Open SystemC Initiative Briefing

Mike Meredith, President

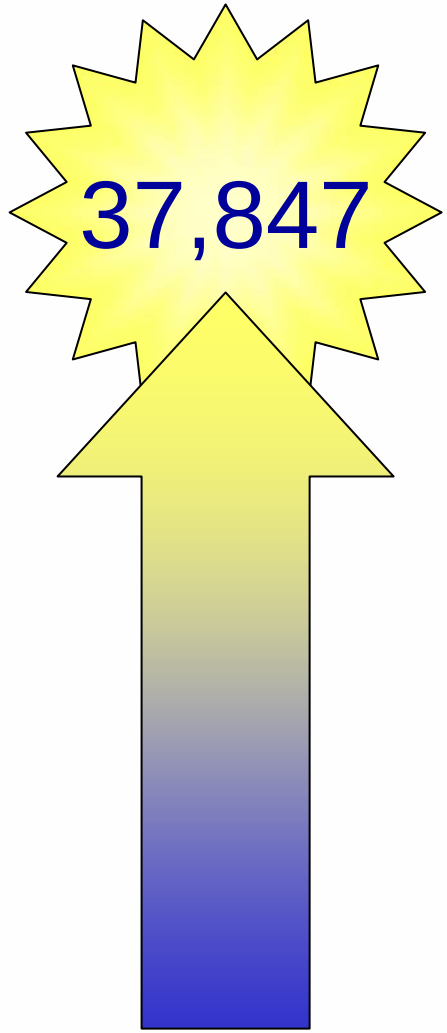
March, 2006

Basics

- What is the Open SystemC Initiative?
  - A non-profit organization formed to develop and promote SystemC
- What is SystemC™?
  - A language definition (IEEE 1666)
  - An open source C++ library
  - Intended for system-level modeling
  - Adds concurrency, hierarchy, data types

The SystemC™ Community

- Licensees
  - Free to all
  - Agree to open source license
  - Download and use libraries
  - Participate in email forums
- Members
  - Participate in governance
  - Participate in technical working groups
  - Have access to draft standards



OSCI Membership

- Corporate Members
  - ARM Ltd
  - Cadence Design Systems
  - CoWare
  - Forte Design Systems
  - Mentor Graphics
  - Philips
  - Summit Design Inc
  - STMicroelectronics
  - Synopsys
- Associate Corporate Members
  - Atrenta, Inc.
  - BlueSpec, Inc
  - Calypto Design Systems
  - Canon Inc
  - Carbon Design Systems
  - Celoxica Ltd
  - Chipvision Design Systems
  - Doulos Ltd
  - ESLX Inc.
  - Fraunhofer Institute for Integrated Circuits
  - GreenSocs Ltd
  - Intel Corporation
  - Jeda Technologies Inc
  - Prosilog SA
  - SpiraTech Ltd.
  - Synfora Inc
  - Tenison EDA Ltd

OSCI Board of Directors

- OSCI Board Members
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  - Cadence - Stuart Swan
  - CoWare - Pat Sheridan
  - Forte - Mike Meredith
  - Mentor - Mark Glasser
  - Philips - Ralph von Vignau
  - Summit - Emil Girczyc
  - STMicroelectronics - Alain Clouard
  - Synopsys - Rindert Schutten
- OSCI Officers
  - Chairman, Alain Clouard
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  - Executive Director, Pat Sheridan
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  - Treasurer, Stan Krolikoski
    - stank@chipvision.com
  - Secretary, Paul Tauber
    - Legal counsel

SystemC Language is IEEE 1666 !

- Approved by IEEE on Dec. 6, 2005
- See IEEE and OSCI press releases Dec. 12, 2005
- IEEE LRM available in Q2'06 from IEEE
- International standardization at IEEE provides clear benefits for the SystemC community
  - Stability of the language
  - Furthers SystemC adoption
  - Grows community and ecosystem

Vendor Commitment to IEEE 1666

- Actis
- Atrenta
- ARM
- Cadence
- Calypto
- Carbon
- Celoxica
- Chip Vision
- CoWare
- Doulos
- ESLX
- Forte
- Jeda
- Mentor
- Summit
- Synfora
- Synopsys
- Tensilica

