

2021 Semicon Europa

The Next Decade of Semiconductor Innovation In Europe

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Technology Development



intel®

The Semiconductor Supply Chain is GLOBAL



Intel Supply Chain by the Numbers Across 89 Countries

~3600

Engineers,
Data Scientists,
Analysts, Program
Managers, Planners,
Buyers,
Solution Architects

~1M Orders

~1400
Customers

~16,000
Suppliers

50,000+
Unique Goods and
Services

12,000
SKUs

~900
Critical Supplier Sites

90+
Commodities

17

Distribution Hubs

1.8B Units Shipped

20 COUNTRIES

Co-located with Supplier Factories and
Partner Groups

\$39B
Spends Managed

Current Semiconductor Supply Chain

% Global Manufacturing Capacity 2020

United States

10

EU

8

China
20

South
Korea
20

Japan
15

Taiwan
20

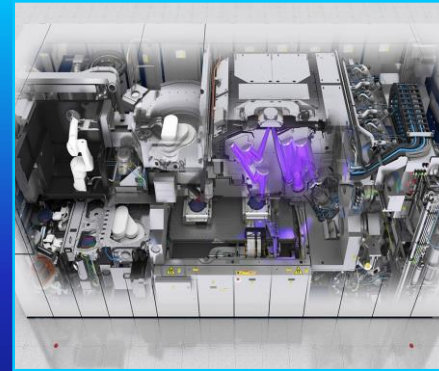
European Leadership



Semiconductor
Research



Semiconductors for
Automotive, IOT,
MS/RF, Sensors,
Power



Lithography
Equipment &
Materials



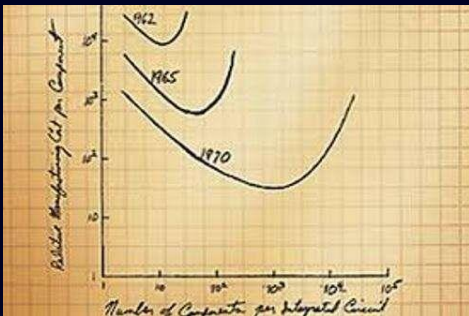
Mobile Network
Equipment

We Are Evolving Moore's Law Together as an Industry

Dennard
Scaling

Evolution I

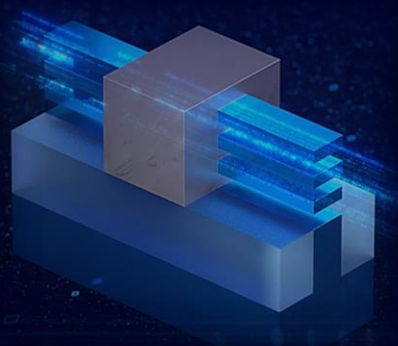
Geometric Scaling of
Planar Transistors



Novel Materials &
Device Structures

Evolution II

Gate All Around
Transistor



Design-Technology
Co-Optimization

Evolution III

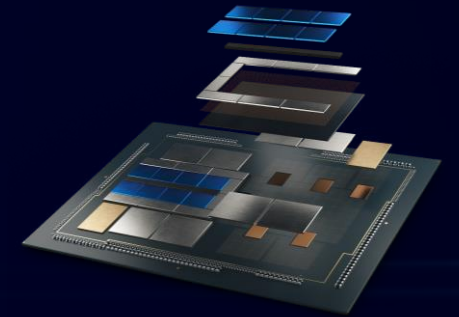
Backside Power Network



System-Technology
Co-Optimization

Evolution IV

Die Stacking



Providing Solutions for today and tomorrow

10nm
SuperFin

Intel
