
Bridging the Gap between Concept Engineering and Development

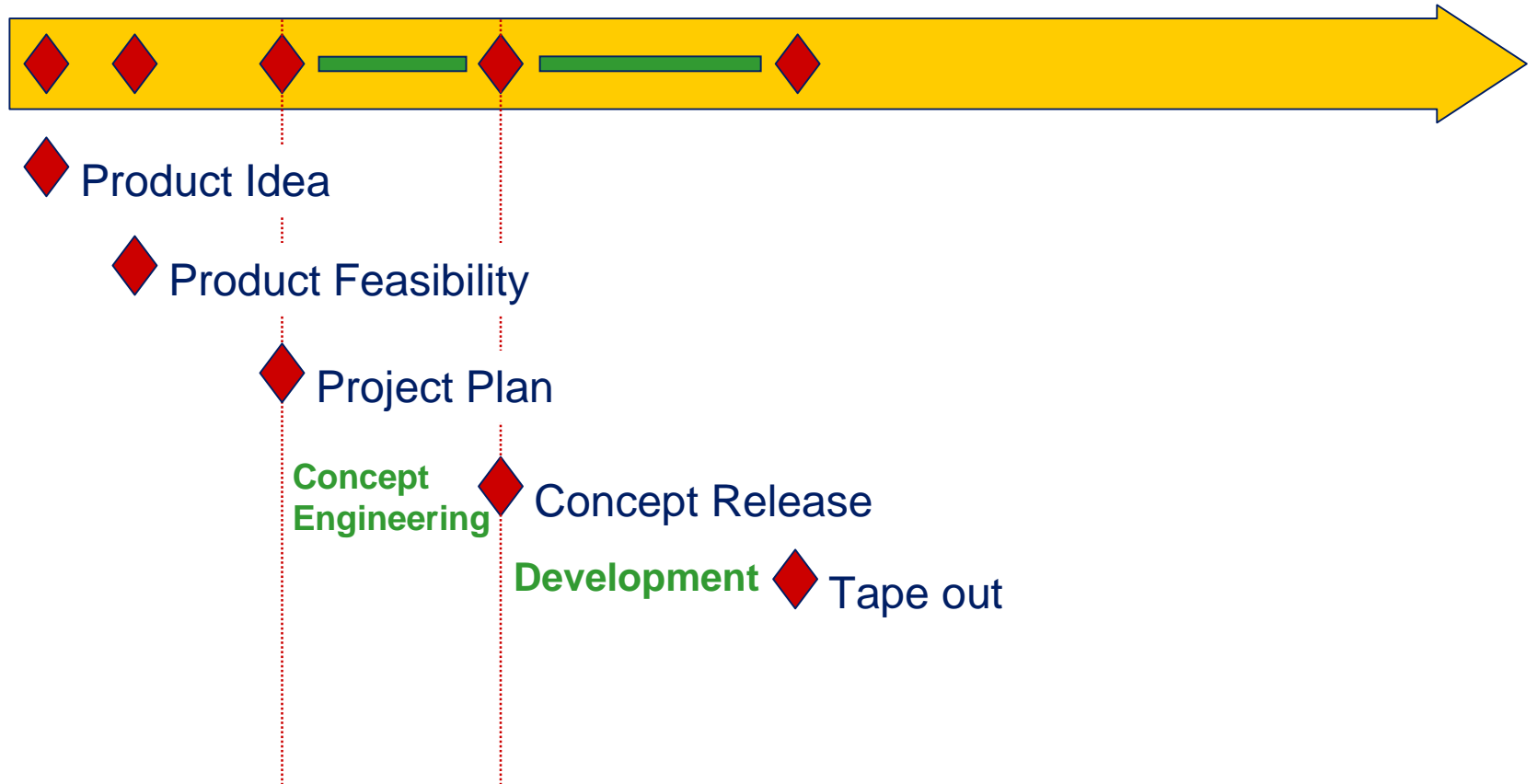
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Grenoble, Jan. 2002

