
Design Constraints Conceptual Model

Jin-sheng Shyr - shyrj@taec.com

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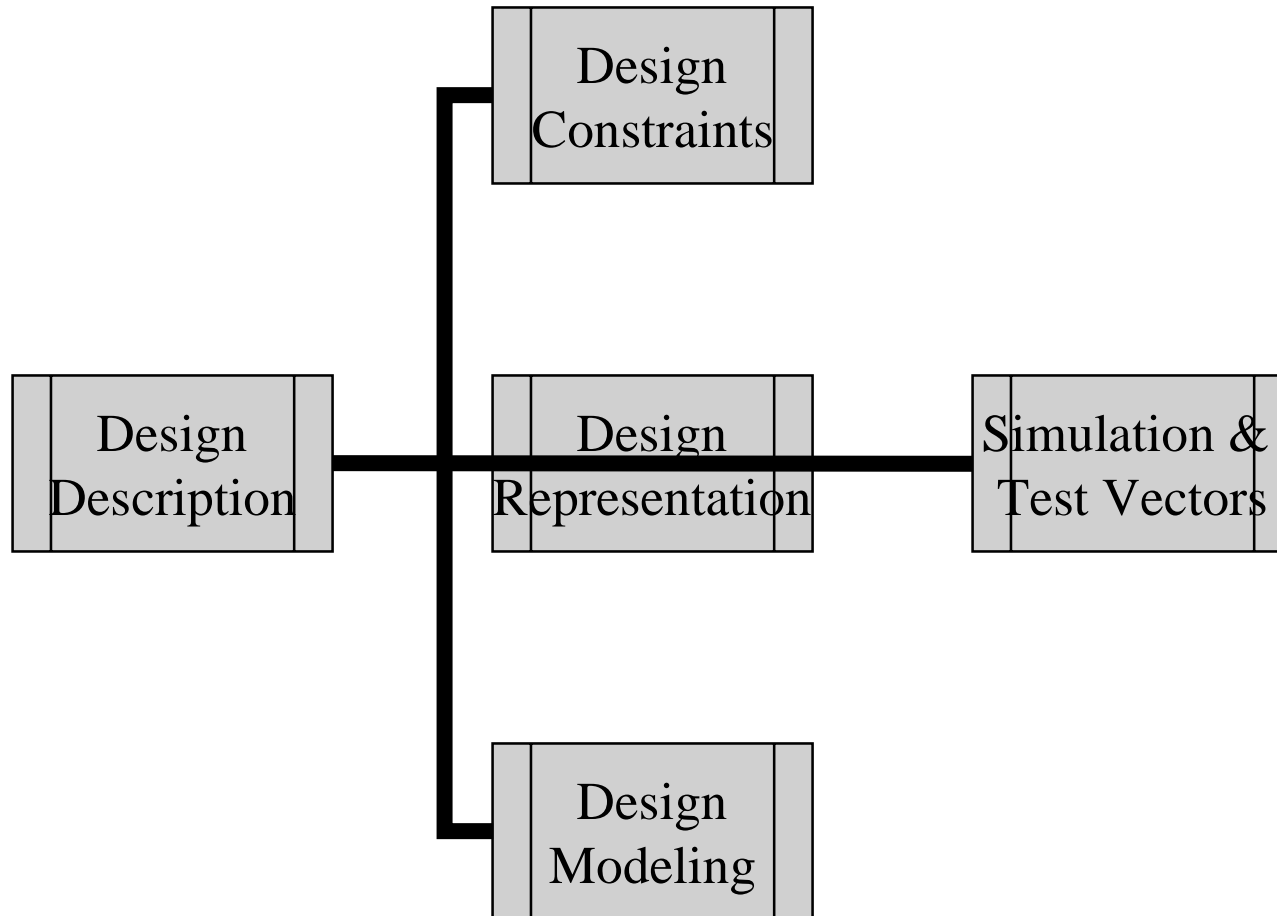
Outline

- Purpose of the Model
- Elements of Design Description
- Design Constraints Prescription Model
- Categories of Constraints
 - ◆ Commons -- inherited rules & constants
 - ◆ Budgets -- those propagating top-down
 - ◆ Assertions -- those surfacing bottom-up
 - ◆ Attributes -- symbolic properties
 - ◆ Parameters -- user direct inputs
- Refinement of Design Constraints
- Constraint Hierarchy Modeling
- Domain of Constraints

