SystemC CCI
Summer of Code 2025 project

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Agenda

- CCI overview

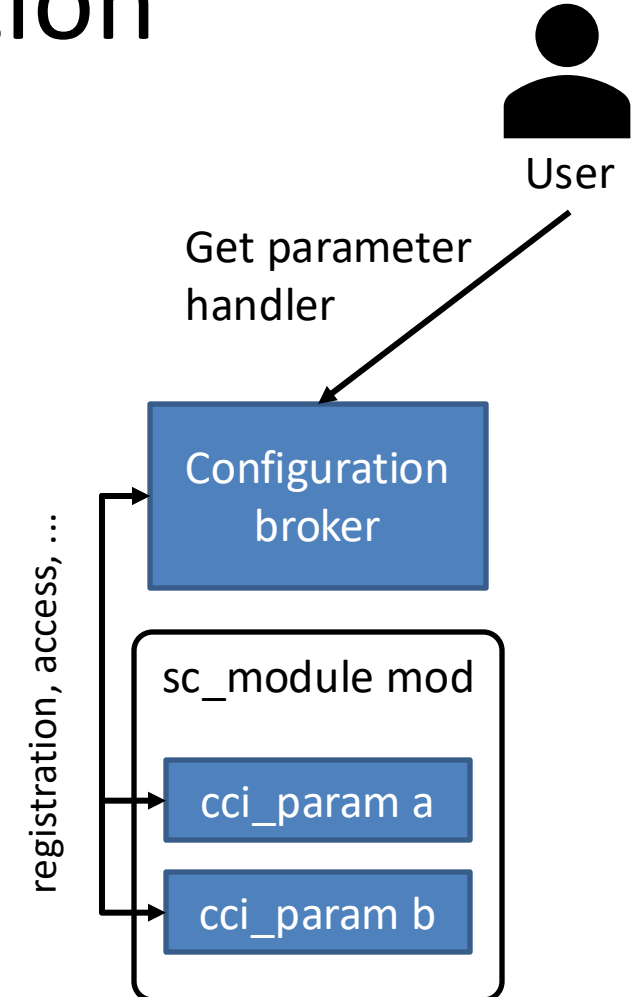- Summer of Code project

- Early work

- Current work

SystemC CCI

SystemC CCI

- **C**onfiguration, **C**ontrol and **I**nspection standard

- Motivation:
  - VPs are an assembly of models from different vendors
  - Users want to interact with them without needing implementation details

- Goal:
  - Standardized way of configuring, controlling & inspecting these (black box) models
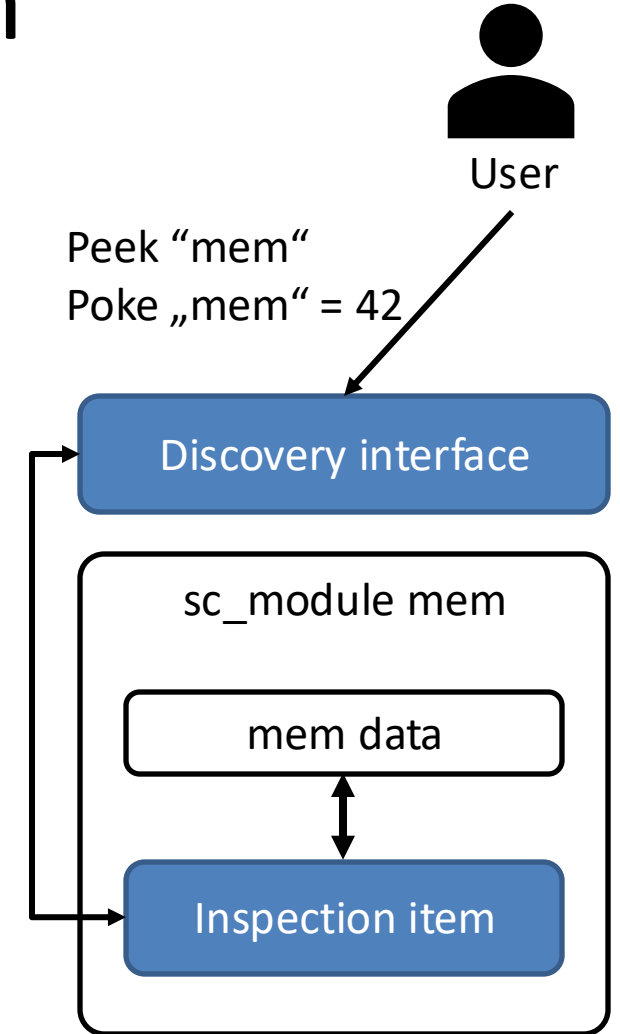
SystemC CCI: Configuration

- Goal: Parametrization of SystemC modules

- Module own parameters
  - Registration to broker

- User interacts with them via broker
  - Requests a parameter handler

- Status: standardized & implemented

User

Get parameter handler

registration, access, ...

