

## The AMD Opteron™ Processor

for Servers and Workstations

Learn how **AMD64** technology helps simplify business at [www.amd.com/opteron](http://www.amd.com/opteron)

### The power of 32- and 64-bit technology in one solution.

First launched in 2003, the AMD Opteron™ processor gives companies a whole new way of doing business. The processor is based on AMD64 technology – an innovative technology that allows IT professionals to run 32- and 64-bit applications simultaneously. This means that organizations can grow into 64-bit computing without sacrificing their existing IT investments.

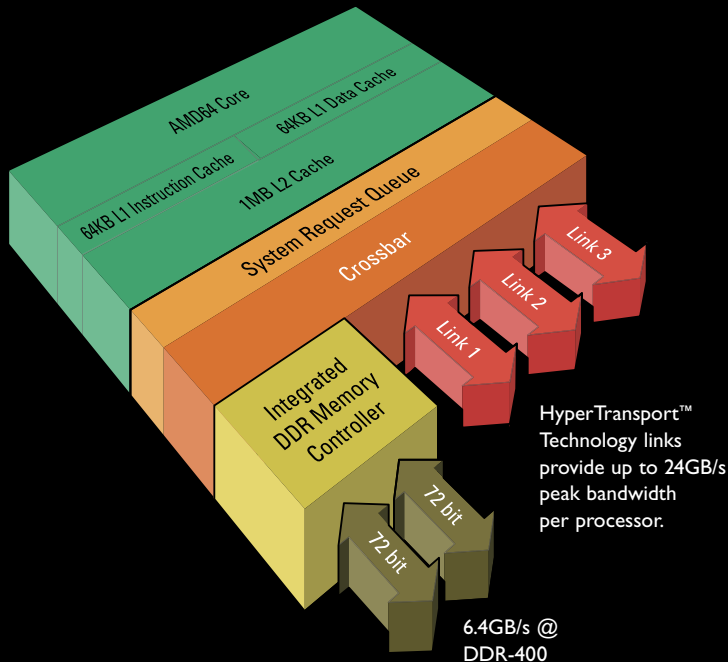
With its Direct Connect Architecture, the AMD Opteron processor helps eliminate the real challenges and bottlenecks of system architectures because everything is directly connected to the CPU. Direct Connect Architecture delivers the best 2P and 4P architecture for x86 computing, resulting in the best performance-per-watt in the market. It's the ideal performance boost for the working environments of today and tomorrow.



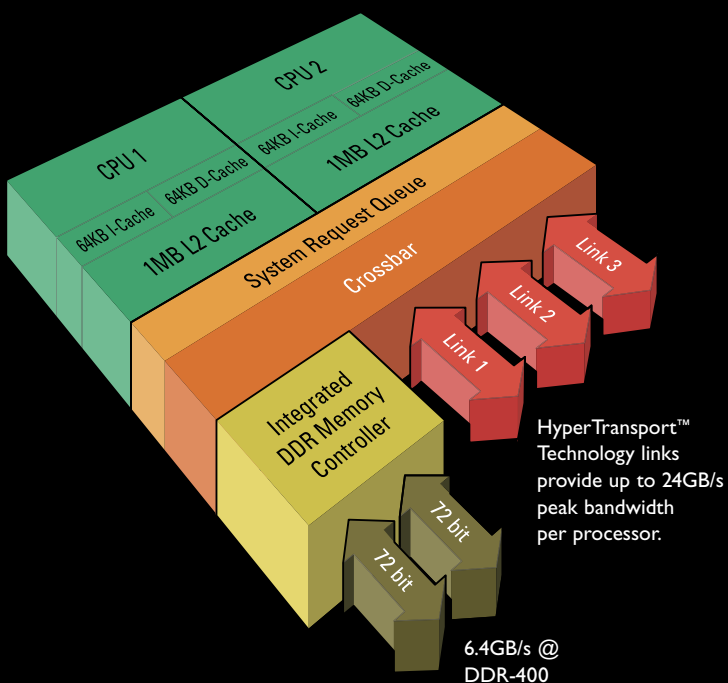
# One Enterprise.

# One Platform.

## Single-Core Technology AMD Opteron™ Processor Design



## Dual-Core Technology AMD Opteron™ Processor Design



AMD is continuing to drive technology leadership by introducing another computing first: multi-core technology for the x86-based computing market. Dual-core AMD Opteron processors for servers and workstations extend AMD's Direct Connect Architecture by connecting two CPUs on one die, improving overall system performance and efficiency.

The AMD Opteron processor with Direct Connect Architecture is offered in three series: the 100 series (1P), the 200 series (up to 2P), and the 800 series (up to 8P). Each series includes low-power AMD Opteron processors Model HE and EE that provide uncompromised performance, allowing for increased compute density and lower TCO for data centers with limited power budgets.

**Access at-a-glance specifications and the complete line-up of AMD Opteron processors at [www.amd.com/processorquickrefguide](http://www.amd.com/processorquickrefguide)**

**Single-Core and Dual-Core AMD Opteron processors with Direct Connect Architecture integrate key system elements:**

### AMD64 Core

- Enables simultaneous 32- and 64-bit computing
- Eliminates the 4GB memory barrier imposed by 32-bit only systems

### Integrated DDR Memory Controller

- Increases application performance by dramatically reducing memory latency

### HyperTransport™ Technology

- Provides up to 24.0GB/s peak bandwidth per processor – reducing I/O bottlenecks
- HyperTransport technology directly connects CPUs – enabling scalability

The AMD Opteron processor offers the power and simplicity of AMD64 technology for servers and workstations. AMD64 is an AMD innovation that extends x86 – the industry’s most widely supported instruction set. Companies get a single, proven architecture that provides exceptional performance for existing applications, along with 64-bit computing capabilities for future business needs.

