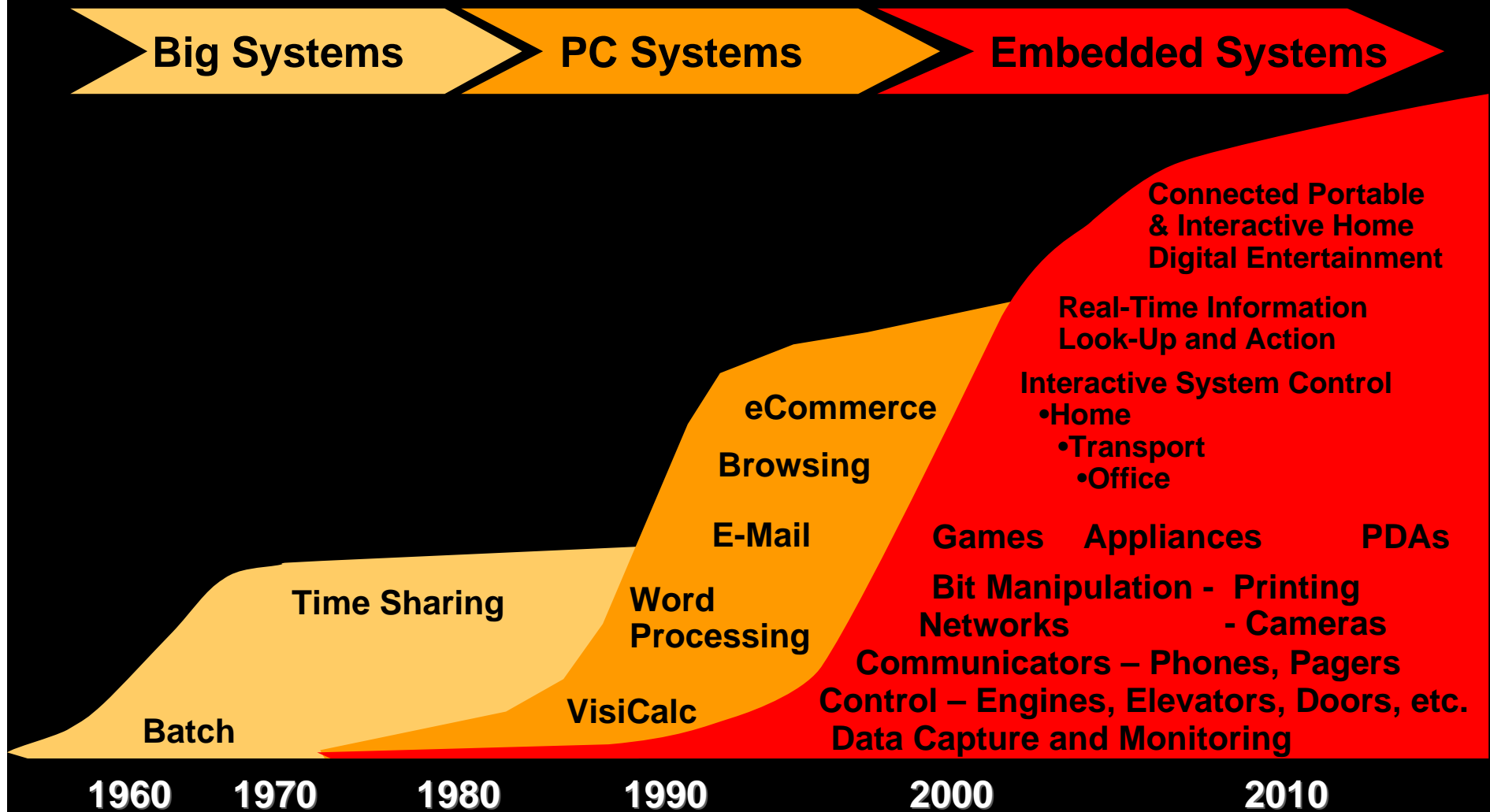


SoC: The Convergence Point for Solutions of the 21st Century

Joe Pumo, Director
System-on-a-Chip Design Technology
Motorola

- **Market Shift to SoC**
- **SoC Capability Requirements**
 - **System Design**
 - **Reusable IP Portfolio**
 - **Silicon Implementation**
 - **Manufacturing Technology**
- **System Platforms**

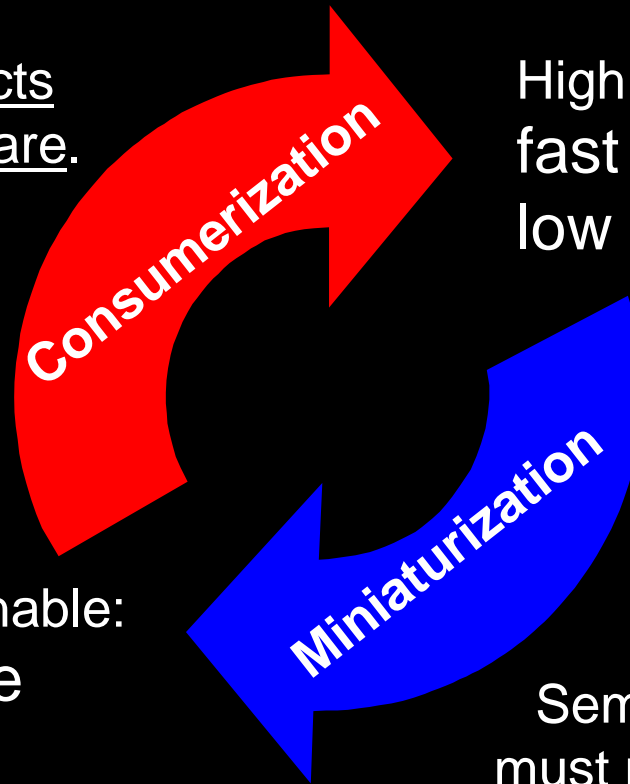
3rd Wave of Electronic Computing



Two forces working in conjunction in electronics industry:

