A Service Based Component Model for Multi-Level HW/SW Specifications

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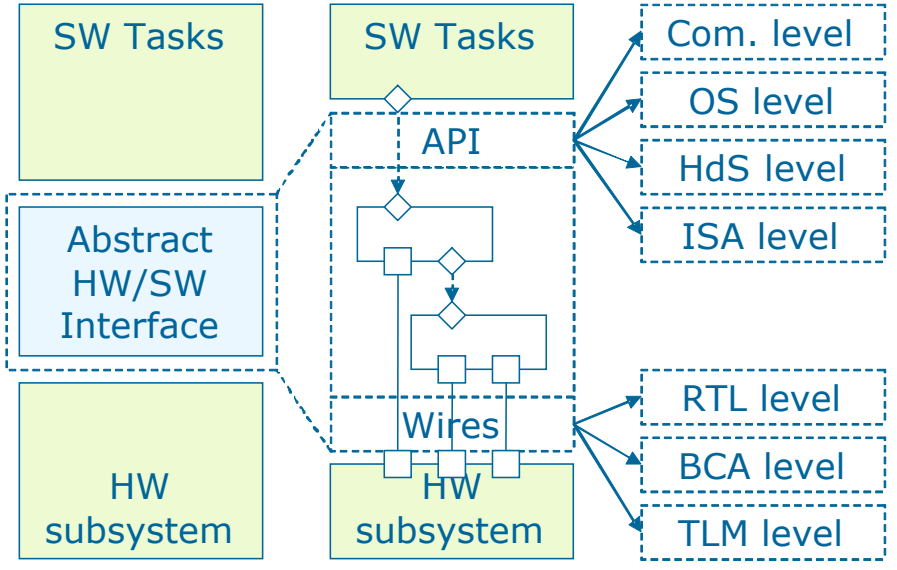
The Problem

- Adapt interfaces
  - That use different protocols (wrappers)
    - API vs. wires, Amba vs. Coreconnect
  - That belong to different domains (transactors)
    - TLM vs. BCA, TLM vs. RTL