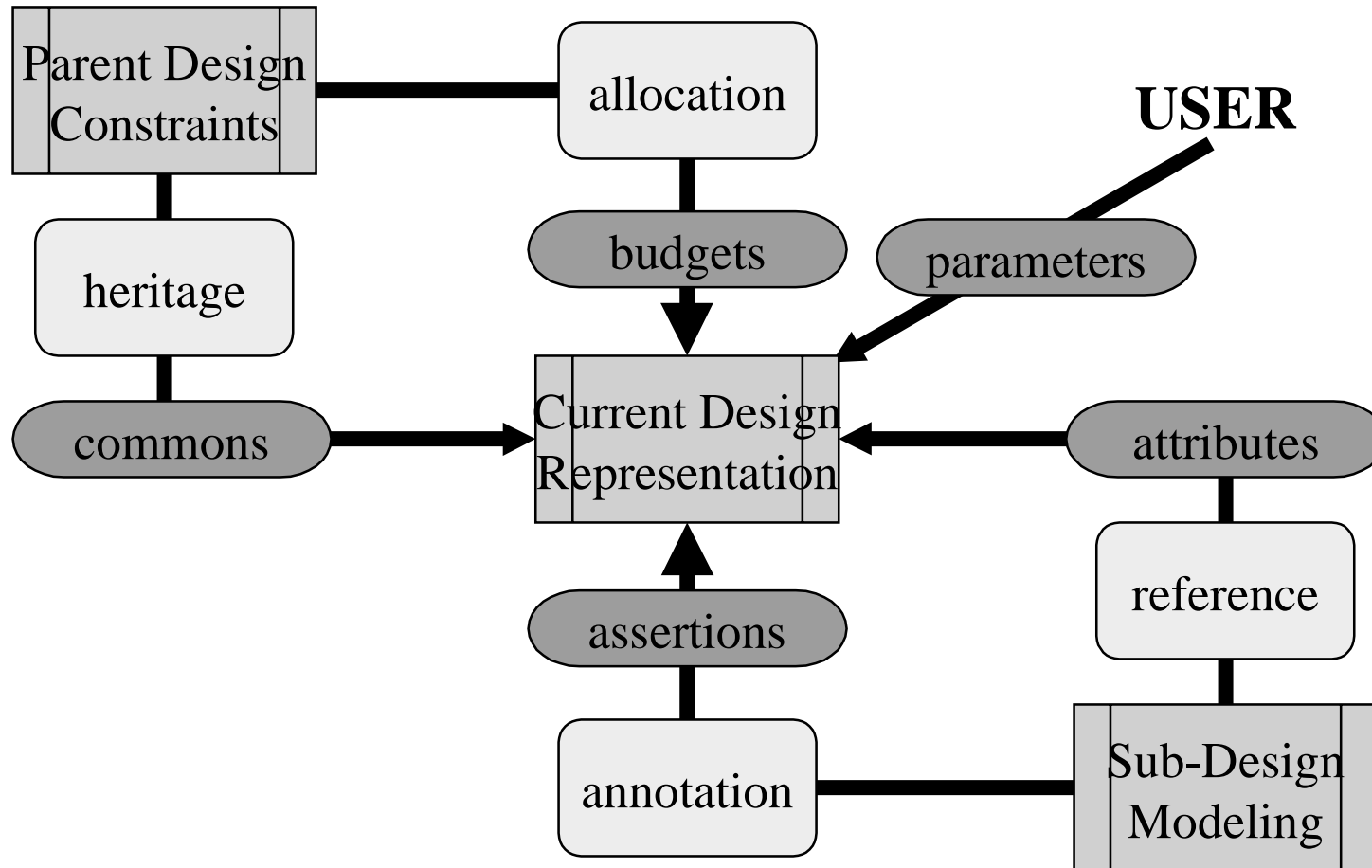
Purpose of the Model

- The attempt here is to:
 - ◆ visualize the essentials that capture the **designer's intent**
 - ◆ analyze the ways constraints are prescribed
 - ◆ explore an information model to categorize constraints
 - ◆ consolidate a common framework of working concepts
- The model does not mean to:
 - ◆ suggest the specific mechanisms to capture or transform design constraints
 - ◆ purpose schema for a repository database