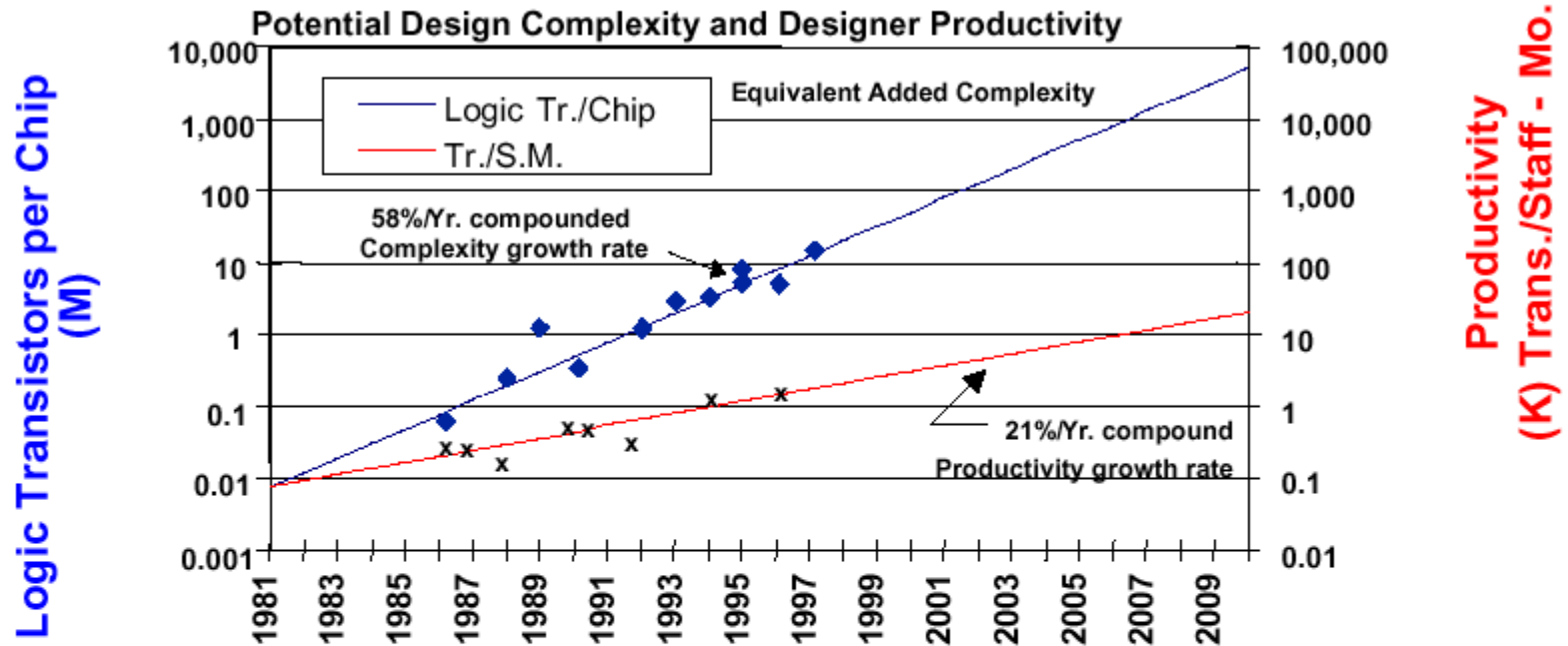
Outline

- Development Process
- Design Complexity
- Design Platform
- Proposed Design Flow

Development Process (partially)



Potential Design Complexity and Designer Productivity



<u>Year</u>	<u>Technology</u>	<u>Chip Complexity</u>	<u>Frequency</u>	<u>3 Yr. Design Staff</u>	<u>Staff Cost*</u>
1997	250 nm	13 M Tr.	400	210	90 M
1998	250 nm	20 M Tr.	500	270	120 M
1999	180 nm	32 M Tr.	600	360	160 M
2002	130 nm	130 M Tr.	800	800	360 M

* @ \$150K / StaffYr. (In 1997 Dollars)

Design Scenario: *E-Gold+*

Features:

- Technology: 0,25 μ m CMOS
- Transistors: 11 million
- Dual Core Architecture
- Mixed Signal
- SRAM 1,3 Mbit

