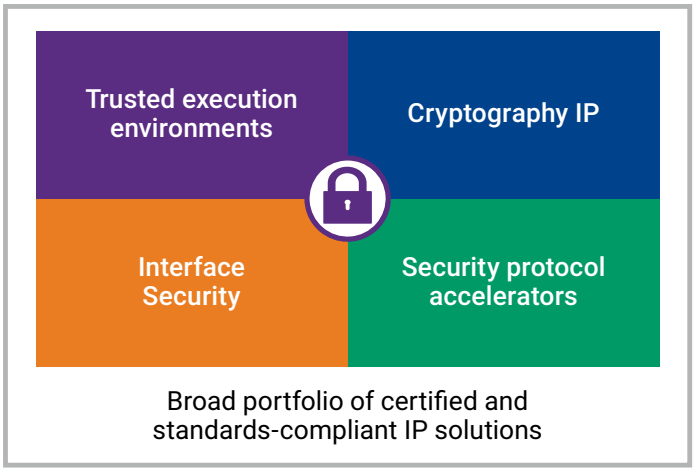
SYNOPSYS®

Synopsys Security IP

Enabling the Highest Levels of SoC Security

Secure Your SoC from the Start

Whether you are developing system-on-chips (SoCs) for mobile and wearables, automotive, artificial intelligence (AI), or entertainment, securing your proprietary data and your customers' information is critical to your company's long-term success. Hackers can exploit vulnerabilities in any part of those systems, at the network, device, or chip levels. Protecting your systems starts with having base security functionality hardened into the SoC to enable the setup of a secure communication environment.



Synopsys' industry recognized security experts are committed to helping you protect your SoC. We provide a broad portfolio of highly integrated security IP solutions that support your system requirements to help you accelerate your secure chip's tape out and time-to-market, even if you don't have in-house security experts. Our IP and software solutions help prevent a wide range of evolving threats in connected devices—threats including theft, tampering, side channels attacks, malware and data breaches

The reality is, security breaches can affect any connected device. Protect yours with Synopsys Security IP.

Automotive	AI	Cloud	Industrial	Wearables	Entertainment
• Protect car subsystems and data against tampering • EVITA	• Secure algorithm protection • Avoid rogue data injection	• Protect confidential data during transfer • Highest level of security for I/O interconnects • High-performance, low-latency solution	• Remote updates and control • Monitor and manage production flow	• Fast, efficient, seamless ID and authentication • Secure in-field updates	• Ultra HD content protection • Secure key management • Side channel attack resistance

"As security attacks increase and evolve, relying solely on internal development carries too much risk and affects time-to-market.

We use Synopsys Security IP for our autonomous automotive SoC product lines due to Synopsys' deep security expertise and proven, certified technology that supports the features we require."

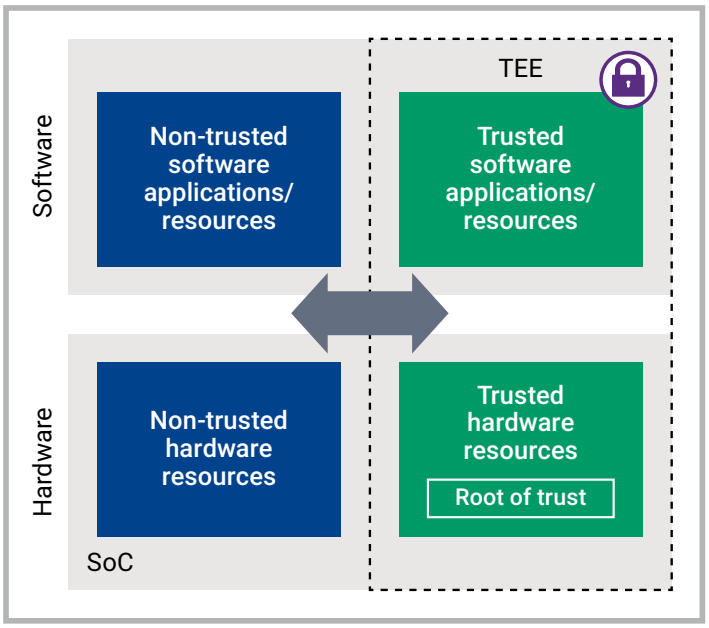
~VP of ASIC Design, Leading AI Chip Provider

Your SoC Deserves a Unique, Tamper-Proof Identity

Creating trust in devices begins early in the design process and figures in aspects of manufacturing, service and maintenance throughout the devices' life cycle. Many devices store and process valuable information such as service subscriptions, health records, credit card and banking information, and similar data on behalf of their owners that must be protected. Deeply embedded security has never been more critical.

