

VxWorks – An Overview

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References

- <http://www.cs.ru.nl/lab/vxworks/vxworksOS.html>
- www.wikipedia.org

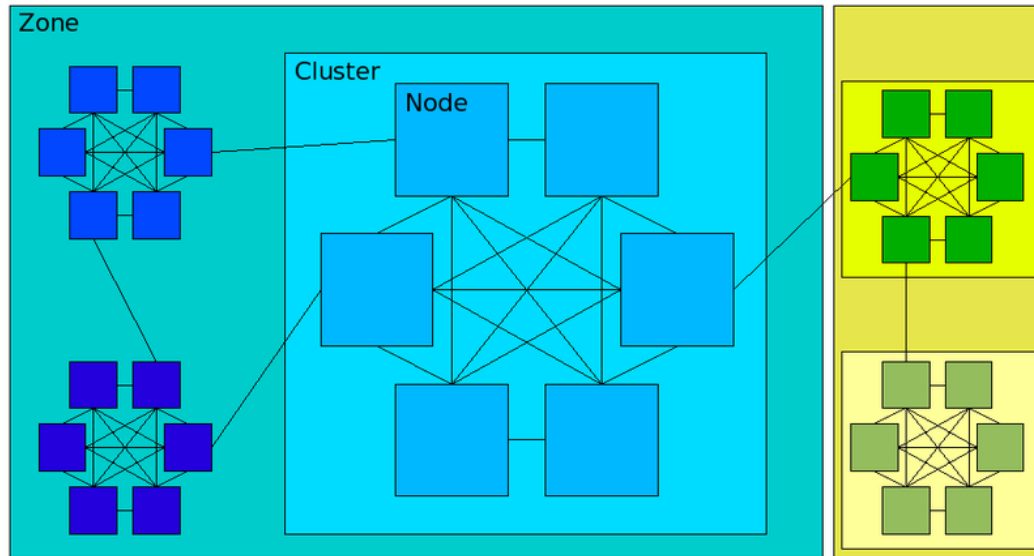
What is VxWorks?

- **VxWorks** is an RTOS developed by Wind River Systems of California, USA.
- VxWorks is designed for specific use in embedded systems.
- Unlike "self-hosting" operating systems such as Unix, VxWorks development is done on a "host" machine running Linux, Unix, or Microsoft Windows, cross-compiling target software to run on various "target" CPU architectures.

Task Management, Communication & Scheduling

- Multi-tasking kernel with pre-emptive and round-robin scheduling and fast interrupt response.
- Native 64-bit operating system (only one 64-bit architecture supported: Intel 64). Data model: LP64.
- SMP and AMP support
- Fast, flexible inter-process communication including TIPC
- Error handling framework
- Binary, counting, and mutual exclusion semaphores with priority inheritance

TIPC



An illustration of the Transparent Inter-Process
Communication Protocol model

Possible States for a 'Task'

- **READY** : Waiting for the CPU
- **PEND** : Blocked due unavailability of some resource other than CPU
- **DELAY** : Asleep for some time
- **SUSPEND** : disabled for running, however the task can still change from states PEND/DELAY to READY when being disabled
- **PEND + T** : PEND with timeout

Priority Convention

- Priority 0 - highest
- Priority 255 – lowest
- `taskPrioritySet()` sets the priority of a particular task.

Error Handling Framework

- Null(0) – to indicate an error
- Errno – The global variable which specifies the error code

Task Management, Communication & Scheduling

- Local and distributed message queues
- File systems: High Reliability File System (HRFS), FAT-based file system (DOSFS), Network File System (NFS)
- IPv6 networking support

Notable Products

- Boeing 787 Dreamliner
- Airbus A400M Airlifter
- BMW iDrive
- Mars Pathfinder
- Stardust

Exposé

- In August 2010, hacker HD Moore uncovered a vulnerability in VxWorks that affected numerous vendors. CERT published advisories for VU#362332 and VU#840249 on August 2, 2010, both flaws in the VxWorks operating system.

THANK YOU