Tortuga Logic is a cybersecurity company providing products and services to detect and prevent hardware vulnerabilities. Unlike software and firmware security solutions that do not find underlying hardware flaws or manual penetration testing that only find issues after the device is manufactured, the Radix-S patented technology detects and prevents security vulnerabilities in FPGAs, ASICs and SoCs. Its advanced analysis helps security and verification teams identify and isolate security vulnerabilities before the device is manufactured, saving costly design re-spins or catastrophic system failure due to an attack.

The inputs to Radix-S include the System IP or SoC’s RTL files, a set of security rules based on the threat models defined for the system, along with the block or system level testbench files that verification teams are already developing. Radix-S then creates and adds a hardware Security Model to the design. The Security Model is used to check the validity of the security rules while running standard verification testbenches in your choice of simulator, such as Synopsys ZeBu, Mentor Veloce, and Cadence Palladium.

**USE CASES**

- Hardware Root of Trust Security Verification
- SoC access control verification
- Secure boot sequence verification
- Red/Black separation
- Timing side channels
- Configuration register read/write protection
- Encryption key leakage
- Verification of clearing secret content
- External Debug disablement/analysis
- 3rd Party/vendor IP and interface security

**BENEFITS**

- Ensures correct configuration for maximum security
- Prevents unauthorized access
- Verifies boot data and keys remain secure
- Checks for isolation of redundant systems
- Detects and prevents Meltdown/Spectre variants of attacks
- Ensures SoC access control is maintained
- Ensures keys remain secure during and after usages
- Ensures secure data is cleared prior to switching to non-secure modes
- Ensures JTAG does not access secure data or keys
- Increases assurance that IP is secure and does not contain hardware trojans

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If security vulnerabilities are found, analysis information including custom waveforms and leakage path information helps pinpoint the root cause. The Radix Analysis Views displays both signal values and leakage information to identify the source of the vulnerability and the signal values that caused it.

Using Radix-S greatly speeds up your existing RTL security review while diminishing the risk of a hardware security vulnerability making its way into the chip or worse, the final system deployment. Radix-S is compatible with Cadence® Xcelium™, Mentor® Questa®, and Synopsys® VCS® simulators.

Founded in 2014, Tortuga Logic is a cybersecurity company that provides industry-leading services and solutions to address security vulnerabilities overlooked in today’s systems. Tortuga Logic’s innovative hardware security verification solutions, Radix, enables verification and security teams to detect and prevent system-wide exploits in FPGAs, ASICs and SoCs that are otherwise undetectable using current methods of security review.

ABOUT TORTUGA LOGIC

HARDWARE SECURITY DEVELOPMENT LIFECYCLE

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