Intel Custom Foundry

Leading at the Edge of Moore's Law

Intel Custom Foundry
Competing in today's fabless eco-system

Keynote @Semi/Gartner Market Symposium, July 7, 2014, San Francisco

Sunit Rikhi

Vice President, Technology & Manufacturing Group

General Manager, Intel Custom Foundry

intel

AGENDA

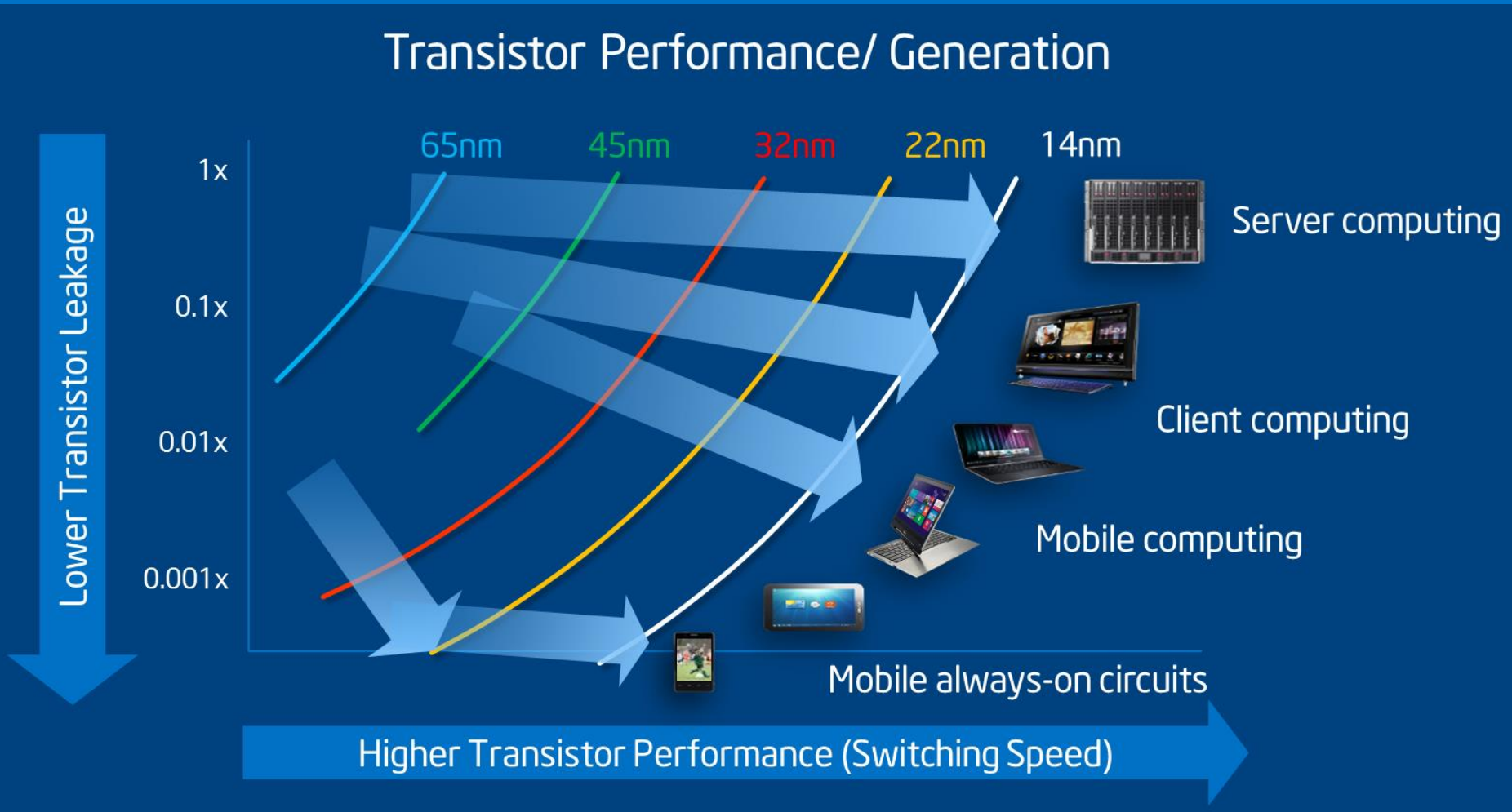
As a new player in the fabless eco-system,

1. The value we bring to the table
2. How we deliver on platforms of capability and services
3. How we leverage the advantages of being inside the world's leading Integrated Device Manufacturer (IDM)
4. How we face the challenges of being inside the world's leading IDM

