An open and flexible SystemC to VHDL workflow for rapid prototyping

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Chair for
Chip Design for
Embedded Computing

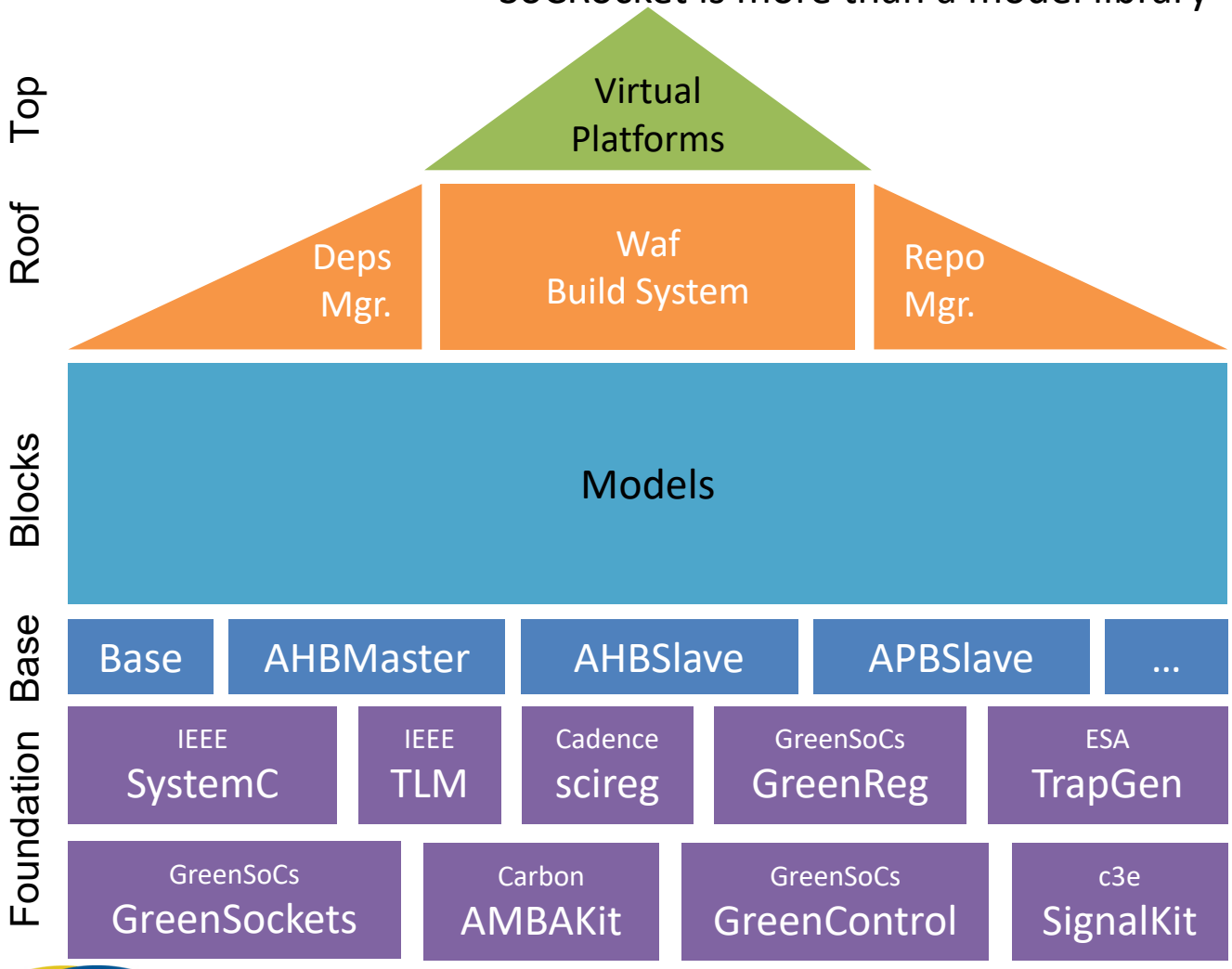
Disclaimer

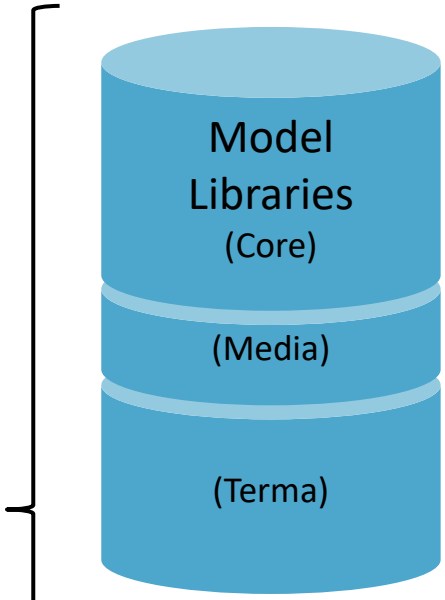
Introduction

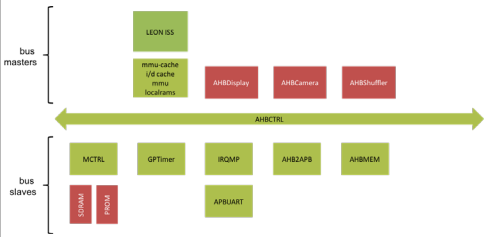
- Design methodology
- SystemC/TLM
- Rapid prototyping
- Validation