Embedding a hardware root of trust enables chip manufacturers and their OEM/ODM customers to build a trusted execution environment (TEE) to protect valuable data stored within trusted software and hardware resources. The TEE creates a strong cryptographic device identity that is permanently bound to that unique device. Manufacturers can use this trusted identity to provide secure maintenance or enable new features and services. The trust can then be extended to the network and other connected devices.

Synopsys offers several options for creating a TEE on an SoC. The Synopsys tRoot™ Hardware Secure Modules (HSMs) with Root of Trust protect sensitive information and data processing within the SoCs. The tRoot HSMs are available either as flexible, configurable HSMs, or as self-contained HSMs for a completely secure environment with a limited set of interactions with the host processor. Designers can also choose DesignWare ARC® SecureShield™ Technology to build a TEE on low-power ARC EM embedded processors.



Build Safe and Secure Automotive SoCs

The ASIL B Compliant tRoot HSM for Automotive augments its comprehensive root of trust security solution with a suite of automotive documentation and hardware safety mechanisms to protect against both malicious attacks and random and systematic faults.

The tRoot HSM for Automotive safety mechanisms such as dual core lockstep, memory ECC, register EDC, parity, watchdog and self checking comparators, provide protection against permanent, transient and latent faults for the secure system that includes an ARC processor, scalable side-channel resistant cryptography, secure external memory controllers and true random number generator. The ASIL B Compliant tRoot HSM for Automotive is developed and assessed specifically for ASIL B random hardware faults and ASIL D systematic development flow.

Build a Strong Foundation with Secure Cryptography

The cornerstone of all security solutions that deal with confidentiality, integrity, and authentication is cryptography. Synopsys' Cryptography IP including symmetric and hash cryptographic engines, Public Key Accelerators (PKA) and True Random Number Generators (TRNG), are silicon-proven, standards-compliant solutions providing the essential building blocks of secure systems. The hardware and software security implementations are easily configured, cover a wide spectrum of size and performance combinations, and are available in different architectures, such as look-aside or flow-through. Each cryptographic core can be used as a building block for security protocol accelerators and embedded security modules.

> *"With increased demand for data protection against malicious attacks, we needed to develop our storage SSD SoC with strong security based on proven, standards-compliant IP. Synopsys' Security IP enabled us to implement the highest level of security for our SoC."*
>
> ~Sky Shen, CEO of Starblaze

SoC Design is Critical for Device Security

SoC security is taking center stage as more interfaces are used to process, store, and connect large amounts of valuable data at increasingly faster rates. More connected devices, more sophisticated attacks, and more regulations for data privacy and protection require strict security for SoCs and data communication. This demands the semiconductor industry to take a serious look at security, not as an afterthought but as an essential part of SoC development. Interfaces need to incorporate security to ensure data confidentiality and integrity. This can be achieved by encryption/decryption, authentication, and physical protection. Integrating security features in the controllers, Synopsys offers a broad range of secure interface IP products to protect HPC, IoT, mobile, and automotive SoCs against tampering and physical attacks.

Protect Data Transfer in SoCs Against Tampering and Physical Attacks

The Synopsys Integrity and Data Encryption (IDE) Security Modules help designers protect against data tampering and physical attacks in high-performance computing (HPC) SoCs using PCIe and CXL interfaces. The Synopsys IDE Security Modules protect sensitive data with efficient encryption, decryption, and authentication based on AES-GCM algorithms while meeting PCIe 5.0/6.0 and CXL 2.0/3.0 specifications, performance and latency requirements. The Synopsys IDE Security Modules are designed to the latest standards and are validated with Synopsys' Controller IP to accelerate SoC integration.