The value we bring to the table

Leadership silicon technologies

The value of better transistors

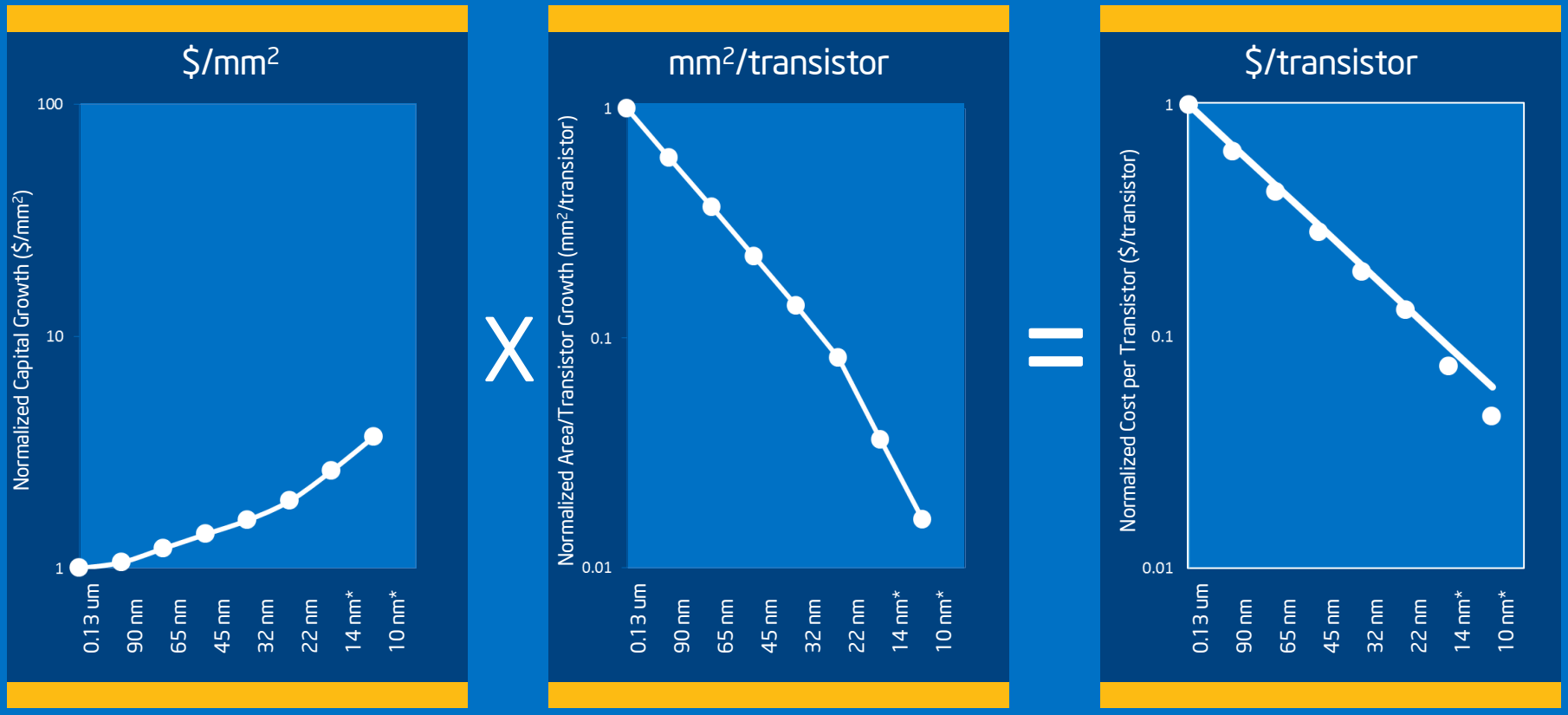


Performance per watt is the critical enabler for all

Intel Custom Foundry

Source: Intel

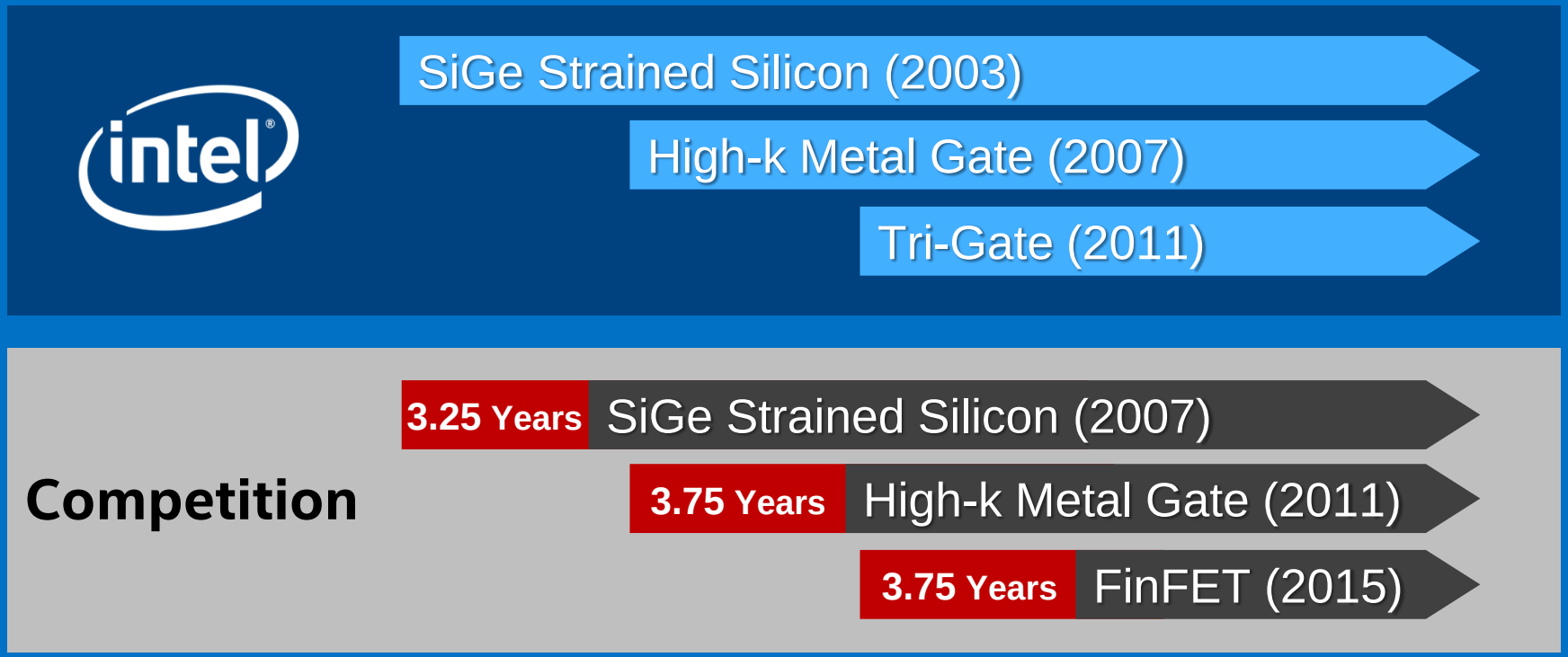
The value of decreasing cost per transistor