SoCRocket - The building blocks

SoCRocket is more than a model library

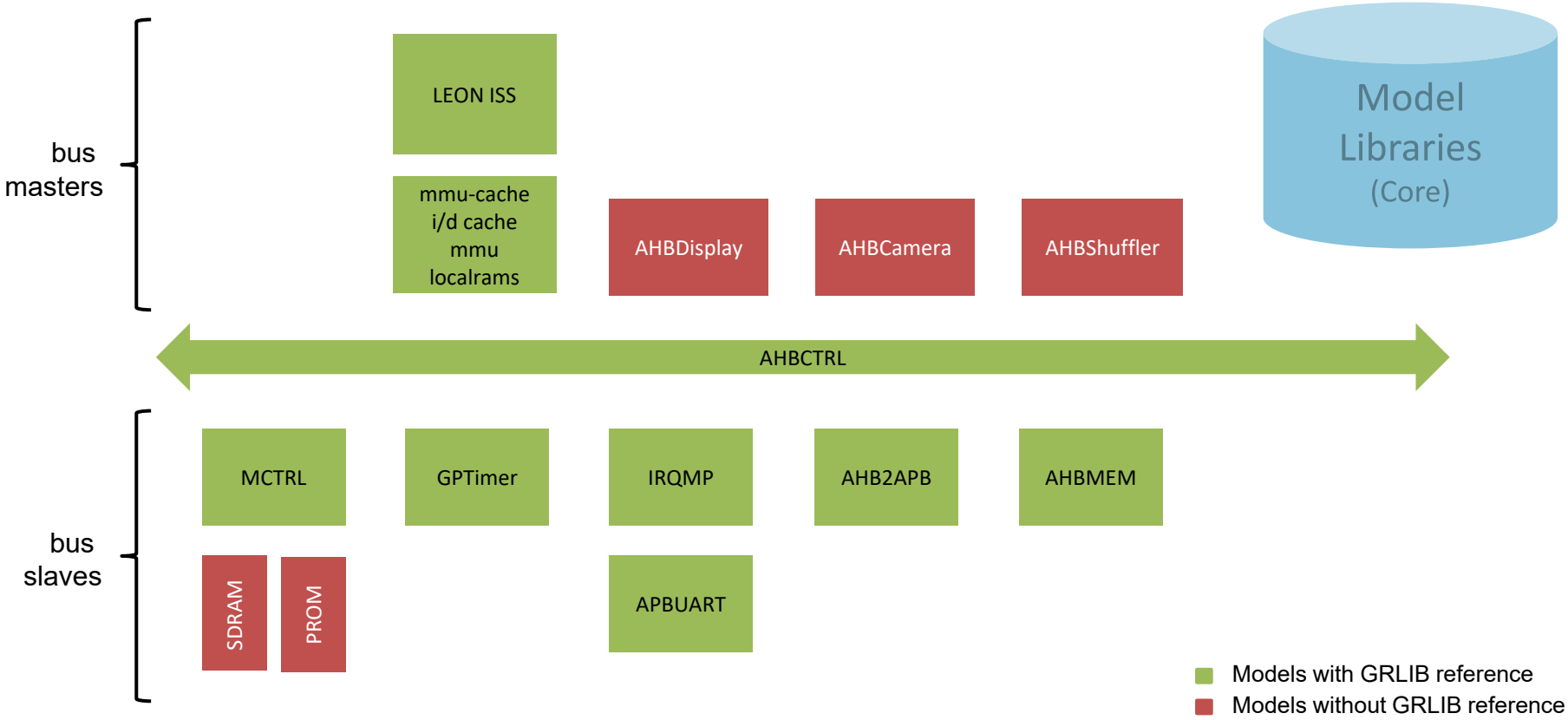






SoCRocket TLM Models

All models developed with RTL equivalents as blueprint



- Models available in loosely timed (LT), and approximately timed (AT) flavor of TLM2.0.
- ESA Reference TLM Platform

Universal Scripting Interface (USI)

- Available for several simulators
- SystemC APIs in Python
- Usability Enhancements
- No recompilation needed
- Standards compliant

Further information: Rolf Meyer, *Universal Scripting Interface for SystemC*, DVCon Europe 2015

Jinja2 Templates

- Inheritance Support
- High performance (JIT)
- Configurable Syntax
- Custom Filters

Create Generic Map Filter

```
1 ahb0 : ahbctrl -- AHB arbiter / multiplexer
2 generic map (
3   {{ ahbctrl.generics|create_generic_map }} )
4 port map (rstn, clkm, ahbmi, ahbmo, ahbsi, ahbso);
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custom filter function

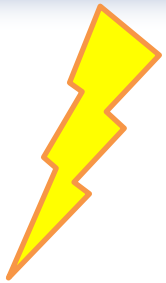
Create Generic Map Filter

