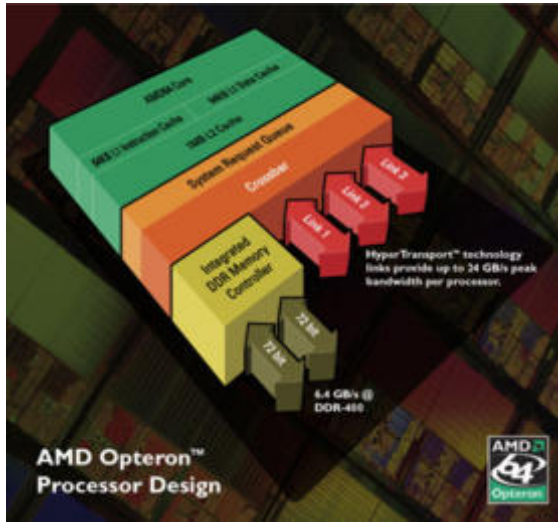


AMD Opteron Processor for Servers and Workstations Key Architectural Features



The AMD Opteron™ processor, enabling simultaneous 32- and 64-bit computing, represents the landmark introduction of AMD64 with Direct Connect Architecture. The AMD Opteron™ processor is designed to run existing 32-bit applications with outstanding performance and offers customers a simplified migration path to 64-bit computing. This evolutionary processor provides a dramatic leap forward in compatibility, performance, investment protection, and reduced total cost of ownership (TCO). The AMD Opteron™ processor is offered in three series: the 100 series (1-way), the 200 series (Up to 2-way), and the 800 series (Up to 8-way).

AMD Opteron processors with Direct Connect Architecture integrate key system elements:

AMD64 Core

- Enables simultaneous 32- and 64-bit computing. Allows end users to run their existing installed base of 32-bit applications and operating systems at peak performance, while providing a migration path that is 64-bit capable
- Designed to enable 64-bit computing while remaining compatible with the vast x86 software infrastructure
- Represents a new class of computing, enabling a single architecture across 32- and 64-bit environments
- Eliminates the 4GB memory barrier imposed by 32-bit only systems

Direct Connect Architecture

- Addresses and helps reduce the real challenges and bottlenecks of system architectures
- Memory is directly connected to the CPU 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

Integrated DDR DRAM Memory Controller

- Increases application performance by dramatically reducing memory latency. 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
- 128-bit wide integrated DDR DRAM memory controller capable of supporting up to eight (8) registered DDR DIMMs per processor
- Available memory bandwidth up to 6.4 GB/s (with PC3200) per processor

HyperTransport™ Technology

- HyperTransport technology directly connects CPUs enabling scalability
- Provides a scalable bandwidth interconnect between processors, I/O subsystems, and other chipsets
- Support of up to three (3) coherent HyperTransport links, providing up to 24.0 GB/s peak bandwidth per processor reducing I/O bottlenecks
- Up to 8.0 GB/s bandwidth per link providing sufficient bandwidth for supporting new interconnects including PCI-X, DDR, InfiniBand, and 10G Ethernet
- Offers low power consumption (1.2 volts) to help reduce a system's thermal budget

Other features of the AMD Opteron processor include:

- 64-bit wide key data and address paths that incorporate a 48-bit virtual address space and a 40-bit physical address space
- ECC (Error Correcting Code) protection for L1 cache data, L2 cache data and tags, and DRAM with hardware scrubbing of all ECC protected arrays
- 90nm SOI (Silicon on Insulator) process technology for lower thermal output levels and improved frequency scaling
- Support for all instructions necessary to be fully compatible with SSE2 technology
- Two (2) additional pipeline stages (compared to AMD's seventh generation architecture) for increased performance and frequency scalability
- Higher IPC (Instructions per Clock) achieved through additional key features, such as larger TLBs (Translation Look-aside Buffers), flush filters, and enhanced branch prediction algorithm

Feature	Benefit
AMD64 Dual-Core Technology directly connects two processor cores on to a single die for reduced latencies between processors	Improves system efficiency and application performance for computers running multiple applications at the same time or compute-intensive multi-threaded applications
Simultaneous 32- and 64-bit computing capabilities	Allows users to run 32-bit and/or 64-bit applications and operating systems as they desire—without sacrificing performance
Direct Connect Architecture addresses and helps reduce the real challenges and bottlenecks of system architectures	Provides optimized memory performance, balanced throughput, expandable I/O, and more linear symmetrical multiprocessing
Support of up to three (3) coherent HyperTransport links, providing up to 24.0 GB/s peak bandwidth per processor	Provides substantial I/O bandwidth for your current and future application needs
256 Terabytes of memory address space	Creates a significant performance benefit for applications in which large (or many) datasets are held in memory
Scales from 1-way to 8-way across entire data or compute centers utilizing the same hardware and software infrastructure	Allows for maximum flexibility in IT infrastructure, helping contribute to bottom line success
Integrated memory controller reduces latencies during memory access in a SMP server system	Yields fast computational processing for increased performance and productivity
Low-power processors in HE (55 Watt) and EE (30 Watt) - Providing uncompromised performance	Increased compute density; lower TCO for datacenters with limited power budgets

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