Source: Intel * Forecast

Density improvements offset wafer cost trends

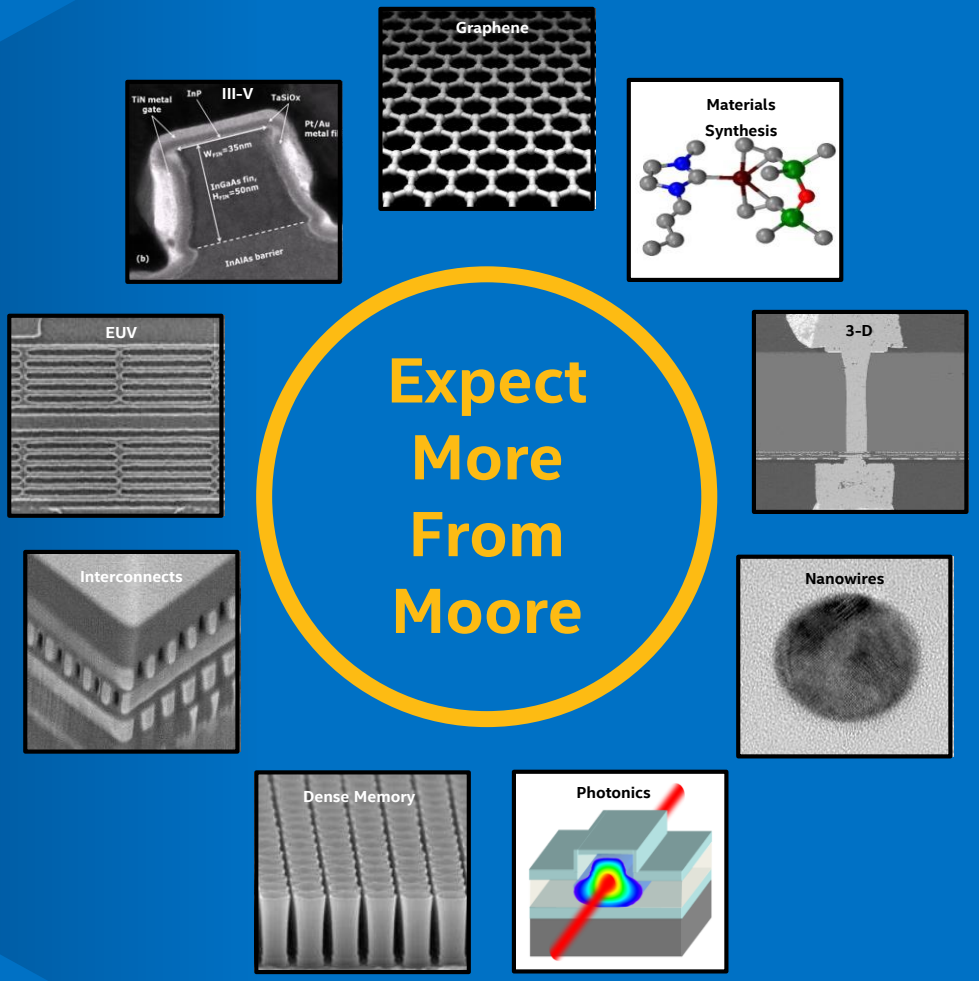
The value of time to market



Intel has ~3.5 year lead in introducing revolutionary transistor technologies

The value of confidence in pursuit of Moore's Law

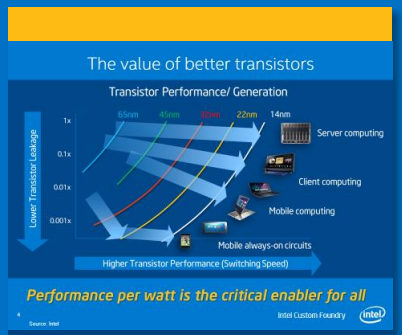
Future Technology Options



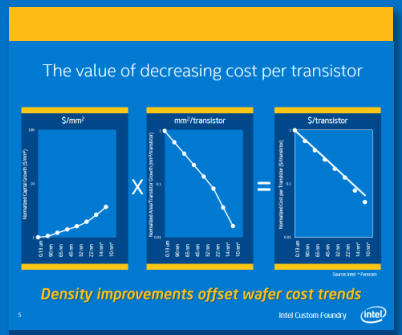
Future options subject to change

Source: Intel

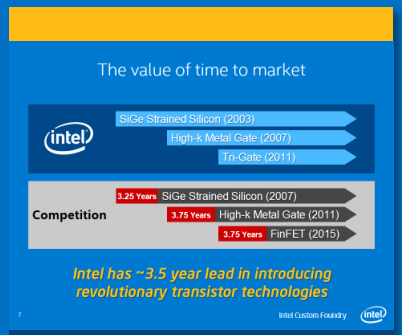
The value we bring to the table summary



Better transistors



Decreasing cost per transistor



Time to market

Confidence in pursuit of Moore's Law

Leadership silicon technologies

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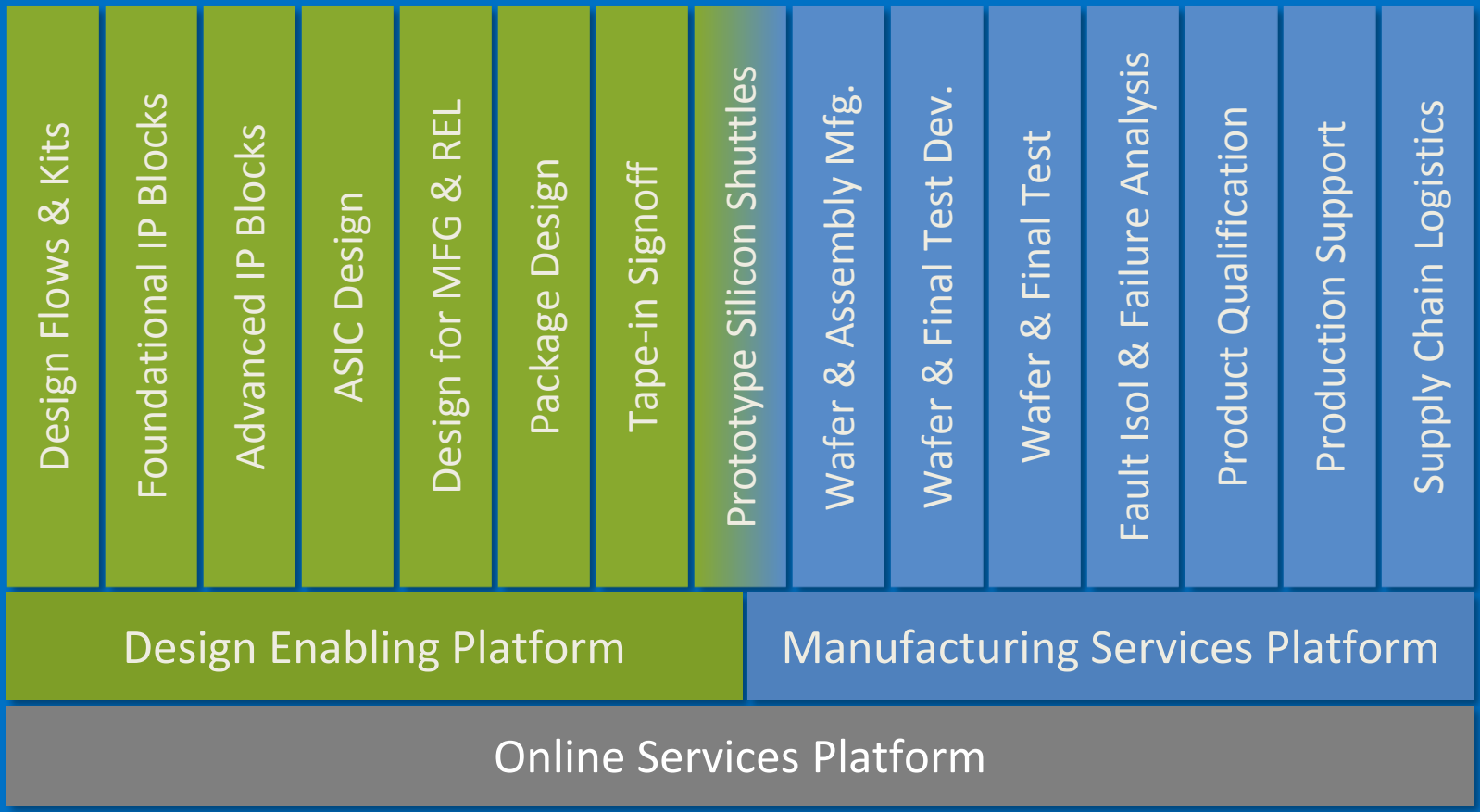
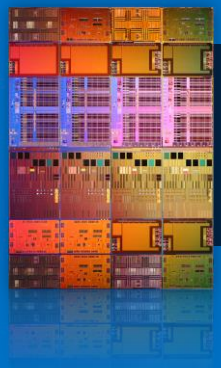
Foundry capabilities & services platforms