```
1 ahb0 : ahbctrl -- AHB arbiter / multiplexer
2 generic map (defmast => CFG_DEFMST, split =>
CFG_SPLIT,
3   rrobin => CFG_RROBIN, ioaddr => CFG_AHBIO,
4   fpnpen => CFG_FPNPEN, nahbm => maxahbm , nahbs =>
maxahbs )
5 port map (rstn, clkm, ahbmi, ahbmo, ahbsi, ahbso);
```

Recipe for Adjustment

1. Compare HDL and SystemC models
2. Deactivate models in HDL
3. Verify functionality (test synthesis)
4. Create top-level template
5. Execute script

Cobham Gaisler GRLIB

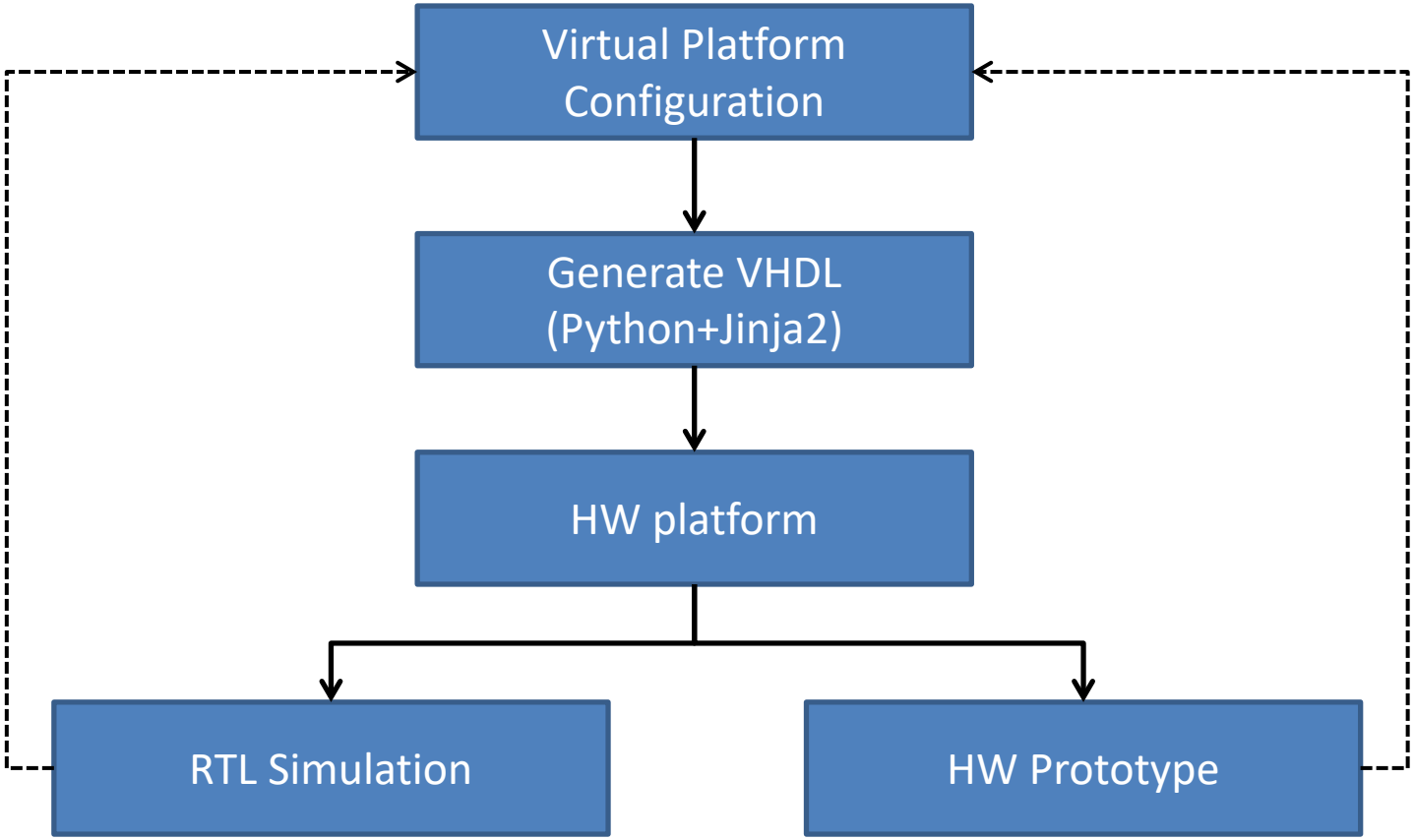


SoCRocket

- AHB ROM
- GPIO
- Debug support unit
- AHB JTAG
- AHB status register

- AHB Memory
- SDRAM Model
- AHB Camera
- AHB Shuffler

Putting it all together



Outlook

- Power Analysis
- Integration into automatic DSE
- UVM framework automation
- …

SoCRocket is available online: https://socrocket.github.io/

For more information do not hesitate to contact us!

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Questions?