Configuration broker

sc_module mod

cci_param a

cci_param b

SystemC CCI: Inspection

- Goal: Inspect SystemC models
  - i.e.: peek/poke memory models, …

- Inspection items
  - Registration to global discovery interface
  - Handle access to internal data

- Status: Experimental implementation available

User

Peek "mem"
Poke „mem" = 42

Discovery interface

sc_module mem

mem data

Inspection item
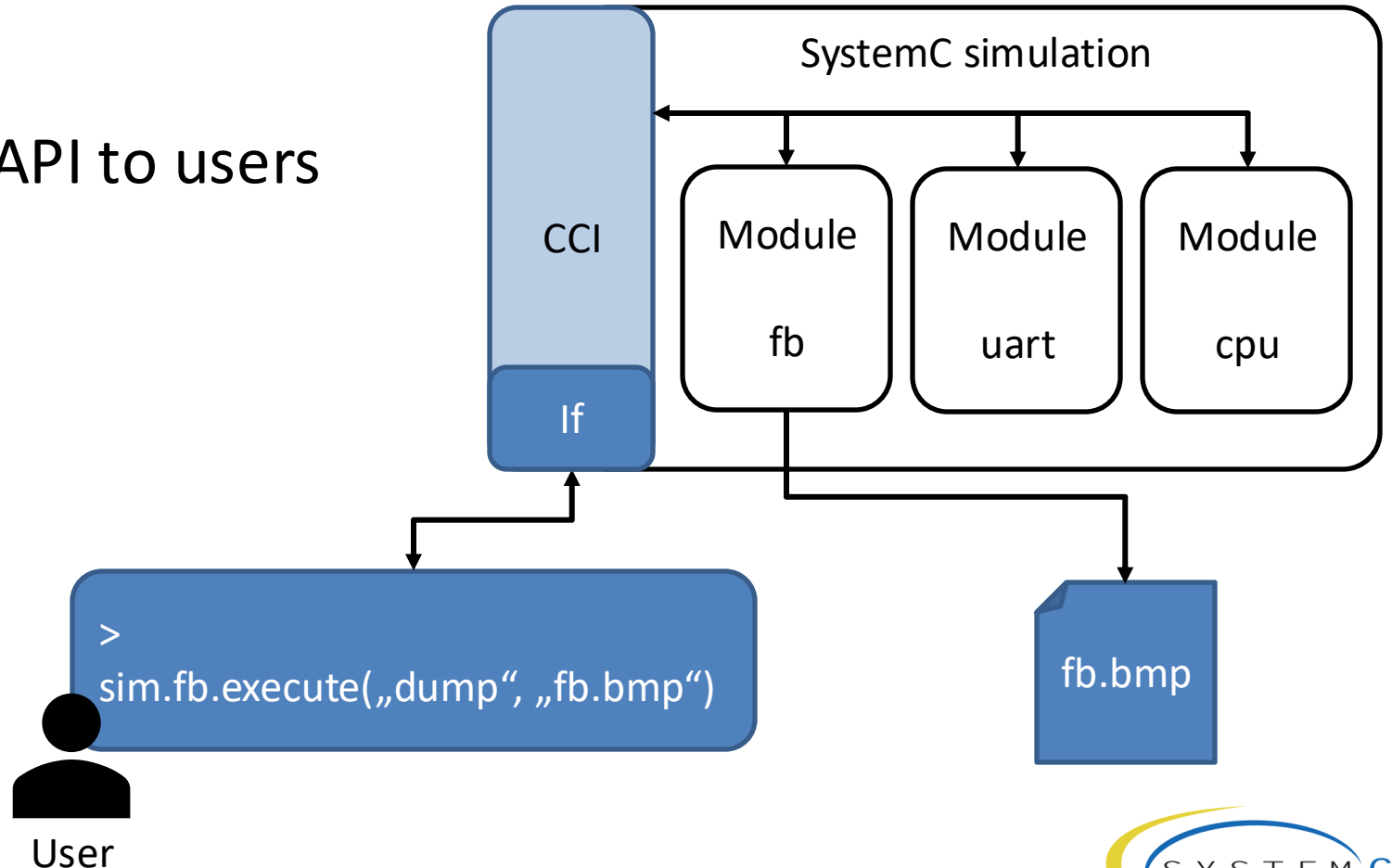
SystemC CCI: Control

- Goal: Controlling simulations models
  - i.e.: Dump contents of framebuffer model into bitmap

- Use cases/Requirements: Ongoing discussion in WG

- Status: not standardized, no implementation available

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Project goal

- Control interface for CCI

- Expose CCI as interactive API to users
  - CLI application
  - REST web app

- Use cases
  - Debug
  - Inspect
  - Control

SystemC simulation

CCI

If

Module

fb

Module

uart

Module

cpu

>
sim.fb.execute(„dump", „fb.bmp")

fb.bmp

User

Early work: General maintenance

- CI fixes => Checkmarks are finally green again :)

- Golden reference tests => CCI gets checked :)

- Minor issues
  - C++20 compatibility

