VECTOR >

Security Verification and Testing

Multi-level Security Verification, Validation and Hardening

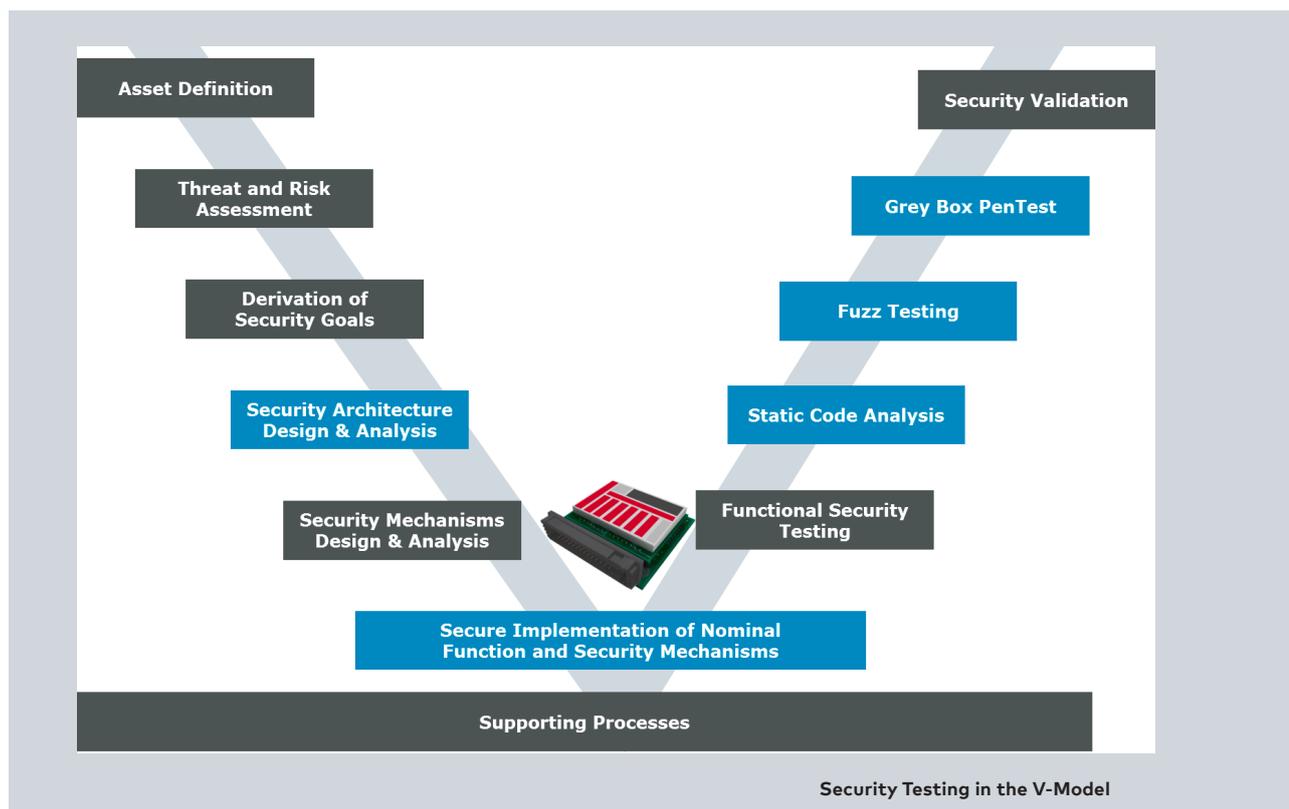### What is Security Verification and Testing?

Our Security Verification and Testing service includes **Architecture and Code Review**, **Static Code Analysis**, **Fuzz Testing** and **Pen Testing**. It allows our experts to employ comprehensive security analysis from code and architecture level to targeted attacks, uncovering system weaknesses and potential risks. The methods and techniques used are similar to those deployed by hackers or crackers to break into a system.

Deliverables of Security Verfication and Testing

> Security Testing strategy and concept
> Provision and adequate tools, if applicable
> Overview of findings and vulnerabilities
> Pentest misuse, abuse and confuse scenarios
> Guidelines for the recreation of successful attacks
> Recommendations for defect mitigation
> Results of CANoe-based Fuzz Testing
> Results of defect, design and architecture analysis
> Compliance with secure coding metrics, e.g. CERT

Advantages with Vector Consulting:

> Full knowledge of automotive industry from semiconductor to hardware, software and service layers
> Competences from different standards, OEMs and suppliers on their needs and expectations
> Leading automotive security best practices and standard evolution for twenty years covering all topics such as cryptography, key management and root cause analysis in key technologies
> Experience with hardware trust anchors (SHE, HSM, TPM)
> Advanced security engineering methods, such as Threat Analysis and Risk Assessment (TARA)
> Secure boot / Secure flash
> Architecture and code reviews, and static code analysis
> Management of crypto material (key, certificates)
> Intrusion detection and intrusion prevention systems
> Secure on-board and off-board communication
> Usage of database and restbus simulation
> Comprehensive black, grey and white box testing

Asset Definition		Security Validation
Threat and Risk Assessment		Grey Box PenTest
Derivation of Security Goals		Fuzz Testing
Security Architecture Design & Analysis		Static Code Analysis
Security Mechanisms Design & Analysis		Functional Security Testing
	Secure Implementation of Nominal Function and Security Mechanisms	
	Supporting Processes	

Security Testing in the V-Model

Competence Supports

Vector Consulting supports with tailored competences from its consulting and development product lines:

> Test strategy and test concept for cost-efficient and sustainable penetration testing that scales to further evolution of your product
> Testing method in automotive networks
> Incident management and root cause analysis with defect resolution
> Guidance and support for the mitigation of vulnerabilities
> Training and Coaching

Security Verfication

With security verification, we support architecture and code reviews and static code analysis, including:

> Architecture Analysis: identify and document all access rule violations in the architectural documentation
> Design Analysis: Identify code metric violations, code duplicates, and anti-pattern
> Weakness analysis: Identification and evaluation of the defects based on CERT 2016, MISRA-C 2012 Amd1 and SANS Top 25 CWEs

Penetration Testing

> Pentest strategy and concept
> Development of misuse, abuse and confuse case
> Pentest cases and scenarios
> Provisioning of adequate testing tools if applicable
> Test execution support

Testing of Security Mechanisms

Despite careful analysis, design and implementation of security mechanisms, it remains necessary to test them. Fuzz testing is one method of doing so, which has been successfully used in IT for years.
Vector offers the capability of efficiently and professionally executing automotive fuzz tests using Vector Signal Fuzzer.

Vector is your trusted Cybersecurity Partner:

"*Vector Consulting supported Panasonic in cybersecurity, demonstrating outstanding expertise. The goal of a comprehensive TARA, integrated into a security concept, was achieved!*" - Michael Prantke, Panasonic

"*Vector Consulting Services is a good partner for analyzing and supporting vehicle security realization. The Vector team has helped Claas implement TARA and security engineering for embedded ECUs*" - Alexander Großmann, Claas E-systems

For more information about Security Testing and Vector Consulting Services, please contact our security experts:
> E-Mail: consulting-info@vector.com
> Tel.: +49 711 80670-1520

www.vector.com/consulting

Fuzz Testing with Vector Signal Fuzzer