SystemC 2.1 Preview - DAC2004

Electronic Systems Solutions

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version 1.0

Motivations

- Improve modeling features
- Improve verification features
- Improve modularity for IP
- Ease of use
- Bug fixes

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Improved modeling features

- sc_event_queue class
  - Multiple notifications result in multiple events
  - Reliably catch every notification
- sc_export
  - Opposite of sc_port w.r.t. caller/callee
  - Exposes internal channels
  - More controlled hierarchical interfaces
  - Can reduce context switching

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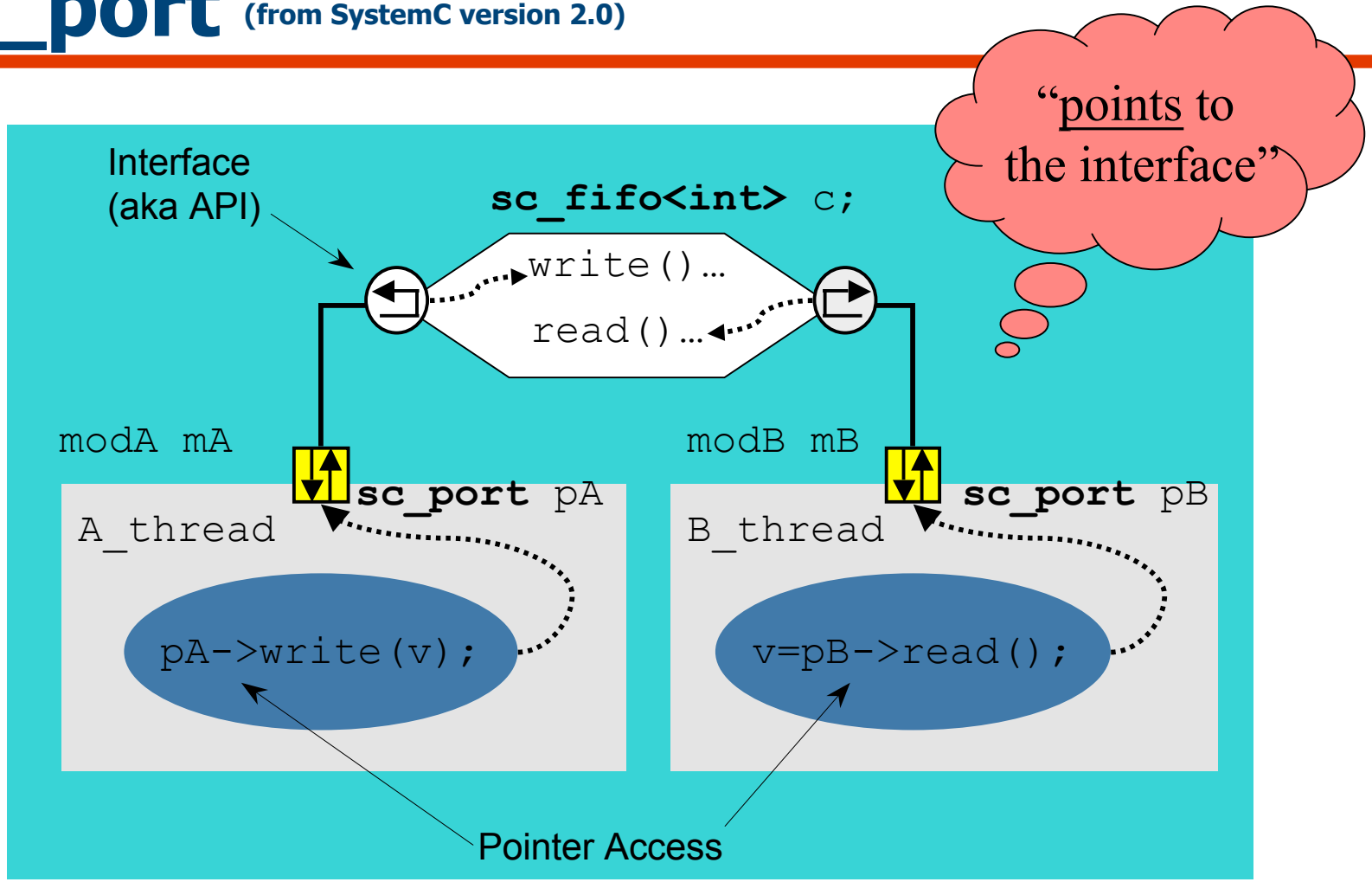
sc_port (from SystemC version 2.0)



