

The End of Moore's Law? High Performance ICs Through Modular Chip Design

Tom Smelker

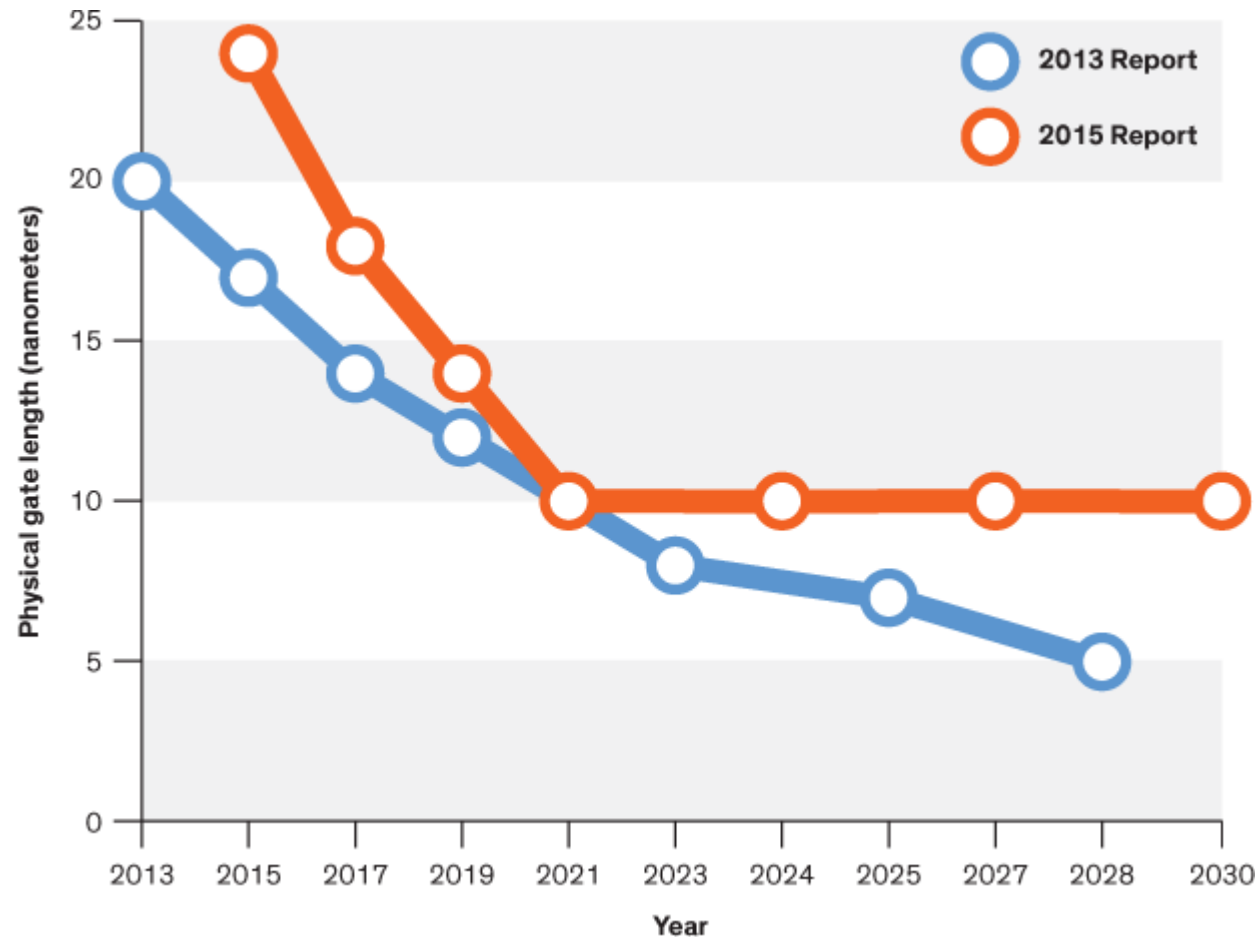
Vice President & General Manager

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Moore's Law

We are coming to the end of transistor shrinking phase



* Image Source IEEE Spectrum.com

Moore's Law

- Doubling the number of transistors per chip at a constant cost
- Increasingly difficult to maintain this exponential improvement