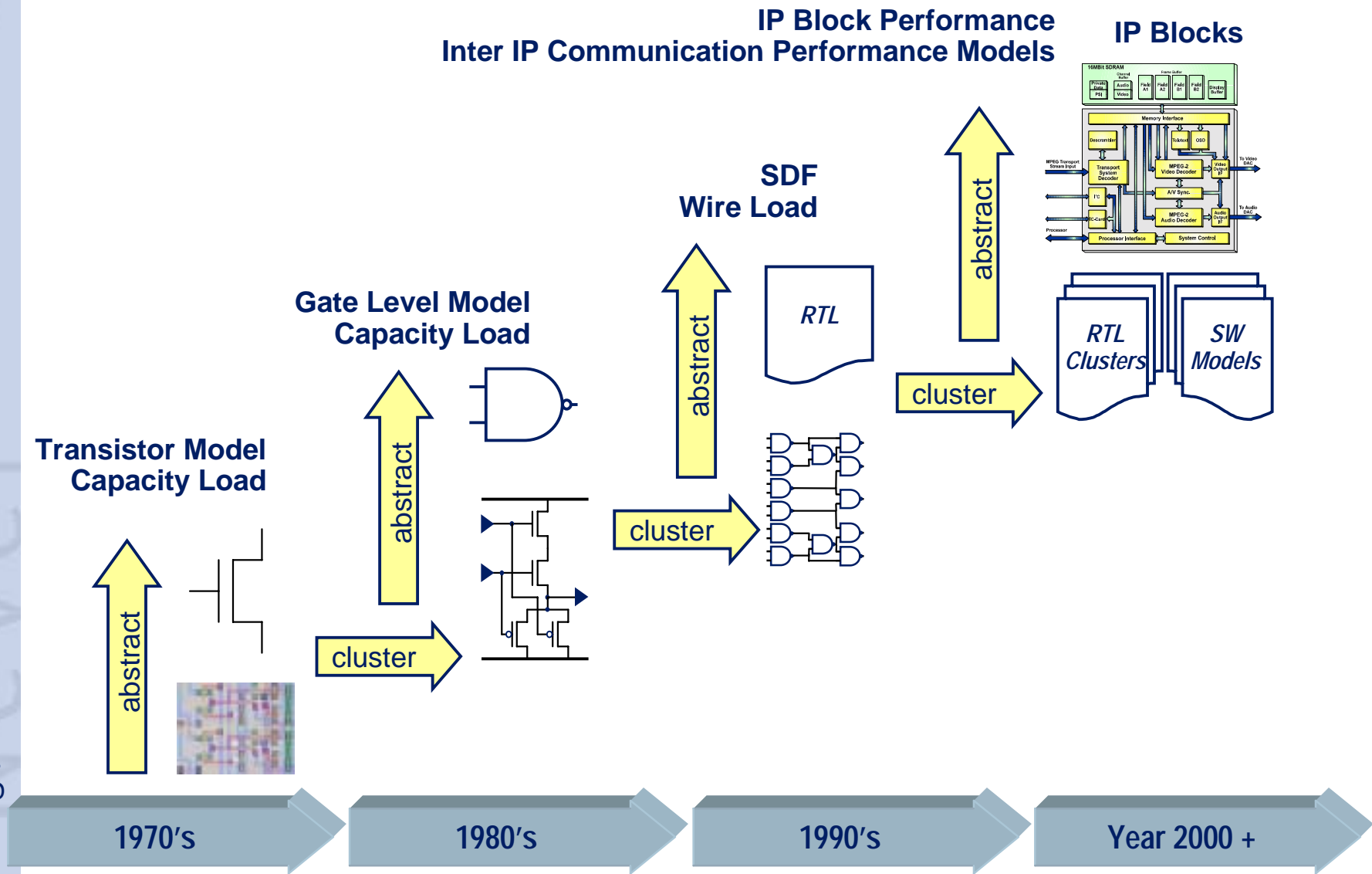


today



2010

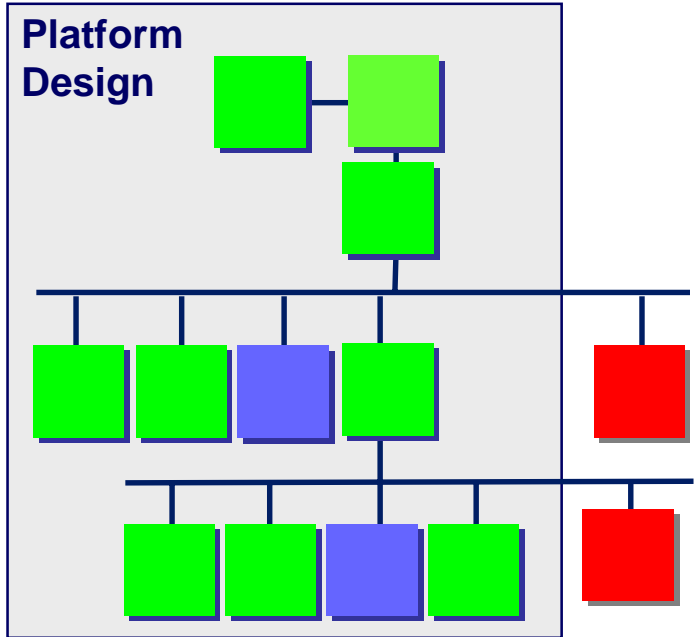
The next level of abstraction ...