Differentiated value on industry standard platforms

Prototype Silicon Shuttle Services



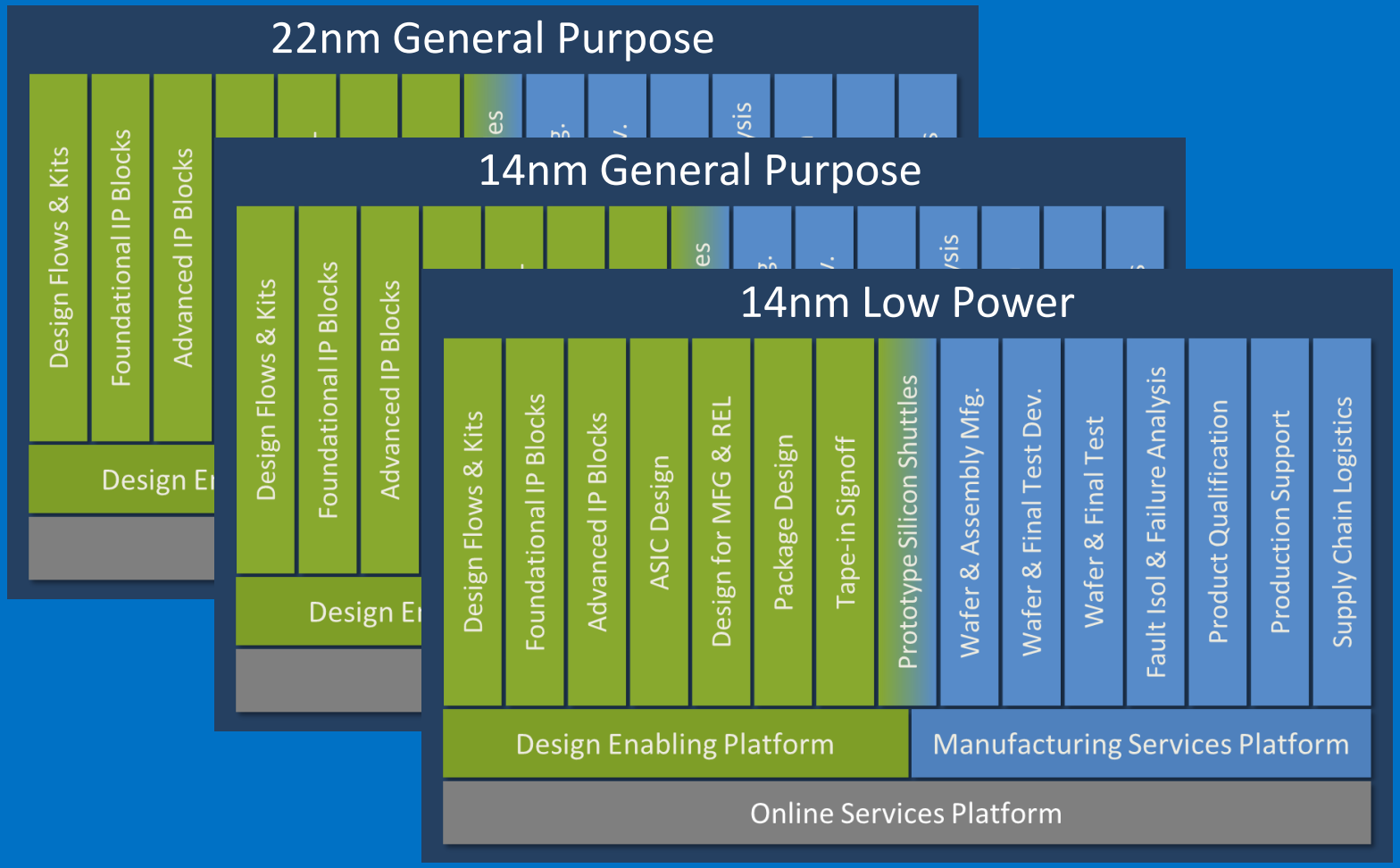
22nm started in 2011

14nm started in 2013

10nm will start in 2015

125 prototype designs processed to-date

Foundry capabilities & services platforms multiple flavors



Intel Custom Foundry eco-system

Design Services	intel, cadence, Open-Silicon (The Science of ASICs), SMARTPLAY (Services for your success), SYNOPSYS, WIPRO (Applying Thought)
Soft IP	intel, cadence, Northwest Logic, SYNOPSYS
Advanced IP	intel, cadence, SYNOPSYS
Foundation IP	intel, SYNOPSYS
Design Tools & Flows	intel, ANSYS, cadence, Mentor Graphics, SYNOPSYS

Note: Logos other than Intel's are properties of their respective companies, and order of logos is in alphabet sequence.

Eco-system collaboration announcements on June 03

ANSYS And Intel Collaborate To Deliver Power, EM And Reliability Sign-Off Reference Flow For Customers Of Intel Custom Foundry

Cadence and Intel Collaborate to Enable a 14nm Tri-gate Design Platform for Customers of Intel Custom Foundry

Mentor Graphics Tools Fully Enabled on Intel's 14nm Processes for Customers of Intel Custom Foundry

Synopsys and Intel Collaborate to Enable 14-nm Tri-Gate Design Platform for Use by Customers of Intel Custom Foundry

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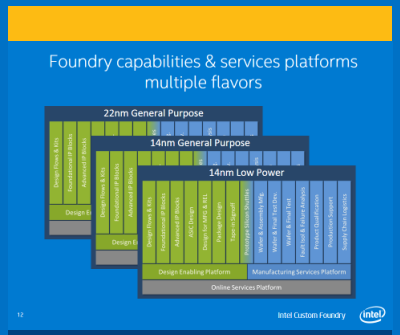
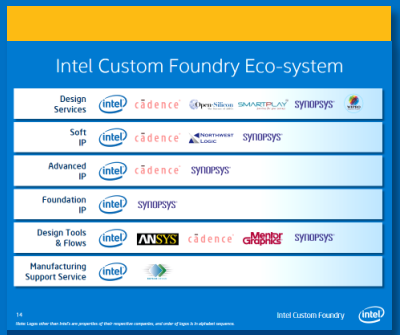
How we deliver on platforms of capability & services summary



Multi-flavored platforms



Enabled by eco-system partners

Broad capability and services offered on industry standard platforms

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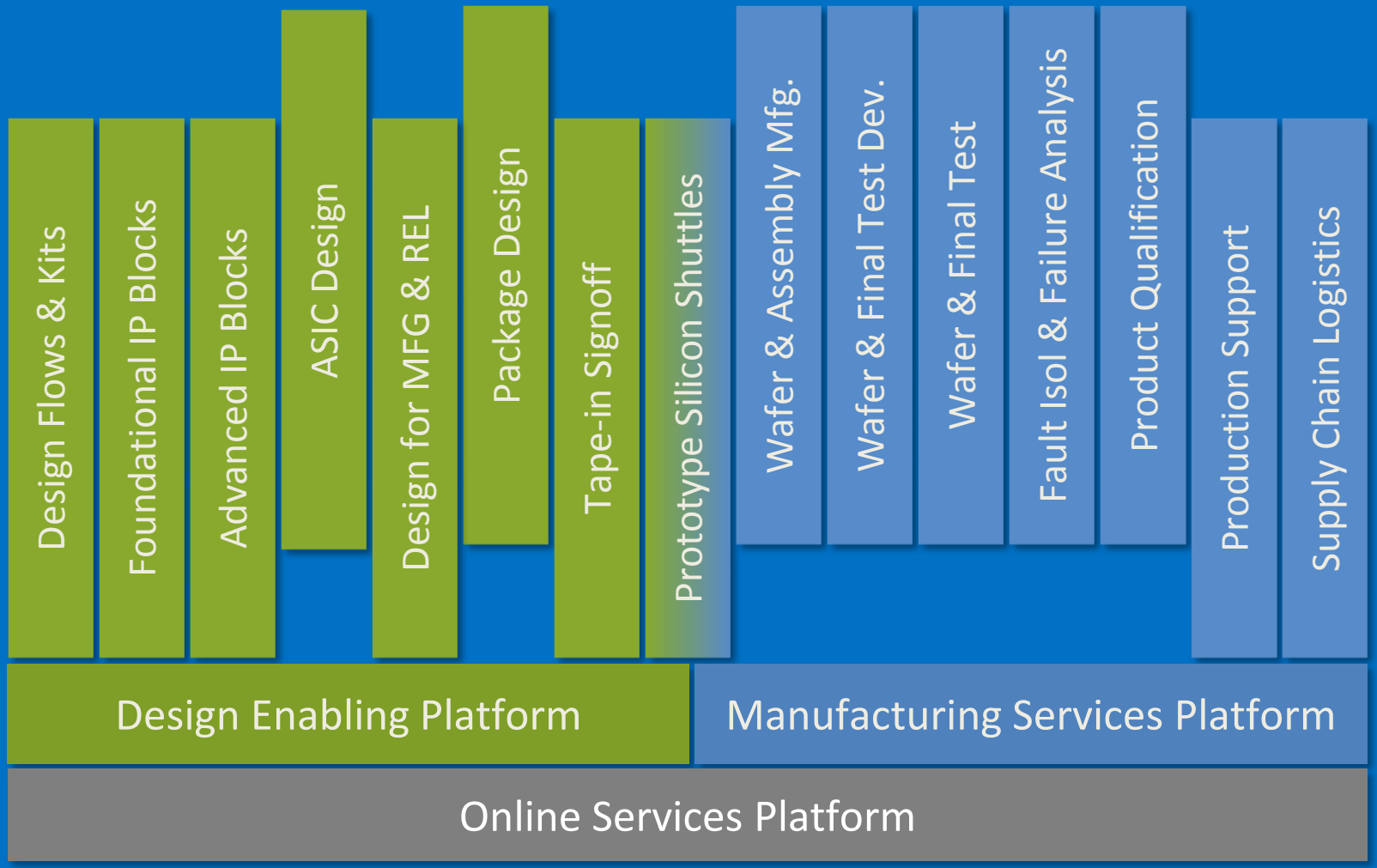
IDM Advantage: Foundry Plus



A fuller array of co-optimized end-to-end services

"Intel's end-to-end foundry services dramatically accelerated Achronix's ability to develop and ship, high-end FPGAs. That experience has already paid off and we have significantly reduced the development time required to build our current 14nm products."