High-Value Digital Content Protection

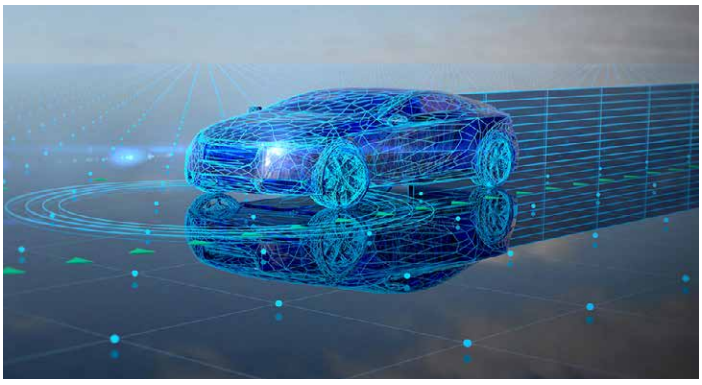
Designs supporting HDMI and DisplayPort (including USB Type-C connectivity) can ensure the highest content protection between links with Synopsys High-Definition Content Protection (HDCP) Embedded Security Modules. Our single and multi-port proven security solutions span silicon cores to embedded software to help content owners, service providers, network operators, embedded system OEMs and SoC suppliers protect high-value digital content for the home entertainment and digital media markets.

Ensure Confidentiality of Data Over Memory Interfaces

Synopsys Inline Memory Encryption (IME) Security Module provides confidentiality of data in use or stored in off-chip memory over memory interfaces for HPC, IoT, Mobile, and Automotive applications. It integrates seamlessly with Synopsys DDR and LPDDR Controllers for most optimal solutions in the industry with latency as low as 2 cycles, accelerating SoC integration and reducing risk. The IME Security Module is scalable to match various memory interfaces bandwidths, supports both write and read channels based on the AES-XTS cryptographic algorithm and is FIPS 140-3 certification ready.

Protect High-Speed Network Traffic

Synopsys Media Access Control Security (MACsec) Modules secure ethernet traffic against denial-of-service (DoS) attacks, eavesdropping, and man-in-the-middle attacks by supporting confidentiality, integrity, origin authentication, and replay protection in switch, router, and bridge SoCs for HPC, 5G, Mobile, and Automotive applications. The standards-compliant full-duplex solutions integrate seamlessly with Synopsys Ethernet MAC & PCS IP, supporting scalable data rates with optimal latency, network prioritization, and diversity for a range of secure Ethernet connections.



Why Choose Synopsys for Security IP?

1. Proven & trusted in 500+ designs
2. Highly integrated
3. Recognized technology leadership
4. Demonstrated expertise with standards compliant security solutions

Accelerate Standard Security Protocols

Supporting major security protocols such as IPsec, TLS/DTLS, WiFi, MACsec, and LTE/LTE-Advanced bring complex cost and power requirements to your SoCs. Synopsys Security Protocol Accelerators offer power- and area-efficient encryption and authentication capabilities for your design, providing increased performance, ease-of-use, and advanced security features such as quality-of-service, virtualization, and secure command processing.

Software Security

In addition to security IP, Synopsys offers the most comprehensive solution for integrating security and quality into your software development life cycle and supply chain. The comprehensive array of managed and professional services, products, and training is tailored to fit your specific needs. For more information on software security, visit synopsys.com/software-integrity.

> *"The IDE cryptographic features in the PCIe 5.0 specification are aligned to industry-standard design requirements and can be flexibly extended as security requirements evolve. By offering the unique combination of interface and security IP for the PCIe 5.0 specification, Synopsys is enabling the design community to quickly implement necessary security functionality into their systems."*
>
> ~Al Yanes, PCI-SIG® Chairman and President

About Synopsys IP

Synopsys is a leading provider of high-quality, silicon-proven IP solutions for SoC designs. The broad Synopsys IP portfolio includes logic libraries, embedded memories, PVT sensors, embedded test, analog IP, wired and wireless interface IP, security IP, embedded processors, and subsystems. To accelerate prototyping, software development and integration of IP into SoCs, Synopsys' IP Accelerated initiative offers IP prototyping kits, IP software development kits, and IP subsystems. Synopsys' extensive investment in IP quality, comprehensive technical support and robust IP development methodology enable designers to reduce integration risk and accelerate time-to-market.

For more information on Synopsys IP, visit synopsys.com/ip.

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