System provider
must differentiate products
through application software.

High volumes require:
fast time-to-market
low cost

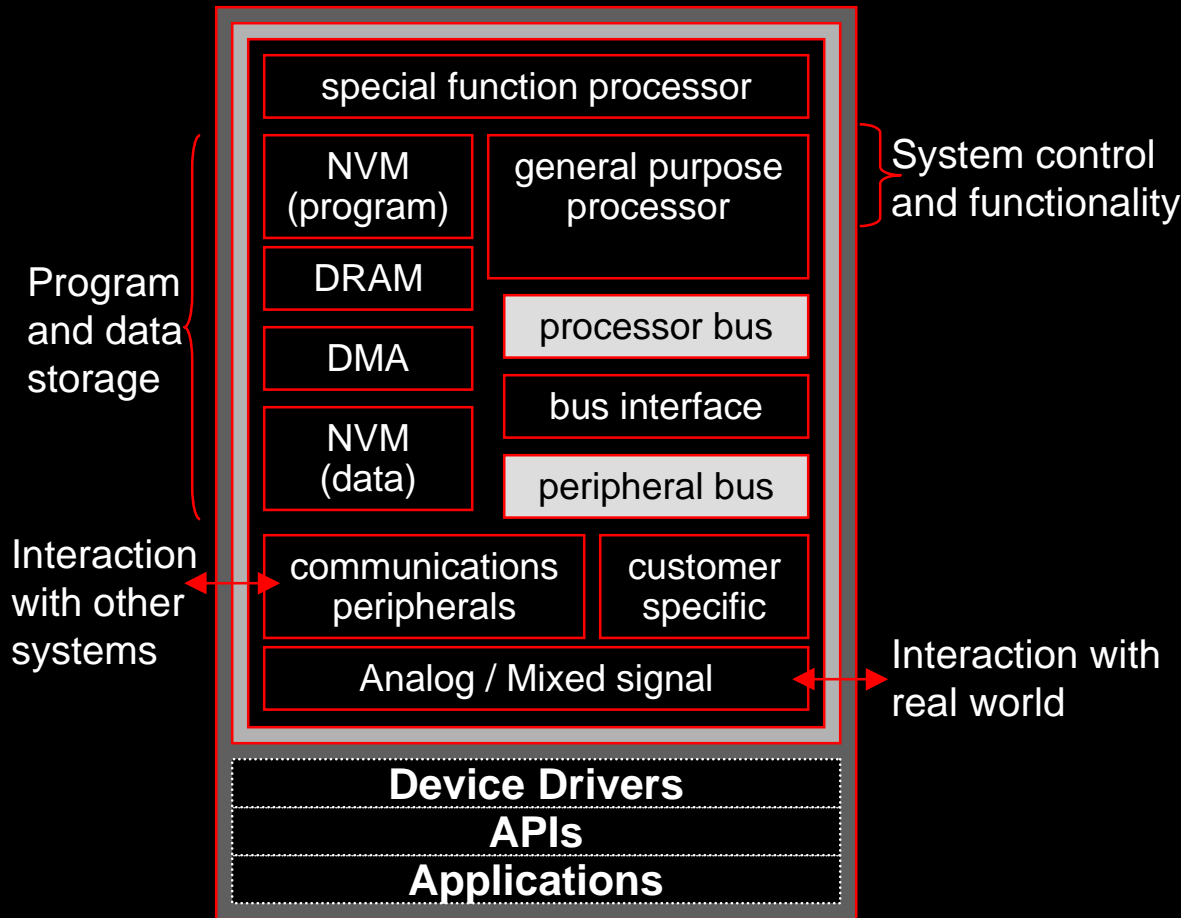


Small geometries enable:
high performance
integration

Semiconductor manufacturer
must recover costs of fabrication
through added system value.

a Product ...

