

The Importance of Ecosystem

Debug, Trace and Testing

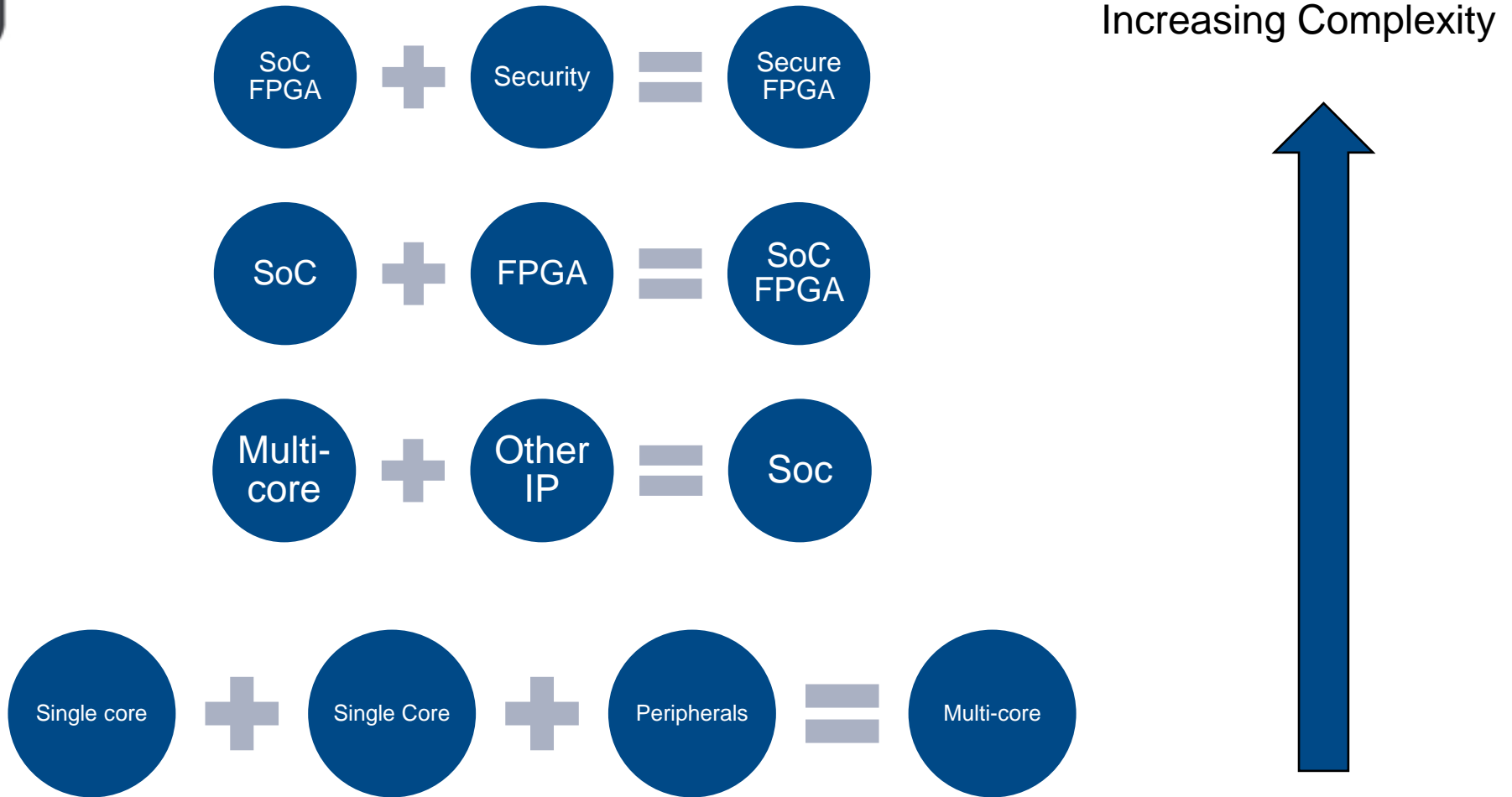
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Increasing cost of performance

- ◀ **Rock's Law:** Cost of a semiconductor chip fabrication doubles every four years
- ◀ **Moore's Law:** Number of transistors in a dense integrated circuit doubles approximately every two years