- Robert Blake, Achronix CEO

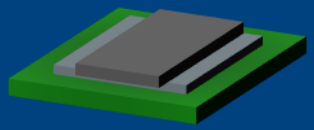
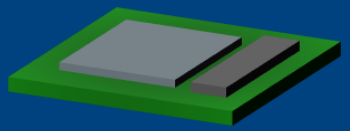
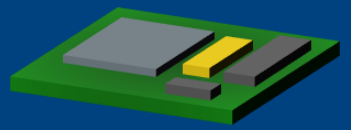
Achronix Silicon Shipped Q1 2013

Achronix Speedster22i - High-End FPGAs

- Achronix Industry "firsts"
  - Intel's first foundry customer
  - First to ship high-end FPGAs on advanced 3-D Tri-Gate production process
  - First to embed extensive hard IP for communications applications
  - First to receive PCI-SIG PCI Express compliance for 22nm Tri-Gate advanced process

achronix
SEMICONDUCTOR CORPORATION

IDM Advantage: Packaging technology

	Reduced Form Factor	Performance Boost	Increased Functionality
Today	 Intel Atom Package on Package	 Intel Core w/Iris Pro Graphics Heterogeneous Integration CPU + eDRAM	 Intel Core i7 Logic Integration CPU + PCH
Tomorrow	 3D Chip Stacking	 High Density Interconnects	 System in Package

Building better products through multi-component integration

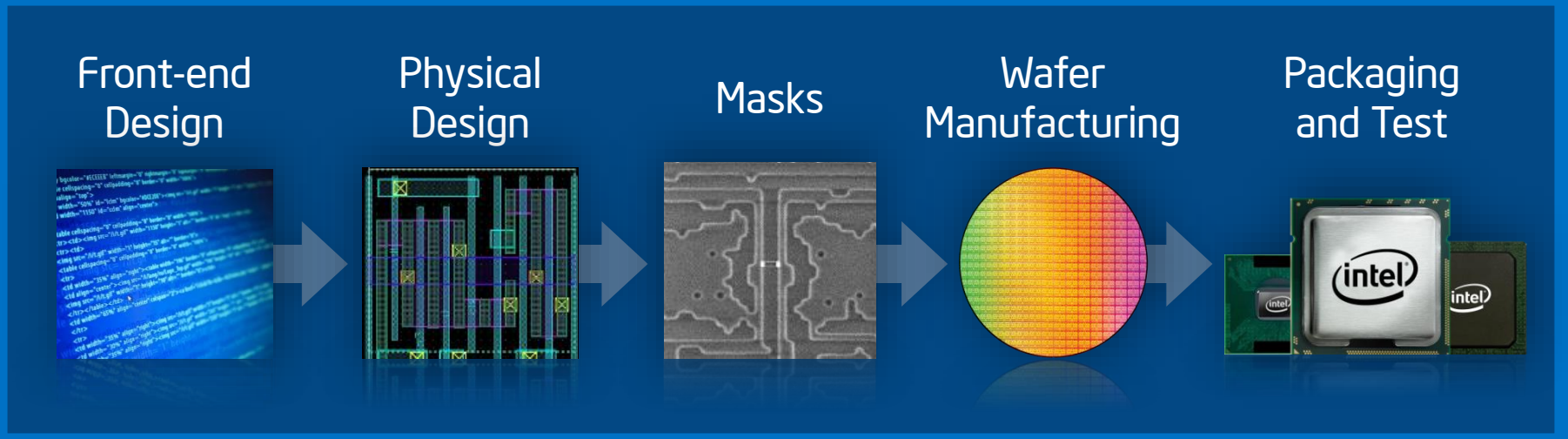
Altera and Intel extend manufacturing partnership to include development of multi-die devices

3/26/2014

"Leveraging Intel's advanced manufacturing and chip packaging capabilities will allow Altera to deliver system-in-a-package solutions that have been identified as critical to meeting overall performance requirements."

Brad Howe,
Senior VP of R&D at Altera

IDM Advantage:
Flexible business models



Customer Owned Tooling

Full Service (ASIC Model)

Flexible business model (ASIC)

"Netronome's latest fully featured 200Gbps Network Flow Processor fully exploits the power/area/performance advantages of Intel's 22nm process. Intel's Foundry team provided back-end design services to deliver fully functional silicon"

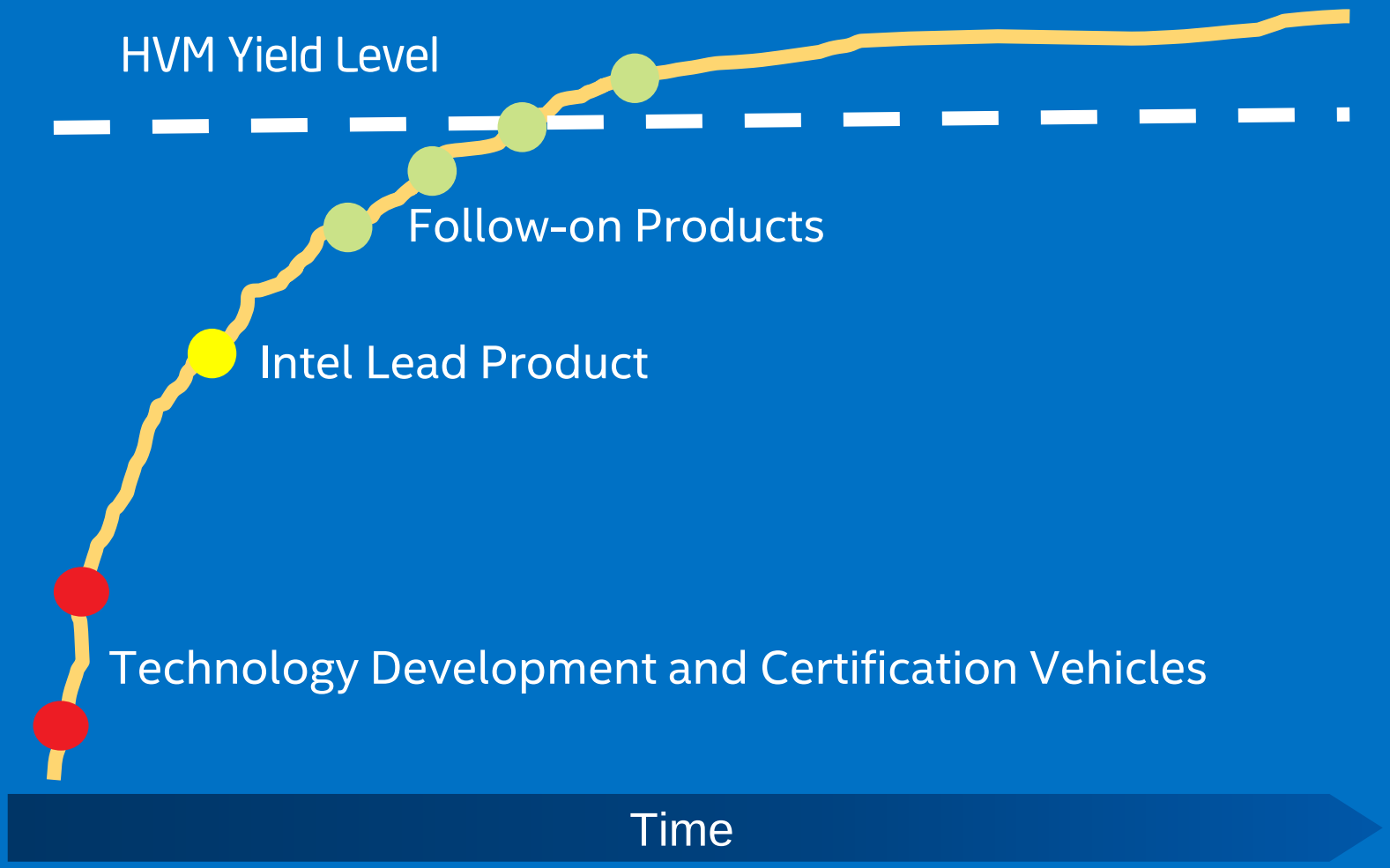
– Niel Viljoen, Netronome Founder and CEO

Shipping functional silicon to Netronome

IDM Advantage: Intel's lead product clears the way

Intel Custom Foundry

Starting high on the yield learning curve



"The Tabula team is delivering advanced systems solutions demonstrating industry leading capability and performance. Significantly, this is achieved with 1st silicon shipments; an outstanding example of design-team and foundry collaboration plus the design-for-manufacturability prowess Intel is known for."