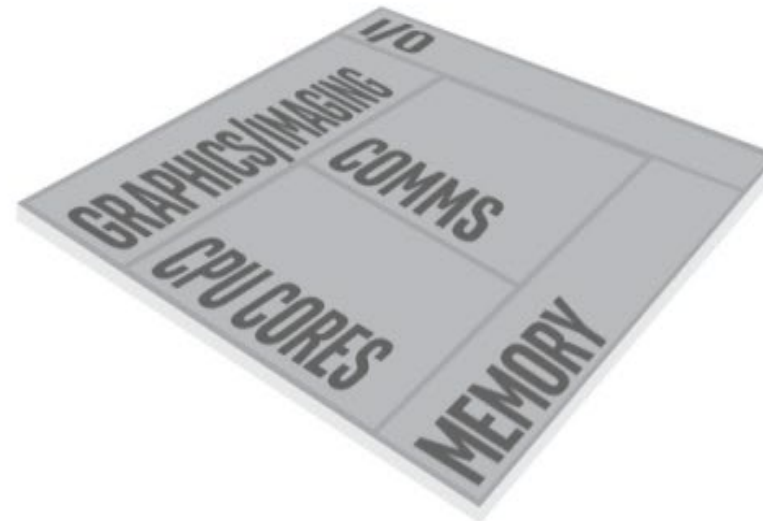
...modular chip design will enable the next phase of Moore's Law

The Next Phase of Moore's Law

- 2.5 and 3D materials
- Reduced complexity of chip-to-chip communications
- Specialized System in Packages (SiP)
- Leading semiconductor companies are already moving to heterogeneous 2.5D solutions

MONOLITHIC CHIP

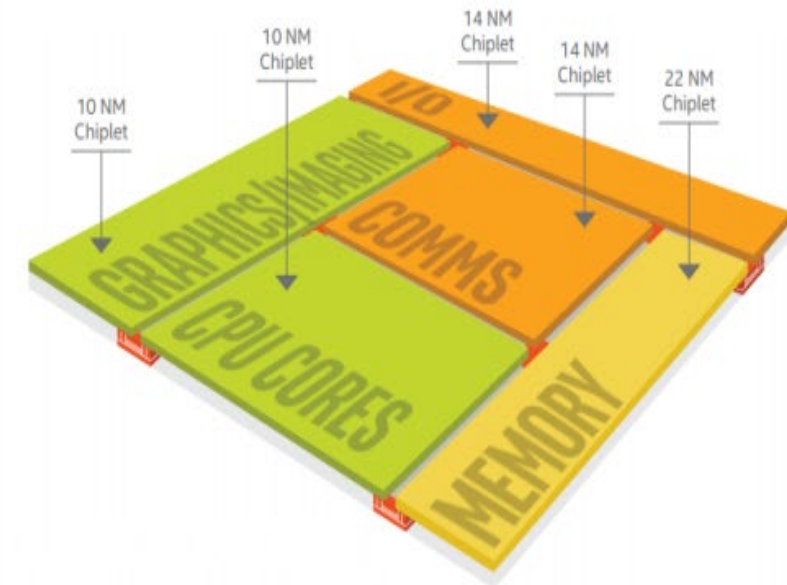
A singular piece of silicon, constructed as a unit



* Image Source Venturebeat.com

CHIPLETS

A heterogeneous collection of "chipslets" integrated as one device



After transistor shrinking phase – heterogeneous solutions phase (last page of Moore's Law)

