

A FRAMEWORK FOR CONSISTENT MEASUREMENT WORKFLOWS ACROSS IC DEVELOPMENT, VERIFICATION AND DATA MANAGEMENT

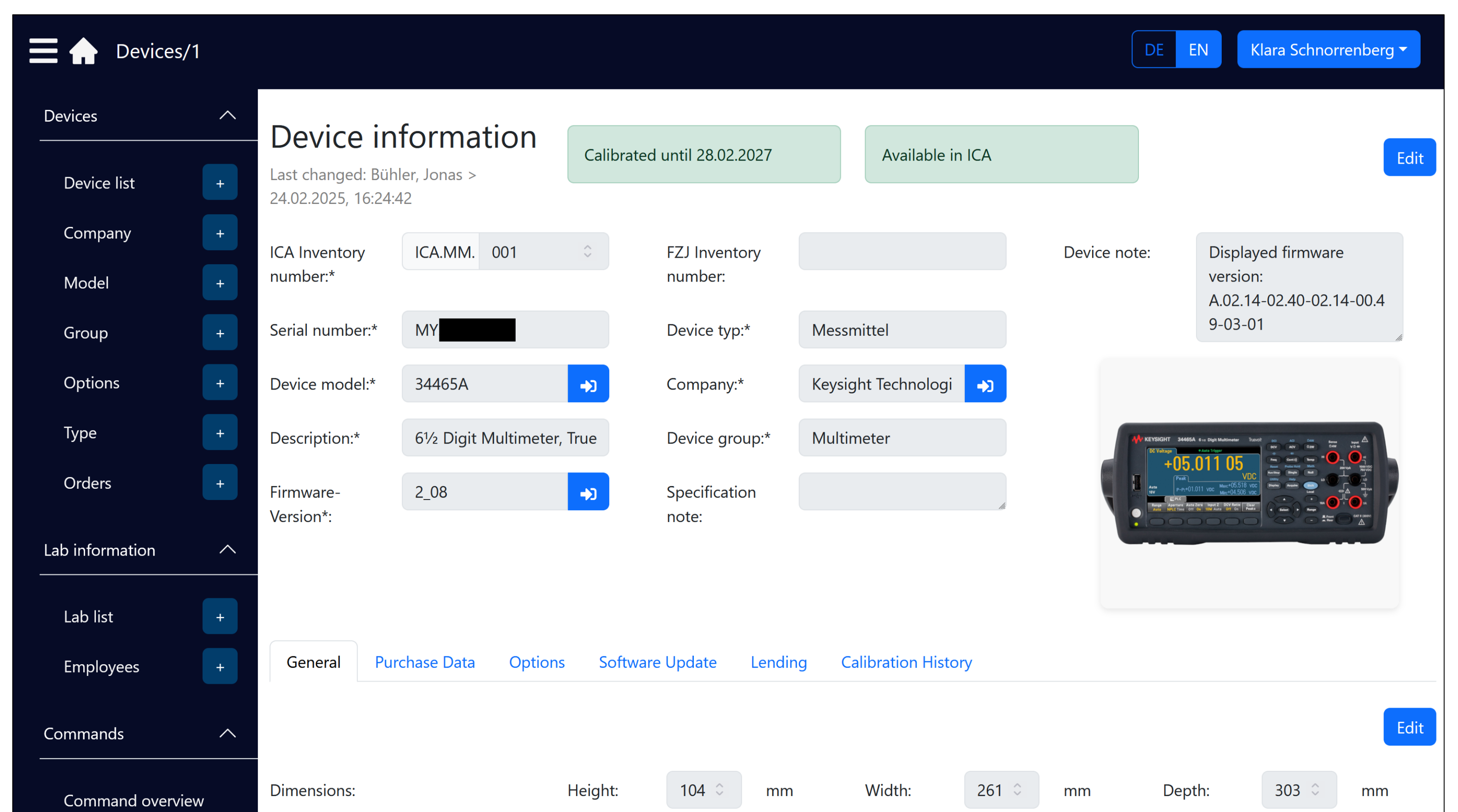
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MOTIVATION

- Automating processes, improved speed and consistency for IC verification
- Consistent data flow from chip-design to measurement phase
- Measurement scripts independent of measurement devices
- Usage of central database for FAIR measurements and device calibration

STATUS: Work in progress

GOAL: Minimize redundant work and communication errors, improving reliability and consistency of laboratory workflows



