Multi-Core MIPS64® Processors

OCTEON™ Plus CN58XX 4 to 16-Core MIPS64-Based SoCs
Product Brief

CAVIUM NETWORKS
OCTEON ™ Plus
CN54XX-1000BG1521-MS
113G64165.1.1
TAIWAN

OVERVIEW

The OCTEON™ Plus CN58XX family of Multi-core MIPS64 processors targets intelligent networking, control plane, storage, and wireless applications in next-generation equipment from 2 Gbps to full-duplex 10 Gbps (20 Gbps) performance. The family includes 12 different software-compatible parts, with four to sixteen cnMIPS64 cores on a single chip that integrate next-generation networking I/Os along with the most advanced security and application hardware acceleration to deliver a 2x – 3x performance, power and real-estate value proposition over alternatives.

FEATURES

Pin and software compatible with the leading OCTEON CN38XX/CN36XX family
- 4-16 cnMIPS™ CPU cores (MIPS64/32 compatible) with MMU
- Available in 600 MHz to 1 GHz versions
- Enhanced MIPS64 integer (Release2) 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
- 1MB or 2MB ECC protected 8-way set associative L2 cache with locking, partitioning features for optimal performance
- Integrated mainstream 128/144b DDR2 memory controller with ECC, up to DDR2-800
- Optional, additional, low-latency 2x18b or 4x9b RLDRAM2 for content based processing, meta-data and TCAM connectivity

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

Integrated high-performance networking interfaces
- Up to 2 sets of I/Os - each configurable as 4x 10/100/1000 Ethernet MACs (RGMII) or SPI-4.2
- Integrated 64-bit, 133 MHz PCI-X host or slave

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

Optimized power consumption: 15W – 40W

Package: 1521 FCBGA

BENEFITS

Market-leading performance
- Up to 32 Billion instructions per second
- Leading-edge application performance
  - Up to 30 Mpps 64B IP forwarding
  - Full-duplex up to 10 Gbps for TCP, IPsec, SSL, KASUMI
  - Up to 5 Gbps for Regular Expression Compression/Decompression

Double L1/L2 caches and up to 3x Interconnect bandwidth along with 1 GHz Core delivers up to 2x performance over OCTEON CN38XX

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

Reduced BOM cost with essential interfaces for standalone Routers/Appliances, Line-card and Services-card applications

Flexible architecture allows host and coprocessor Implementations

Industry-standard programming model without any need for Proprietary Tools or Micro-coding

Fully software compatible with OCTEON CN31XX and CN30XX to deliver 1- 16 CPU scalability

2x – 3x advantage over alternative system architectures in performance and power for L4-L7 data and security services

2x performance/watt over OCTEON CN38XX
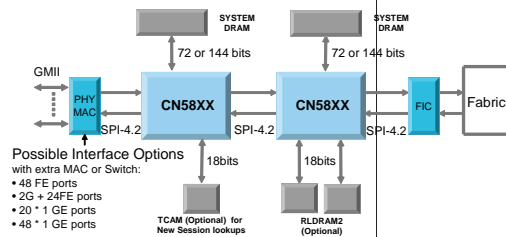
OCTEON Plus CN58XX - Block Diagram
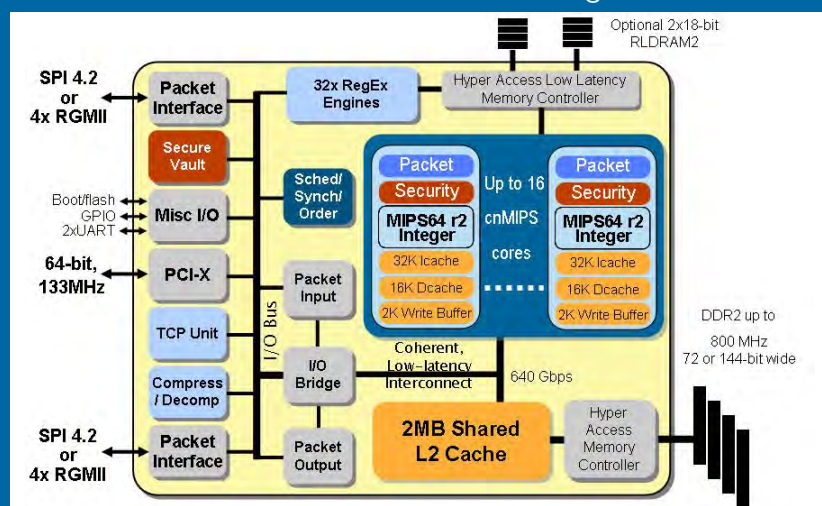
Multi-Core MIPS64® Processors
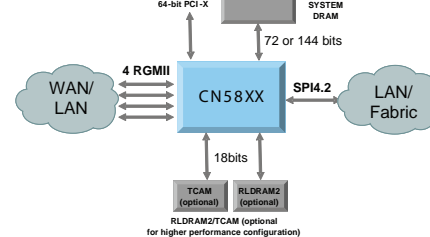
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OCTEON Plus CN58XX - Based System Block Diagrams

OCTEON Plus as Full-duplex 10Gbps Line Card or Service Blade

OCTEON Plus CN58XX as 4Gbps+ Single-Chip Network Appliance

OCTEON Plus 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, compression

- Integrated management and route processor cards

- Switch/router line card and services card control and datapath processing

- TCP, iSCSI, RDMA, compression processing for storage applications

- Wireless LAN switch/appliance security and packet processing

- Wireless WAN security, control and packet processing including 3G/4G/LTE and WiMAX

OCTEON Plus Software Support

- Cavium Networks SDK includes:
  - Up to 16-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

  - Broad range of third-party application software vendors, including 6Wind, Intoto, D2 Technologies, and Apogee

  - Appliances, AMC, ATCA cards from ASUSTek, Flextronics, GE Fanuc, Lanbird, Portwell, RadiSys, and others

- MIPS64/32 support enables thousands of MIPS and other C/C++ applications to be easily ported to OCTEON

OCTEON Plus CN58XX - Product Family

Device	Part Number *	cnMIPS cores	Performance Max. Available Instructions Per Second	Option NSP	Option EXP	Option SCP	L2 Cache	Interfaces	PCI/ PCI-X	Memory IO w/ECC	DFA Memory IO w/ECC	Package
CN5830	CN5830-XXXBG1521- Option Code	4	8.0G	Y	Y	Y	2MB	2x [4x RGMII or 1x SPI-4.2]	64-bit/ 133 MHz PCI-X	DDR II - 72-bit or DDR II - 144-bit	2x 18-bit RLDRAM2 (optional)	1521 pins
CN5840	CN5840-XXXBG1521- Option Code	8	16.0G	Y	Y	Y	2MB					
CN5850	CN5850-XXXBG1521- Option Code	12	24.0G	Y	Y	Y	2MB					
CN5860	CN5860-XXXBG1521- Option Code	16	32.0G	Y	Y	Y	2MB					

* (Part Number Options):
XXX = Device Speed Grade (600 = 600 MHz, 800 = 800 MHz, 900 = 900 MHz, 1000 = 1000 MHz)
Option Code = Device Family Listed Below:

NSP = Network Services Processor: Includes, encryption, reg-ex acceleration, decompression, networking, TCP acceleration and QoS
EXP = Extreme Processor: Includes reg-ex acceleration, decompression, networking, TCP acceleration and QoS
SCP = Secure Communications Processor: Includes, encryption, networking, TCP acceleration and Qos