

Virtualizer

Create virtual prototypes of target hardware

Synopsys Virtualizer™ is a tool suite that enables the creation of virtual prototypes of target hardware allowing developers to develop, test, and debug unmodified software binaries. The output of Virtualizer is a Synopsys Virtualizer Development Kit (VDK). The VDK is an electronics digital twin of an electronic system combined with software productivity tools meant for development and testing. A VDK is executing unmodified binary production software with closest real-hardware behavior.

Software developers are under increasing demand to reduce the development timelines, with up to 40% of the project time spent on debug. Virtualizer can help teams deliver software earlier and faster, reduce software defects, and accelerate overall software innovation.

Virtualizer and VDKs for software development, integration, and test have been successfully deployed at 100's of customers of all sizes. They enable fast multi-abstraction virtual hardware simulation, provide the largest model library from IP/Subsystems to reference SoCs, and facilitate the highest debug productivity with unified system-level analysis.

Virtualizer is part of Synopsys' complete [virtual](#) and [hybrid prototyping](#) solutions including transaction-level models and consulting [services](#).

Key Features

Accelerate Virtual Prototyping with the Largest TLM Model Library

- Synopsys Virtualizer provides a comprehensive library of processor and peripheral models enabling engineers to rapidly assemble VDKs in Virtualizer Studio. With out-of-the-box compatibility these models ensure seamless integration across compilers, libraries and debug environments. eliminating the need for manual integration and implementation of common IP models.
- Supporting a wide range of architectures including ARM, ARC, Renesas, Infineon SiFive, Andes, Tensilica and others along with DesignWare TLM peripherals, the extensive library accelerates software development and system validation.
- Additionally, models like PCIe and USB allow end-to-end testing of VDKs by enabling I/O connectivity to host operating systems and physical hardware.
- Available for both Arm and Intel simulation machines, it empowers developers to achieve maximum productivity and shift-left benefits in their design workflows.

Virtualizer Native Execution

Synopsys Virtualizer delivers industry-leading virtual prototyping performance with native execution of edge software workloads on Arm servers. Complex edge software stacks can now run at near-native speeds, unlocking new use-cases and higher developer productivity.

Key benefits enabled with Virtualizer Native Execution include:

Fastest performance: By executing software binaries directly on Arm servers, Virtualizer Native Execution significantly increases execution speeds for software deployed on application processor cores.

Flexible deployment across cloud and on-premise: Virtualizer Native Execution supports Arm-based infrastructure, such as Ampere, AWS, Google, Microsoft, and Nvidia. Developers can optimize compute resource utilization in the cloud or on-premise, balancing performance, power, and cost to align with their development workflows.

Seamless system-level integration with electronics digital twins: Virtualizer Native Execution can be integrated with Synopsys' comprehensive tool and embedded software ecosystem used to create and support electronics digital twins for software-defined products.

Hybrid Emulation and Prototyping for Scalable Validation

Synopsys Virtualizer enables [seamless integration of virtual and physical prototypes](#), combining VDKs with ZeBu emulation and HAPS FPGA prototyping. This hybrid approach accelerates software execution, optimizes FPGA capacity, and supports advanced use cases such as application-level validation of functionality, power, and performance.

By partitioning emulation workloads between virtual and physical domains, engineers can refine RTL early, boost emulation speed by up to 20x while maintaining full system context for validation use-cases.

Virtualizer Studio—Accelerate Model Creation and VDK Assembly

- Synopsys Virtualizer Studio is a comprehensive tool suite for creating, building, and optimizing virtual models and assembling them seamlessly into VDK. It provides a cohesive development environment with industry-standard interfaces, allowing engineers to rapidly prototype models and integrate them into their workflows.
- With built-in support for SystemC TLM-2.0, intuitive graphical and script-based tools, and automated model packaging, Virtualizer Studio streamlines VDK distribution across the supply chain.
- Supporting both Arm and Intel architectures, it enhances development efficiency, accelerates debugging, and ensures smooth deployment of virtual prototypes in software and system design.

CI/CD Regression with Virtual Prototypes

- Synopsys Virtualizer enables automated regression testing by integrating Virtual Prototypes (VDKs) into CI/CD workflows. By bridging the gap between hardware and software development, VDKs allow pre-silicon testing in the same environment engineers use, reducing reliance on physical prototypes.
- Cloud-based scalability enhances flexibility, while continuous testing ensures faster bug detection, improved code quality, and seamless integration.
- With support for leading DevOps tools like GitLab, Jenkins, Docker, and Kubernetes, Synopsys VDKs streamline software validation, accelerate development cycles, and enhance collaboration in modern CI/CD pipelines.

Automotive VDK

Synopsys has partnered with leading IP, semiconductor and automotive development tool companies to enable semiconductor, tier 1 and OEM companies to deploy prototyping solutions for your specific automotive design. Using virtual hardware ECUs, based on Synopsys Virtualizer Development Kits (VDKs) and extensive deployment expertise, automotive engineers can support a broad range of design tasks including:

- Complex driver, MCAL and operating system porting
- Multicore software development
- System integration and test using virtual Hardware-in-the-Loop (vHIL)
- ADAS software and algorithm development
- Functional safety testing
- Regression testing
- Vehicle Electrical and Electronic (E/E) architecture and testing

For more information about Synopsys virtual prototyping solutions contact your Synopsys representative or visit <https://www.synopsys.com/verification/virtual-prototyping.html>