



SNEAK PEEK

Cisco Support Community Expert Series Webcast

IOS-XR Fundamentals and Architecture

Nov 18, 2014-India

Nov 17th-US

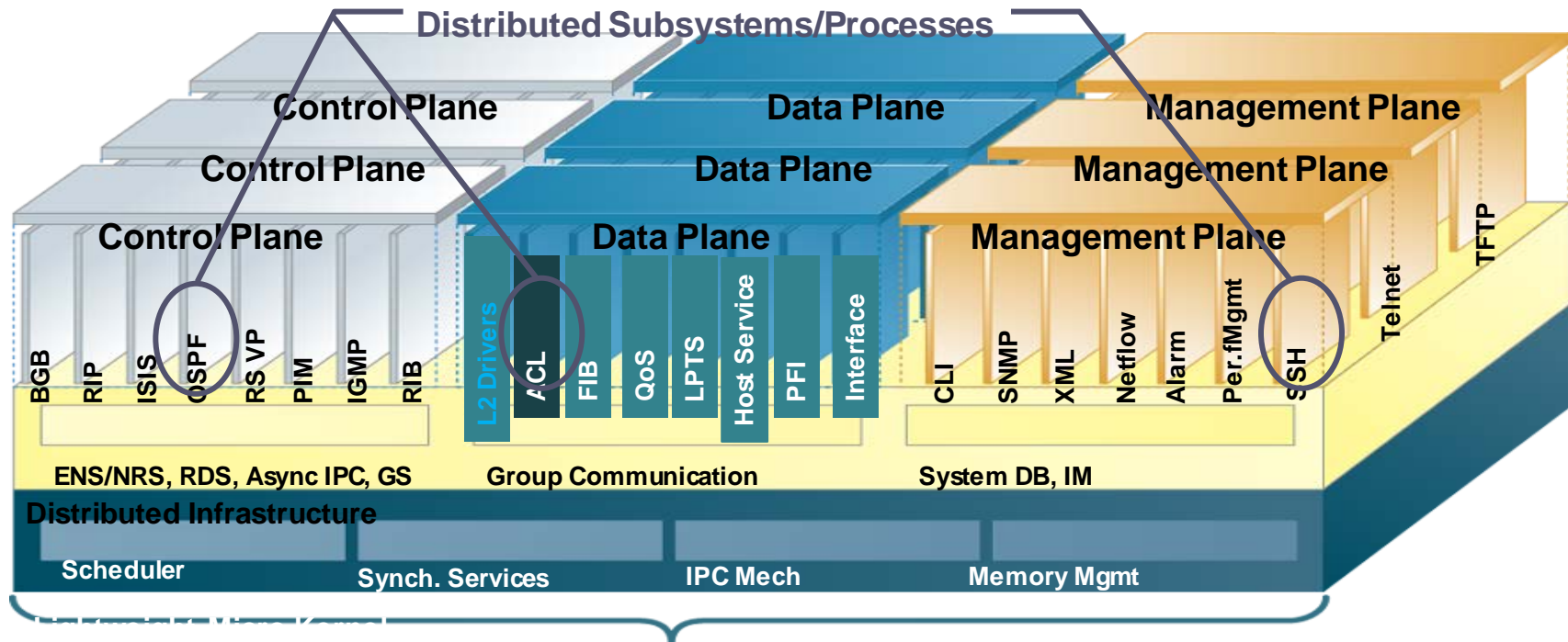
with Sudeep Valengattil, Sudhir Kumar, Raj Pathak

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Agenda

- High-Level Overview of Cisco IOS XR
- Cisco IOS XR Infrastructure
- Configuration Management
- Cisco IOS XR Monitoring and Operations
- Cisco IOS XR Security
- Introduction to different IOS-XR platforms

