SYNOPSYS®
Predictable Success

The Role of Prototyping in SoC Development

MPSoC 2011, Beaune, France

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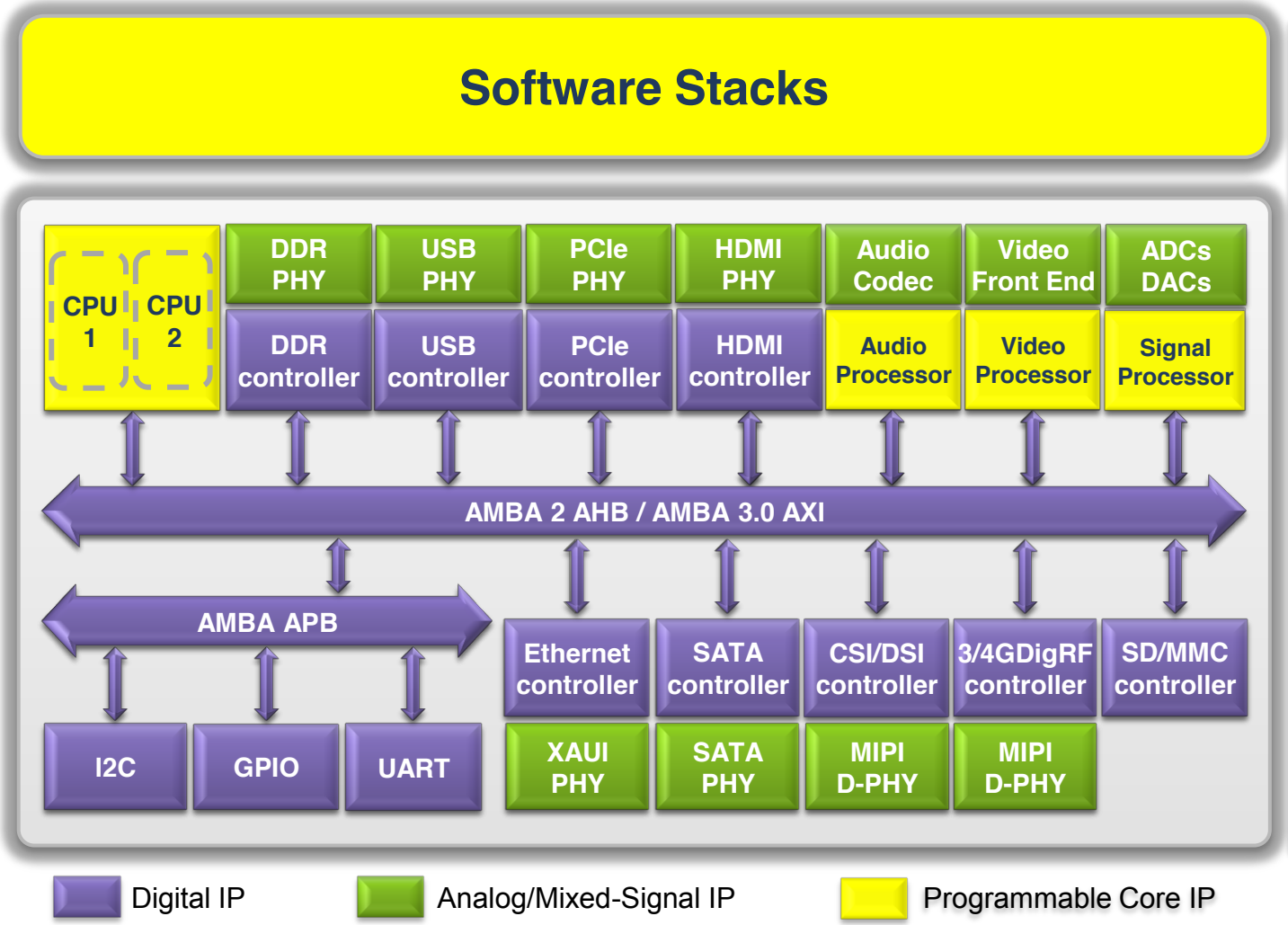
System On A Chip

HW Has Become The Execution Platform For SW



Highly Structured Design Style

Heavy Reuse of Building Blocks (IP)

