SYNOPSYS®

Accelerate SDV Development with **Electronics Digital Twin Platform**

eDTs Key Benefits

- **Reduce costs** by shifting software development, validation, and integration to virtual environments long before hardware is available.
- **Achieve faster time to market more reliably** by enabling parallel development across software, hardware, and systems engineering, allowing teams to begin integration and testing months earlier.
- **Improve quality** by helping teams identify and resolve issues far earlier in the lifecycle.
- **Accelerate innovation** among OEMs, Tier 1 suppliers, semiconductor vendors, and partners.

Digital twins are evolving. For decades, they have played a growing role in the design and lifecycle management of mechanical and other physical systems. They are now being adapted for an era in which silicon and software increasingly define core product functions—and even business models. With the move to AI-driven, software-defined vehicles (SDVs), electronics and software increasingly define the customer experience. Automotive companies must re-engineer their engineering processes to enable greater collaboration and accelerate development throughout the vehicle lifecycle.

Electronics Digital Twins—Shift 90% of Development Left

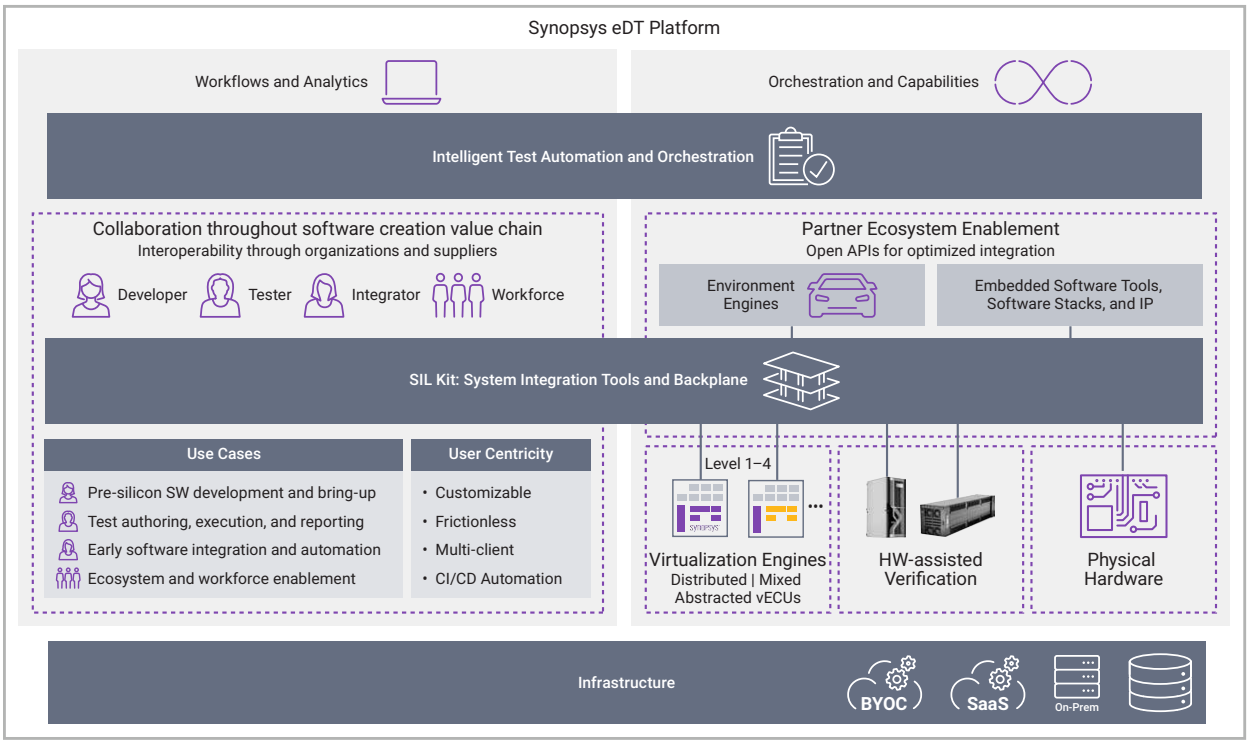
Electronics Digital Twins (eDTs) are a virtual representation of an electronic system and its environment. They are revolutionizing the automotive industry by providing powerful capabilities to simulate, analyze, and optimize development and maintenance activities. They can support a broad set of use cases including early design evaluation, early software development, collaborative software development, and efficient system validation. Their benefits start well before physical hardware and systems are available and continue throughout the vehicle lifecycle.

Automotive companies, from OEMs to a broad range of suppliers, can enhance design efficiency and ultimately help deliver better customer experiences, leading to a more innovative and competitive automotive industry.

Cloud-based Virtual Prototypes

Traditional physical hardware centric workflows hamper development because they depend on actual silicon and electronics control unit (ECU) hardware, meaning that verification and validation teams must wait until hardware becomes available, typically late in the project timeline. This delay shortens integration windows, creates risks to the start of production (SOP) timeline, and limits responsiveness in a market where vehicle development cycles aim to shrink below two years.