Elements of Design Description



Design Constraints Prescription Model



Categories of Constraints (1)

- ◆ Commons
 - Technology Constants and Rules
 - Operating Conditions
 - Global Signals
- ◆ Budgets
 - Timing, Area, and Power Budgets
 - Floorplan and Wiring Models
- ◆ Assertions
 - Clocking: skew, setup, hold, etc.
 - Local partial clocktree and power rings
 - Input arrival times, output delays, etc.
 - Signal Integrity

Categories of Constraints (2)

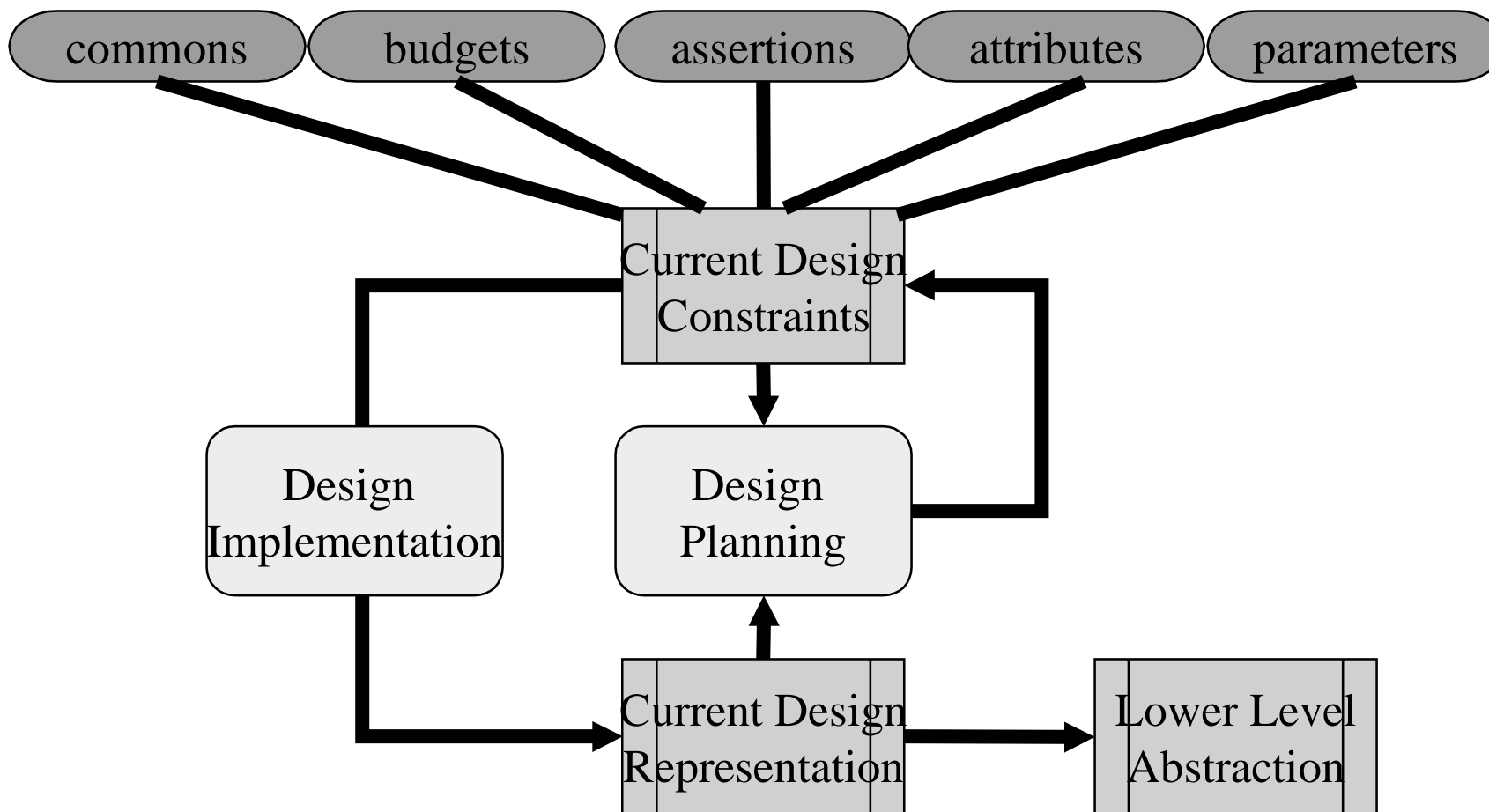
◆ Attributes

- Physical: location, orientation, shape and blockage
- Design for Test
- Special conditions
 - Don't care conditions
 - Mutually exclusive conditions
 - Infeasible states (false paths, feedback loops)