Vendors integrate functionality to create value

The evidence and its impact



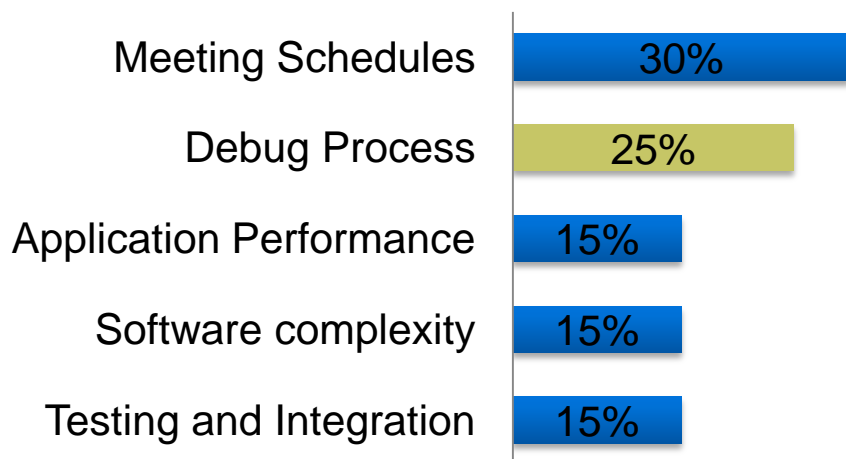
Complexity is inevitable.

- ◀ Silicon vendors will integrate functionality.
- ◀ Functionality will address different applications.
- ◀ Such integration of functions makes devices complex.

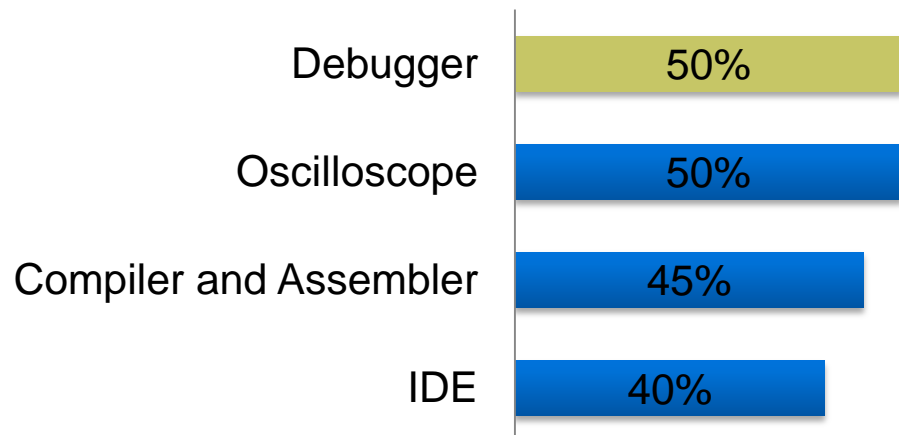
You can run but you cannot hide.

Complexity complicates debugging.

Top Concerns for product developers



Most important tools for product developers



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Power comes with responsibility

- ▶ Powerful devices such as SOC responsible to ensure should come with hardware debug capabilities to match.
- ▶ Silicon vendors should provide high quality debug tools through experienced partners
- ▶ Product developers should completely understand the differences in debug architectures, software and tools offerings

How to choose a device?

◀ Three guiding principles.

Device Debug Architecture

- Enables system level view
- Supports high bandwidth debug

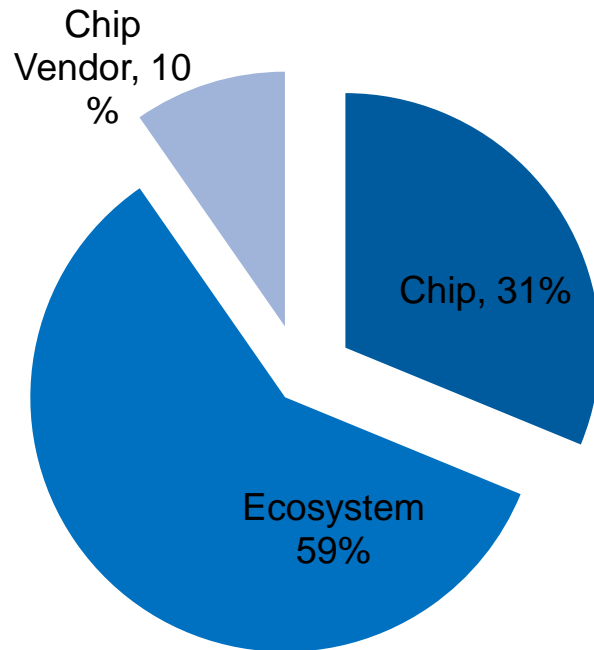
Debug Tools

- Leverage all hardware features
- Provide all relevant information
- Easy to setup and use

Support

- Global Product Development
- Expertise
- Maturity

How are teams choosing processors.