7

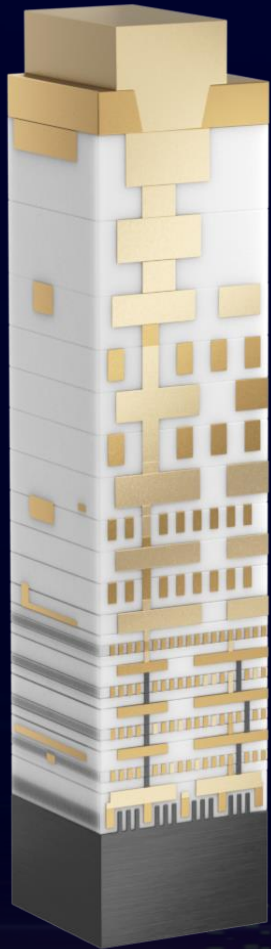
Intel
4

Intel
3

Intel
20A

Providing Solutions for Today

Enhanced SuperFin Technology on Intel 7



Thick Metal

Additional thicker layers for power delivery

More MIM

extra nanolayer in superlattice

Novel High Density Patterning Process

New streamline structures improve power efficiency

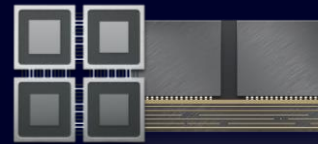
Extension of Novel Thin Barrier

reduces via resistance in mid-metal stack

New lower-k Dielectric Material

reduces capacitance at M1

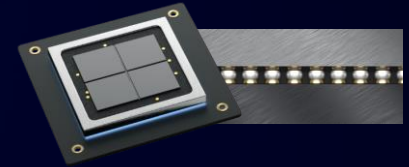
Embedded Multi-die Interconnect (EMIB)



bump pitch **50-40 microns**

- Industry-leading
- first 2.5D embedded bridge solution
- products shipping since 2017

Foveros Technology



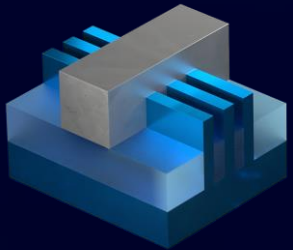
bump pitch **50-36 microns**

- wafer-level packaging capabilities
- first-of-its-kind 3D logic stacking solution

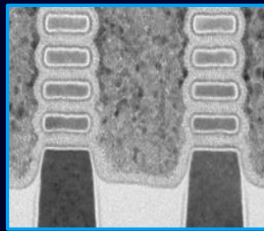
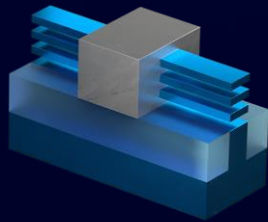
Providing Solutions for Tomorrow

RibbonFET and PowerVia Technology

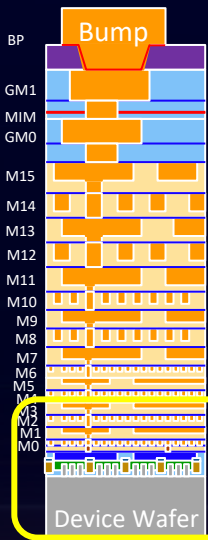
FinFET



RibbonFET

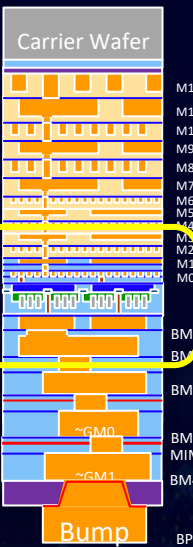


Frontside Interconnects

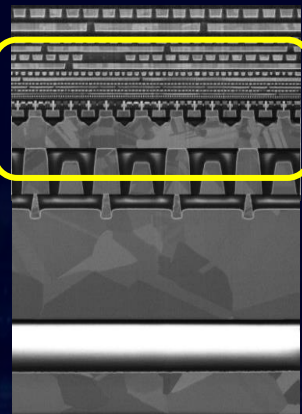


Transistors

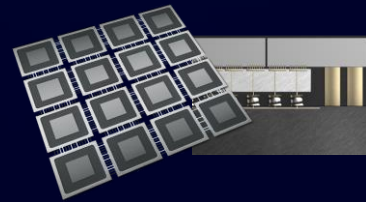
Backside Interconnects



PowerVia



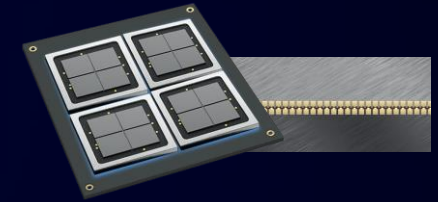
Foveros Omni



bump pitch ~25 microns

- next gen Foveros technology
- unbounded flexibility with performance 3D stacking technology for die-to-die interconnect and modular designs