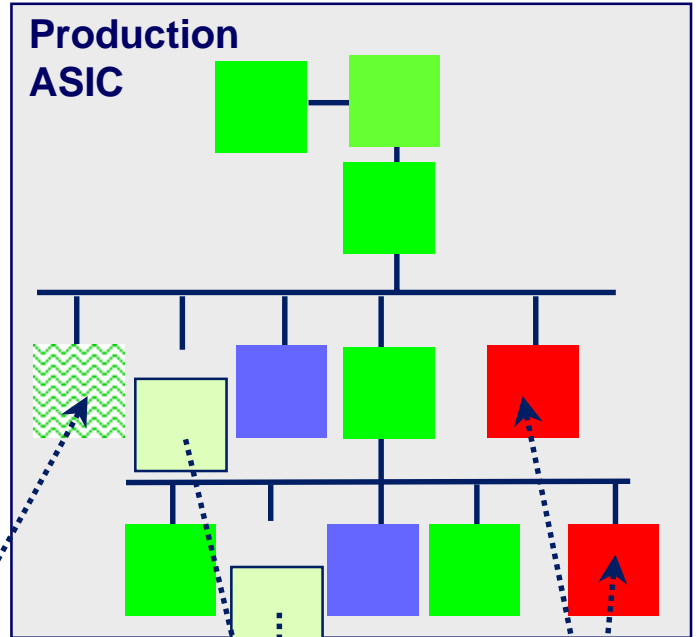
stop thinking ever

Platform-based Design

Extendible Platform made from *Reusable Components*



Deconfigured & Extended Customer Specific Solution

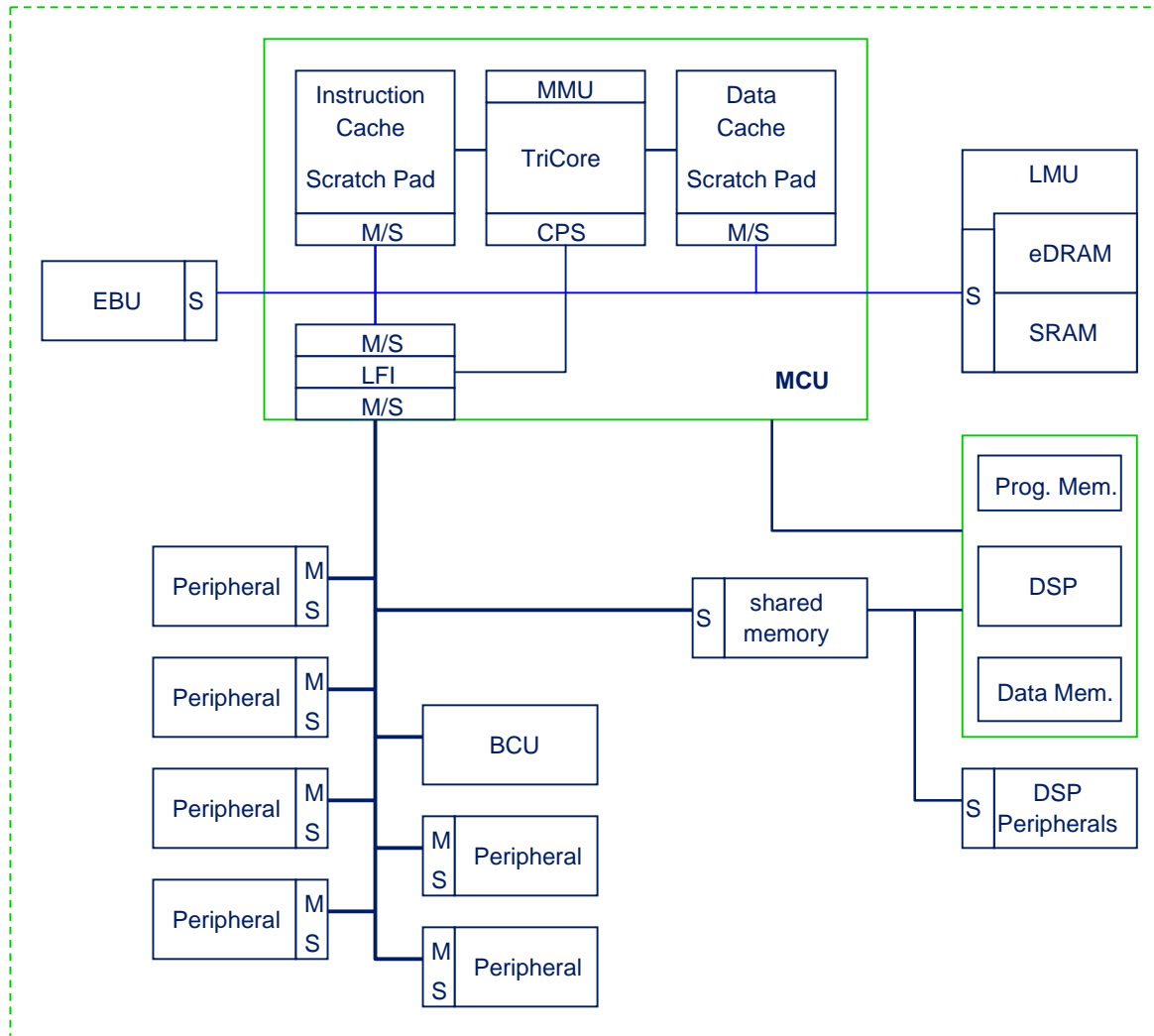


The **busses**, not the CPU, are the backbone of this strategy

- PS own IP
- 3rd Party IP
- Customer IP

modified (extended) removed (deconfigured) added (integrated)