Standard On-Chip & Off-Chip Interfaces

Many Processors Controllers & DSPs

The System On a Chip Challenge

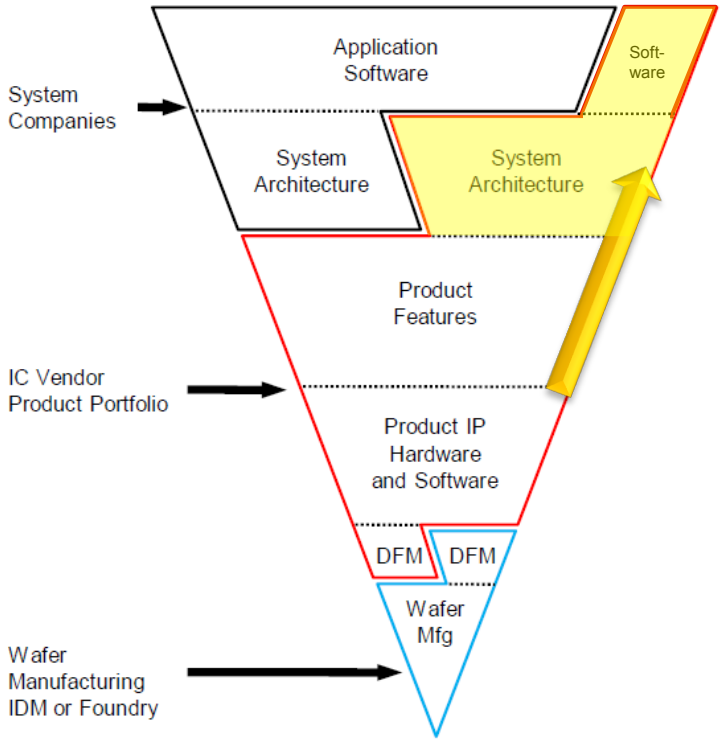
HW Design & Verification

+

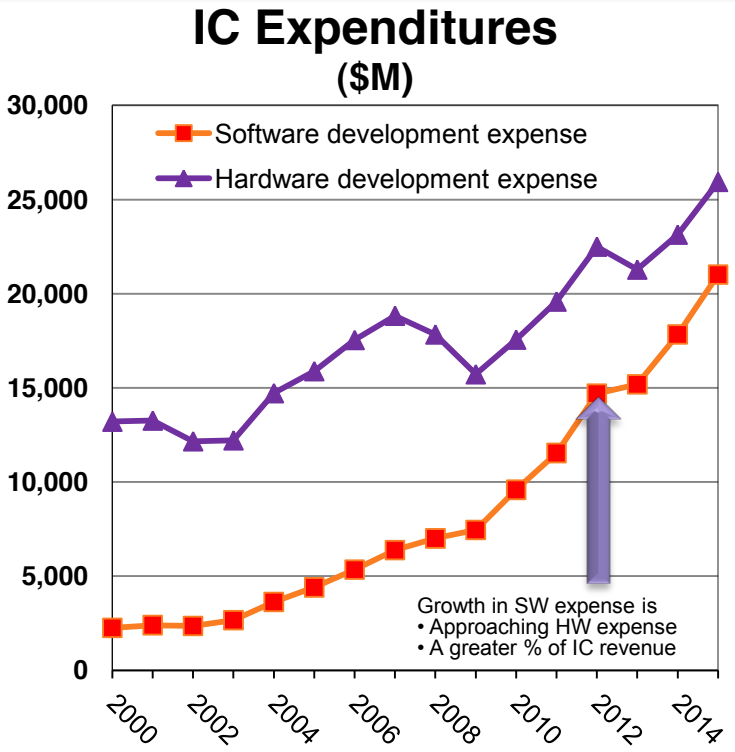
SW Development
HW/SW Integration
System Validation

How Big Is It?