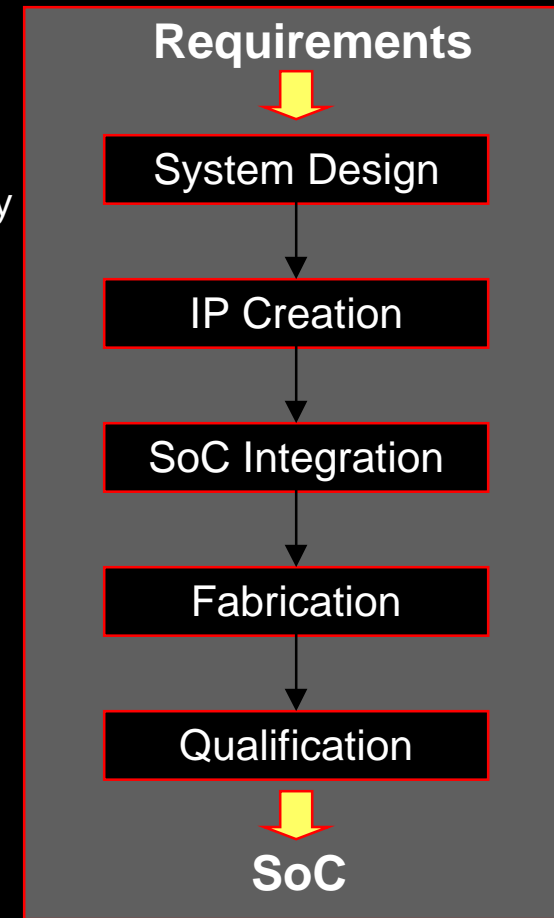
Solutions targeted toward specific applications that implement entire systems *including software*



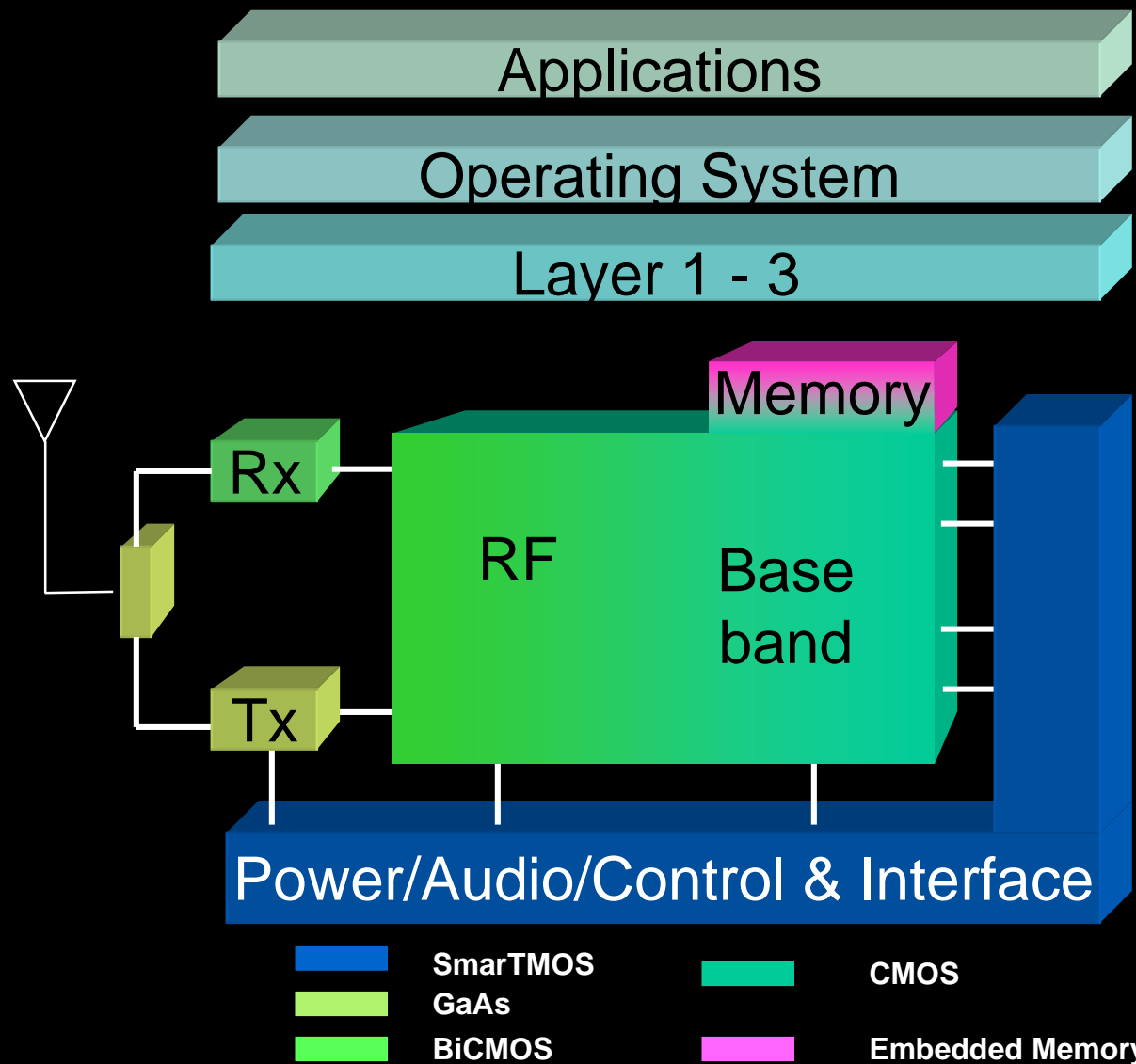
SoC Defines

and a Process.

System to Silicon in a rapid time-to-market.