- Dennis Segers, CEO Tabula Inc.

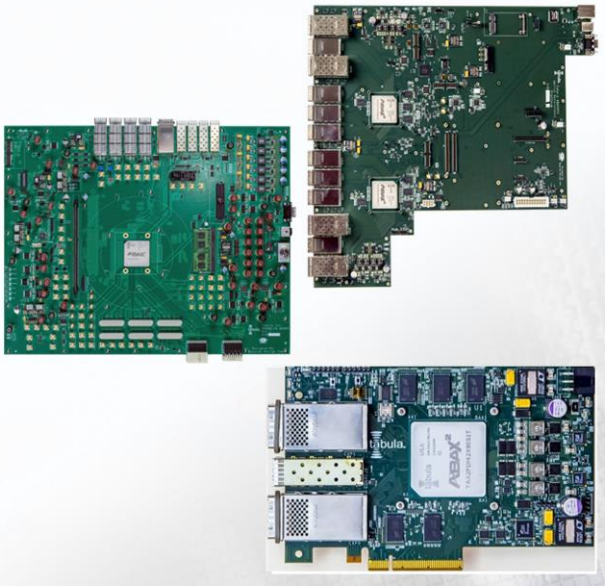
Tabula Advanced Systems powered by Intel silicon technologies

ABAX² – P1 Programmable Logic Family
- Built on Intel 22nm

tabula.

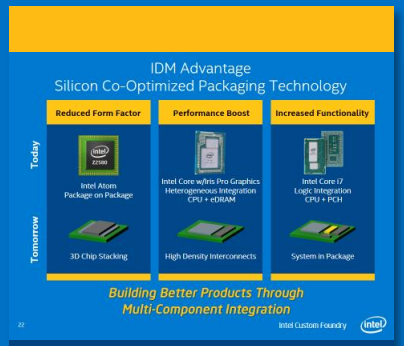
- Industry's highest performance PLD
  - Up to 2 GHz performance
- 23.3 Mbytes on-chip RAM
  - 104 Tb/s throughput (Industry's highest)
- State-of-the-art hard IP blocks
  - 10/40/100G EMACs and DDR3 controllers
- Unmatched system performance
  - 4 x 100G L2-L4 switch: a PLD 1st
  - Highest performance RegEx acceleration

100G Pre-engineered Solutions



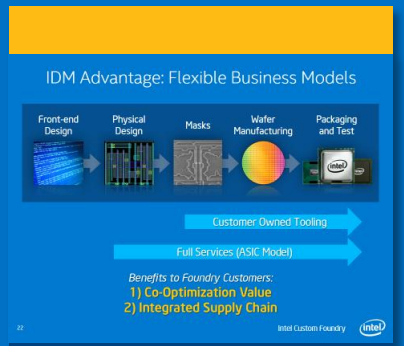
- Switch
- Bridge
- Search

Advantages of IDM summary



Co-optimized

Product proven



End-to-end

Capability and Services

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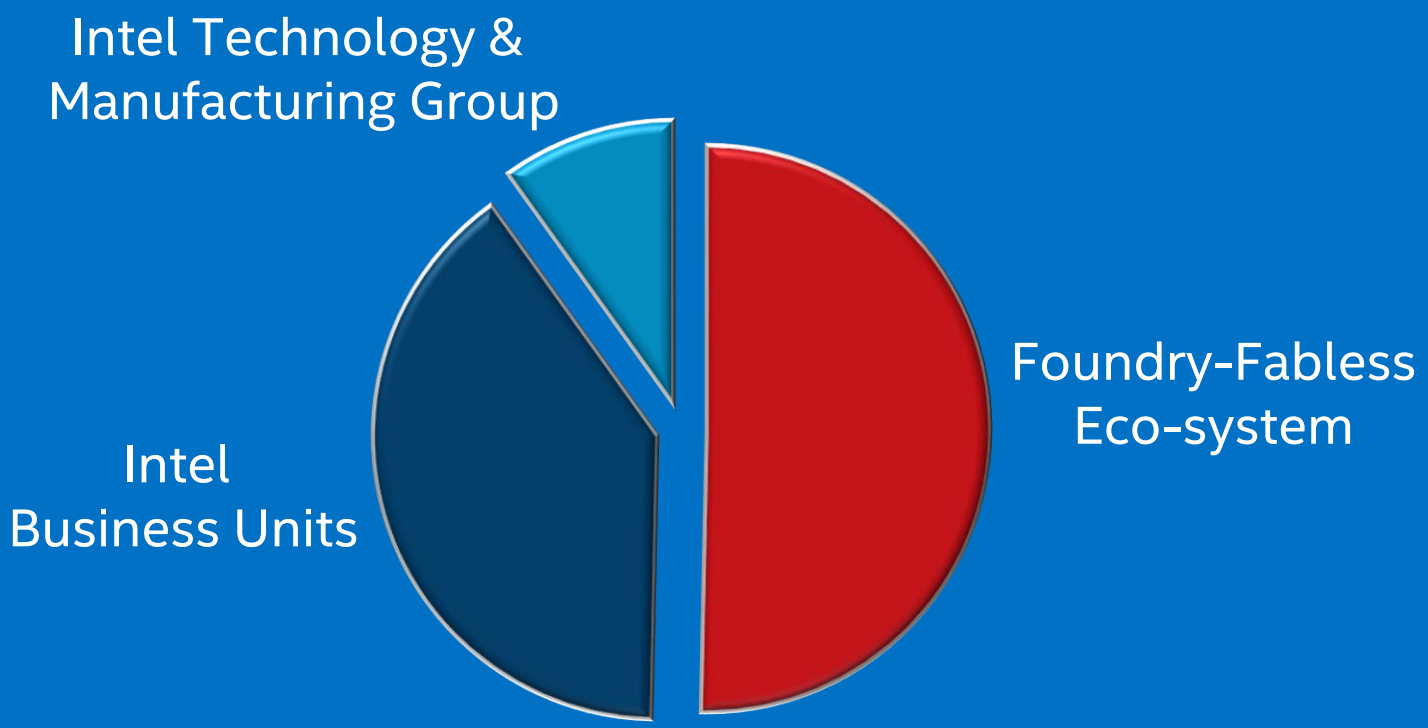
IDM Challenge:
Developing the insights, culture & expertise