Foveros Direct



bump pitch < 10 microns

- direct copper-to-copper bonding for low resistance interconnects
- blurs the boundary between where the wafer ends and the package begins

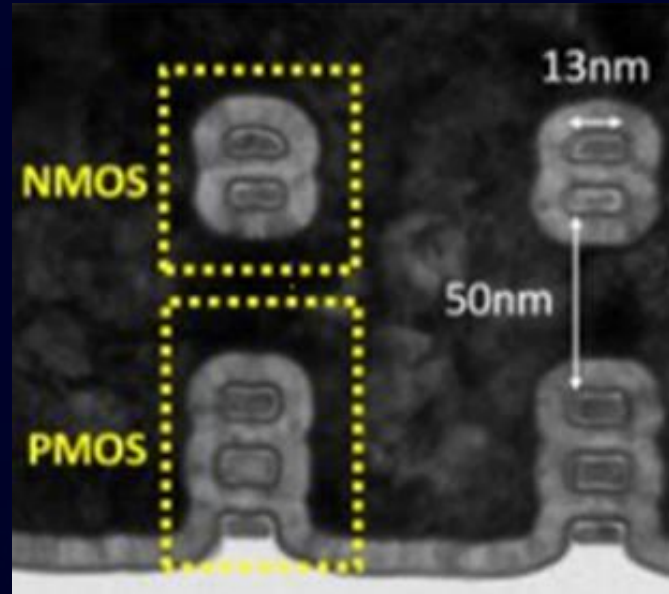
Providing Solutions for the Future

High-NA Lithography



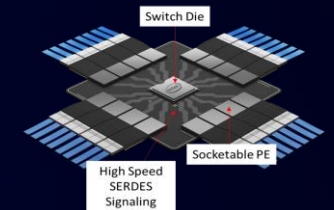
High-NA Lithography aims at printing lines/spaces down to ~16nm pitch

First Stacked Nano-ribbon CMOS



3-D Self-aligned Stacked NMOS-on-PMOS Nanoribbon combining stacked nanoribbon transistors and vertical interconnects between the two device layers