Motorola Wireless Solutions



SoC - required Capabilities

1. System Design Skills

to define and optimize at the system level

2. Reusable IP Portfolio

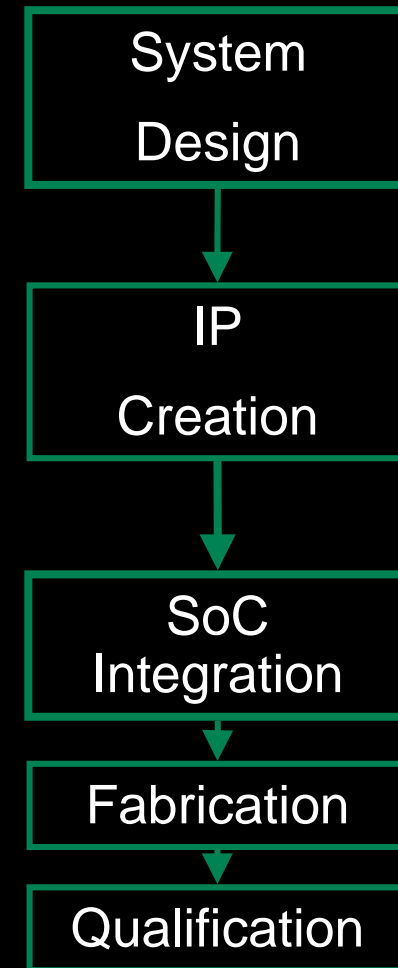
to meet cycle time requirements

3. Silicon Implementation

to ensure functionality and performance

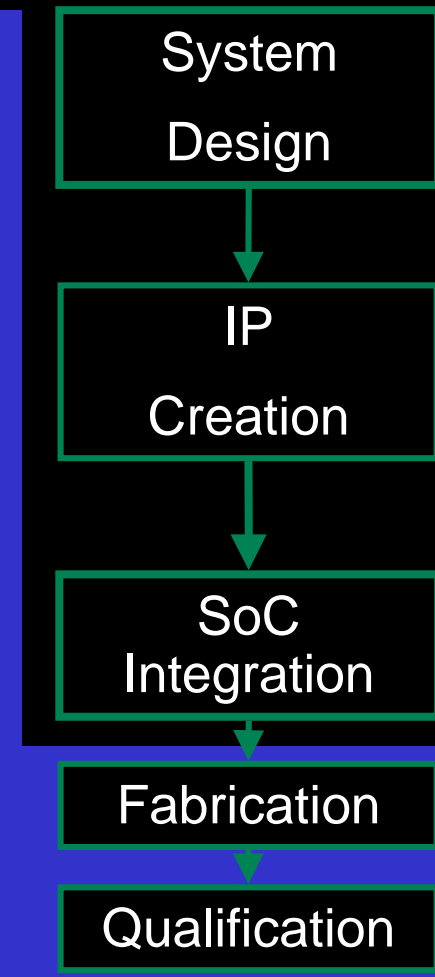
4. Manufacturing Technology

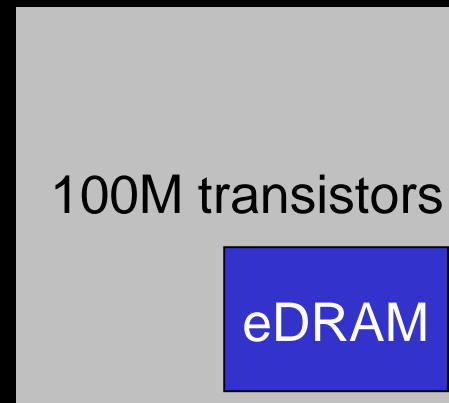
to achieve price and performance goals



Requirements for SoC Convergence:

- Cost
 - Higher density fabrication processes
 - More compact packages
- Time-to-market
 - Scan and special test modes
 - Upfront planning
- Functionality
 - Higher pincount packages
 - Integration of a variety of devices
- Performance
 - Faster interconnect
 - Higher performance testers





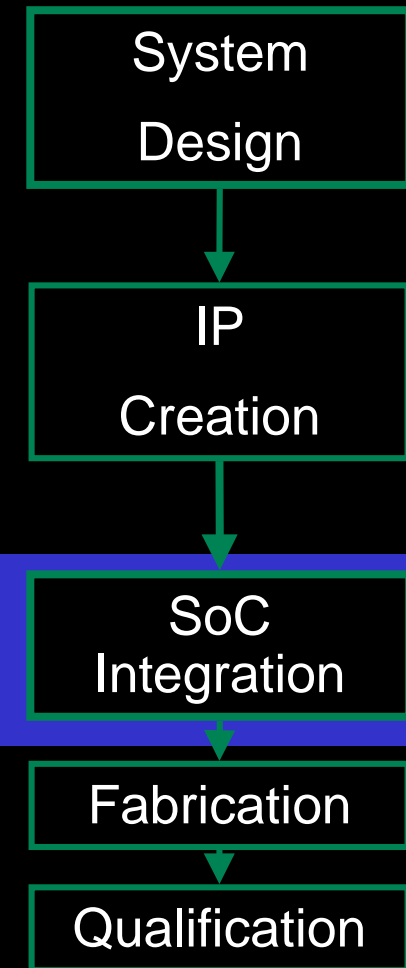
Two challenges drove development of a new process:

- density
- embedded DRAM

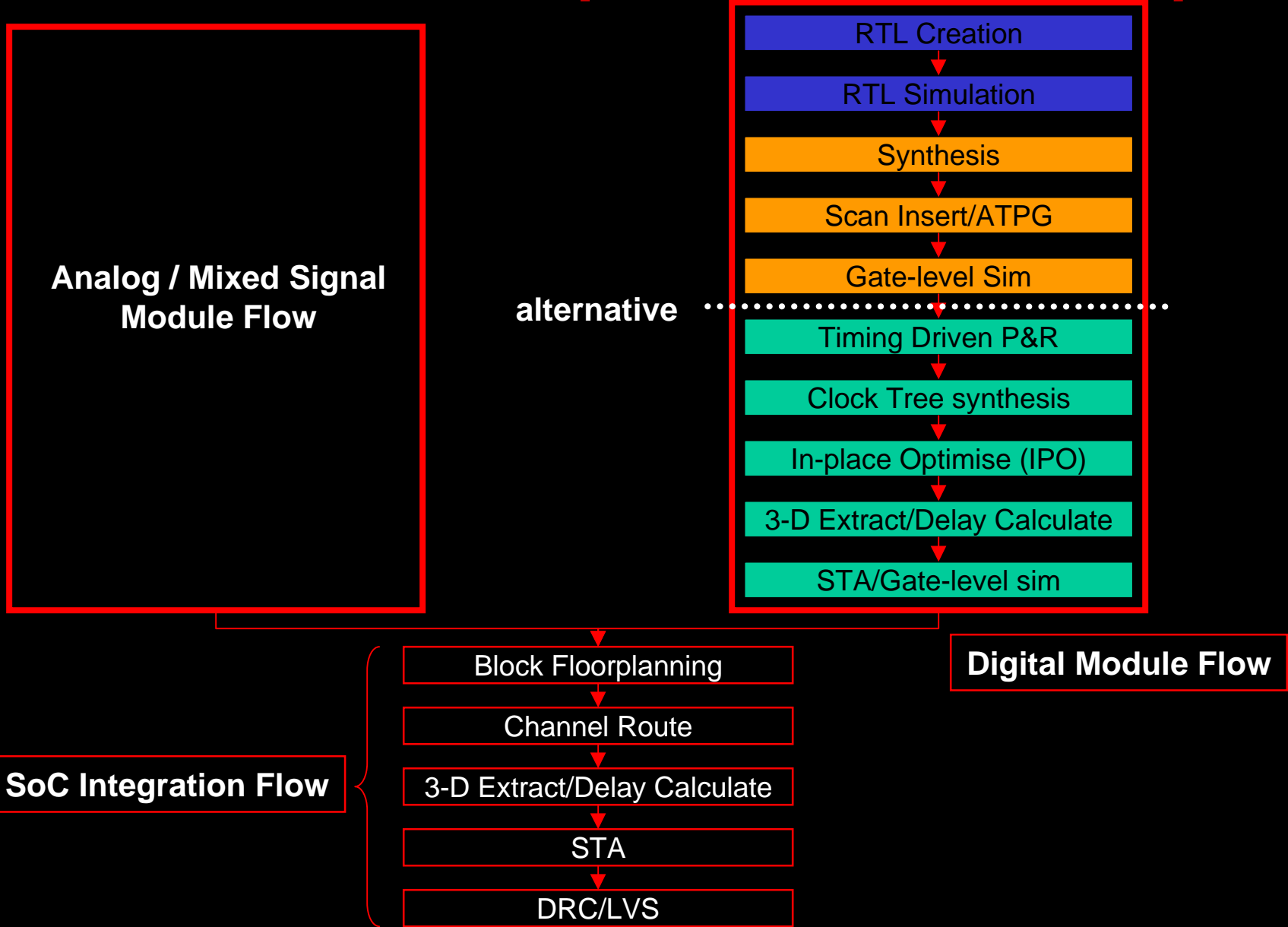
Process development is driven by systems, no longer by memories / processors.

Requirements for SoC Convergence:

- Cost
 - Efficient backend
- Time-to-market
 - Configuration management
 - Integration of IP from various sources
- Functionality
 - Advanced verification techniques
- Performance
 - Accurate representation of parasitics

