

Session 201: Software

Building a Software Tool base for Multicore Network Processors

Building a Software Tool base for Multicore Processors

Multicore Processors are the new Network processors.

- How will the multicore software tools ensure that these new processors won't have the same fate as the previous generation?
- How will an ecosystem of software toolkits be created to speed time to market for application?

Evolution in Network Processor Silicon

Legacy

- ASIC's and FPGA
 - Solutions favored by current leaders in IP-Networking
- Network processor Silicon especially suited for ATM based packet networks
 - Intel IXP, Cport, Agere, Winpath, etc.

Emerging

- Multi-core processor solutions with hardware acceleration assists
 - Cavium Octeon, RMI XLR
- New generation of general purpose multi-core processor solutions
 - Sun Niagara, Intel Dual Core IA, AMD Opteron

Software Evolution

- NPU's had a reputation for being difficult to program
 - Software Tools Ecosystem for Intel IXP tried to simplify software
- Part of the challenge is addressed by using a MIPS processor core architecture
 - Supports well known operating systems such as Linux and VxWorks
 - Allows software tool vendors to port applications across multiple vendors
 - Real Time OS (RTOS) allows wire rate processing

Linux vs RTOS

- RTOS supports wire rate packet processing
 - Pattern Matching
 - Routing
 - Compression / Decompression
 - Encryption / Decryption
 - Etc.
- Linux supports management & exception processing
 - User / Device Authentication
 - Security Associations
 - Accounting

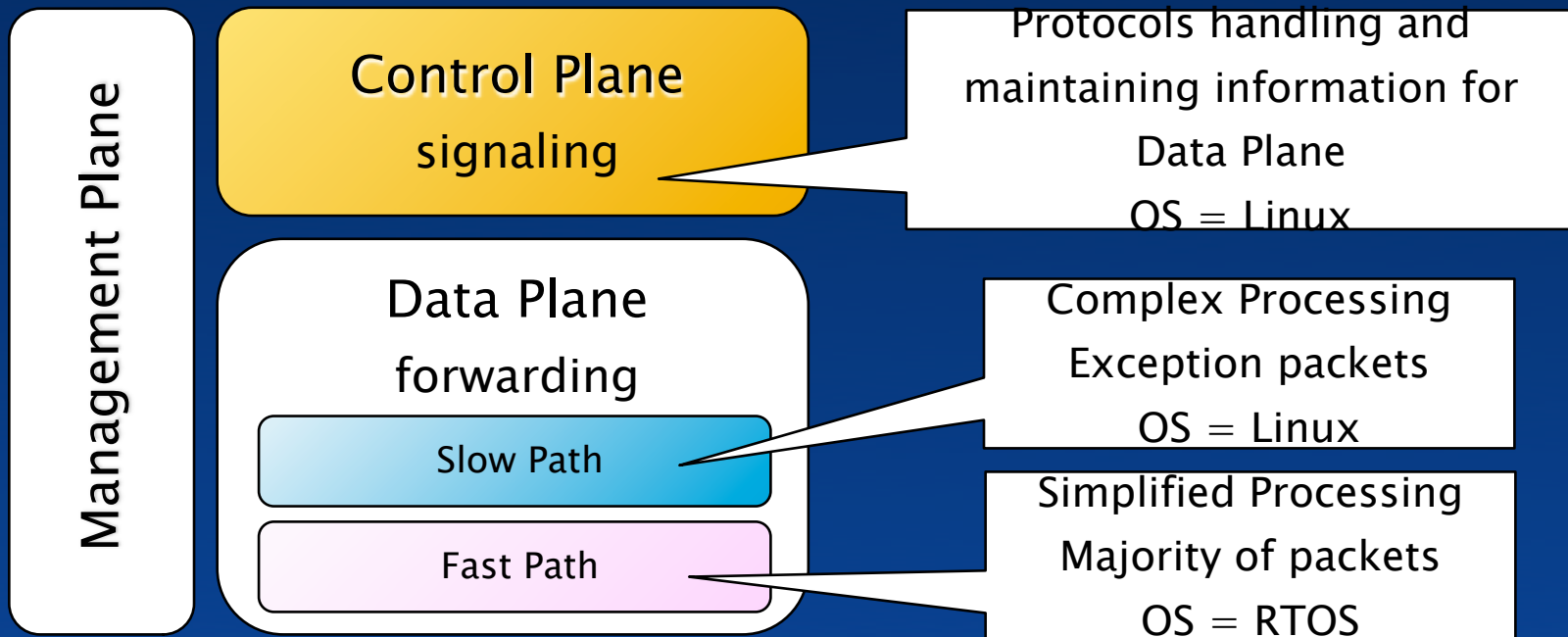
Which Linux?

- Wind River PNE
- Monte Vista CGE
- Red Hat
- Linux.org
- Etc.

Hardware Accelerators

- New Multicore Processors frequently include hardware accelerators:
 - IPsec
 - Compression / Decompression
 - Pattern Matching / Regex

Network Equipment Architecture



⇒ **Control Plane and Data Plane can be co-localized or distributed over multiple processors**

⇒ **High performance is achieved by running Fast Path on dedicated hardware**
⇒ **Data Plane easily Parallelized**

Multicore & Virtualization

- Virtualization improves the reliability of multi-OS embedded systems by enabling the complete isolation of real-time tasks from general-purpose operating-system (GPOS) tasks
- Task isolation brings significant advantages to communications applications.
 - real-time call-critical processing can continue without interruption even when the GPOS becomes overloaded, fails, or needs to be rebooted
- Combining multiple homogeneous CPUs on a single silicon chip provides performance advantages that enable the efficient parallel operation of multiple operating environments across multiple CPUs
 - Eliminates the bottleneck of running time-dependent tasks on a general-purpose operating system.

Software Toolkits for Network Processors

- Toolkits are now emerging and can exploit the power of a multicore processor as well as use the real time operating systems provided with the different processors.
 - 6WIND 6WindGate™
 - SafeNet Quicksec™
 - Interphase Protocol Accelerators
 - SIP / RTP
 - GTP-u
 - SIGTRAN
 - Qosmos ixDPI

Will Multicore Architectures converge?

Freescal, Intel, AMD, Sun
Vs
Cavium, RMI

Current Key Differentiators

Speed

Real Time Support

Hardware Accelerators

Thank You!

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