Semi companies asked to provide more



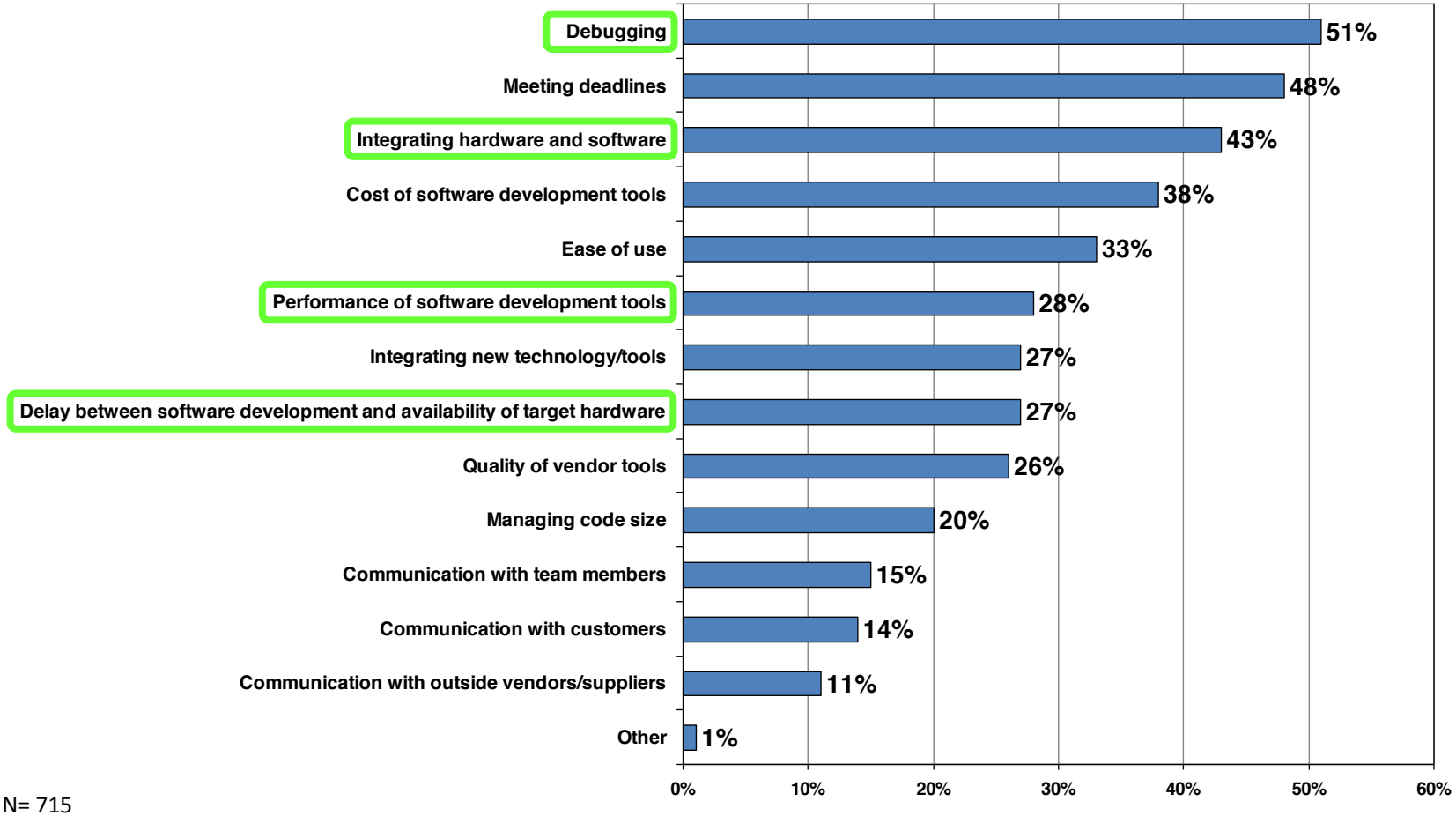
Semi companies spending more to develop software



Source: Global System IC (ASSP/ASIC) Service Management Report, IBS 2010

Challenges:

What are your most important challenges as they relate to embedded software development? (Please select all that apply)