IOS XR Architecture: Separation of management, control, and data plane



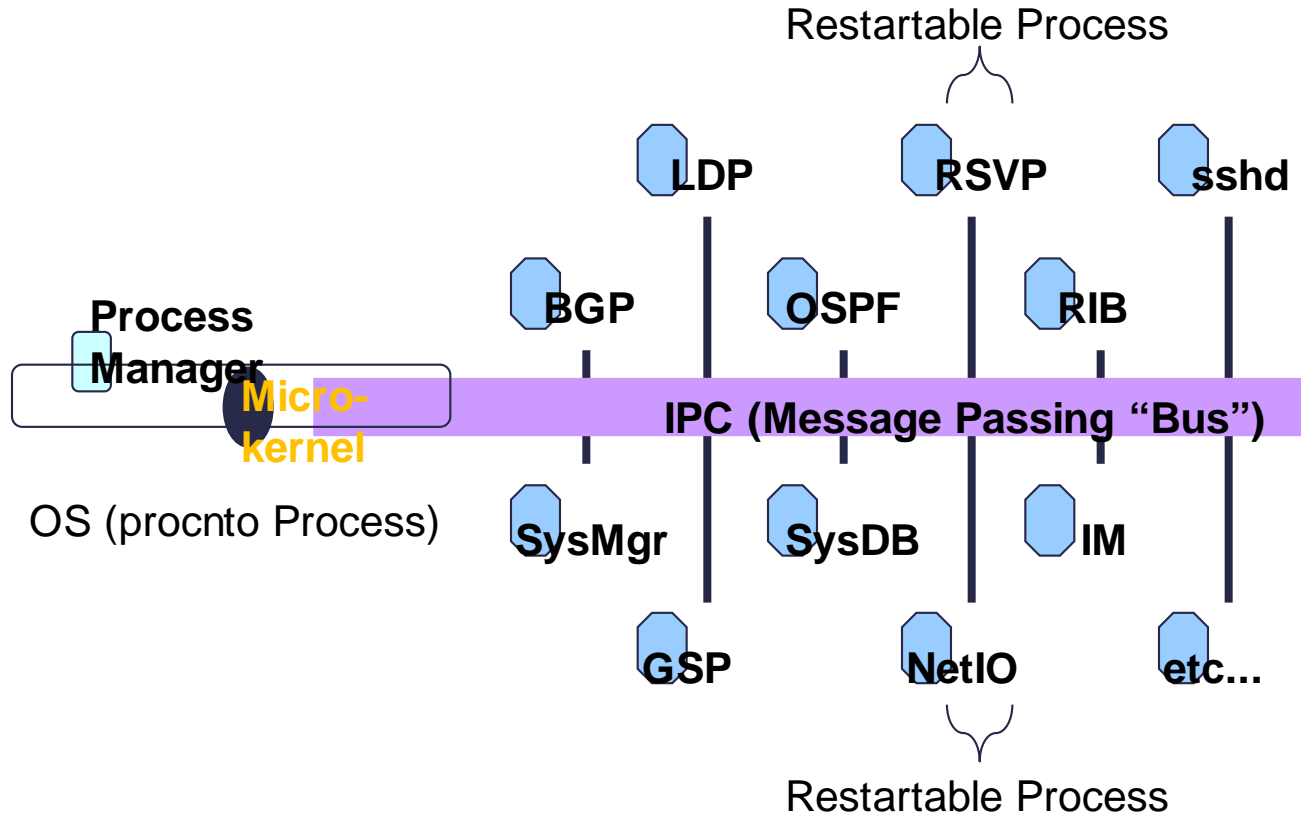
Kernel System Services

Each routing control plane or management plane runs on one or multiple (D)RPs
 Data plane processes are located on each node that participates in packet forwarding

