



Wind River Studio Digital Twin

Wind River® Studio cloud-native simulation platforms allow you to create simulated digital twins of highly complex real-world systems for automated testing and debugging of complex problems.

WHY DIGITAL TWIN?

The next generation of intelligent systems will consist of diverse hardware and software, some of it virtualized, with a mix of criticalities and performance requirements including hard real time. Such systems may feature autonomous capabilities, leverage AI frameworks, and depend on 5G connectivity as well as public, private, or hybrid cloud infrastructure. All these services must be continuously managed to ensure that they meet service-level guarantees throughout their complete lifecycles.

The scale and complexity of these systems represent unique challenges to developers, especially IT or application developers who are not necessarily familiar with the demands and dependencies of the embedded systems that make up much of the intelligent edge. For such developers, digital twins provide a degree of abstraction from this complexity while insulating safety-critical and mission-critical production systems from development and testing activities.

The complexity and interdependencies of connected devices in the field of operation represent many potential points of intermittent or outright failure. Digital twins can provide system-level or component-level redundancy, enabling IoT systems to continue to function despite such unavailability or to identify deviation from expected operational, environmental, or historical parameters.

SAFELY TEST DEVICE SOFTWARE AT ANY STAGE OF DEVELOPMENT

Studio digital twin capabilities enable teams to deploy device software to high-performance, cloud-native simulation platforms for testing in all phases of development, from unit testing to system-level testing and debugging. This cloud-native environment provides ubiquitous access to near-unlimited resources to execute simulation technology at scale.

With Studio digital twin capabilities, teams can create both high-fidelity and low-fidelity simulations, while physical and virtual hardware targets can be accessed through the Wind River Studio Virtual Lab reservation system. The same software can be run on both physical and virtual hardware. Virtual Lab is integrated with Wind River Studio Test Automation Framework to support virtual test automation.

Companies that aren't taking advantage of digital twin technologies are behind their competitors. Period.

Increased availability of data and feedback is the fuel that powers an effective digital twin. If executed properly, a digital twin provides insight into large, complex systems — insights that can be used to support predictive maintenance, process improvements, prevention of costly outages, and opportunities to develop and monetize new opportunities.

ARCHITECTURE

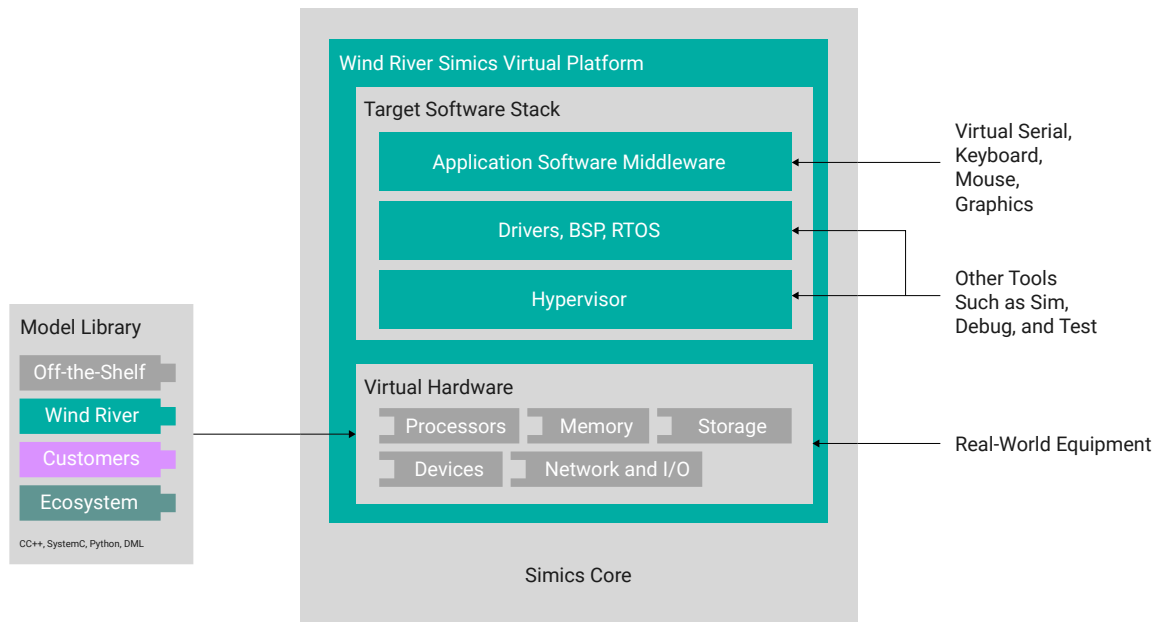


Figure 1. Wind River Studio digital twin for test automation

FEATURES AND BENEFITS

The key simulation capabilities within Studio include:

- **Wind River Simics®:** Developers use this full-system simulator to simulate the hardware of complex electronic systems. Simics allows on-demand and easy access to a fully simulated target system, supporting more efficient collaboration between developers and enabling large-scale test automation.
- **QEMU:** An open source machine emulator, QEMU mimics the machine's processor through dynamic binary translation and provides a set of different hardware and device models. It can be used within the Studio environment for application development and as a testing platform from the Studio user interface, from Visual Studio, and from a command-line interface.
- **Virtual Lab:** A cloud-native reservation system hosting embedded hardware targets and large-scale simulation resources, Virtual Lab is based on Simics and QEMU. It ensures that dispersed development teams have high availability of embedded targets to debug and test.

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