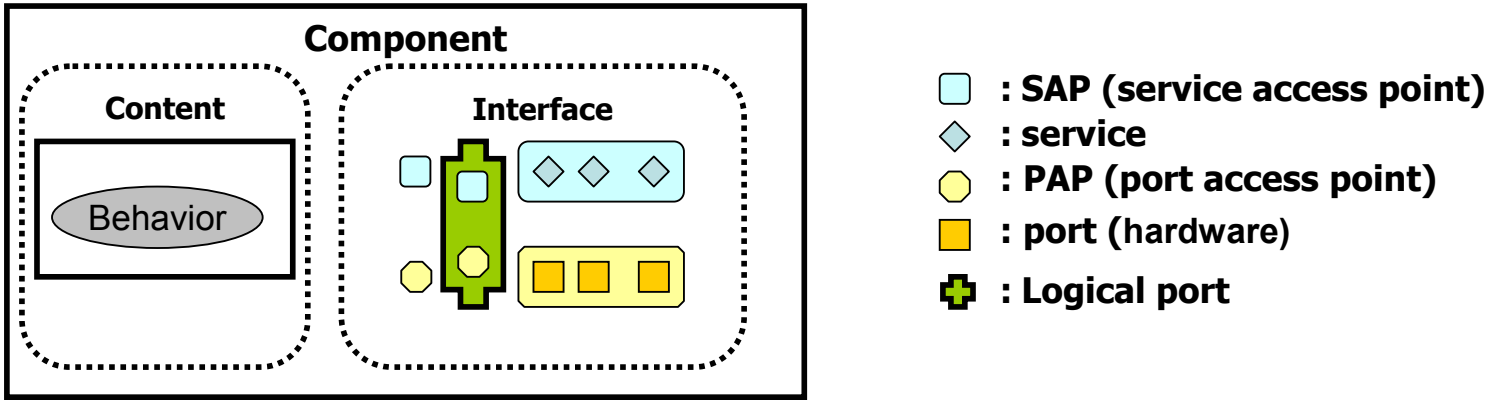


Motivations

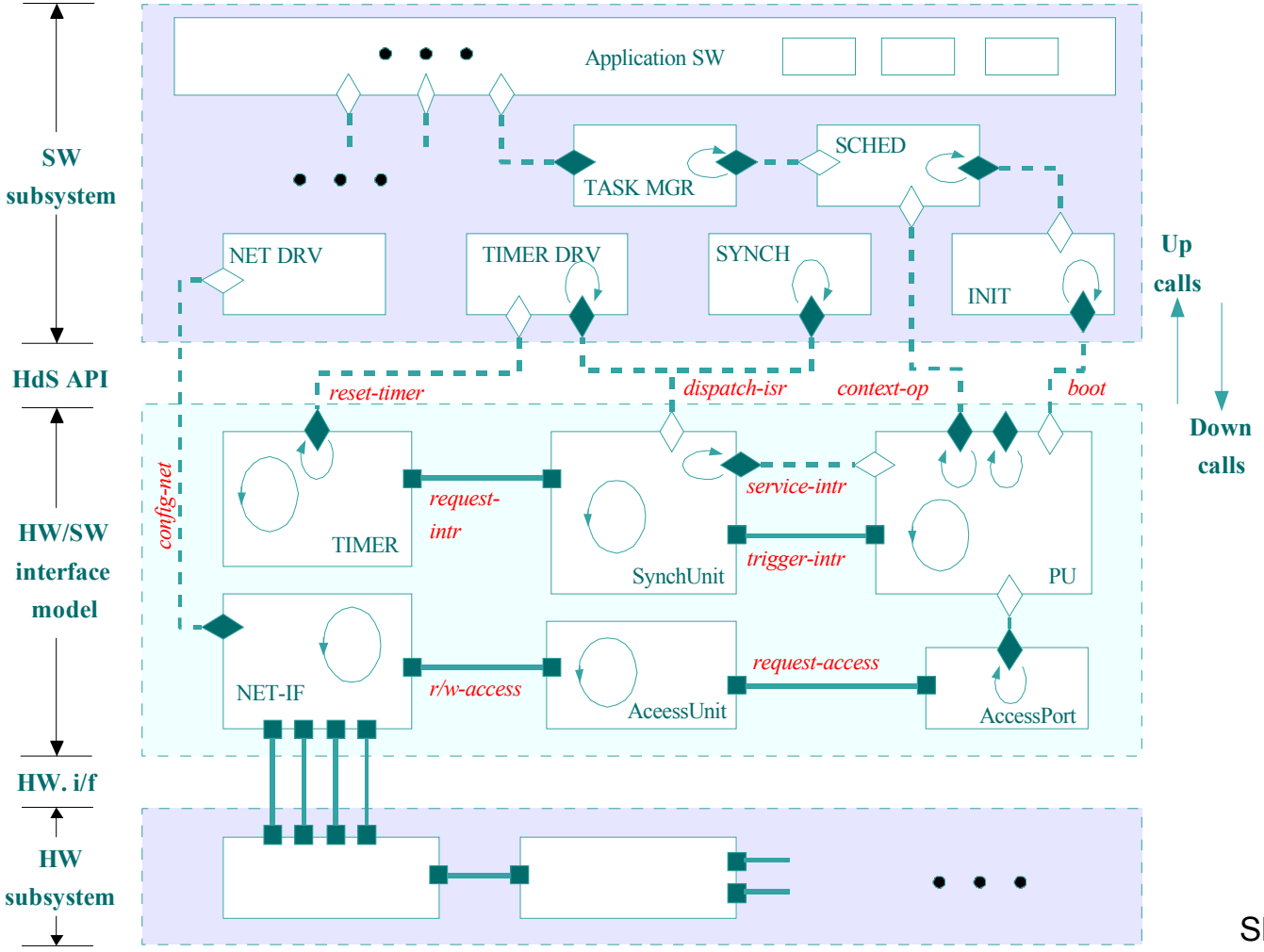
- Why propose a new model?
  - Unified model for both HW and SW elements
  - Unified model for different abstraction level
- What is useful in the service-based model?
  - Separate interface from implementation, communication from behavior
  - Separate functional dependency from physical accessibility
- What is physical accessibility?
  - Hardware: p2p link, memory map for bus, …
  - Software: memory map, common header files, file name in the file system on disk, shared library, linker scripts, …