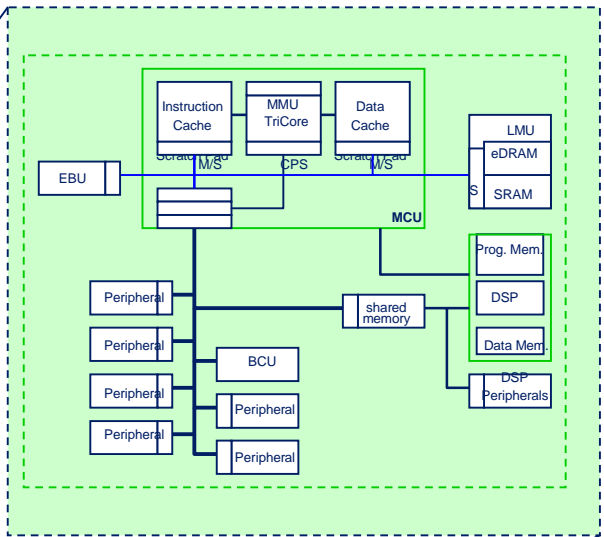
Platform Architecture



System-level goes smoothly into hierarchical design flow

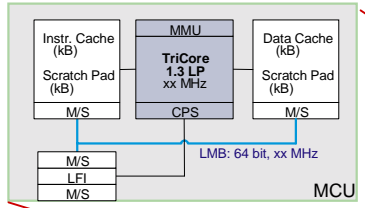
stop thinking
every

System View

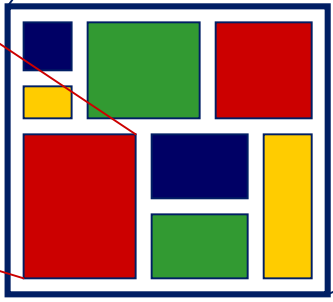


top-level
planning

Module View



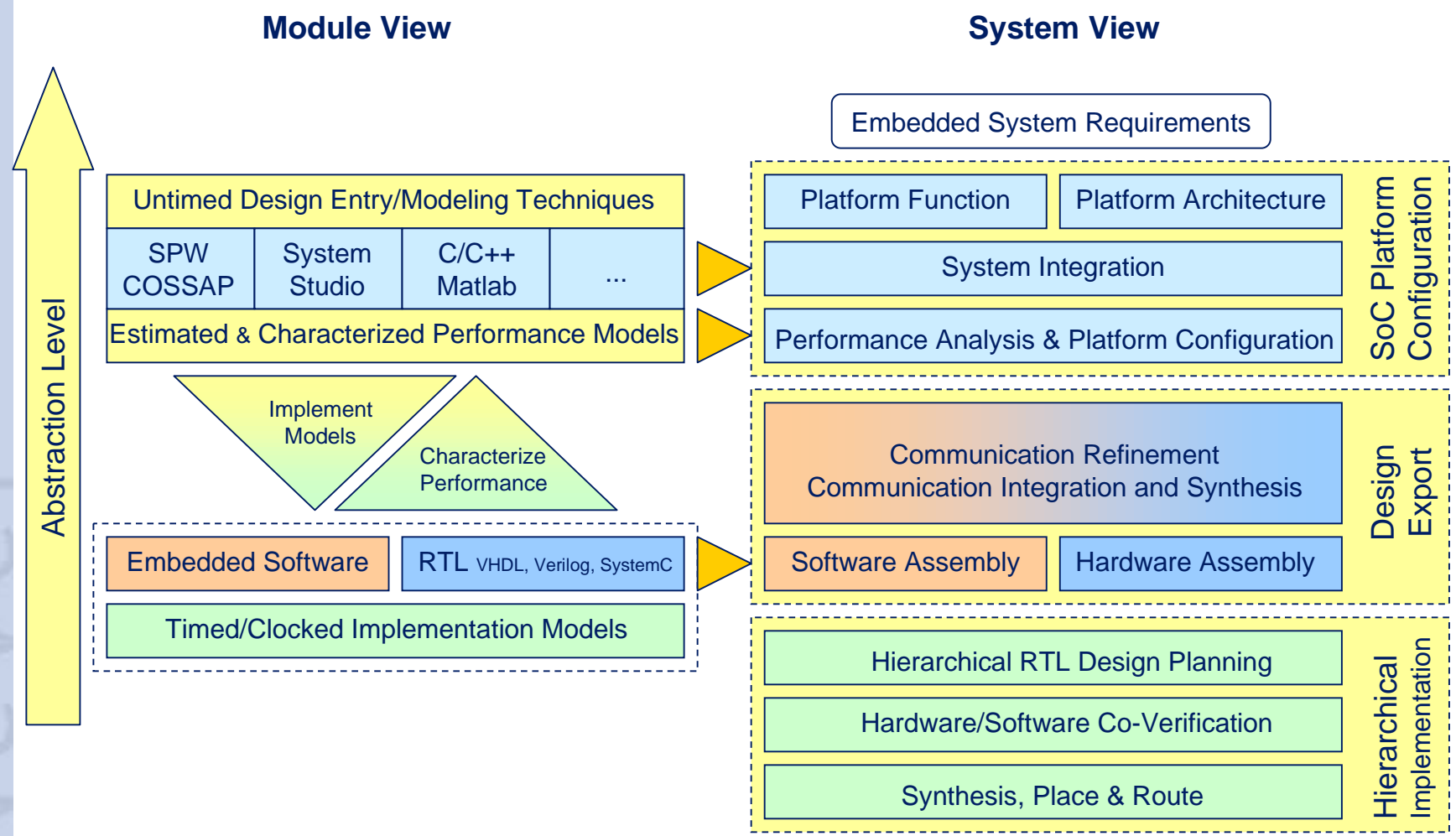
subblocks,
peripherals



automatic
interface
generation

Design Planning

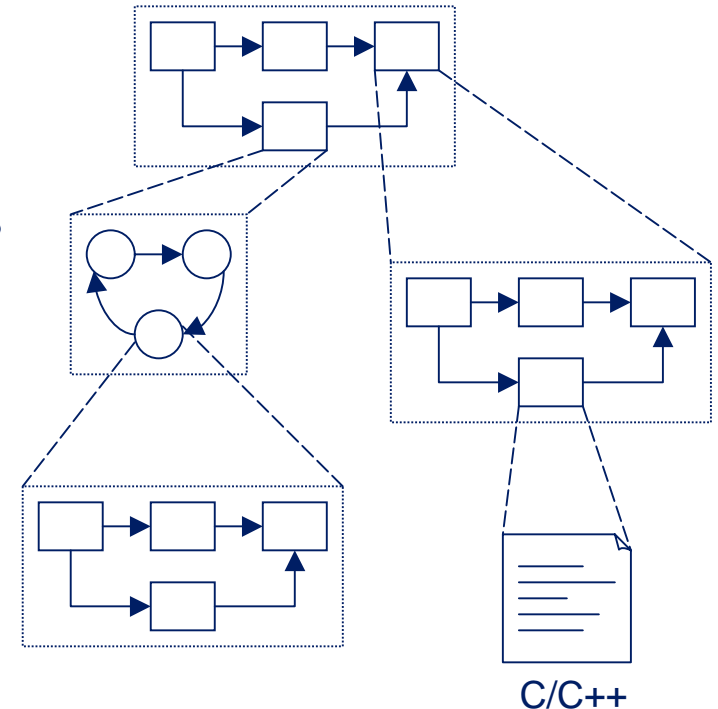
System-level Front-end



Module-level Integration - *Modeling Styles*

■ Modeling Styles

- Data flow
- Control, FSM: States and Transitions
- C/C++ functions
- VHDL, Verilog co-simulation
- SystemC co-simulation



■ Combining data flow and control

- embed a control model in a hierarchical data flow graph
- embed a data flow model in a hierarchical state of a control model

System-level Design Flow and Demonstrators

■ Goal

- Define a design flow on system-level and validate this flow with a demonstrator example.