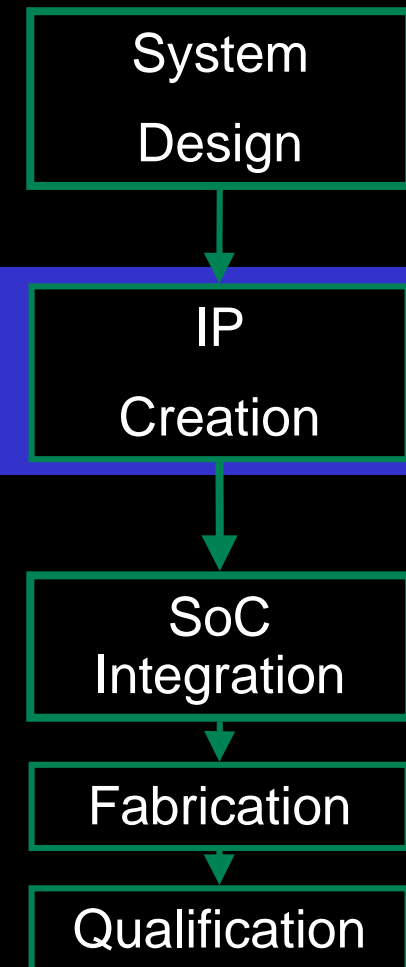


Silicon Implementation Example

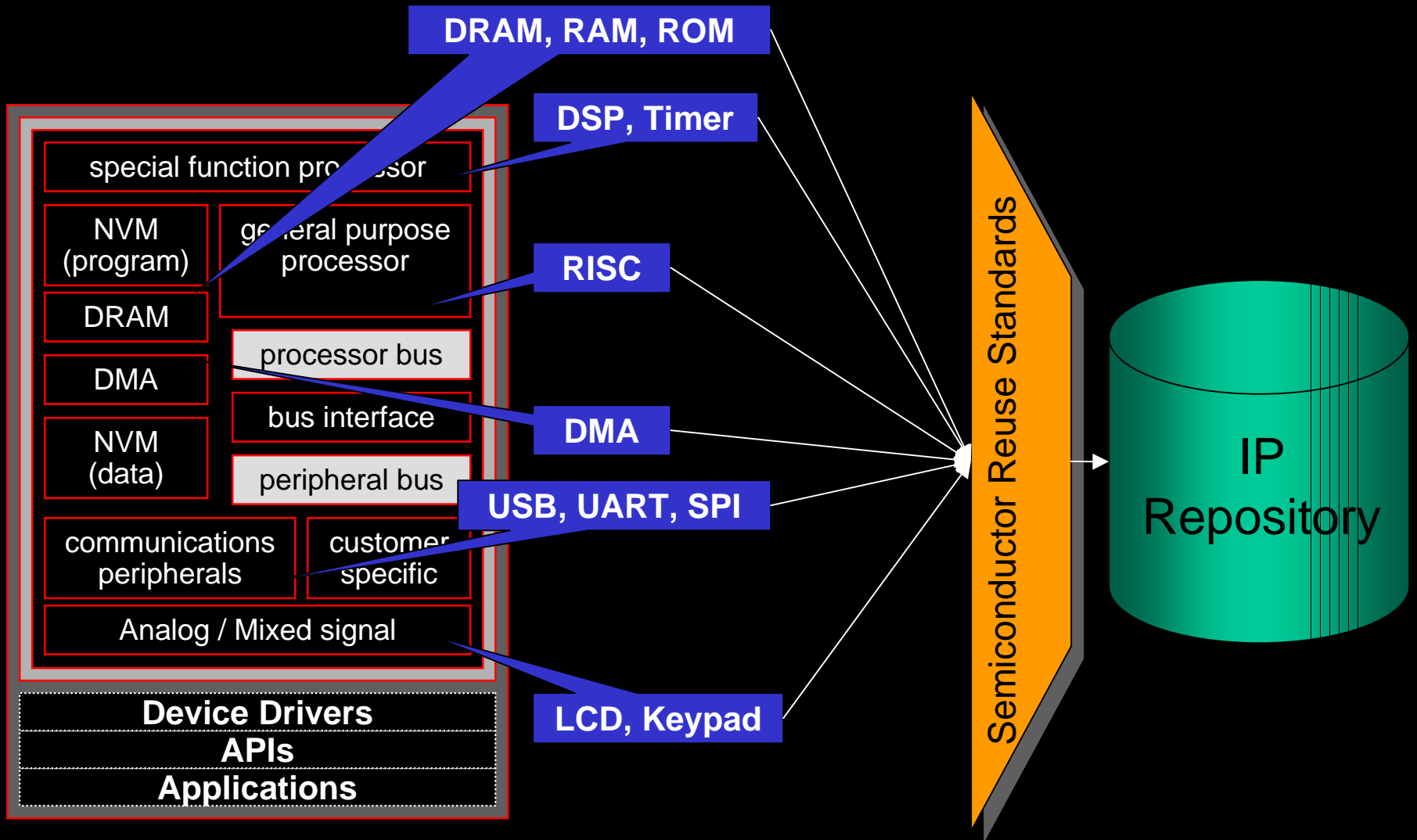


Requirements for SoC Convergence:

- Cost
 - Planning for strategic IP development
- Time-to-market
 - Standards compliant
 - Central availability
- Functionality
 - Soft IP transfer
- Performance
 - Hard IP transfer