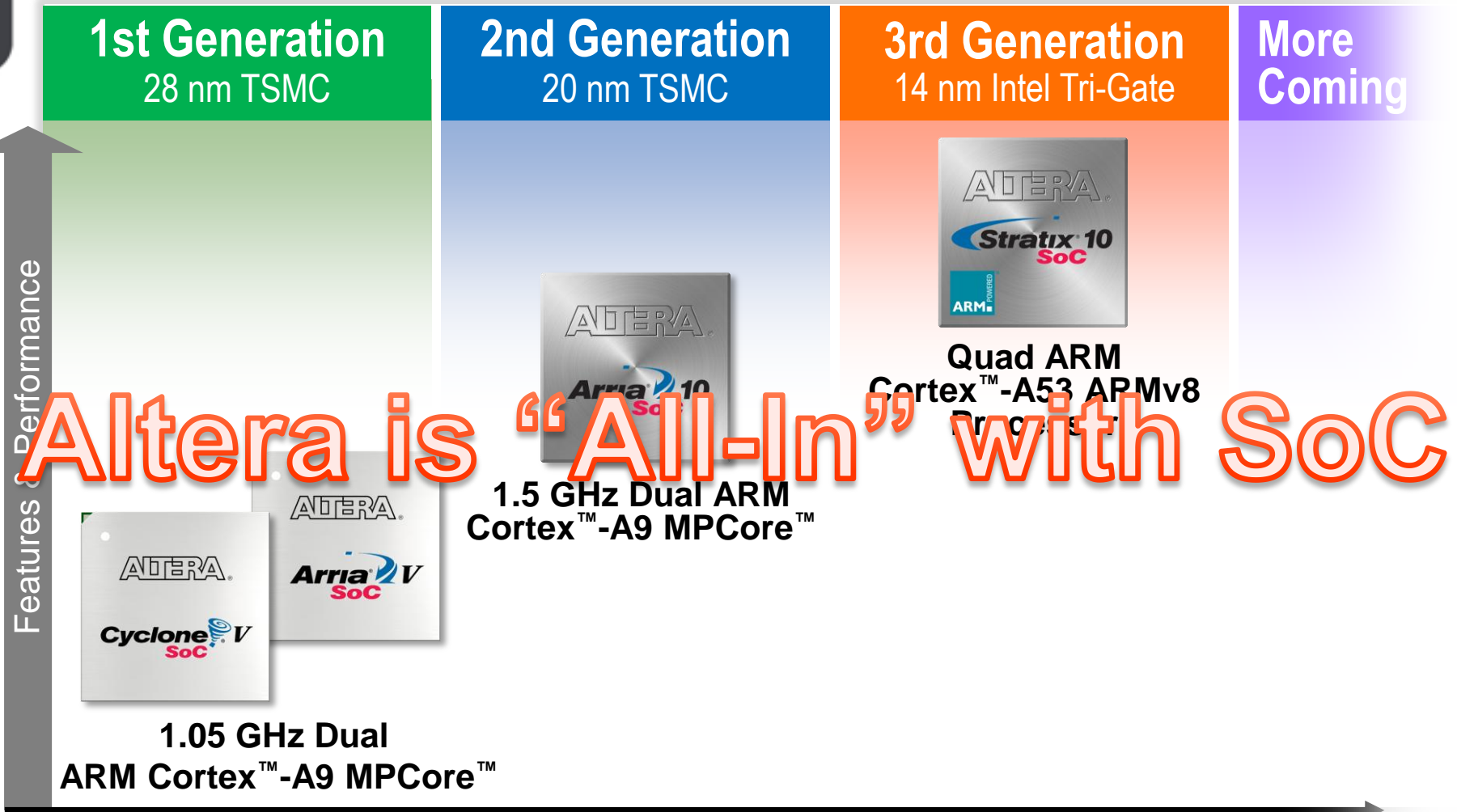


◀ Ecosystem, ecosystem, ecosystem.