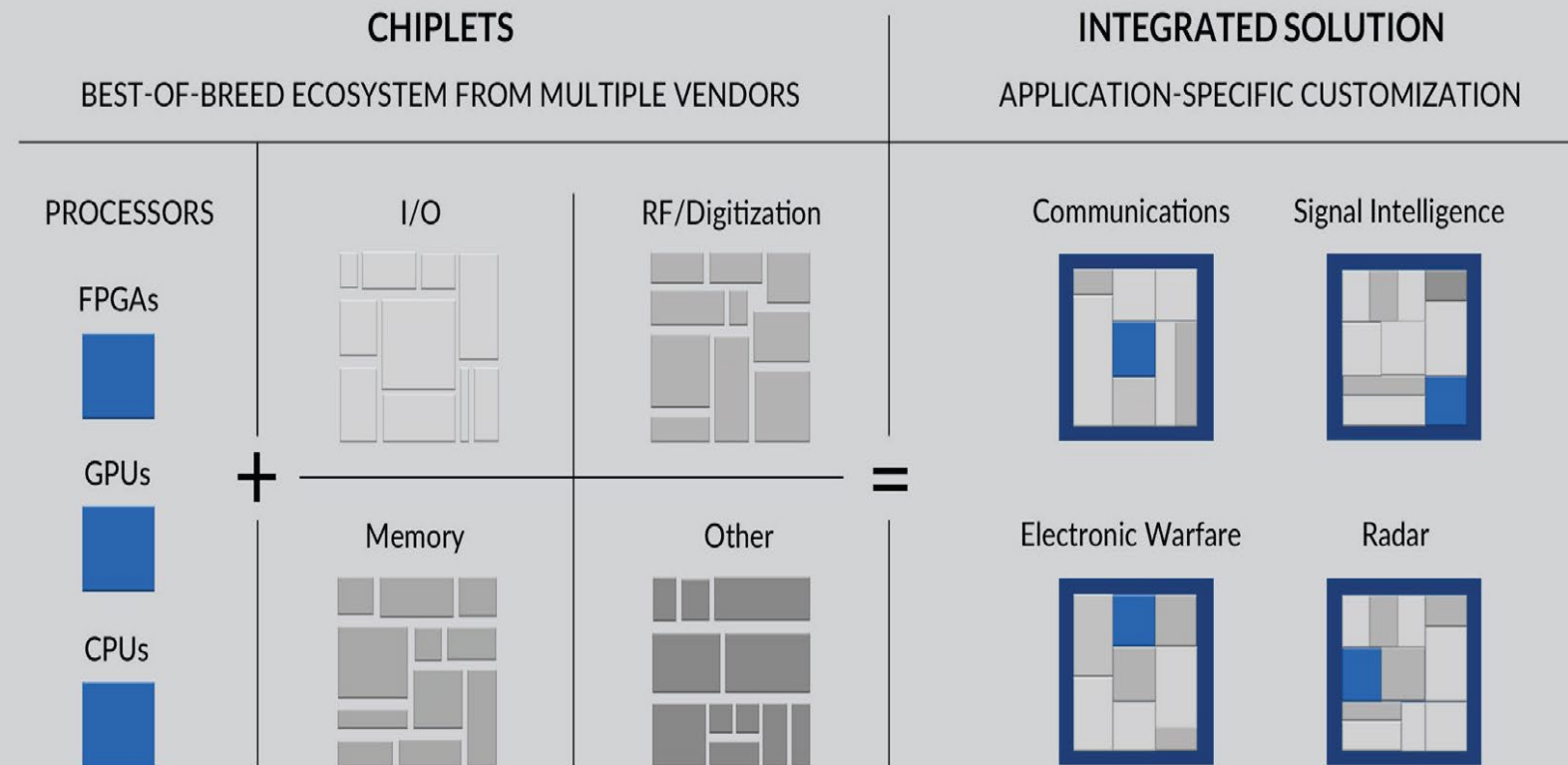
The Value of Modular Chip Design

Chip-scale Open Architecture Allows:

- Increased investment in application-specific chiplets
- Rapid integration for application-specific solutions
 - Artificial Intelligence
 - Machine Learning
 - Integrated Security Solutions
 - Direct to Digital Convergence
- Enables low volume / high mix solutions as well as computing at the edge
 - Autonomous systems
 - Small satellites
 - IoT

New Modular Library Enables Rapid Customization

Open systems at chip scale allows unprecedented configurability and flexibility



What is needed next – open architecture at the chip level

How Mercury is Approaching Challenge For Defense Industry?

New Accelerated Delivery Cycle

Chiplets and 2.5D manufacturing reduce delivery times up to 4X



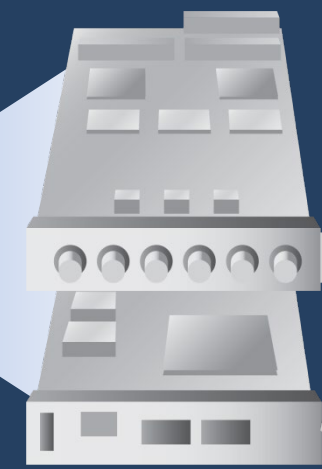
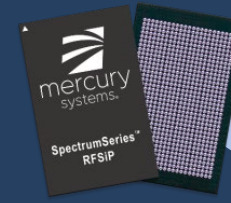
Concept

12-18 months



Delivery

- Trusted Manufacturing
- Trusted Supply Chain
- Made in USA



Traditional Monolithic Chip Delivery Cycle



Concept

36-48 months



Delivery

Accelerating the delivery of advanced trusted computing for defense



Thank you!

Questions?

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