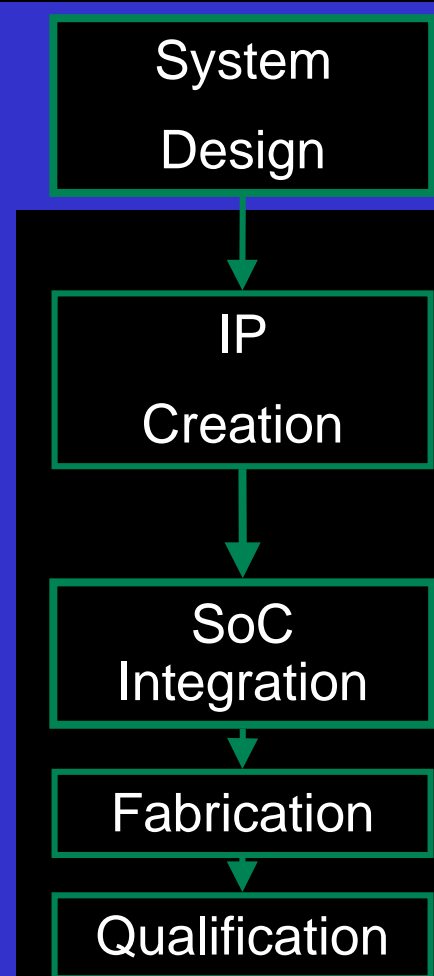


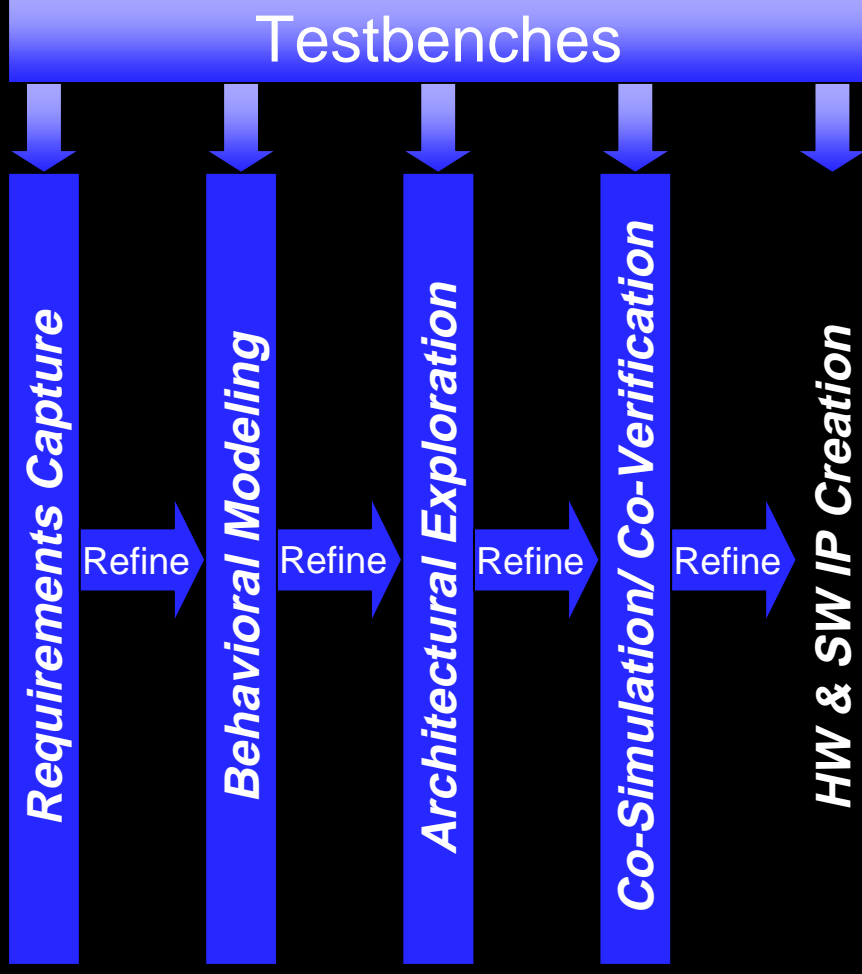
Reusable IP Portfolio Example

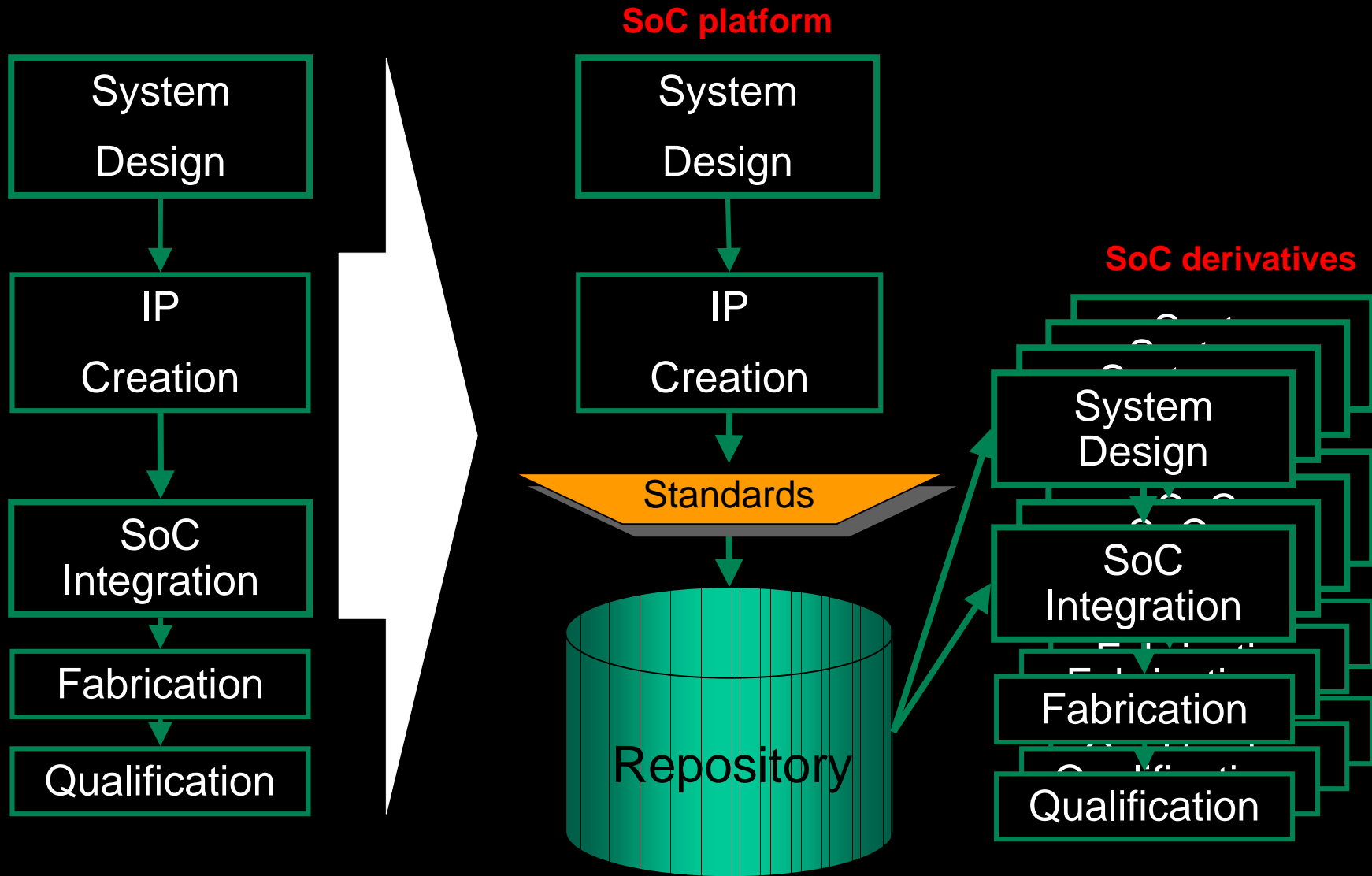


Requirements for SoC Convergence:

- Cost
 - Optimize for a specific application
- Time-to-market
 - Automatic generation to lower abstraction
- Functionality
 - Domain-specific flows
- Performance
 - Increased accuracy







Platform Impact on ROI

Technology Derivative

- subset of Technology Implementation in same technology

Technology Implementation

- silicon implementation of SoC

SoC Platform

- phase 3: emulator
- phase 2: soft models mapped to processor (s)
- phase 1: behavioral models (non-partitioned)

Processor IP

- soft h/w core IP and core-specific s/w drivers