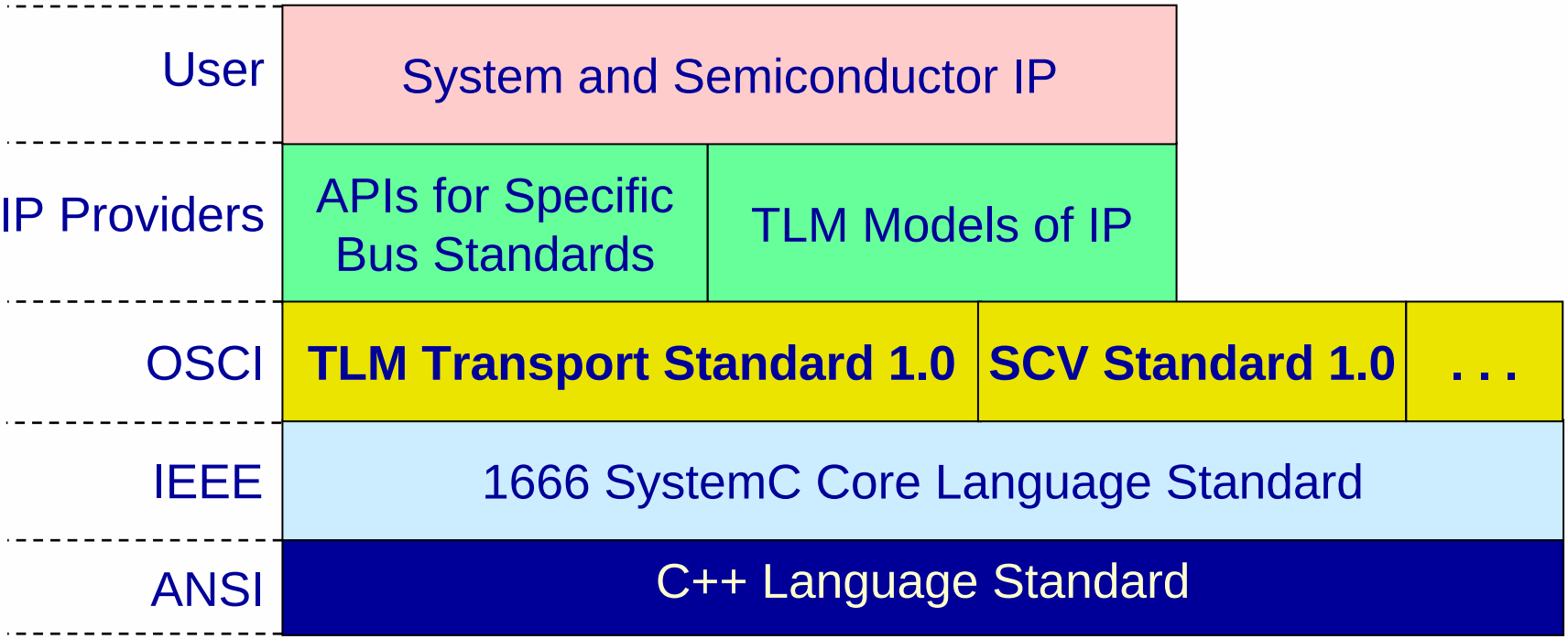
... and more !

Partial list, based on OSCI IEEE 1666 PR Quote Sheet, 12/12/05

OSCI's Continued Role...
... Your Opportunity to Participate

- We develop consensus within the SystemC community, and work with the IEEE with respect to the SystemC language standard
- We define layered standards for SystemC to
  - Bring existing layers forward to IEEE 1666
  - Enable interoperability of transaction-level IP models and tools from various sources
  - Extend the usage of SystemC into new areas, as driven by our members
- We foster and help promote a healthy ecosystem of commercial tools, IP, silicon and systems

