2006/results/ as of 4/11/12. The comparison presented above is based on the best performing two-socket servers using AMD Opteron™ processor Model 6234 and Intel Xeon processor Model E5-2620, operating at each processor's default frequency. For the latest SPECint®_rate2006 results, visit http://www.spec.org/cpu2006/results/. SPECint®_rate2006 score of 388 using 2x AMD Opteron™ processor Model 6234: Dell PowerEdge R715 (AMD Opteron™ 6234, 2.40 GHz), 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC), Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86_64, C/C++: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD), http://www.spec.org/cpu2006/results/res2011q4/cpu2006-20111121-19028.html. SPECint®_rate2006 score of 393 using 2 x Intel Xeon E5-2620: Dell PowerEdge R720 (Intel Xeon E5-2620, 2.00 GHz), 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz), SUSE Linux Enterprise Server 11 SP2 (x86_64) 3.0.13-0.9-default, C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux, http://www.spec.org/cpu2006/results/res2012q1/cpu2006-20120312-19876.html. Pricing for Intel-based low cost server is based on HP ProLiant DL380 G8 server ($4,587) with two Intel Xeon processor Model E5-2620, 32GB RAM (1333MHz 4x8GB 2R), 72GB 15K hdd, DVD, and 3yr base warranty at www.hp.com as of 4/4/12. Specs for Intel Xeon E5-2600 Series processors are available at www.intc.com/pricelist.cfm as of 4/11/12. Pricing for AMD-based server is based on HP ProLiant DL385 G7 server ($3,503) with two AMD Opteron™ processor Model 6234, 32GB RAM (1333MHz 4x8GB 2R), 72GB 15K hdd, DVD, and 3yr base warranty at www.hp.com as of 4/4/12. Specs for AMD Opteron™ 6200 Series processors are available at http://www.amd.com/us/products/server/processors/Pages/model-numbers.aspx as of 4/11/12. SVR-161

8 Compared to AMD Opteron™ 6100 Series processors. 2 sockets x 12 DIMMs/socket x 32GB DIMMs = 768GB; 4 sockets x 12 DIMMs/socket x 32GB DIMMs = 1.536TB. SVR-57

9 Reduce number of physical 2p servers "23:1" Based on HP internal testing on 385 G7 compared DL380 G4. ROI for AMD Opteron™ 6200 Series-based server is expected to be similar or better. Actual ROI may vary.

AMD