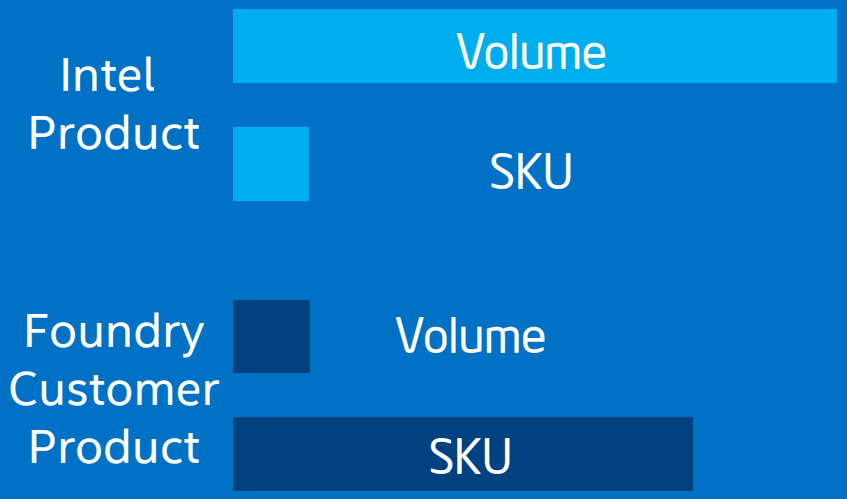
.. to serve the needs of an expanded marketplace which includes the traditional Intel Business Units and the new Intel Foundry Customers

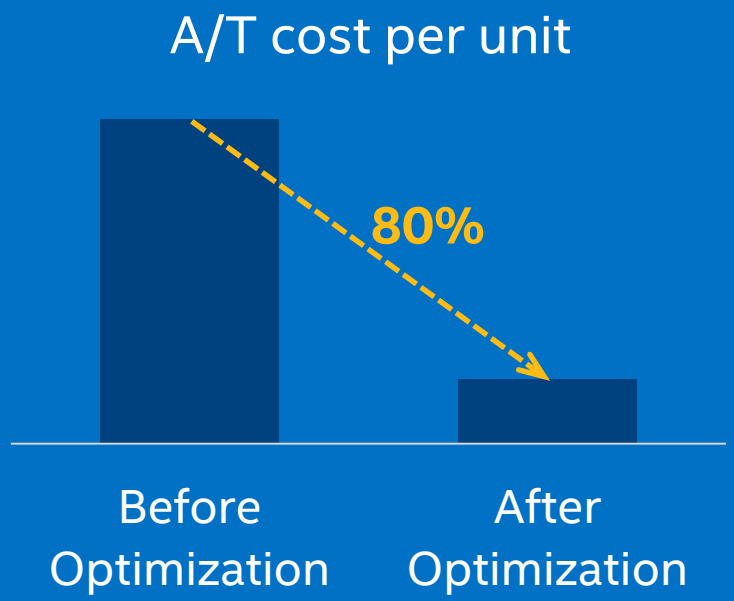
Response:
Reflect the marketplace in our workforce and maintain a learning & serving environment



Sources of Intel Custom Foundry Workforce

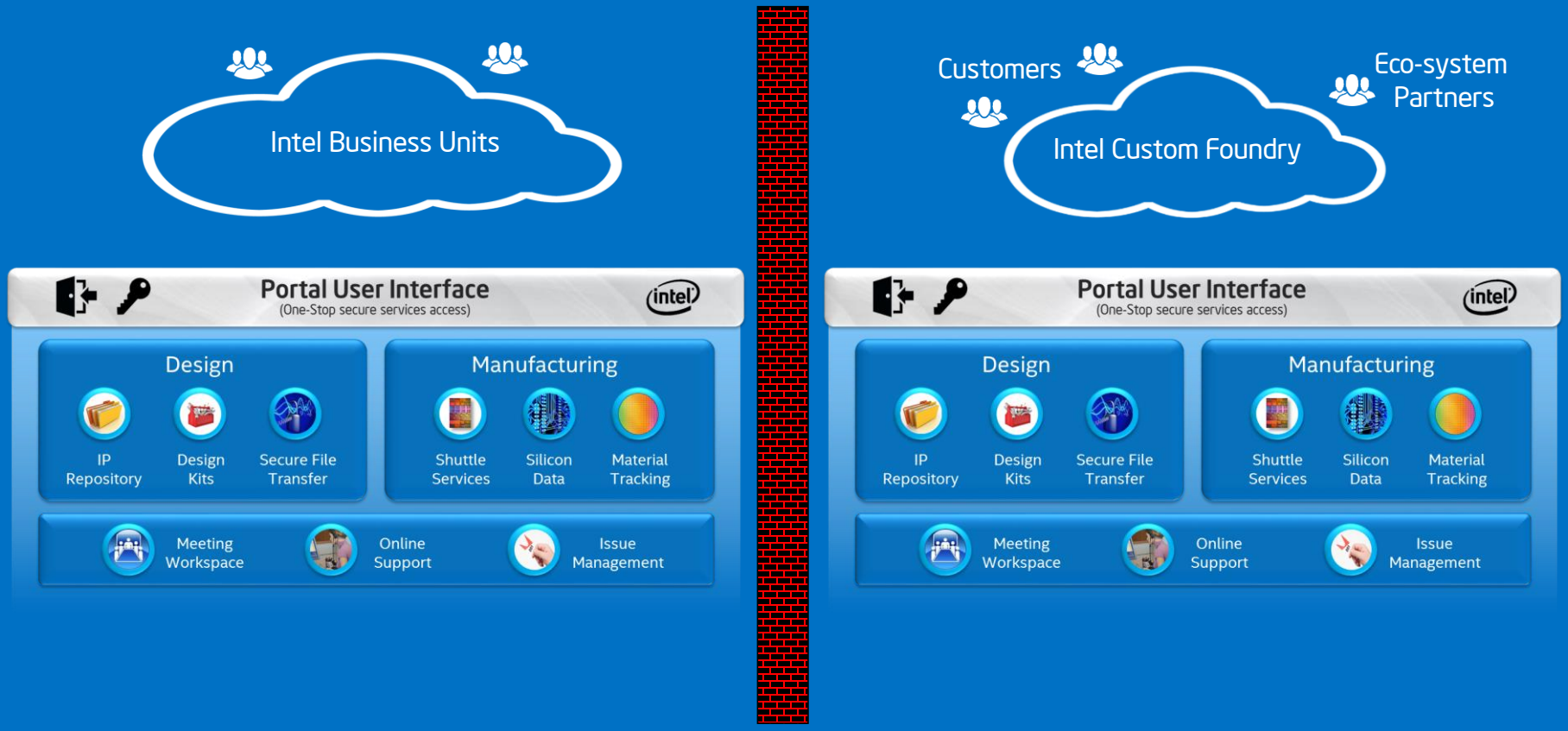
IDM Challenge:
High-mix-low-volume Configuration





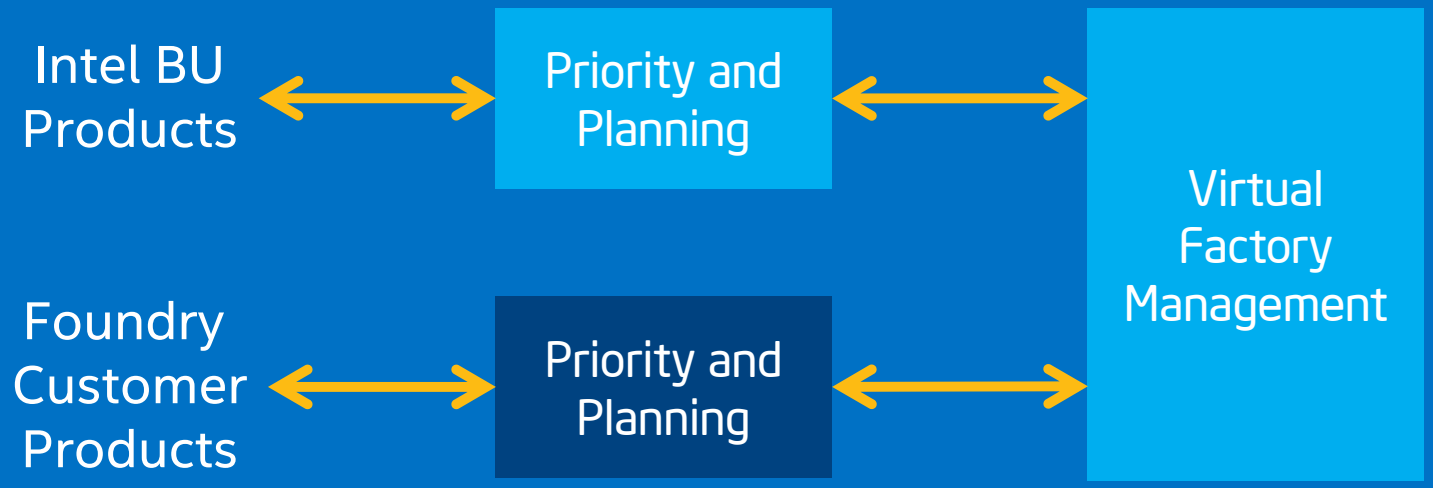
Response:
Configuration optimization in tooling & set up