SystemC Layered Standards

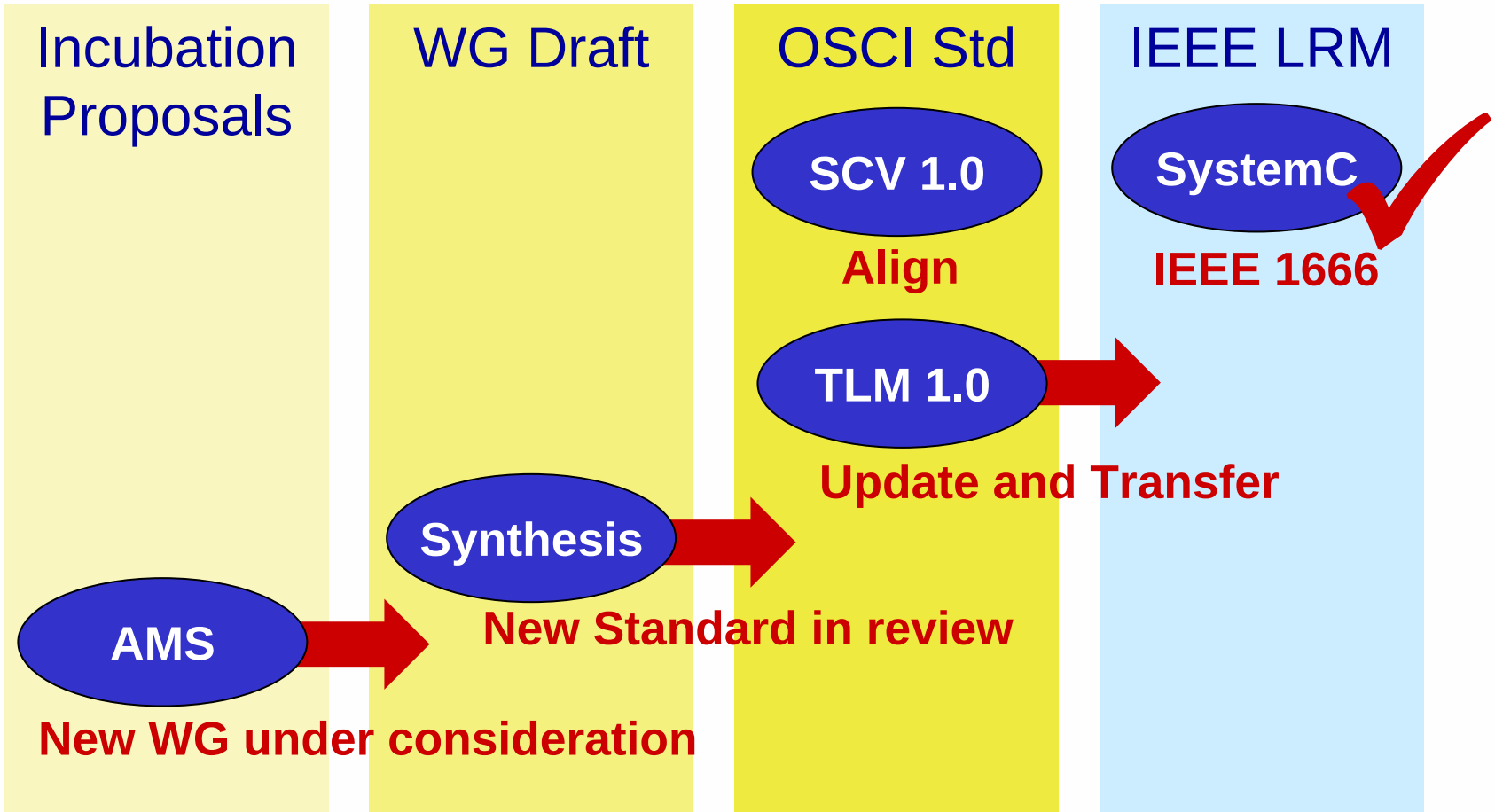


- Where appropriate, OSCI provides open-source, proof-of-concept libraries to promote SystemC adoption
  - SystemC library, TLM library, SCV library…

Key Objectives for OSCI (FY06)

- Achieve standardization of IEEE 1666 SystemC
  - Consolidating usage and promoting compatible tools
  - Aligning layered standards to this foundation
- Continue SystemC adoption
  and further grow SystemC community
  - Enable and promote interoperability of SystemC models
  - Guide protocol & IP owners to provide TLM view of their protocol
  - Facilitate interoperability of SystemC and non-SystemC models
  - Continue to improve information on website

OSCI Technical Agenda – FY06 Summary



Technical Working Groups

- Language Working Group
  - Developing core SystemC language
- Verification Working Group
  - Add-on libraries for verification
- Synthesis Working Group
  - Defining synthesizable subset of SystemC
- Transaction Level Modeling Working Group
  - Developing methodology and library for transaction-level system design

Language WG Status

- Current standard is IEEE 1666
  - OSCI 2.1v1proof-of-concept library has some incompatibilities
- Library update in progress
  - Repair all known incompatibilities with IEEE 1666
  - Remove lambda expressions
    - Substantial body of code not needed to support IEEE 1666 semantics
  - 64-bit support
- LWG review begun in January

Verification WG Status

- Current standard is OSCI SCV 1.0
- Aligning SCV kit for compatibility with 2.1v1
  - Major contribution by Mentor Graphics
- Items under consideration for future SCV releases
  - IEEE 1666 compatibility
  - Coverage support
  - Simplification of existing features
    - Transaction Recording
    - Simulation Introspection
  - Temporal Assertion Support
  - Co-simulation API and debugging standard for the kernel

TLM WG status

- Current standard is OSCI TLM 1.0
  - OSCI has a goal to transfer TLM standard to IEEE in FY06
- Company representatives presented requirements for next TLM release, including internal existing solutions
  - Intel, CoWare, ST, Mentor, ChipVision, OCP-IP, GreenSocs, Cadence, Tuebingen University, ESLX, Philips
- Face-to-face meeting for initial code review of proposals here at DATE

TLM WG Current Areas of Activity

- IEEE standardization of TLM 1.0
- Standard Bus Modeling APIs
  - Generic PV
  - Generic PVT
  - Interrupt Modeling
  - Memory Map Services
  - Memory / Register Modeling
- Standard Configuration and Control APIs
  - Configuration Interface
  - Debug Interface
  - Analysis Interface

How do we move transactions about ?

What transactions do we move about ?

How do we ***control*** and ***analyse*** the transactions moving through the TLM ?

Synthesis WG Status

- Latest Version: Draft 1.1.21
  - In OSCI member review; Preparing for public review
  - Goal: produce a synthesisable subset specification standard in 2006
- Defining a Synthesizable Subset for SystemC
  - C++ Base
    - Templates, namespaces, classes, and much more…
    - Memory allocation and exception handling not supported
  - Bit-Accurate Data Types provided by SystemC dt:
    - Integer types: sc_(u)int, sc_big(u)int
    - Fixed-Point types: sc_(u)fixed
    - Logic: sc_bv, sc_lv, sc_logic
  - SystemC core:
    - Modules, events, signals, wait, ports, SC_CTHREAD
    - Supported reset styles for behavioral level