The only scalable path forward is to shift development and validation to eDT-based workflows, enabling earlier, more efficient, and scalable development.



Synopsys eDT Platform for Automotive

Synopsys eDT Platform for Automotive is a cloud-based, open, end-to-end solution to create, manage the deployment, and use eDTs in the context of the targeted use cases. It provides the tools and capabilities to create eDTs with Synopsys Virtualizer™, Synopsys Silver™, and a rich ecosystem of models and simulation tools all interoperable based on SIL Kit. The deployment of eDTs can be closely controlled and managed in the cloud and their use leverages analysis, debug and test automation tools such as Synopsys TPT and other industry tools and infrastructure supporting continuous integration/continuous deployment (CI/CD).

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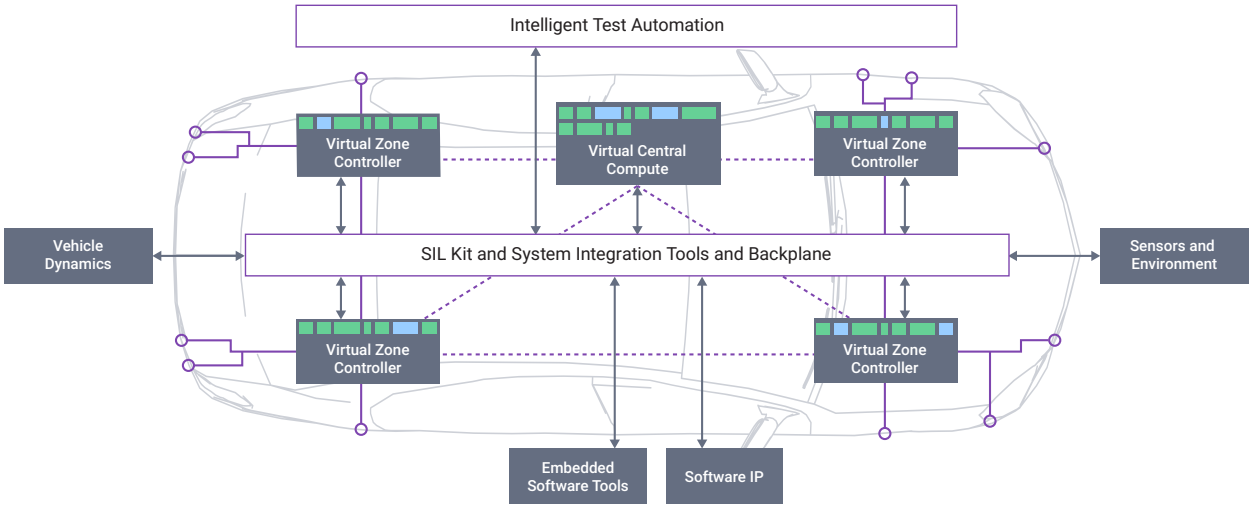

The result is a holistic tool chain that enables building accurate multi-ECU simulations for multiple purposes including software development, integration, and validation. eDT Platform is flexible and customizable, enabling a wide range of users and project engineering tasks, spanning semiconductor suppliers, OEMs, and Tier 1 vendors.

The Platform enables full virtualization of the vehicle's E/E architecture. Modern zonal designs concentrate most software on central compute clusters, while each zone still includes its own mission-critical controller. All these computing elements can be modeled virtually, enabling fast, synchronized system-level simulation.

eDTs Platform Key Benefits

- **Early software bring-up** before physical ECUs or **benches are available**
- **More productive system testing** due to **deterministic reproduction of issues** and a high degree of **debug visibility**
- Support for the rapid pace of **agile development** and **integration into CI/CD systems**
- **Corner cases, functional safety and security validation,** can be achieved without the inherent risk associated to **physical hardware**
- Easy **supply chain collaboration**

eDT Platform Enables Several Use Cases

Early customer evaluation of new SoCs or MCUs: Frictionless access to early virtual prototypes reduces time-to-selection decision. Such evaluation can start up to 12 months before silicon is available.

Early customer start-of-software development: Shift-left milestones by starting software development well before hardware availability with pre-integrated tools support.

Collaborative software development: Enable seamless collaboration between customer teams, suppliers, and tool vendors to accelerate time to market.

Reduce system validation effort: Integration in continuous integration/testing workflows with rapid provisioning of eDTs reduces validation effort while improving software quality.

> Lower development costs, achieve reliable SOPs, and reduce recalls and maintenance costs, **all while accelerating innovation.**

Accelerate Your SDV Development

The Synopsys eDT Platform for Automotive empowers you to bring eDTs to life by enabling collaboration between participants in the automotive development ecosystem throughout the product lifecycle. The eDT Platform is your solution to accelerate the development of AI-driven, software-defined vehicles.

Learn how to re-engineer automotive engineering at synopsys.com/eDT