TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

VE-VIDES
Development of Trustworthy Design Methods and a MEMS-based Fingerprinting Architecture

Schott, Christian[1]; Meinel, Katja[1]; Mayer, Franziska[1]; Gupta, Dhruv[1]; Mittag, Sebastian[1]; Hahn, Susann[1]; Weidlich, Sebastian[1]; Bülz, Daniel[2]; Forke, Roman[2]; Hiller, Karla[1,2]; Kuhn, Harald[1,2]; Heinkel, Ulrich[1]

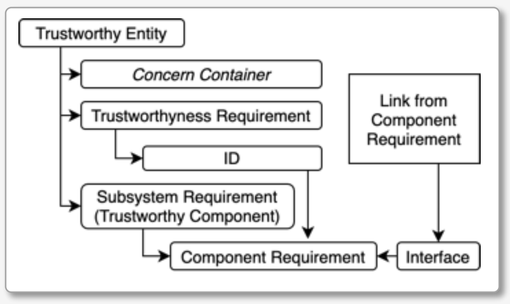
[1] Technische Universität Chemnitz, Fakultät für Elektrotechnik und Informationstechnik, 09126 Chemnitz

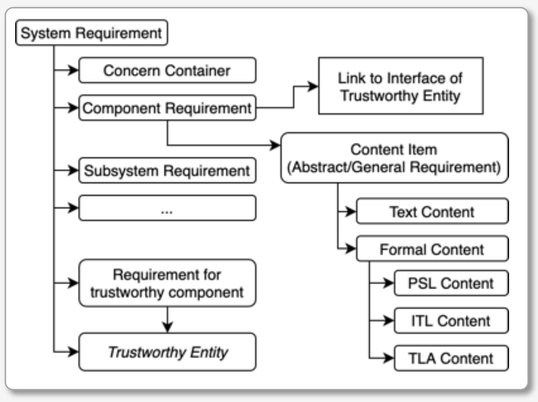
[2]Fraunhofer-Institut für Elektronische Nanosysteme ENAS, 09126 Chemnitz

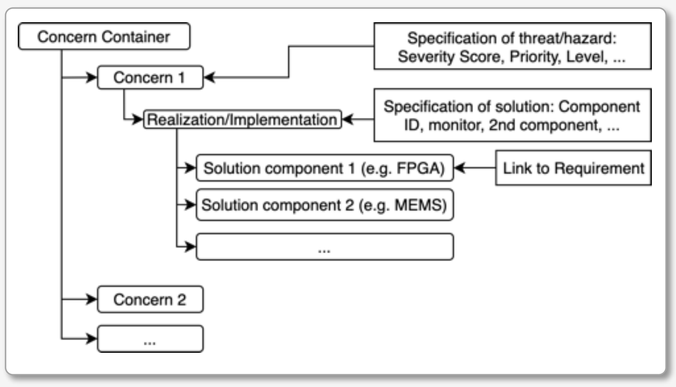
Trustworthy Design Methods

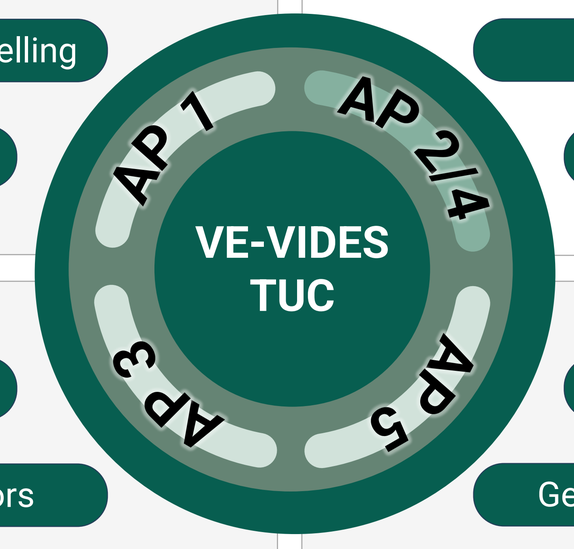
Modelling of Trustworthy Requirements

- Formulation of concerns describing certain threats/hazards
- Part of common specification and its requirements
- Concerns are solved by trustworthy entities and its components
- Integrated in an in-house requirements engineering tool *SpecScribe*



