Multi-Core MIPS64® Processors

OCTEON® Plus CN56XX 8 to 12-Core MIPS64-Based SoCs

Product Brief

OVERVIEW

The OCTEON® Plus CN56XX family of Multi-core MIPS64 processors targets intelligent networking, control plane, security, and wireless applications in next-generation equipment from 4Gbps to 10Gbps performance. The family includes six different software-compatible parts, with eight to twelve cnMIPS64 cores on a single chip that integrate next-generation SERDES based networking I/Os along with the most advanced security and application hardware acceleration to deliver a robust performance, power and real-estate value proposition over alternative solutions. Industry's first Network Services Processors with less than 3 Watt/GHz power consumption across the 3.6 GHz to 10 GHz range.

FEATURES

Software compatible with the leading OCTEON family
- 8-12 cnMIPS Plus CPU cores (MIPS64/32 compatible)
- Available in 600 MHz to 800 MHz versions
- Enhanced MIPS64 integer (Release 2) instruction set
- Dual-issue, five-stage pipeline, optimized latencies
- Auto instruction pre-fetching and advanced data pre-fetching features to minimize memory stalls

High-performance coherent memory subsystem
- 2MB ECC protected 8-way set associative L2 cache with locking, partitioning features for optimal performance
- Integrated mainstream dual DDR2 memory controller with ECC, up to DDR2-800, up to 144bit wide

Integrated coprocessors for application acceleration
- Packet I/O processing, QoS, TCP Acceleration
- Support for IPsec, SSL, SRTP, WLAN and 3G/UMB/LTE security (includes DES, 3DES, AES-GCM, AES up to 256, SHA1, SHA-2 up to SHA-512, RSA up to 8192, DH, KASUMI)
- Compression/Decompression

High-density, high-bandwidth serial I/O for networking
- 16 high-speed SERDES, flexibly configured in blocks of 4
- Flexible combinations of PCI Express x4, x8, XAUI (10GE), SGMII (GbE/2GbE)

Comprehensive development environment with Linux, VxWorks, FreeBSD and C/C++ support

Optimized power consumption: 10W – 30W
- Package: 40 x 40 mm 1217 FCBGA

BENEFITS

Market-leading performance
- Up to 21.6 Billion instructions per second
- Over 10+ Gbps application performance
  - Up to 23 Mpps 64B IP forwarding
  - Up to 20+ Gbps for TCP, IPsec, SSL, KASUMI
  - Up to 12Gbps for Compression/Decompression

Sophisticated hardware based QoS support
- Queuing, scheduling
- Very low latency for real-time traffic

Scalable per-core security coprocessor architecture for lower latency, reduced interconnect overhead, and higher small packet performance

Reduced BOM cost with essential interfaces

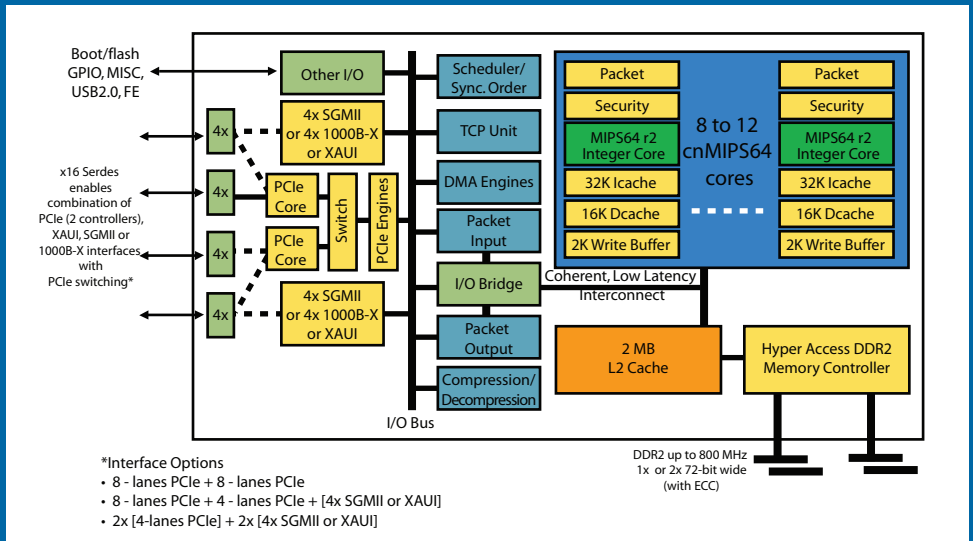
Flexible architecture allows host and coprocessor Implementations in a single chip

Industry-standard programming model without any need for Proprietary tools or micro-coding

