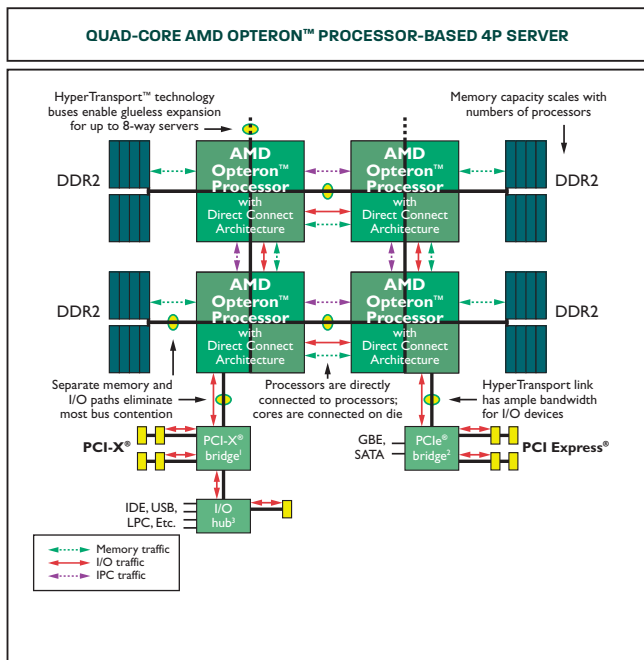


Quad-Core AMD Opteron™ Processor with Direct Connect Architecture

4P Server Comparison



DIRECT CONNECT ARCHITECTURE

QUAD-CORE AMD OPTERON™ PROCESSOR-BASED SYSTEM (Barcelona)

OUTSTANDING PERFORMANCE WITH AMD64 AND DIRECT CONNECT ARCHITECTURE

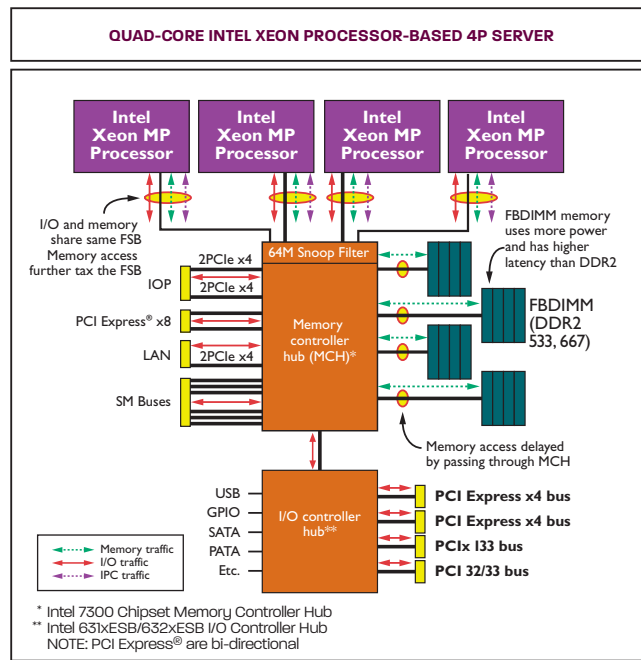
- » AMD64 enables simultaneous high-performance on 64-bit and 32-bit applications
- » Addresses and helps reduce the real challenges and bottlenecks of legacy system architectures by directly connecting the processors, memory, and I/O
- » Integrated DDR2 memory controller: low-latency, high-bandwidth interface enables high performance on memory intensive applications while the on-line spare capability is designed to provide enterprise-class reliability for your datacenter
- » HyperTransport™ Technology links: At up to 8GB/s bandwidth per link, with up to 3 links per processor connecting CPUs-to-CPU and CPUs-to-I/O, provides bandwidth and scalability for supporting I/O intensive server and workstation applications
- » AMD Balanced Smart Cache and AMD Memory Optimizer Technology are designed for exceptional performance on highly-threaded applications and multi-tasking environments

OPTIMAL VIRTUALIZATION

- » Silicon-assisted AMD Virtualization™ (AMD-V™) with Rapid Virtualization Indexing, offers industry-leading performance, security and application support
- » Rapid Virtualization Indexing significantly improves virtualized application performance by enabling memory management in hardware rather than relying on slower software-based methods
- » Direct Connect Architecture for excellent scalability and performance on I/O and memory-intensive virtualized application environments; for more virtual machines per server
- » Integrated memory controller offers industry-exclusive x86 capabilities helping improve performance while efficiently enforcing security between virtual machines

INDUSTRY-LEADING PERFORMANCE-PER-WATT

- » Highly efficient computing cores with Enhanced AMD PowerNow!™ technology can reduce CPU power consumption to match application needs, for in power and cooling cost savings
- » AMD CoolCore™ technology reduces power to unused sections of the CPU to save on power and cooling costs
- » Dual Dynamic Power Management™ (DDPM™) helps maximize the power saving capabilities of AMD PowerNow!™ technology while maintaining memory throughput for improved application performance
- » Uses low-power, high-bandwidth DDR2 memory for excellent performance that can consume almost 8 watts per DIMM less power than Fully Buffered DIMM memory