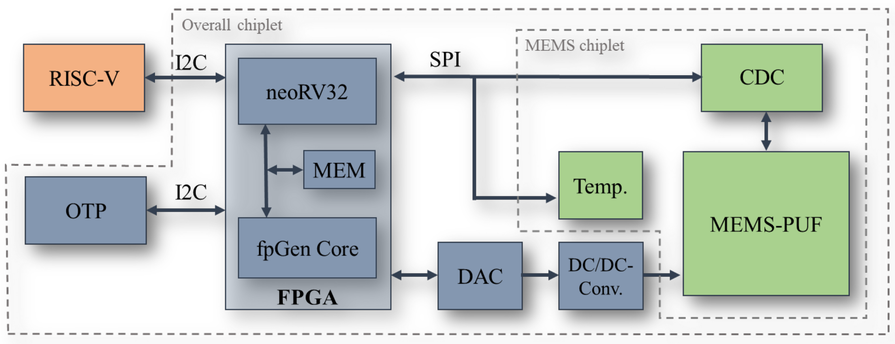


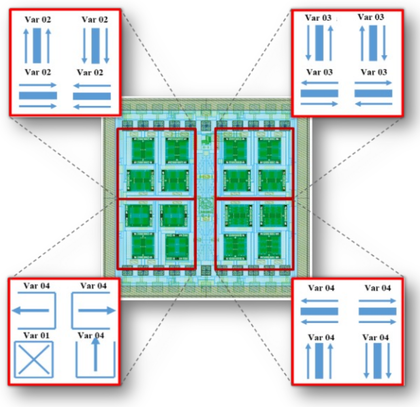




MEMS-based Fingerprinting Architecture

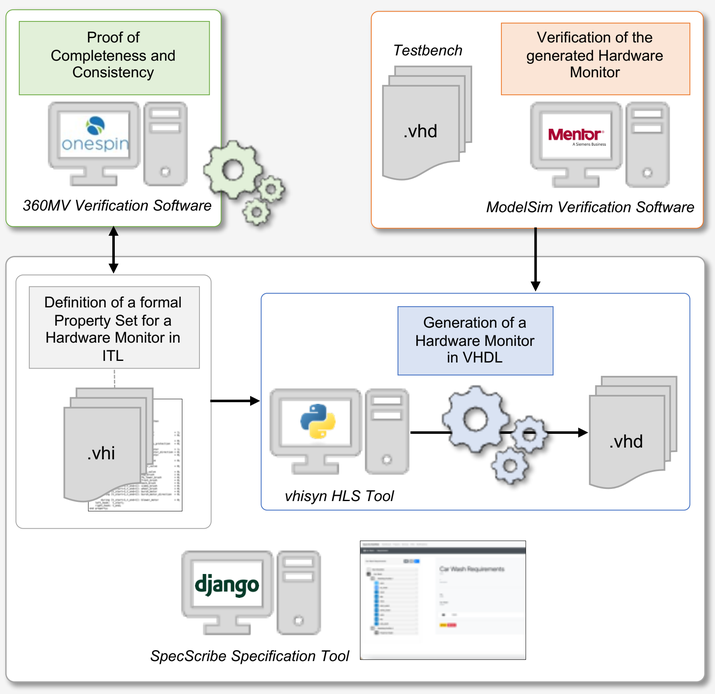
- Micro-Electro-Mechanical System (MEMS) as physical unclonable function (PUF): MEMS varactor array
- Fingerprint calculation and evaluation in FPGA with hashed key
- Challenge-Response method
- 64 Bit Fingerprint





Formal Properties for Hardware Monitors

- Formal specification of hardware designs using InTerval Language (ITL)
- Application field in project: Hardware Monitors for trustworthy designs
- Proof-of-concept HLS flow
- Generating hardware monitors for Fingerprinting FPGA implementation

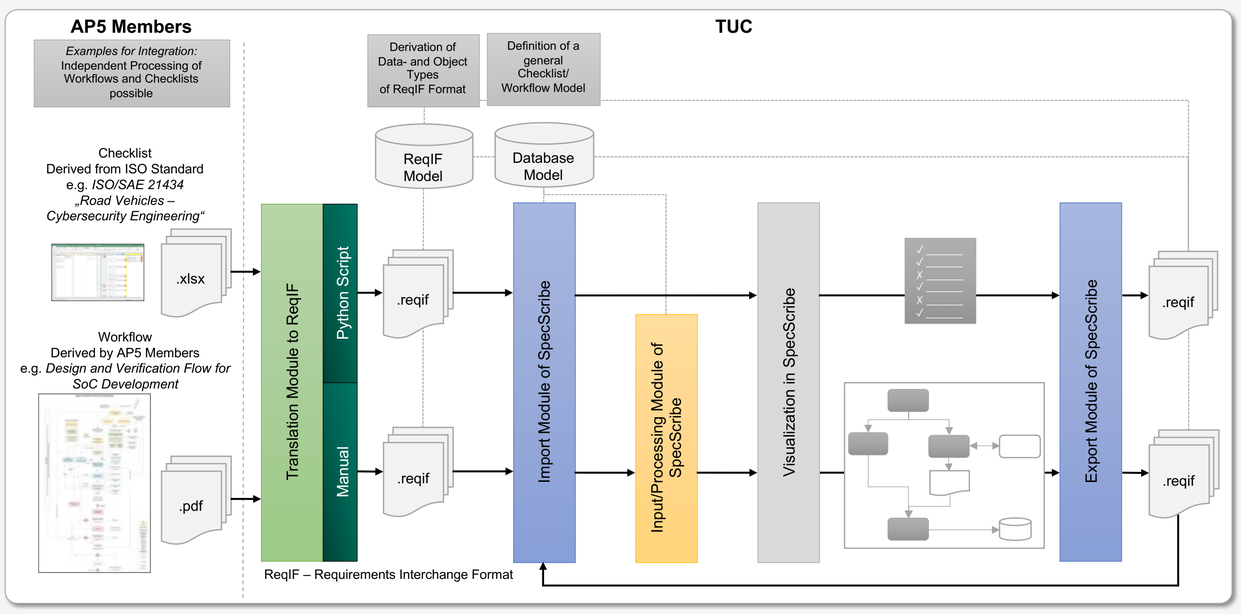


1. Specification in tool *SpecScribe*
2. Formal proof of completeness and consistency using *OneSpin 360MV*
3. Synthesis using in-house HLS tool *vhisyn*

Formal Modelling of Workflows and Checklists

- Generalization for different fields of application
- Dedicated ReqIF model for objects, activities, relations and results
- Implementation in tool *SpecScribe*

- Goal: individual workflows and checklists formal and interchangeable amongst all partners within the product development lifecycle



Bundesministerium für Bildung und Forschung

VE-VIDES

Förderkennzeichen:
16ME0243K - 16ME0254

Contact:
Prof. Dr.-Ing. Ulrich Heinkel
Professur Schaltkreis- und Systementwurf
Technische Universität Chemnitz
Reichenhainer Str. 70
09126 Chemnitz

SSC

ZfM Zentrum für Mikrotechnologien

Fraunhofer ENAS