◆ Parameters

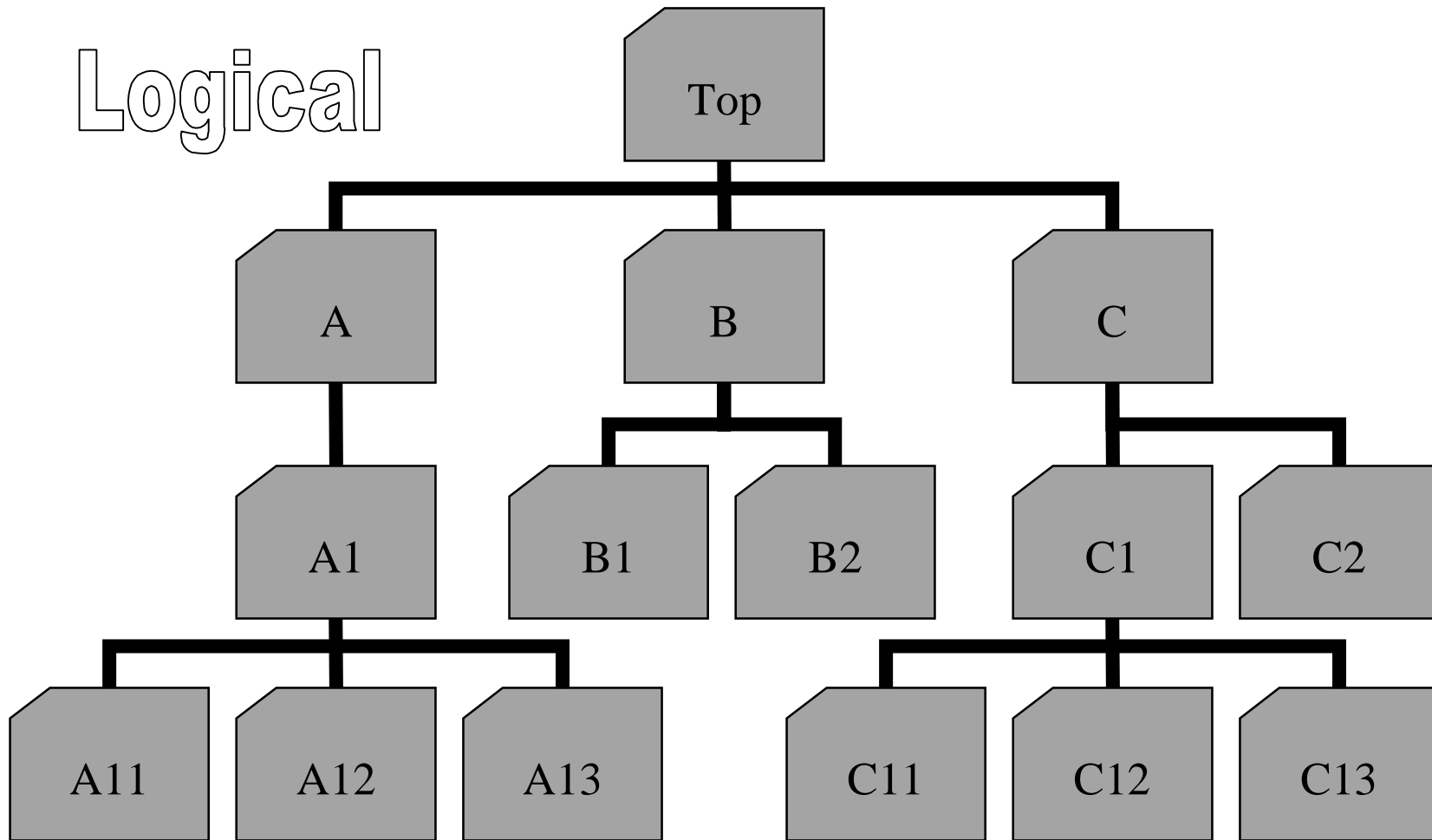
- Logic Architecture
- Boundary Conditions
- Detailed implementation controls
- File pointers: parasitics, scripts, detailed wiring, etc.