Issues (1)

- Compatibility issues with SystemC 2.3.4 on Windows/macOS

- Marking SC_THREAD stacks on Linux as non-executable

- Guarded by precompiler directives…

  …BUT precompiler was not called for the specific assembly file
  - Builds fail
  - Fixed in SystemC 3.0.0

Issues (2)

- Library buildable with MinGW GCC on Windows

- BUT tests segfault in CI
  - Only when run non-interactively…
  - Running them twice is successful…   :|
  - Not reproducible on a local machine…   :(

- For now: Skip testing this platform
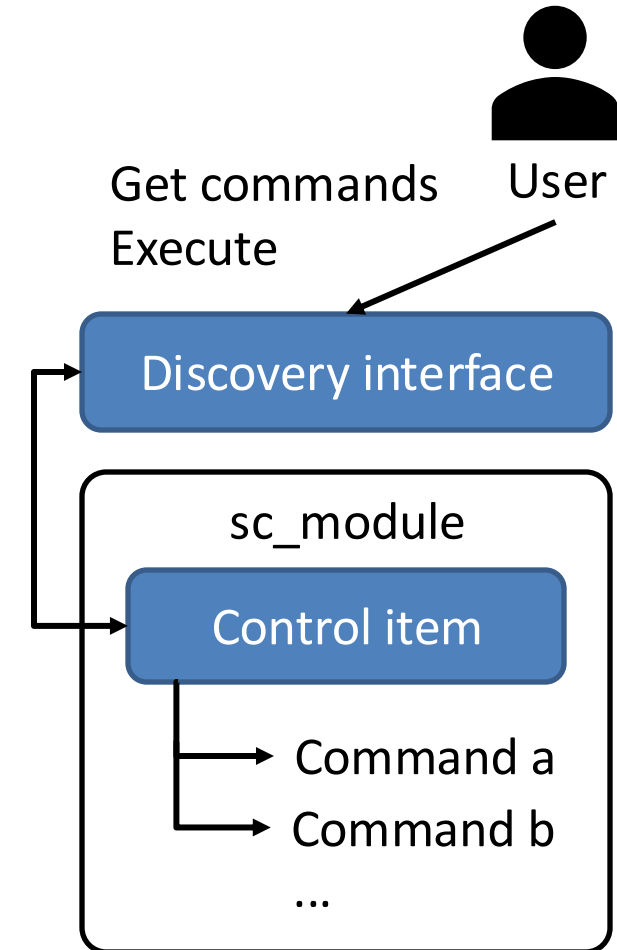
Current work: Inspection integration

- Experimental implementation available
- => Merge to main repository

- Create tests
- Create examples (as entry points/…)

- Evaluate how parts of configuration could be reused

Current work: CCI Control

- **Interface design proposal**
  - Parameter/return types ?

- **Control items**
  - Own commands
  - Registration to global discovery interface

- **Commands implement desired behavior**

- **Reuse other CCI components (?)**

User

Get commands
Execute

Discovery interface

sc_module

Control item

Command a

Command b

…

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