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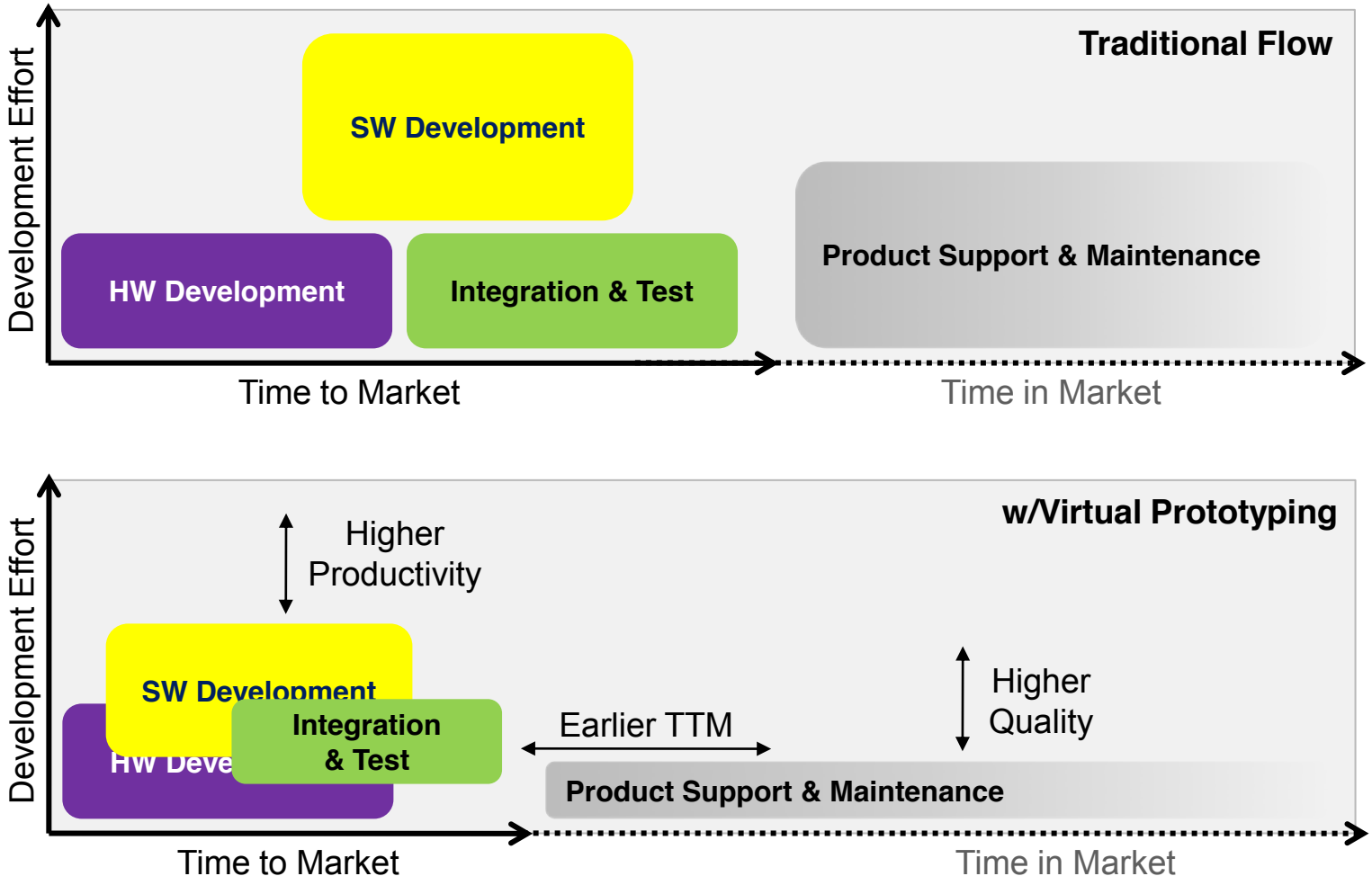
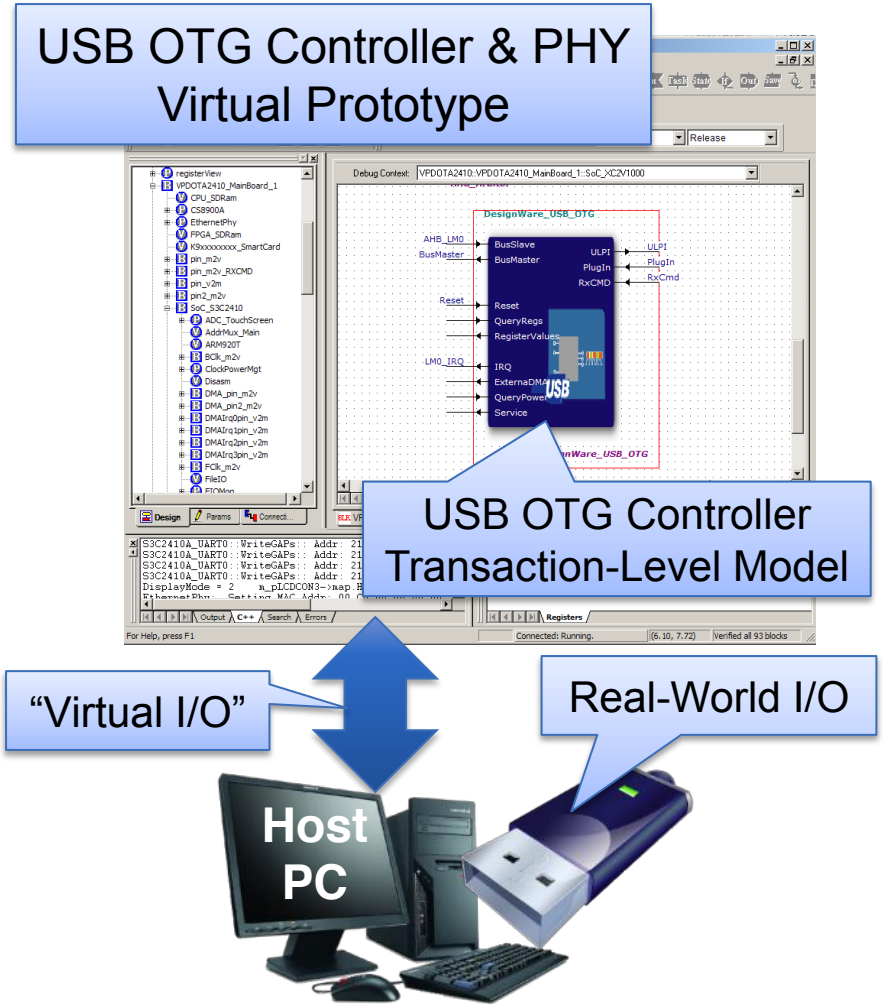
Source: Synopsys eSW Developer Study, March 2011