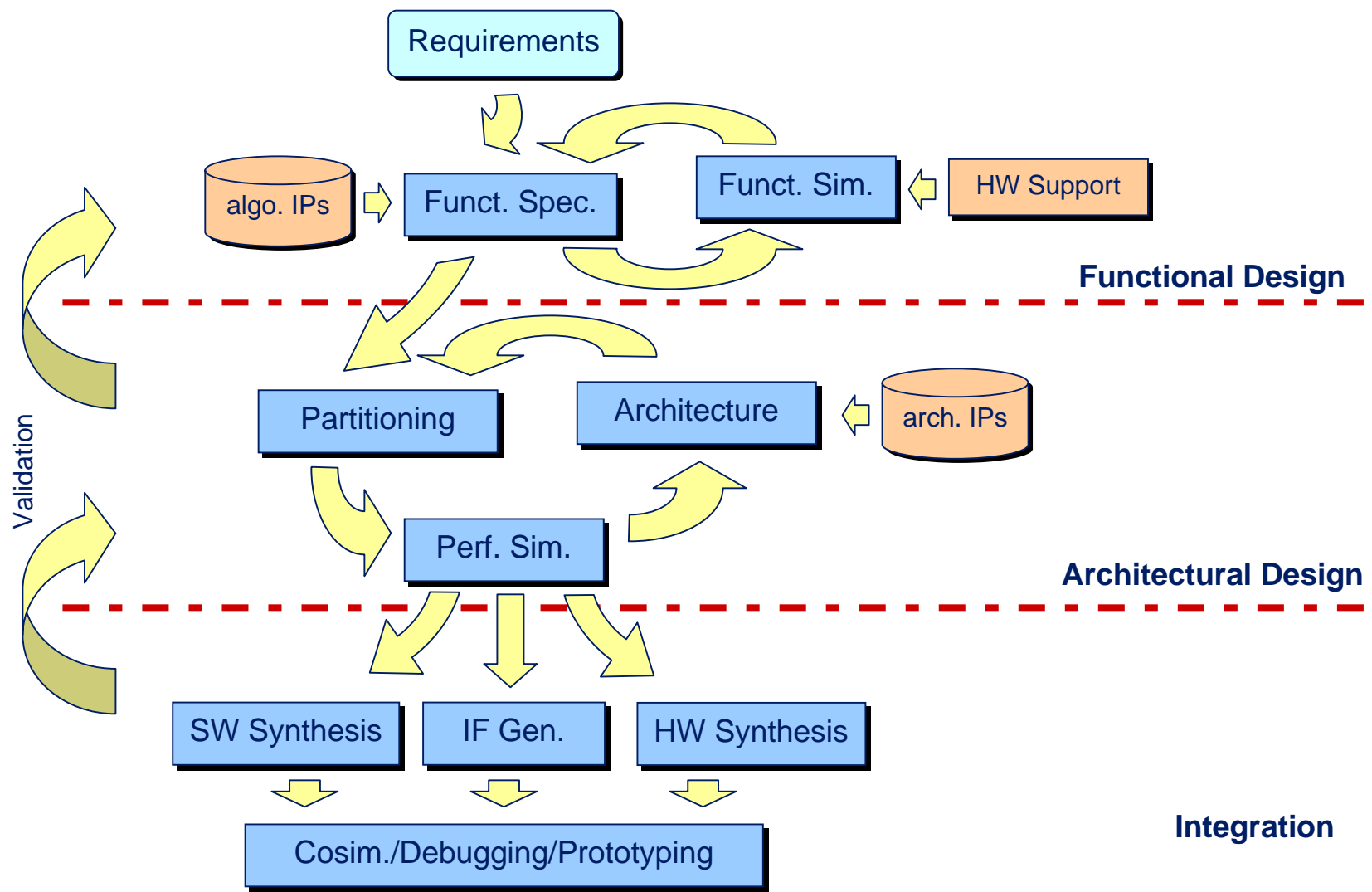
A possible design flow will split up into three major parts:

- functional design,
 - architectural design, and
 - integration.
- The solution will be a platform-based design approach, which is able to monitor and protocol as well as to forward the know-how of the concept engineering phase to the development phase.