IOS XR Kernel

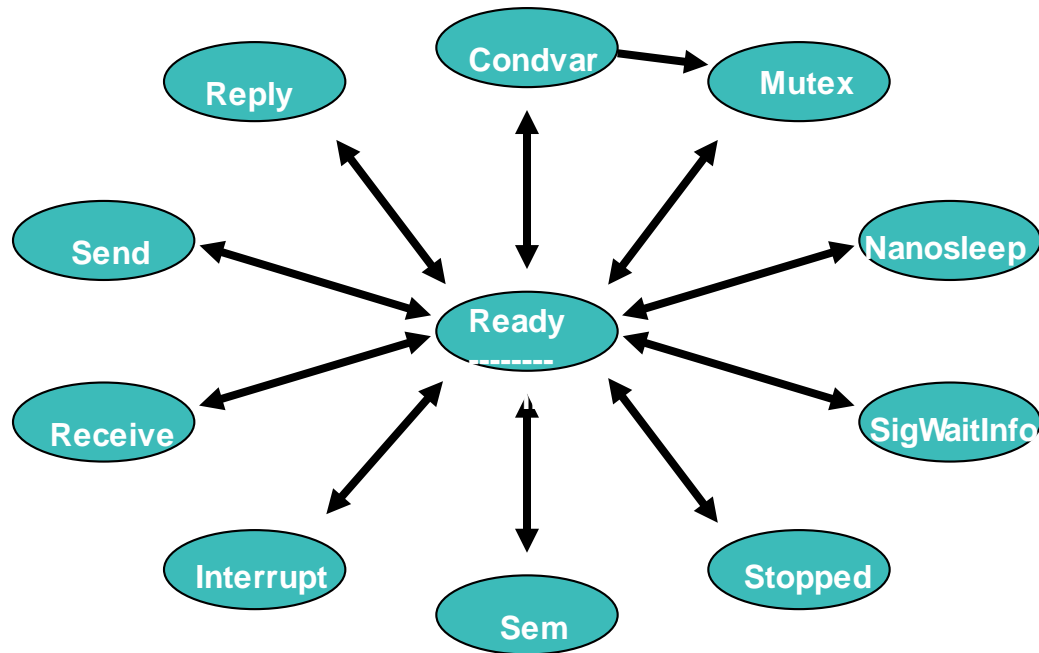
- IOS XR is a highly distributed microkernel-based network OS
- The microkernel is QNX Neutrino real-time OS
- Light weight and providing only a few fundamental services
- POSIX-compliant kernel
- The microkernel provides a high degree of modularity
- Fast context switching capability provides the impetus to a high degree of modularity

Microkernel-Based OS



- OS is a group of cooperating processes managed by a small microkernel

Common Thread States and Transitions



- A thread state can transition from ready to running and vice versa
- A thread in running state may also transition to any of the other states

Synchronization Services

- The microkernel provides a message-passing-based synchronous IPC mechanism
 - This message-passing service copies a message directly from the address space of the sender thread to the receiver thread without intermediate buffering
- Other IPC mechanisms use shared memory space is possible to develop
 - Access to the shared memory space must be synchronized to ensure data consistency
 - The microkernel provides mutex, condvar, and semaphore synchronization tools

Process Status

State	Explanation
dead	The kernel is waiting to release the thread's resources
running	Actively running on a CPU
ready	Not running on a CPU but is ready to run
stopped	Suspended (SIGSTOP signal)
send	Waiting for a client to send a message
receive	Waiting for a server to receive a message
reply	Waiting for a server to reply to a message
stack	Waiting for more stack to be allocated
waitpage	Waiting for the process manager to resolve a page fault
sigsuspend	Waiting for a signal
sigwaitinfo	Waiting for a signal
nanosleep	Sleeping for a period of time
mutex	Waiting to acquire a mutex
condvar	Waiting for a conditional variable to be signaled
join	Waiting for the completion of another thread
intr	Waiting for an interrupt
sem	Waiting to acquire a semaphore

IOS XR vs IOS

IOS XR	IOS
Pre-emptive multi-tasking, multi-threaded (QNX scheduling allows a thread taking up to 4ms as a CPU quantum)	Non pre-emptive scheduling, process runs to completion (A process may take a CPU quantum up to 200ms depending on behavior design)
Virtual Memory - Each process owns its own protected address space	Flat address space – no VM support, memory corruption/illegal access by a single process would kill a router
Process restart ability	Not applicable
Message passing (IPC) between processes	Direct Function Calls, no IPC involved for intra-node communication. IPC is needed only for inter-node communication
Distributed processing, processes are placeable on different nodes	Not applicable

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CRS-3
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2014

CRS-X
400G / LC
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Check out some additional information on IOS XR on the Cisco Support Community.

Cisco IOS XR Introduction Knowledge Share Session

<https://supportforums.cisco.com/video/12170691/cisco-ios-xr-introduction-knowledge-share-session>

Google Hangout: Cisco IOS-XR and Command Line

<https://supportforums.cisco.com/node/12159781>



Hope you enjoyed this little peek into the webcast.

Remember it was just a peek. Nov 18 (India) , Nov 17 (US) you get a chance to see the whole thing.



Register Now: <http://bit.ly/nov18webcast>

At the webcast you will be able to learn so much more and get a chance to submit questions for the expert to answer during the broadcast.

We'll see you there!