Accelerating SW Development
with Virtual Prototyping



Virtual Prototypes Accelerate DesignWare® USB Driver Development

- USB* Driver Development/Debug:
  - Used for new designs as well as IP hardware feature additions
  - Simulated USB “Host” and “Device” functionality to interact with real USB devices and PC applications
- **Software Ready When Hardware Is Ready**
  - Drivers available weeks before first hardware prototypes
  - HW-SW “bring-up” time cut in half
  - Easily scaled to additional SW engineers without incremental cost



*Achieved with both USB 2.0 & 3.0 IP

Is Virtual Prototyping Mature?

Texas Instrument

We are able to **improve our software development schedules**, resulting in **productivity gains** and allowing TI to deliver

Marvell

Virtual Platform saved us development costs and **reduced the integration risk** as we introduced our PXA3xx application processor to

Renesas

Virtual Platforms provide such **productivity enhancement** capabilities to the

Siemens

Platform Architect and **Virtual Prototyping** tools provide us with the **right standards-based, full system simulation approach** we need.

Mazda

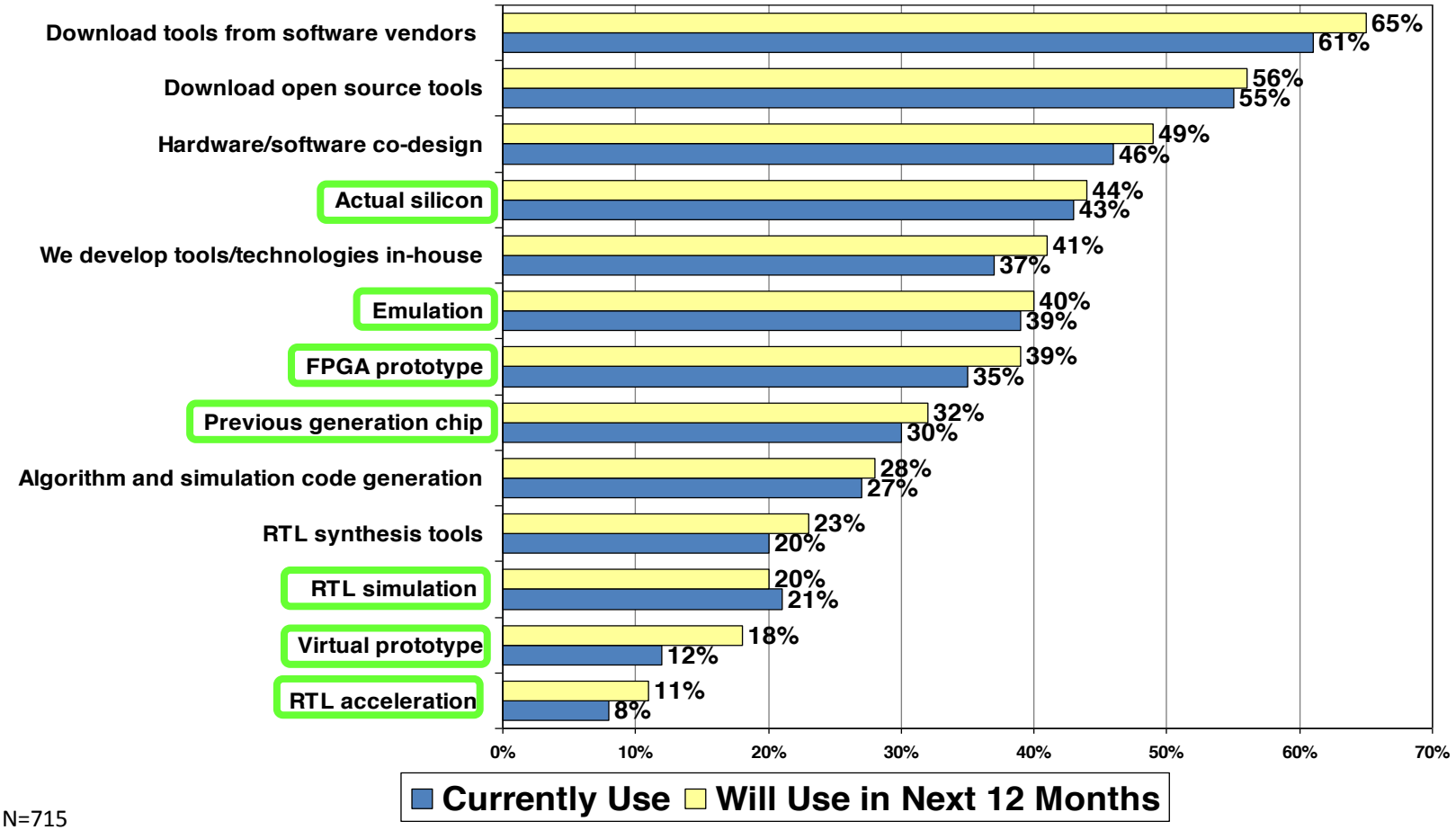
We need virtual prototyping not only to **accelerate ECU development time while lowering cost**, but also to **ensure that our ECUs are safe & reliable**.

Ricoh

We were able to **reduce…software development time for our SoC by 90%** and **validate optimal performance before final RTL implementation**...

Type of Tools/Technologies:

What types of tools/technologies are you using for your current embedded project and which technologies/tools do you expect to use/expect to continue to use in the next 12 months? (Please select all that apply)



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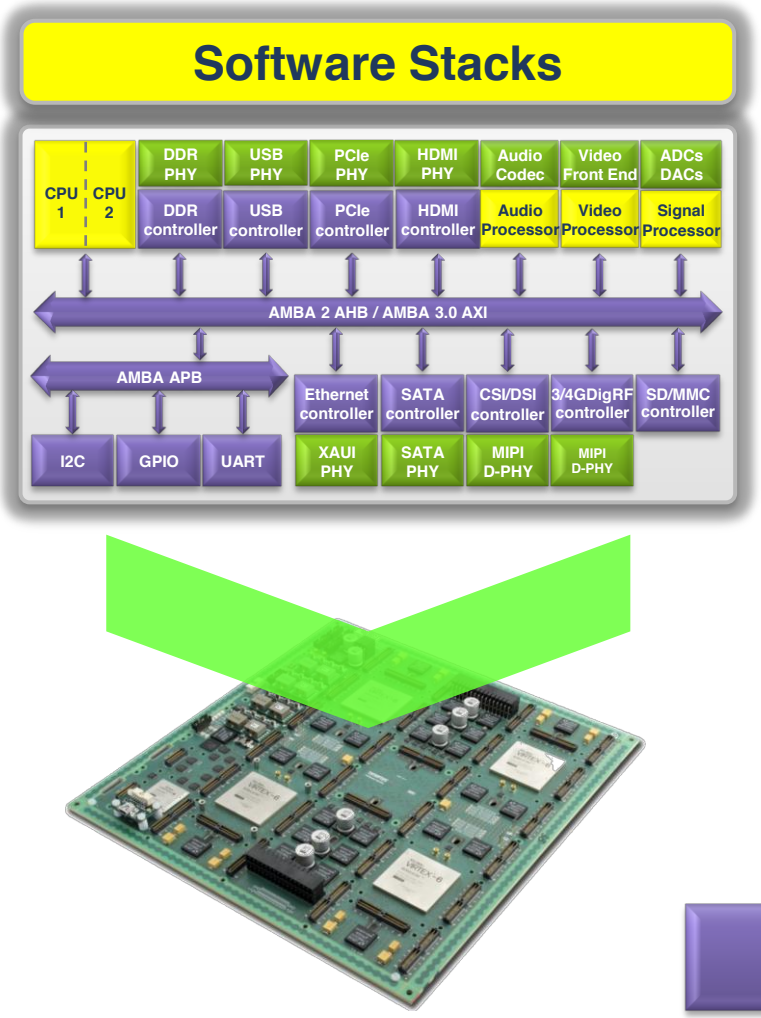
Source: Synopsys eSW Developer Study, March 2011