PREPARATION

1. MANAGEMENT OF MEASUREMENT & LABORATORY INFORMATION

DATA MANAGEMENT SOFTWARE

- Web application for centralized management
- Management of measurement-related information
 - Device metadata
 - IC Register definitions
 - High Level SCPI commands
- Definition of measurement setups and reusable test routines

ROUTINES

- Code snippet containing a process or a default setting
- Independently of programming languages using shared libraries

MEASUREMENT CONTROL

2. CONFIGURATION OF THE CHIP – WRITING REGISTERS & FIELDS

JTAG DRIVER

- Device configuration via abstracted JTAG interface
- Automated register and field programming
- Support for simulated and physical chips
- Common database for simulation and measurements

3. TIME-DETERMINISTIC TRANSMISSION OF DIGITAL SIGNALS

SYNCHRONIZATION MODULE

- Control of deterministic digital input signals via Python Interface
- Modular design to support different hardware platforms, e.g. FPGAs, AWGs
- Reuse of simulation waveforms for measurements

4. DEVICE CONTROL VIA ABSTRACTED HIGH LEVEL COMMANDS

SCPI DRIVER ABSTRACTION

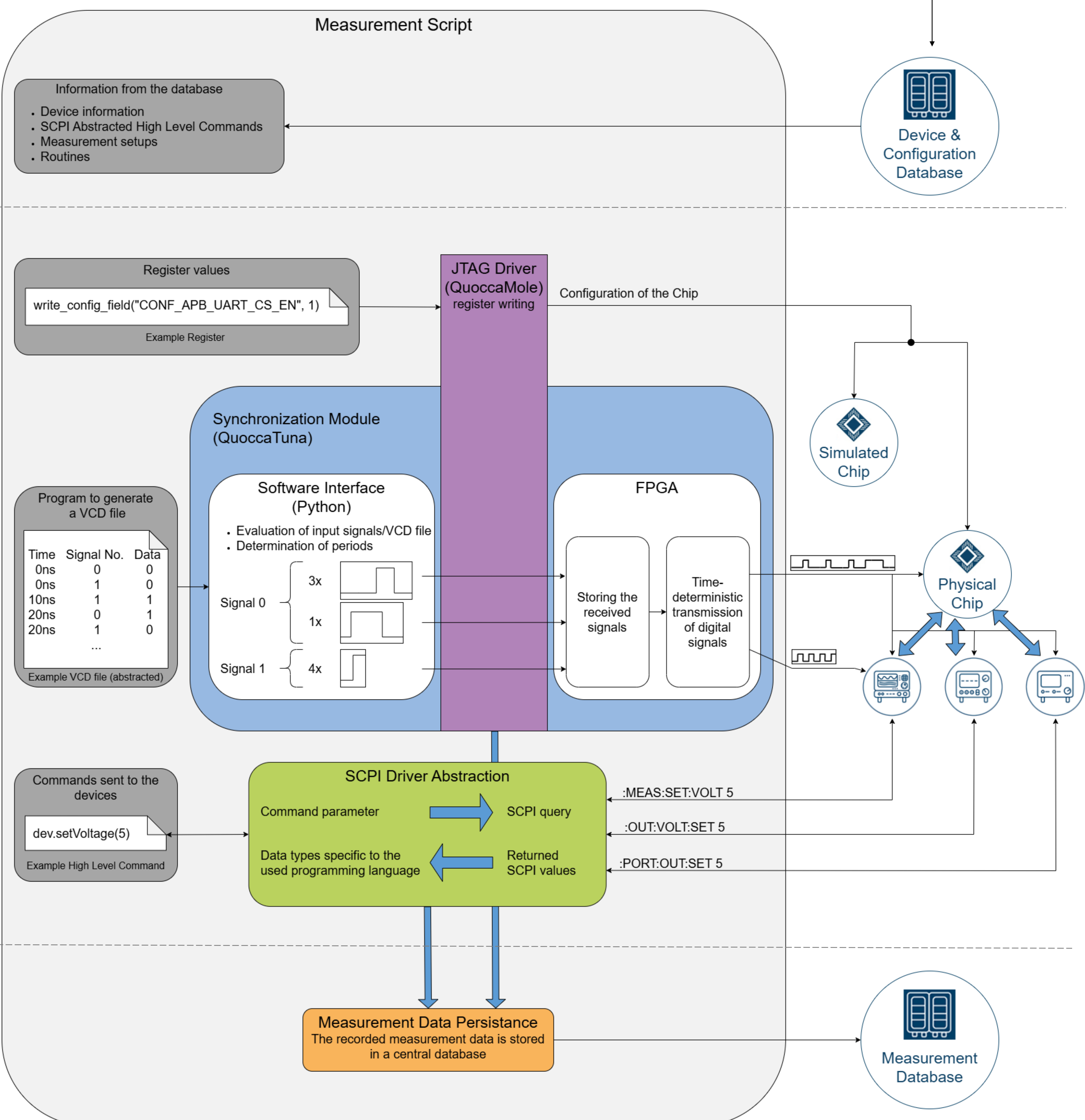
- Device-independent control via Abstracted High Level Commands
- Translation into device-specific SCPI Commands

