Accellera SystemC Standards Update
SystemC Evolution Day 2023

Martin Barnasconi
Accellera Technical Committee Chair

accellera.org
Outline

• Accellera Systems Initiative & Working Groups
• SystemC ecosystem
• SystemC Working Groups updates
• Public Repositories
• systemc.org updates
• How to join us
Accellera Systems Initiative

Our Mission

To provide a platform in which the electronics industry can collaborate to innovate and deliver global standards that improve design and verification productivity for electronics products.
**Accellera Working Groups**

### Verification-centric Working Groups
- Portable Stimulus
- Multi-Language
- SV-AMS
- UVM
- UVM-AMS

### SystemC Working Groups
- Language
  - DT
  - CPS
- AMS
- CCI
- Verification
- Synthesis

### Working Groups in other domains
- Functional Safety
- IP-XACT
- CDC / RDC
- FSS PWG

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SystemC ecosystem

• SystemC is a C++-based language standard, widely used for
  – System-level modeling, design and verification
  – Architectural exploration, performance modeling
  – Analog/mixed signal modeling
  – High-level Synthesis
  – Software development

• Released as IEEE standards
  – IEEE Std. 1666-2023 (SystemC)
  – IEEE Std. 1666.1-2016 (SystemC AMS)

More information: https://systemc.org/
Accellera SystemC Working Groups

• SystemC Language Working Group (LWG)
  – Chair: Laurent Maillet-Contoz (ST)
  – Subgroups
    • Common Practices (SCP): Chair: Mark Burton (Qualcomm)
    • SystemC Datatypes (DT), Chair: Frederic Doucet (Qualcomm)
• SystemC Analog/Mixed-Signal Working Group (AMSWG)
  – Chair: Martin Barnasconi (NXP)
• SystemC Configuration, Control & Inspection Working Group (CCIWG)
  – Chair: Lukas Jünger (MachineWare)
• SystemC Synthesis Working Group (SWG)
  – Chair: Mike Meredith (Cadence) - acting
• SystemC Verification Working Group (VWG)
  – Chair: Stephan Gerth (Bosch)
SystemC Language Working Group

• SystemC Language Reference Manual released as IEEE Std. 1666-2023
  – Free download under the Get IEEE Program thanks to Accellera sponsorship: https://ieeexplore.ieee.org/document/10246125

• SystemC 3.0.0 public review version to be released soon
  – Fully compliant with IEEE Std. 1666-2023
  – Will be made available via Accellera public repository on GitHub: https://github.com/accellera-official/systemc/tags
  – Final version of 3.0.0 expected later this year.

• Next steps
  – Integrate SystemC tests into main SystemC repository.
  – Establishing CI/CD flow in the Accellera public repository on GitHub
  – Start collecting inputs and requirements for next standardization cycle
Recent discussions focusing on addressing limitations in reporting and logging capabilities in the SystemC core language

Different proposals available for review
  – Presented in September Fika and today
  – Improvements considered for next standardization round

This is a public repository, so the community is encouraged to submit proposals

More information: https://systemc.org/overview/systemc-scp/
LWG - Data types Working Group

- Multi-year effort completed to address the simulation performance improvements of SystemC data types
  - Resolving many issues found in data type implementation of sc_bigint, sc_biguint, sc_signed, sc_unsigned, sc_fixed, and sc_ufixed
  - All improvements are implementation-specific, no change to the language standard / API
  - These updates are integral part of SystemC 3.0.0 public review release
- A detailed technical presentation on this data type refactoring will be shared in an upcoming SystemC Fika Event
- Special Thanks to Andy Goodrich and Fred Doucet to make this happen!
SystemC Analog/Mixed-Signal (AMS) WG

- SystemC AMS regression suite released
  - Covering more than 700 tests, covering unit-level tests, application-level tests and examples

- Developing extensions and enhancements as preparation for the next IEEE update (~2026)
  - Analog solver API
  - Converter primitives between LSF and ELN MoC
  - Interactive tracing and debug interface, tracing customization
  - Analog event detection
  - ...
SystemC Configuration, Control & Inspection WG

- CCI 1.0.1 reference implementation released
  - https://github.com/accellera-official/cci/releases/tag/v1.0.1
  - Improved build infra (automake, cmake, msvc)
  - Established basic CI/CD flow
  - Documentation updates for examples
- Proposal available for Register / Memory Inspection API
  - Ongoing discussion on implementation strategy – topic later today!

More information
https://systemc.org/overview/systemc-cci/
SystemC Synthesis WG

- SystemC Synthesis Working Group is restarting its standardization alignments
  - Mike Meredith is coordinating this effort
- Considered activities by the team (not finalized / prioritized list)
  - Next revision of the SystemC Synthesizable Subset
  - Discuss latest technologies and developments in HLS flow/tools and opportunities for standardization
- Sign-up to the Synthesis WG if you are interested to participate and contribute!
SystemC Verification Working Group

- UVM-SystemC library 1.0beta5 was released early this year
  - Various bugfixes and enhancements to uvm_sequencer classes
- The class libraries for Functional Coverage (FC4SC) and Constrained Randomization (CRAVE) are now available via the Accellera public repositories
  - [https://github.com/accellera-official/fc4sc](https://github.com/accellera-official/fc4sc)
  - [https://github.com/accellera-official/crave](https://github.com/accellera-official/crave)
- Current focus on supporting SystemC 3.0.0

More information [https://systemc.org/overview/systemc-verification/](https://systemc.org/overview/systemc-verification/)
Accellera Public Repositories

- The number of Accellera Public Repositories is growing!
- More information: [https://github.com/accellera-official/](https://github.com/accellera-official/)
systemc.org Updates

• New content added
  – SystemC overview pages covering all Working Groups
  – SystemC Evolution Day Events and Fikas: all presentations and videos
  – Open Access Publications
  – Libraries and Projects
• YOU can help in adding content!
  – Submit your pull request to github.com/accellera-official/systemc.org
How to join us

• Become an Accellera Working Group member
  – [Join Accellera](#) and participate in the Accellera working groups
  – Direct access to the latest standardization proposals and development implementations

• Become a member of the IEEE Standards Association
  – Join [IEEE-SA](#) to participate in the IEEE P1666 (SystemC) working group

• Share your experiences
  – Visit [www.accellera.org](http://www.accellera.org) and join the community forums at [forums.accellera.org](http://forums.accellera.org)
  – Report your issues and/or create pull requests on the public SystemC [GitHub](#) repository

• Help us to grow the SystemC ecosystem and community
  – Participate in community events such as the [SystemC Evolution Day and Fika](#)
  – Contribute to the SystemC Community Portal [systemc.org](http://systemc.org)
  – Promote the use of the SystemC standard in complex system simulation tasks
Thank You

Q&A