

# Most Powerful and Widely Adopted Embedded Multicore Development Environment

## OCTEON® Multicore Software Development Kit

### OVERVIEW:

The Cavium Networks OCTEON® Multicore Software Development Kit (SDK) sets the standard as the most powerful and widely adopted software development environment for embedded multicore applications. The OCTEON SDK allows users to rapidly develop scalable software applications targeting anywhere from single-core processors to 32+ core processors using the same code base, delivering linear scalability and enabling straightforward portability from other processor architectures. Leveraging industry-standard toolchains, operating systems, and C/C++ programming, Cavium has provided full multi-core optimization, proven over three product generations. Powerful multicore debugging, profiling, and cycle-accurate simulation tools open the power of multicore to every programmer.



FEATURES	BENEFITS
<b>Powerful Multicore Toolset</b>	
<ul style="list-style-type: none"> <li>Standard GNU GCC 3.X/4.X C/C++ Compiler supporting OCTEON's advanced instruction set</li> </ul>	<ul style="list-style-type: none"> <li>Generates most optimized code leveraging full capabilities of OCTEON instruction set architecture for highest performance</li> </ul>
<ul style="list-style-type: none"> <li>Cycle-Accurate/Functional-Accurate Multicore Simulator with Graphical Performance Analysis tool (ViewZilla)</li> </ul>	<ul style="list-style-type: none"> <li>Enables rapid performance tuning, debugging low level code, and full visibility into execution state of all cores</li> </ul>
<ul style="list-style-type: none"> <li>GDB Debugger with added multi-core functions and DDD multicore GUI</li> </ul>	<ul style="list-style-type: none"> <li>Debug a single core or simultaneously debug multiple cores with familiar interface</li> </ul>
<ul style="list-style-type: none"> <li>Application-Agnostic non-intrusive Graphical Performance Profiling tool (PerfZilla)</li> </ul>	<ul style="list-style-type: none"> <li>Quickly identifies application performance constraints on real HW to identify specific areas for further SW optimization</li> </ul>
<ul style="list-style-type: none"> <li>HFA RegEx Pattern Matching Compiler</li> </ul>	<ul style="list-style-type: none"> <li>Generates performance and space-optimized pattern graphs for Deep Packet Inspection (DPI) applications based on standard RegEx syntax (PCRE/POSIX)</li> </ul>
<b>Comprehensive, Scalable Runtime Software</b>	
<ul style="list-style-type: none"> <li>Linux 2.6.X 64-bit SMP Operating System</li> </ul>	<ul style="list-style-type: none"> <li>Provides optimized Linux support for OCTEON with regular kernel updates</li> </ul>
<ul style="list-style-type: none"> <li>OCTEON Simple Executive (Thin 'Bare Metal' OS)</li> </ul>	<ul style="list-style-type: none"> <li>Lowest-overhead access via powerful C API's to OCTEON hardware resources for highest throughput dataplane performance</li> </ul>
<ul style="list-style-type: none"> <li>C language libraries for comprehensive OCTEON HW security, networking, storage, and content processing acceleration</li> </ul>	<ul style="list-style-type: none"> <li>Enables straightforward access to powerful HW acceleration using industry-standard API's (e.g. OpenSSL)</li> </ul>
<ul style="list-style-type: none"> <li>BSP, Driver, and Diagnostics (uboot, PCI/PCle, diagnostics)</li> </ul>	<ul style="list-style-type: none"> <li>Provides boot-up, diagnostic and host driver support for all OCTEON devices in a single package</li> </ul>
<ul style="list-style-type: none"> <li>Extensive Reference Software and Examples (Full OCTEON Programmer's Guide Available)</li> </ul>	<ul style="list-style-type: none"> <li>Allows user to start OCTEON programming immediately - shows techniques for optimal multicore programming</li> </ul>

## Powerful Multicore Toolset

### Advanced GNU GCC C/C++ Compiler

- Support for MIPS64R2 + over 100 additional OCTEON instructions for best control plane, networking, and security performance
- Extensive instruction set and code optimization

### Multi-Core GDB/DDD Debugger

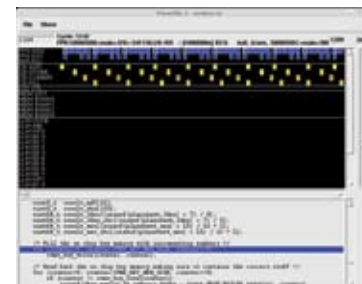
- Full multicore debugging
- Step all cores or subset of cores at once, set breakpoints
- Familiar GNU interface and enhanced gdb server protocol

### Graphical Performance Analysis and Cycle-Accurate Simulator (ViewZilla)

- Graphical cycle-by-cycle depiction of program execution in cycle-accurate simulator
- GUI provides “click and display” of machine state at each cycle including source code display

### PerfZilla Profiler

- Analyze real-time hardware performance in a GUI
- Per-file and Per-line statistics
- Application agnostic: Linux kernel, simple executive, or hybrid programming models with no application modification
- Profile support



ViewZilla Performance Analysis



Optimized Multicore GDB/DDD Debugger

## Comprehensive, Scalable Runtime Software

### SMP Linux Operating System

- Linux 2.6.x with optimized IP stack and Debian root file system
- Runs on a few cores for control plane or across all cores

### OCTEON Simple Executive

- Lowest overhead access to OCTEON hardware for most optimized dataplane performance
- Runs concurrently with Linux or other OS's for integrated control + dataplane solution

### Hardware Acceleration Libraries

- Encryption/Decryption Library with full set of encryption API's, identical to OpenSSL API's accessing OCTEON per-core security engines
- Compression/Decompression Library with full ZLIB implementation accessing Cavium compression/decompression engine
- HFA pattern matching Library for hardware based pattern searching

### BSP, Diagnostics, and Drivers

- Uboot bootloader and board support for all OCTEON processors in a single SDK
- Optimized PCI-X/PCIe drivers for OCTEON host (RC) or target (EP) applications

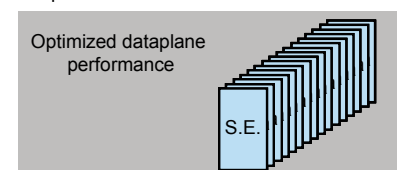
### Additional OCTEON Software Available from Cavium

- Optimized Source Code Toolkits (TCP/IP, IPsec, SSL, SRTP, Protocol Detection, SnortXL, Anti-Virus Gateway, ClamXL)
- OCTEON Embedded Multicore Virtualization (EMVisor) Hypervisor

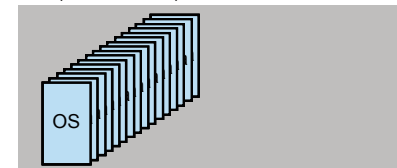
### Extensive OCTEON Software Services + Partner Ecosystem

- All major 3rd party OS/RTOS
- Extensive application software stacks
- Wide range of professional software services for software architecture, development, and tuning.

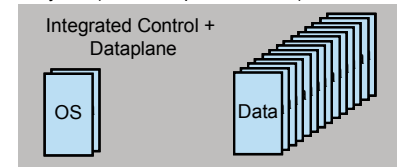
Simple Executive Across All Cores:



OS (SMP or AMP) Across All Cores



Hybrid (OS + Simple Executive)



Example OCTEON Programming Models