PROCESSING

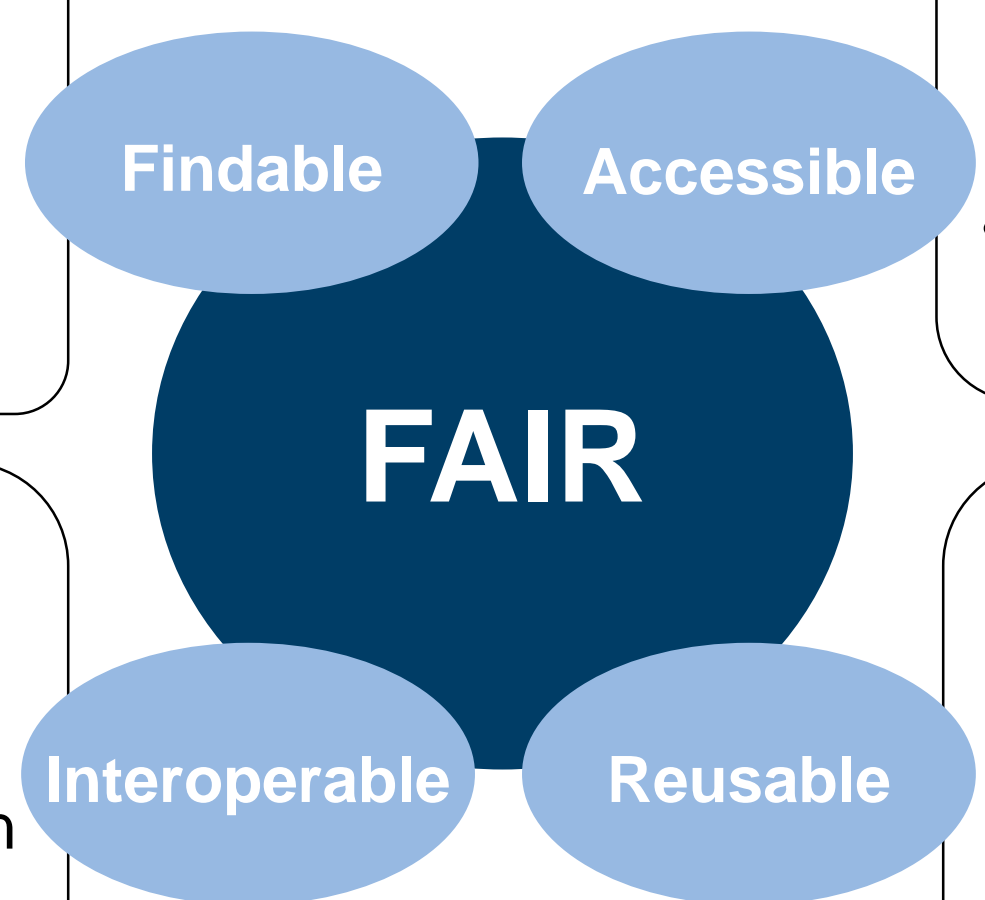
5. CENTRAL STORAGE OF MEASUREMENT- AND METADATA

MEASUREMENT DATA PERSISTENCE

- Persistent and searchable measurement records
- Enables comparison of pre- and post-silicon verification



- **Central database** for measurement- and metadata
- **Unique identifiers** linking data
- **Searchable records** across pre- and post-silicon verification
- **SCPI Abstraction Layer** for device-independent measurements
- **Standardized representation** of signals
- **Shared data formats** across simulation and measurement environments
- **Export** in standardized data formats



- **Central access via web application** to data and metadata
- **Controlled access** through user roles
- **Versioned** routines and measurement setups
- **Reproducible** signal definitions
- **Comparable pre- and post-silicon results**



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