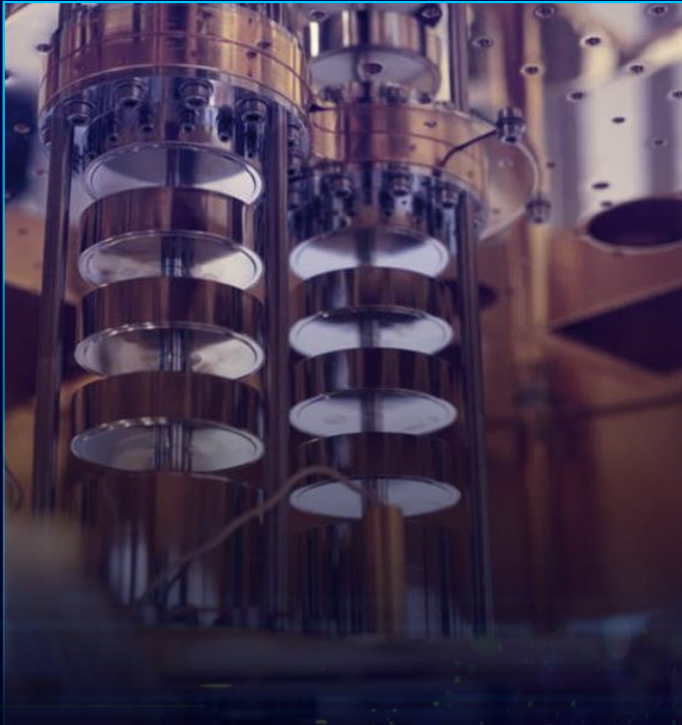
Optical Packaging



1.6 Tbps silicon photonics engine with its 12.8 Tbps programmable Ethernet switch

Shared Challenges

Foundational
Research



Cultivating
Tomorrow's Researchers



Sustainability

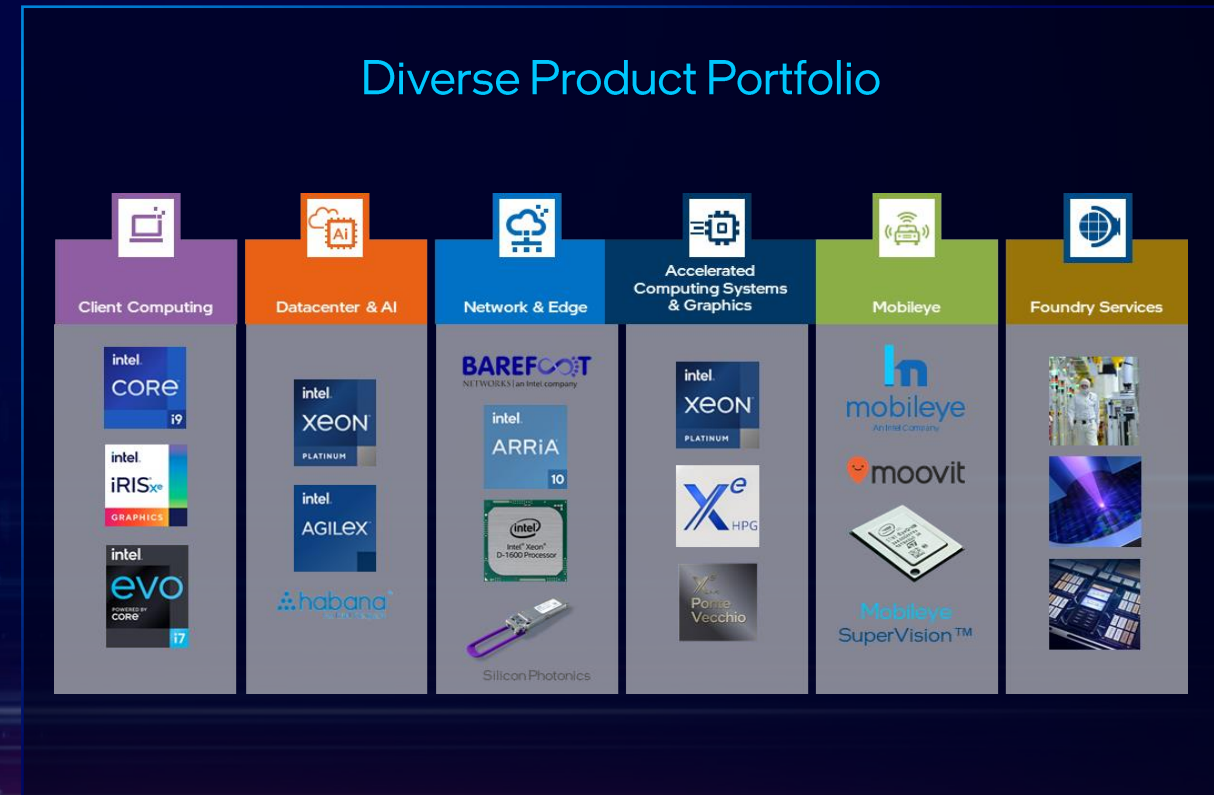


Product Leadership, Supply Resilience, Superior Cost



"We have been working diligently with our partners... to address constraints... to meet the world's needs for this new era."

– Pat Gelsinger



"We need a more balanced supply chain globally... Intel is ready to step into that."

– Pat Gelsinger



Intel in EU

Over 30 Years of Partnership

10+
THOUSAND
employees across
Europe

1000+
Companies in Intel's
EU Supply Chain

€18+
BILLION
Invested in Intel Ireland
by end of 2021

€10+
BILLION
spent with European
suppliers in past 2 years



In Summary

A reliable partner to the EU for ~30 years

Intel continues to provide solutions through innovation

We have shared challenges we can solve together

The world economy is more dependent than ever on a stable semiconductor supply & a cohesive semiconductor industry



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