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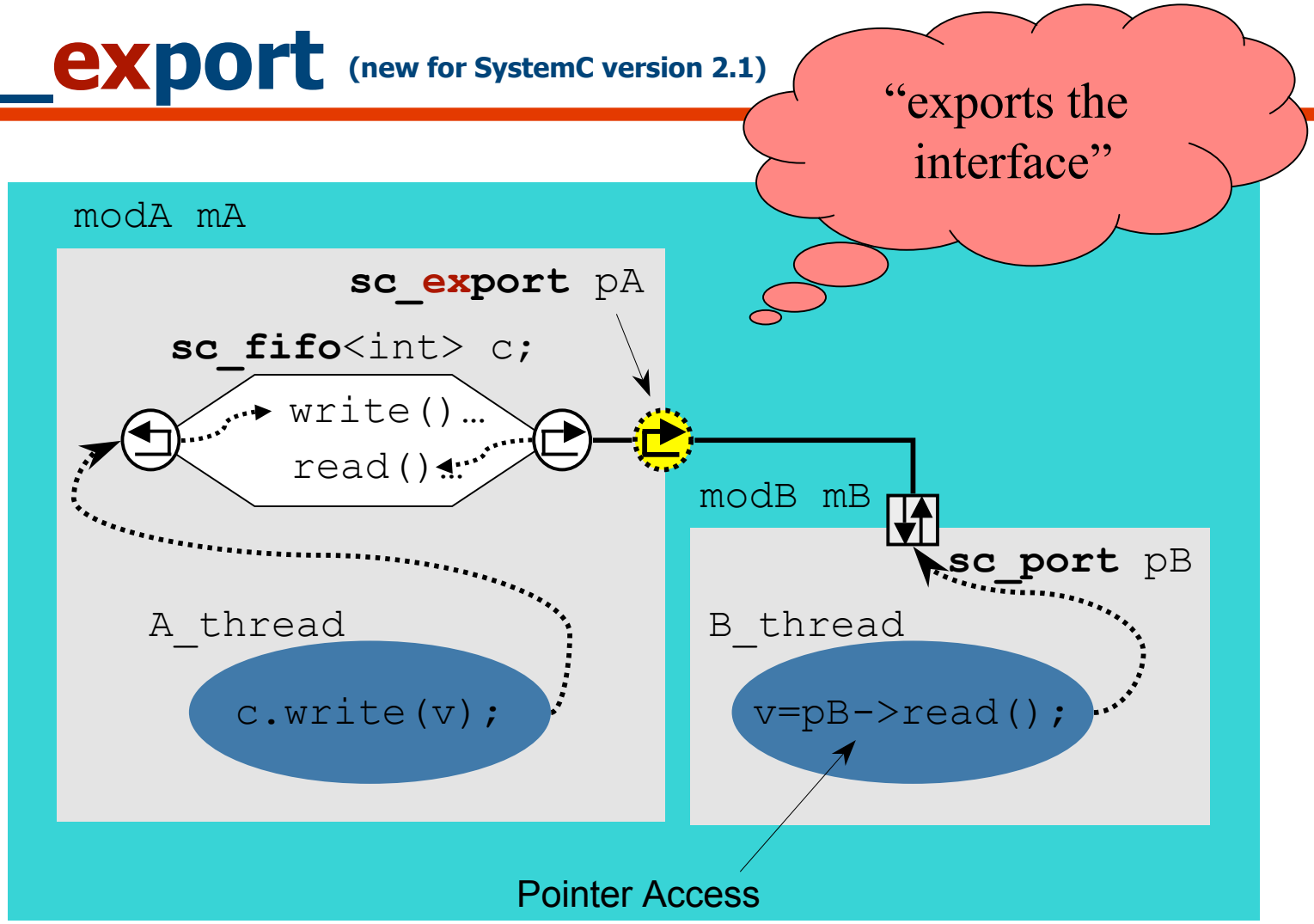
sc_export (new for SystemC version 2.1)



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Improved verification features

- Dynamically spawned processes
  - Fork/join
  - Required for temporal assertion checking
  - Helpful for testbenches
  - Automatic allocation/deallocation of threads
  - Multiple threads off a single method

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Improved modularity for IP

- sc_export - previously mentioned
- Structured error reporting
  - Consistent messaging for all components
    - Simulator core, libraries, IP, modules, testbenches
- Easier access to startup arguments
  - Simplifies ability of libraries and IP to use command-line control
  - sc_argc() and sc_argv()
- New callbacks allow IP integration with requiring code in sc_main
  - before_end_of_elaboration()
  - start_of_simulation()
  - end_of_simulation()

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Structured error reporting

my_module.cpp

```
extern char* sim_nm;
void my_module::some_thread() {
  SC_REPORT_INFO(sim_nm,"Starting");
  …
  if (error_condition) {
    SC_REPORT_ERROR(sim_nm,
      "Oops something bad happened");
  …
```

Output from reporting

```
0 ns: Info: MY_SIM: Starting
…
4 ns: Error: MY_SIM: Oops something bad happened
In file: my_module.cpp:24
In process: my_mod_i.some_thread_0 @ 4 ns
```

Ease of use

- Signal and port specializations
  - Assign to/from part selects of signals and ports directly
- Mixed concatenation
  - Concatenations of sc_(u)int/sc_big_(u)int can now be mixed without ugly casting
- Object code release tagging
  - Link-time detection between incompatible object files
- POSIX thread support
  - Allows use of code coverage and memory leak checking tools
- Support for MacOS X

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Bug fixes (1 of 2)

- sc_start() after simulation has reached its internal maximum time value would overflow simulation time.
- sc_trace for uint64, int64 missing
- sc_set_time_resolution not properly affecting VCD dump information.
- The value of sc_clock needs to be updated during update phase not evaluate (execution) phase to prevent race conditions.
- sc_string subscript operator may modify multiple instance because of copy semantics.
- Cpu risc example not shipped anymore

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Bug fixes (2 of 2)

- Error in sc_bv char constructor
- sc_biguint partial selection bug
- Missing terminating null char in >> operator for sc_string.
- The constructor sc_module(const sc_module&) is not defined
- Signal initialized in module CTOR not registered with its module.
- Deletion of main fiber should not occur in ~sc_cor_fiber
- Need ability to compile with Wno-deprecated
- tracing ports after end of elaboration had no effect
- wait statements in sc_module ctor led to crashes