Software compatible with entire OCTEON family to deliver 1- 16 CPU scalability

Highest performance, optimized power and integration for Networking and Wireless control plane, L4-L7 data and security services

OCTEON® Plus CN56XX - Block Diagram



CAVIUM
2315 N. First Street
San Jose, CA 95131
T 408-943-7100
F 408-577-1992
E sales@cavium.com
www.cavium.com

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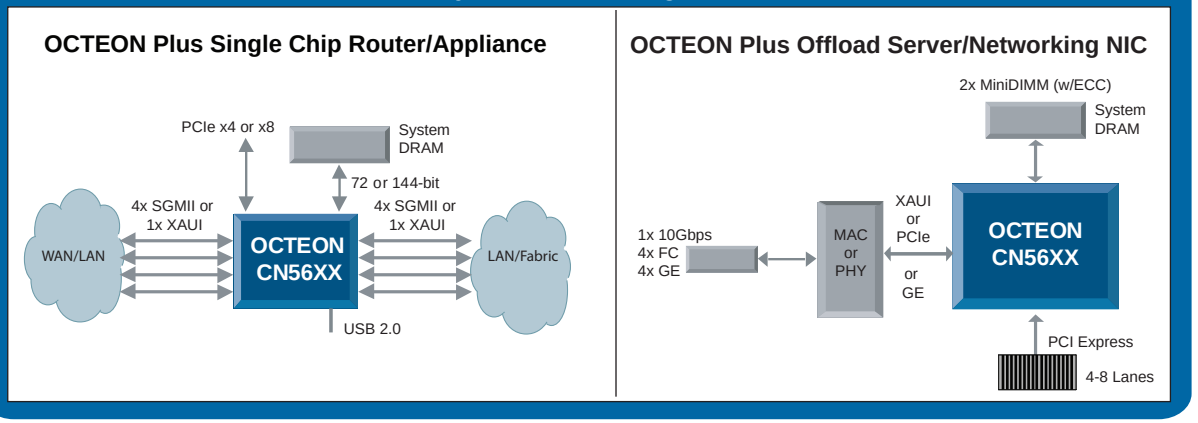
OCTEON® Plus CN56XX - Based System Block Diagram



APPLICATIONS

- Next-generation integrated, standalone routers and appliances
- Unified Threat Management (UTM) appliances with Firewall, VPN (IPsec, SSL), IDS, IPS and Anti-virus scanning
- Application aware/L4+ content processing and switching
- Network acceleration cards for security, TCP, content processing, and compression
- Integrated management and route processor cards
- Switch/router line card and services card control and datapath processing
- Wireless LAN switch/appliance security and packet processing
- Wireless WAN security, control and packet processing including 3G/4G/LTE and WiMAX

SOFTWARE SUPPORT

- Cavium SDK includes:
  - Up to 12-way SMP LINUX support
  - Cavium Simple Executive for data plane applications
  - Complete GNU tool-chain, GDB, DDD and viewzilla for tuning
  - Optimized C libraries for security, regular expression, de/compression processing offload
  - Support for run-to-completion or pipelined software models
- Complete production quality development toolkits for IP, IPsec, SSL, TCP, SSL-VPN available
- Comprehensive ecosystem support
  - Popular third-party operating systems and toolchains, including MontaVista Linux, Wind River VxWorks, ENEA OSE, and FreeBSD
  - Broad range of third-party application software vendors
  - Broad choices of ODM appliances, ATCA, and AMC cards
- MIPS64/32 support enables thousands of MIPS and other C/C++ applications to be easily ported to OCTEON

OCTEON® Plus CN56XX - Product Family

Device	cnMIPS cores	Performance	Option		L2 Cache	Packet Interfaces	PCI Express	Main Memory IO w/ECC	Package
		Max. Available Instructions Per Second	NSP	CP					
CN5640	8	14.4G	Y	Y	2MB	2x [4x SGMII or 1x XAUI]	2x [x4 or x8 lanes]	DDR2 up to 800 MHz 1x or 2x 72-bit wide	1217 FCBGA
CN5645	10	18.0G	Y	Y					
CN5650	12	21.6G	Y	Y					

Device Options:
Device Speed Grade (600LP = 600 MHz Low Power, 600 = 600 MHz, 750 = 750 MHz, 800 = 800 MHz)
Option code for device family listed below:

CP = Communications Processor: Includes networking, TCP acceleration and QoS
NSP = Network Services Processor: Includes, encryption, de/compression, networking, TCP acceleration and QoS

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2315 N. First Street
San Jose, CA 95131
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F 408-577-1992
E sales@cavium.com
www.cavium.com

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