HW/SW Integration & System Validation

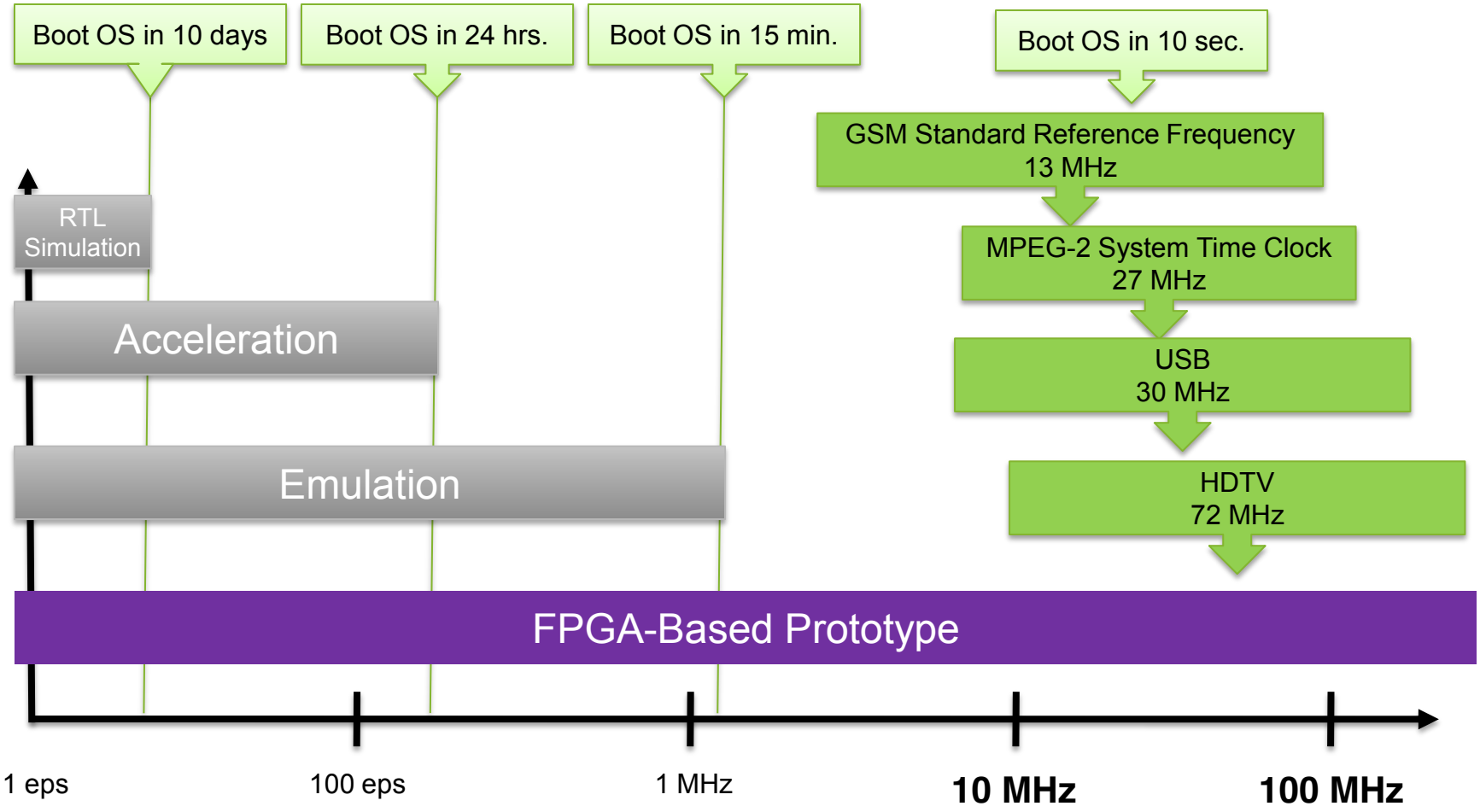
FPGA-Based Prototyping



- Pre Silicon
- Accurate
- Connected to the Real World
- Extendable
- Visibility for Debug
- Fast, Fast, Fast