Responding to the demands of the market, the AMD Opteron processor provides a flexible, manageable, and scalable solution for the most advanced environments. The innovative technology features are described below.

#### **AMD Direct Connect Architecture**

Direct Connect Architecture helps improve system performance and efficiency by directly connecting the processors, the memory controller, and the I/O to the CPU.

- Memory is connected directly to the CPU, thereby optimizing memory performance
- I/O is directly connected to the CPU for more balanced throughput and I/O
- CPUs are connected directly to CPUs, allowing for more linear symmetrical multiprocessing

#### **Dual-Core Technology**

AMD64 was designed from the ground up to be optimized for multiple cores, resulting in high performance for multi-threaded and multi-tasking environments.

- One die with 2 CPU cores, each core has its own IMB L2 cache
- Drops into existing AMD Opteron processor 940-pin sockets that are 90nm capable
- A BIOS update is all that is necessary to get a compatible system up and running with dual-core processors
- The 2 CPU cores leverage the same memory and HyperTransport™ technology resources available in single-core processors

**Placing two or more powerful computing cores on a single processor opens up a world of important new possibilities. Learn more at [www.amd.com/dualcore](http://www.amd.com/dualcore)**

#### **AMD PowerNow!™ Technology with Optimized Power Management (OPM)**

- Provides power-on-demand computing, resulting in optimal performance-per-watt and enabling IT managers to help maximize IT budgets
- Dynamically changes power states, providing up to a 75% reduction in CPU power when idle, thereby reducing heat and decreasing strain on cooling systems, and helping lower the total cost of data centers
- Coupled with dual-core technology, AMD PowerNow! technology with OPM delivers industry-leading performance-per-watt compared to other x86-based technology

**Learn more about power-on-demand computing technology from AMD at [www.amd.com/powernow](http://www.amd.com/powernow)**

#### **Integrated DDR DRAM Memory Controller**

- Changes the way the processor accesses main memory, resulting in increased bandwidth, reduced memory latencies, and increased processor performance
- Available memory bandwidth scales with the number of processors, supporting up to 6.4GB/s (with PC3200) processor
- 128-bit wide integrated DDR DRAM memory controller capable of supporting up to eight (8) registered DDR DIMMs per processor

#### **HyperTransport™ Technology**

- Provides a scalable bandwidth interconnect between processors, expandable I/O subsystems, and other chipsets
- Supports up to three (3) coherent HyperTransport links, providing up to 24.0GB/s peak bandwidth per processor
- Up to 8.0GB/s bandwidth per link providing sufficient bandwidth for supporting new technologies including PCI-Express, PCI-X, InfiniBand, and 10G Ethernet

#### **AMD64 Ecosystem**

AMD understands how important 32- and 64-bit software applications are to supporting business needs. That’s why the AMD64 Ecosystem now showcases over 1300 software packages from over 300 software developers.

**Access an up-to-date listing of 32- and 64-bit software applications designed to support AMD64 at [www.amd.com/amd64ecosystem](http://www.amd.com/amd64ecosystem).**



Single-Core and Dual-Core AMD Opteron™ processors with Direct Connect Architecture enable companies to easily transition to 64-bit technology without sacrificing 32-bit performance.

AMD Opteron processors can help simplify business and minimize integration complexities with the delivery of a flexible architecture. This evolutionary processor provides a dramatic leap

forward in compatibility, performance, investment protection, and reduced total cost of ownership (TCO).

**Get updates on the AMD Opteron processor delivered right to your inbox. Subscribe today at [www.amd.com/amdopteronolutions](http://www.amd.com/amdopteronolutions)**

Feature	Benefit
Dual-Core technology	Enables one platform to meet the needs of multi-tasking and multi-threaded environments; providing platform longevity
Simultaneous 32- and 64-bit computing	Allows users to run 32- and 64-bit applications as they desire – without sacrificing performance
Support of up to three (3) coherent HyperTransport™ Technology links	Provides substantial I/O bandwidth for current and future application needs with up to 24.0GB/s peak bandwidth per processor
256 Terabytes of memory address space	Creates a significant performance benefit for applications when large (or many) datasets are held in memory
90nm SOI (Silicon on Insulator) process technology	Enables lower thermal output levels and improved frequency scaling
Low-power processors in HE (55 Watt) and EE (30 Watt)	Increases compute density, lowers TCO for data centers with limited power budgets and provides uncompromised performance
IP to 8P scalability	Allows for maximum flexibility in IT infrastructure

#### About AMD

AMD (NYSE: AMD) designs and produces microprocessors, Flash memory devices, and system-on-chip solutions for the computer, communications, and consumer electronics industries. AMD is dedicated to helping its

customers deliver standards-based, customer-focused solutions for technology users, ranging from enterprises to government agencies and individual consumers. Founded in 1969, AMD is

a Standard & Poor's 500 company with global operations and manufacturing facilities in the United States, Europe, Japan, and Asia.

**Did you know? More than 40 percent of the Global 100 companies or their affiliates are now using AMD64 Technology.**



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