◀ Followed by capability of chip

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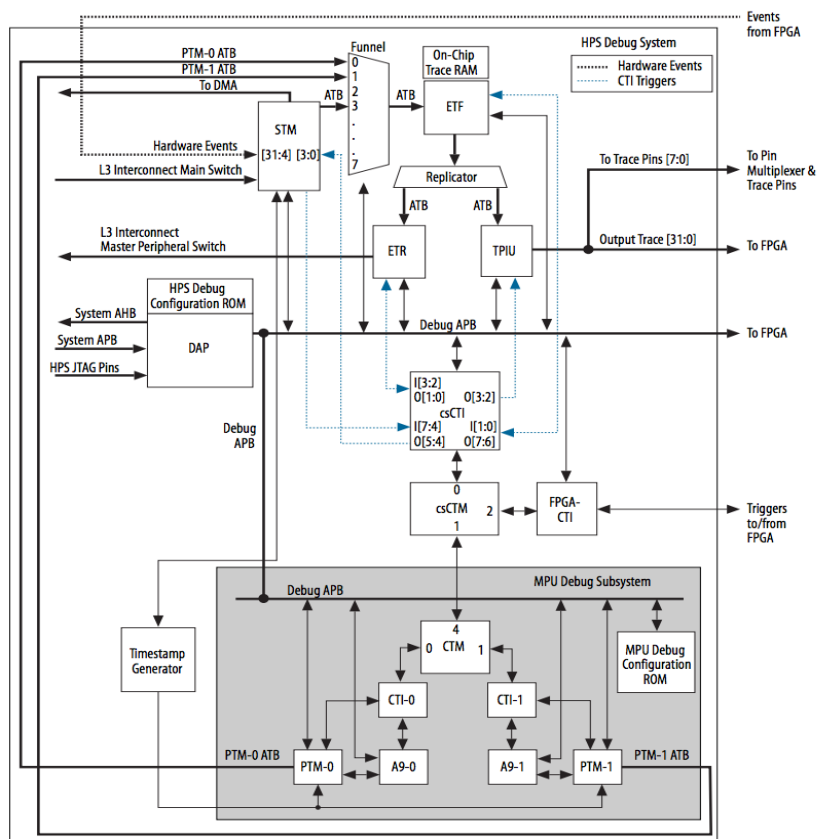
Long-Term SoC Roadmap Commitment



Example: A10 Debug Architecture.

CoreSight Debug and Trace Block Diagram and System Integration

Figure 10-1: HPS CoreSight Debug and Trace System Block Diagram



- Industry standard debug architecture. No proprietary IP. Mature and long history.
- Extension of processor debug bus into FPGA
- Bi-directional hardware interrupts with timestamp capability
- FPGA events into Coresight STM enables FPGA event injection in to trace view.

Hardware enables all advanced debug use cases.

Example: A10 Debug Tools

- ◀ Choice of debug and performance tools available based on requirements.
- ◀ **Lauterbach:** Mature tools from experts. Same tools for multiple silicon vendors. Excellent global support. True multi-core debug between MPU and FPGA and FPGA soft cores (NIOS)
- ◀ **Altera DS-5 AE, GDB etc.**

Variety of tool options to support all advance debug use cases.

Are you considering?

- ◀ Debugging capabilities of silicon hardware.
- ◀ Maturity and capabilities of software and tools available to test and debug SoC FPGAs.
- ◀ Ease of setup and use.
- ◀ Technical support across relevant geographic regions.

Thank You

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How are companies coping

Early Testing

- Businesses are developing products that are designed to provide the necessary test coverage early on.
- Businesses are modifying product development processes to enable early testing

Anomaly Detection

- Companies are investing heavily in continuous testing and regression testing frameworks.

Identify Bugs

- Investing time and resources in identifying the right tools to simplify the resolution of bug

Impact to development model

- ◀ Complexity leads to higher probability of bugs
- ◀ Productivity and Time to market can be at risk
- ◀ Considering the complete device and vendor ecosystem are becoming critical
- ◀ Individual vendors cannot provide quality products in all areas
- ◀ Companies capable of leveraging ecosystems will gain a competitive advantage
- ◀ To remain competitive, consumers of silicon devices need to embrace complexity and adapt accordingly