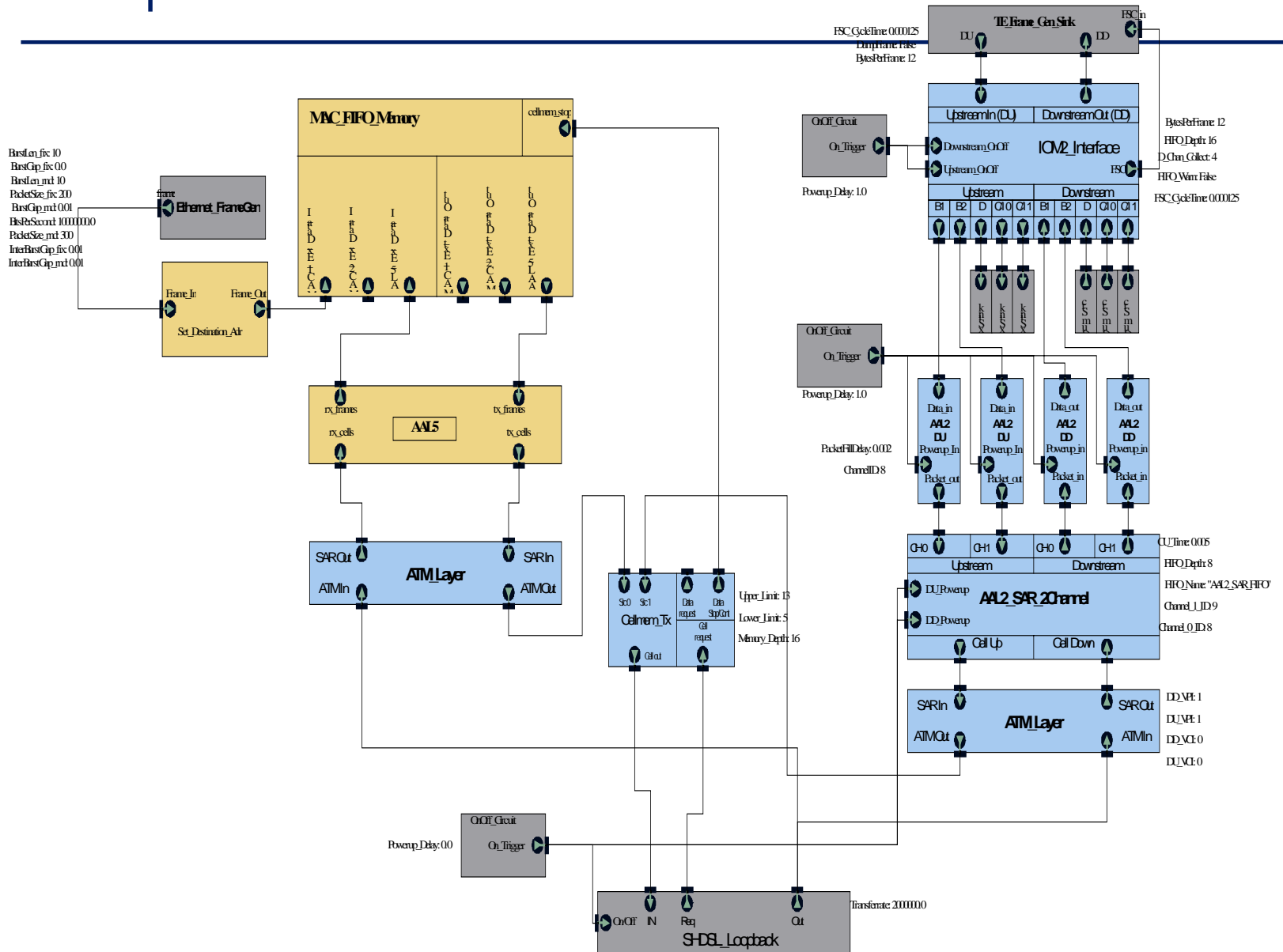
■ Benefit

- Handle higher complexities than today
- Close gap between concept engineering and development groups

Possible system-level design flow



Example: VCC Behavioral VCs



Example: VCC Architectural VCs