IDM Challenge:
Separation of Intel Business Unit & customer IP



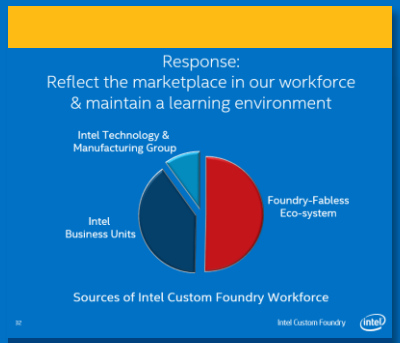
Response: Separation by infrastructure design

IDM Challenge:
Managing customers' priority and capacity

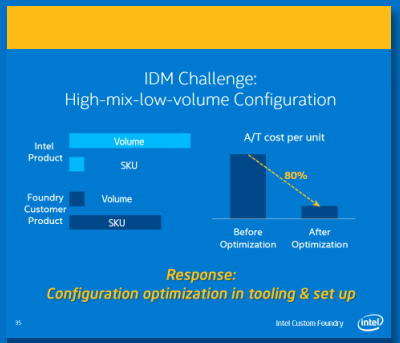


Response: Separate priority and planning process

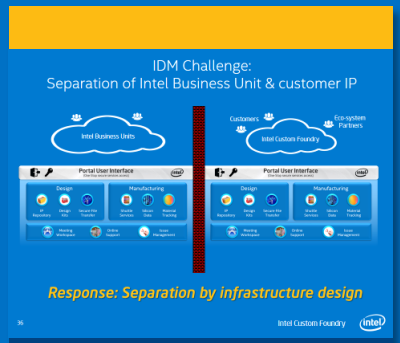
Challenges of IDM summary



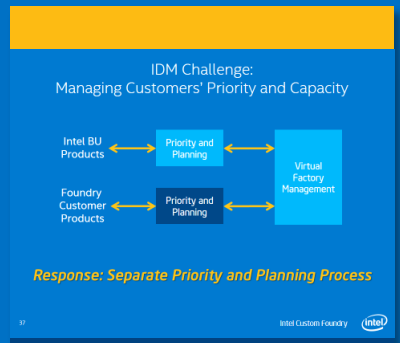
Marketplace insight & expertise



Operational Optimization



IP separation



Priority and capacity planning

There is an effective response for every challenge

Intel Custom Foundry announced customers

Note: This list of customers does not include those did not disclose relationship with Intel.
Logos other than Intel's are properties of their respective companies, and order of logos is in alphabet sequence.

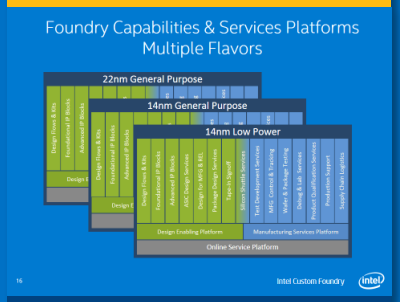
Intel Custom Foundry's Newest Customer

"Intel's 14nm Tri-Gate process technology is very important to develop the next generation SoCs. We will deliver highly improved performance and power advantages with next generation SoCs by leveraging Intel's 14nm tri-gate process technology through our collaboration."

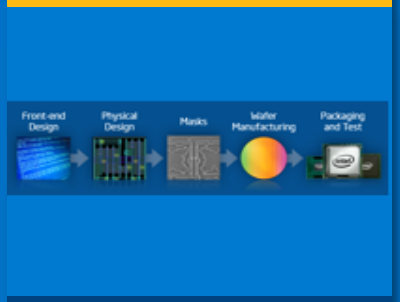
- Yoshifumi Okamoto
Director, SLSI Business Division
Panasonic Corporation

Summary of this talk

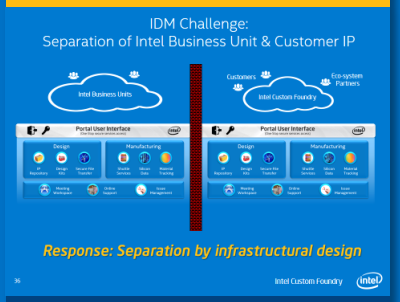
Our Value:
Leadership silicon technologies



Delivered on:
Industry standard platforms



Enhanced by:
our IDM advantages



While responding to:
Our IDM challenges

Growth ahead!

Intel Custom Foundry

Leading at the Edge of Moore's Law

Thank you

Intel Custom Foundry

Leading at the Edge of Moore's Law

Q & A

Risk Factors

The above statements and any others in this document that refer to plans and expectations for the second quarter, the year and the future are forward-looking statements that involve a number of risks and uncertainties. Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates," "may," "will," "should" and their variations identify forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Many factors could affect Intel's actual results, and variances from Intel's current expectations regarding such factors could cause actual results to differ materially from those expressed in these forward-looking statements. Intel presently considers the following to be important factors that could cause actual results to differ materially from the company's expectations. Demand for Intel's products is highly variable and, in recent years, Intel has experienced declining orders in the traditional PC market segment. Demand could be different from Intel's expectations due to factors including changes in business and economic conditions; consumer confidence or income levels; customer acceptance of Intel's and competitors' products; competitive and pricing pressures, including actions taken by competitors; supply constraints and other disruptions affecting customers; changes in customer order patterns including order cancellations; and changes in the level of inventory at customers. Intel operates in highly competitive industries and its operations have high costs that are either fixed or difficult to reduce in the short term. Intel's gross margin percentage could vary significantly from expectations based on capacity utilization; variations in inventory valuation, including variations related to the timing of qualifying products for sale; changes in revenue levels; segment product mix; the timing and execution of the manufacturing ramp and associated costs; excess or obsolete inventory; changes in unit costs; defects or disruptions in the supply of materials or resources; and product manufacturing quality/yields. Variations in gross margin may also be caused by the timing of Intel product introductions and related expenses, including marketing expenses, and Intel's ability to respond quickly to technological developments and to introduce new products or incorporate new features into existing products, which may result in restructuring and asset impairment charges. Intel's results could be affected by adverse economic, social, political and physical/infrastructure conditions in countries where Intel, its customers or its suppliers operate, including military conflict and other security risks, natural disasters, infrastructure disruptions, health concerns and fluctuations in currency exchange rates. Intel's results could be affected by the timing of closing of acquisitions, divestitures and other significant transactions. Intel's results could be affected by adverse effects associated with product defects and errata (deviations from published specifications), and by litigation or regulatory matters involving intellectual property, stockholder, consumer, antitrust, disclosure and other issues, such as the litigation and regulatory matters described in Intel's SEC filings. An unfavorable ruling could include monetary damages or an injunction prohibiting Intel from manufacturing or selling one or more products, precluding particular business practices, impacting Intel's ability to design its products, or requiring other remedies such as compulsory licensing of intellectual property. A detailed discussion of these and other factors that could affect Intel's results is included in Intel's SEC filings, including the company's most recent reports on Form 10-Q, Form 10-K and earnings release.