- core-specific models, s/w dev tools

Processor Platform

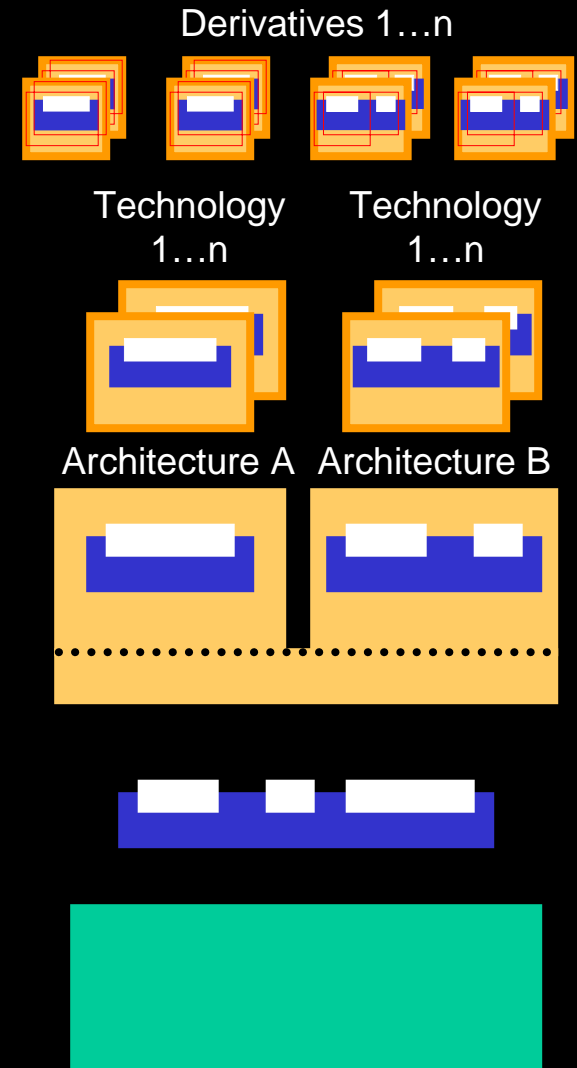
- standards for configuration of core IP

Infrastructure

- standards for design exchange
- design system for s/w and h/w creation / integration
- foundation IP (cell libraries, memories)

Quantity

Effort



- **Convergence is driving us toward SoC.**
- **SoC includes both hardware and software, defined in a top-down process starting at the system level.**
- **SoC requires the following capabilities:**
 - **System Design Skills**
 - **Reusable IP Portfolio**
 - **Silicon Implementation**
 - **Manufacturing Technology**
- **System requirements can be met in a competitive cycle time if a platform development methodology is used.**