FRONT SIDE BUS-BASED ARCHITECTURE

QUAD-CORE INTEL XEON PROCESSOR-BASED SYSTEM (Tigerton)

FRONT-SIDE BUS (FSB) BASED ARCHITECTURES CAN LIMIT PERFORMANCE AND SCALABILITY

- » Passage through memory controller hub (MCH) delays memory reads
- » Memory and I/O must share FSB bandwidth, further reducing the efficiency of the FSB
- » Hardware-assisted VT must run memory-intensive virtualization applications over a shared front side bus
- » With one MCH per system, PCI Express® interface integration can limit expansion options
- » Workstation systems limited to a single PCIe x16 link with 5000X chipset
- » Intel SpeedStep technology and demand-based switching lacking on several processors

¹ AMD-8132™ HyperTransport PCI-X® Tunnel
² Third-Party Chipsets
³ Intel 5000R, 5000V and 5000X Chipset
⁴ Intel 6300ESB I/O Controller



QUAD-CORE AMD OPTERON™ PROCESSOR-BASED 4P SERVER WITH DIRECT CONNECT ARCHITECTURE

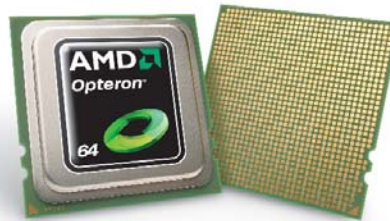
SYSTEM COMPARISON	QUAD-CORE AMD OPTERON™ PROCESSOR	QUAD-CORE INTEL XEON MP 7000 SERIES ^{1,2}	INTEL ITANIUM 2 9000 SERIES ³
Modular, glueless scalability	Yes	Requires Northbridge	Requires Northbridge/SNC
SMP Capabilities	Up to 8 sockets/32 cores	Up to 4 sockets/16 cores	Up to 16 sockets/32 cores
Direct Connect Architecture	Yes	No	No
Native Quad-Core Technology	Yes	No	Dual-Core only
High-Performance 32-bit and 64-bit computing	AMD64	EM64T	Epic
HyperTransport™ technology	Yes	No	No
Integrated DDR2 memory controller	Yes	No	No
Hardware-Assisted Virtualization	AMD-V™ with Rapid Virtualization Indexing	Intel VT	Intel VT
Memory Support	RDDR2 400/533/667	FBDIMM 533/667	RDDR2 400
Memory Bandwidth 4P System	42.7GB/s ¹	32GB/s	12.8GB/s
Maximum I/O Bandwidth with 4P System	32.0GB/s ¹	6GB/s	10.6GB/s
L1 cache size (max)	64KB (Data) + 64KB (Instruction) per core	32KB (Data) + 32KB (Instruction) per core	16KB (Data) + 16KB (Instruction) per core
L2 cache size (max)	512KB per core	8MB shared (2 x 4MB)	256KB per core
L3 cache size (max)	2MB Shared	N/A	Up to 24MB Shared
SIMD Instruction Set Support	SSE, SSE2, SSE3, SSE4A	SSE2, SSE3	N/A
	DEDICATED BANDWIDTH	SHARED BANDWIDTH	

¹ AMD 4P System—AMD Opteron™ 8000 Series with 4 HyperTransport™ Inter-processor Buses and 4 HyperTransport I/O Buses with DDR2 667 memory

¹ With Intel 7300 and 7200 Chipset (<http://download.intel.com/design/chipsets/datashts/318082.pdf>)

² Other OEM chipsets support additional capabilities

³ With Intel E8870 Chipset (<http://developer.intel.com/products/chipsets/e8870/index.htm>). Assumes a single SNC. Other OEM chipsets support additional capabilities.



AMD (NYSE:AMD) designs and produces innovative microprocessors and low-power processor solutions for the computer, communications, and consumer electronics industries. AMD is dedicated to delivering standards-based, customer-focused solutions for technology users, ranging from enterprises and governments to individual consumers. For more information visit www.amd.com.

TECHNICAL SUPPORT

USA & CANADA: 800-222-9323 OR 408-749-5703
USA & CANADA PC MICROPROCESSOR: 408-749-3060
USA & CANADA EMAIL: HW.SUPPORT@AMD.COM
LATIN AMERICA EMAIL: AMDXSBRPO@VSR.AMD.BR
EUROPE & UK: +44-0-1276-803299
EUROPE & UK FAX: +44-0-1276-803298

FRANCE: 0800-908-621
GERMANY: +49-89-450-53199
ITALY: 800-877224
EUROPE EMAIL: EURO.TECH@AMD.COM
FAR EAST FAX: 852-2956-0588
JAPAN FAX: +81-03-3346-784

ACCESS 4P SERVER COMPARISON INFORMATION ONLINE AT WWW.AMD.COM/SERVERCOMPARISON