

VxWorks MILS Certification

Verocel continues its involvement with the Wind River MILS products (Multiple Independent Layered Security). VxWorks MILS is a secure virtualization kernel that can support guest operating systems, making it possible to run multiple applications on a single processor to improve overall resource utilization.

Each guest OS and its application runs on a single virtual board, with security policy enforcement. This means that VxWorks MILS must have NEAT and TIME properties, where NEAT means:

- Non-bypassable
- Evaluatable
- Always invoked, and
- Type-safe

and TIME means

- Type-safe
- No infiltration - (no reading of private data)
- No mediation - (no modification of data as it moves from one state to another)
- No exfiltration - (no publishing of private data)

Both NEAT and TIME must be demonstrated with a high degree of confidence. The University of Idaho is developing mathematical models and proofs to demonstrate NEAT and TIME properties for VxWorks MILS. Verocel is developing certification evidence in accordance with DO-178B at level A.

At the AUVSI conference in August, Wind River demonstrated three applications, each running on separate virtual boards under the control of VxWorks MILS. Two of the boards provided raw Ethernet packet transports and one of the boards enforced a message filtering service based on security labels. The demonstration showed very high throughput with very low infrastructure overhead, confirming that VxWorks MILS could become a component of a safe and secure platform with applicability in many types of safe and secure systems.

Importantly, VxWorks MILS provides a solution to the CyberHard problem. Solving the CyberHard problem for a system means that there will be no vulnerabilities against denial of service and remote execution.

Even though Microsoft Windows is the most trusted operating system in the world, it still does not solve the CyberHard problem. In the latest patch release this summer, over 20 CyberHard vulnerabilities were fixed, but an unknown number still remain. Interestingly, Linux had a similar update in its latest version.

Verocel is pleased to partner with Wind River on its VxWorks MILS team, as we consider this to be a very important platform for systems in the safety and security domain. We will provide updates in *VEROCEL VIEW* as appropriate.