HW/SW Integration & System Validation

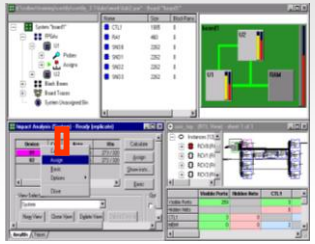
Real World Performance Required



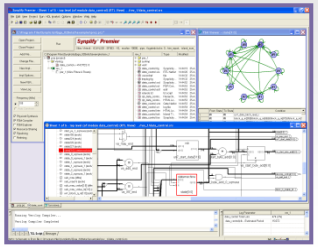
System Performance *(eps: evaluations/sec or MHz clock rates)*

Synopsys' FPGA-Based Prototyping Solution
Build Around HAPS Prototyping System

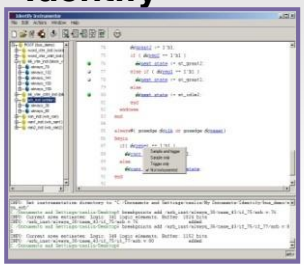
Certify



Synplify Premier



Identify



HAPS

HDL
Co-Simulation

UMRBus

SCE-MI

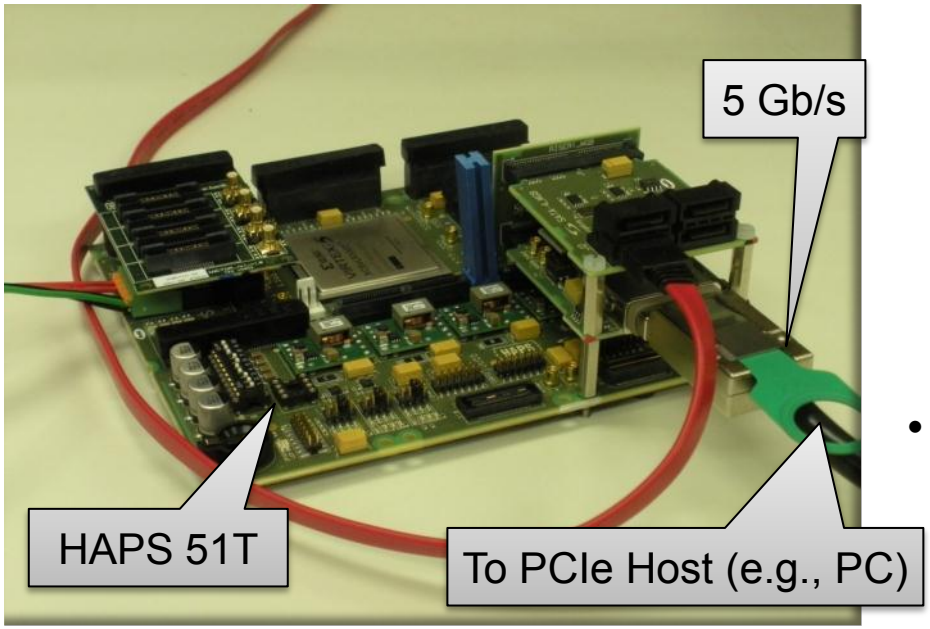
Hybrid
Prototyping

- FPGA-Based Prototyping Solution
  - implementation
  - run time support
  - debug
- Performance and Accuracy vs. Time to Prototype tradeoff remains
- FPGA-Based Prototyping will get closer to the comfort of emulation without loosing Performance and Accuracy

DesignWare® IP Prototyped with HAPS

Achieves Higher Quality in Less Time

DesignWare SATA & PCIe Endpoint HD Video Prototype



- **Comprehensive Verification with HAPS**
  - Functional verification
  - Interoperability testing
    - Between controller and PHY
    - Between our IP & commercially-available devices
    - With standard software stacks (Linux & Windows)
  - Compliance testing and “plugfests”
  - Product demos
- **Benefits for SATA & PCIe prototypes**
  - Saved 4-6 mos vs. custom board dev’t
  - Caught ~10 critical bugs missed in simulation
  - Streamlined support
    - Customers have same HW platform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