Refinement of Design Constraints



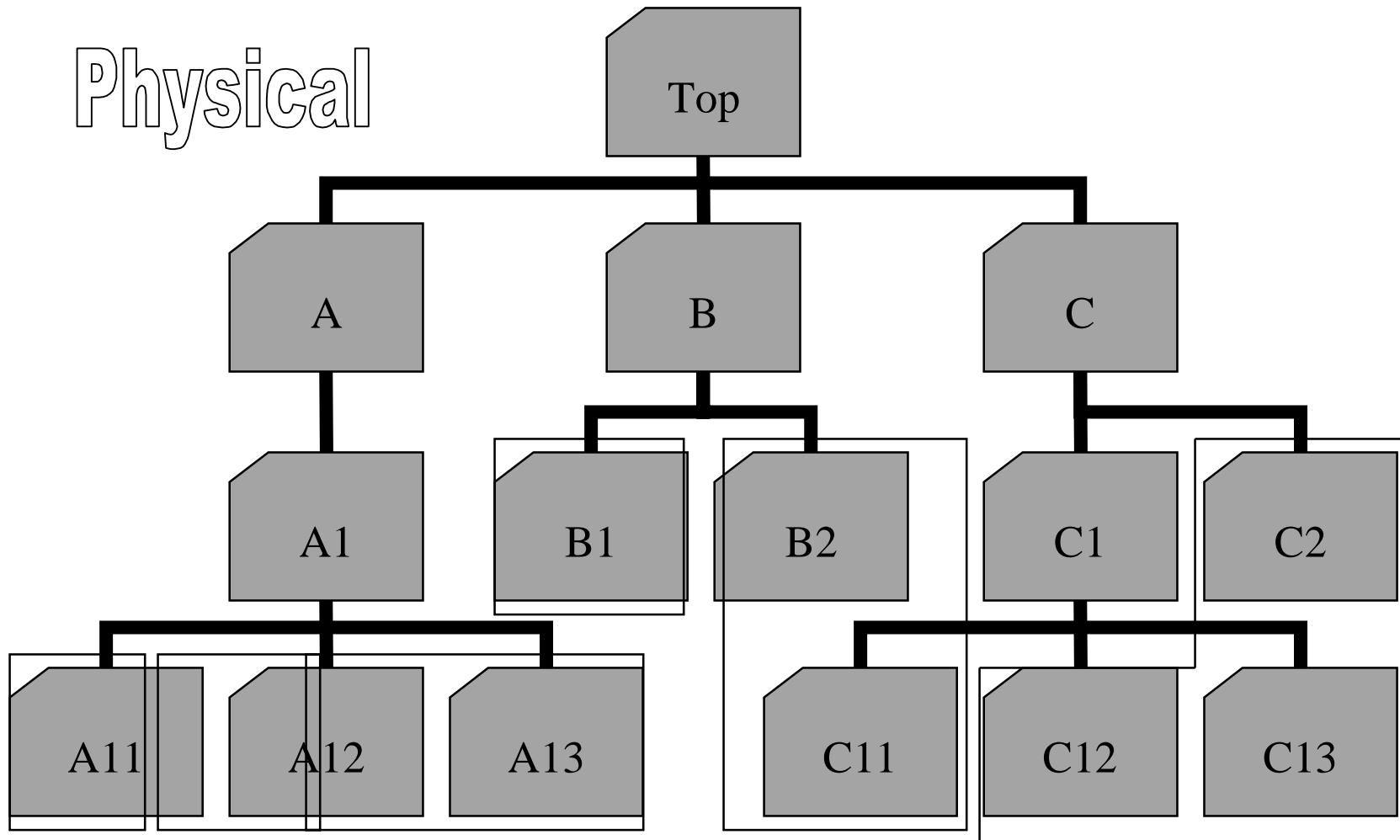
Constraint Hierarchy Modeling (1)