Service-based Component Model

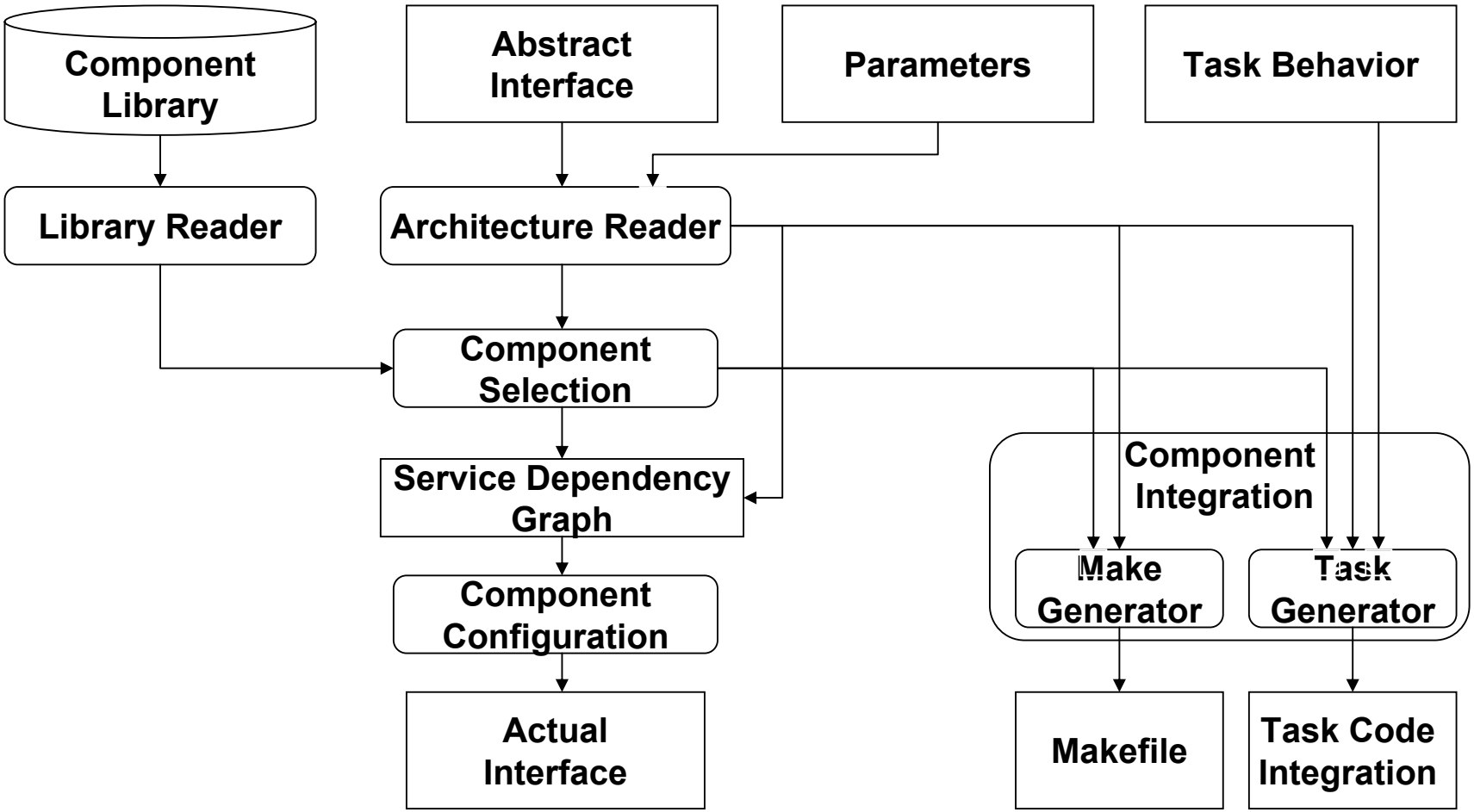
- Service-based component
  - Interface (or port, …)
    - Service declaration (provided / required)
    - Data structure (physical access method)
  - Implementation (or content, behavior, …)
    - Parameterized implementation statically freezable



Example use for modeling HW/SW interfaces



Proposed Design Flow



Conclusion

- **Modeling**
  - Single model to present system design from abstract specification to RTL implementation
  - Enables mixed level descriptions
- Implementation
  - Automated generation of wrappers and transactors
- Other benefit
  - Makes explicit things that are often implicit or hidden in SoC design