Logical



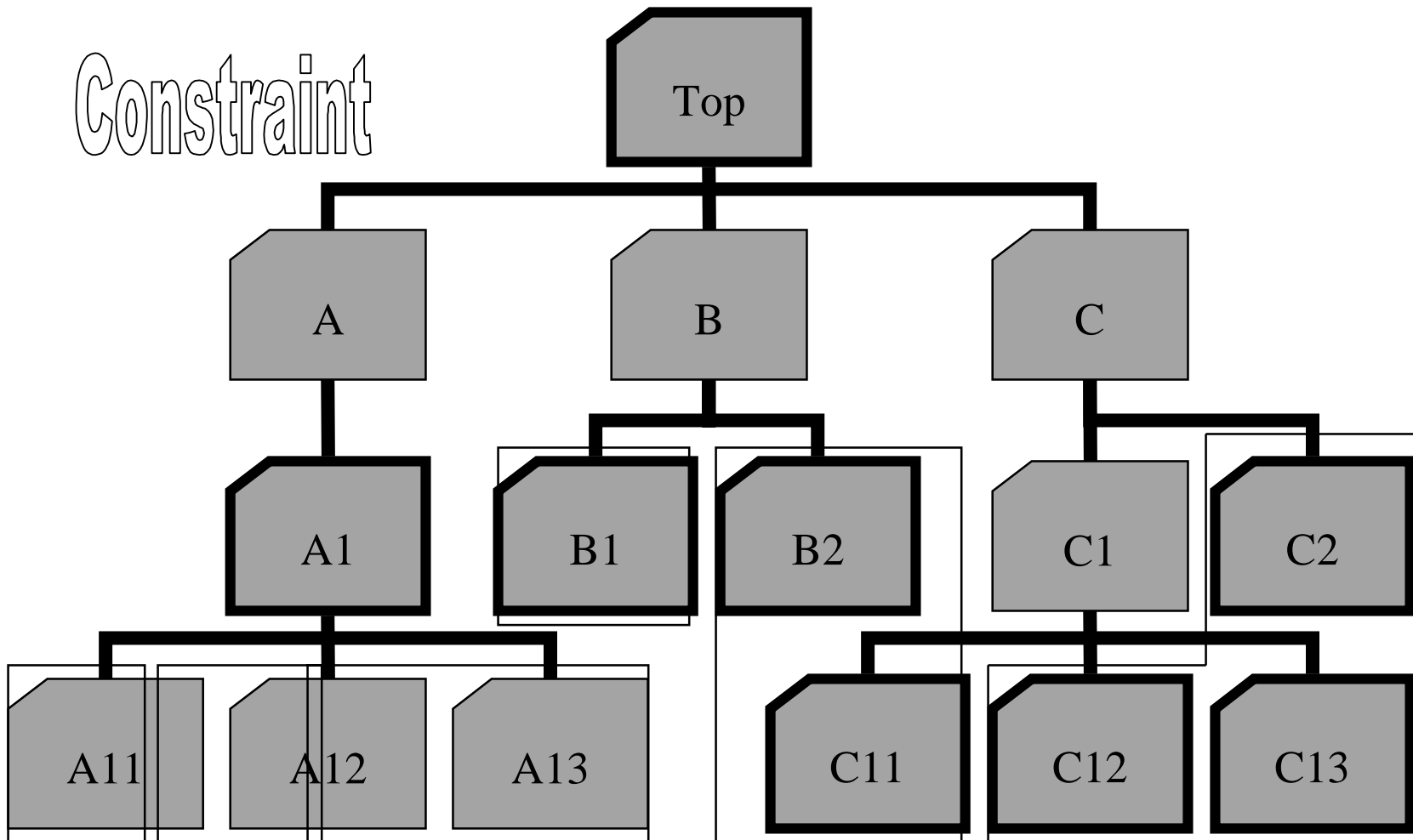
Constraint Hierarchy Modeling (2)

Physical



Constraint Hierarchy Modeling (3)

Constraint



Domain of Constraints

- ◆ Timing
- ◆ Area
- ◆ Power
- ◆ Logic Architecture
- ◆ Clocking
- ◆ Test
- ◆ Signal Integrity
- ◆ Manufacturability
- ◆ Reliability
- ◆ Life Cycle