



TOM CAULFIELD

CEO
GLOBALFOUNDRIES



GLOBALFOUNDRIES / DARPA partnership

ERI Summit 2019



GLOBALFOUNDRIES®

GF at a glance: The world's leading specialty foundry

#1



Only global pure-play foundry

>\$6.2B



2018 revenue

>15M



Total wafers shipped
over decade

>250



Customers

1.6M



Hours invested in training
2018

16,000



Employees

>34M



Hours worked in 2018 at better
than safety benchmarks

55



Process technology offerings
350 - 12 nm

1



US DoD Trusted Foundry

>15,000



Patents & applications

5



Market Segments

At-scale global manufacturing footprint

Malta, New York, USA

Nodes: 14 – 12 nm
Wafer size: 300 mm



Burlington, Vermont, USA

Nodes: 350 – 90 nm
Wafer size: 200 mm



Dresden, Germany

Nodes: 55 – 12 nm
Wafer size: 300 mm



East Fishkill, New York, USA

Nodes: 90 – 22 nm
Wafer size: 300 mm



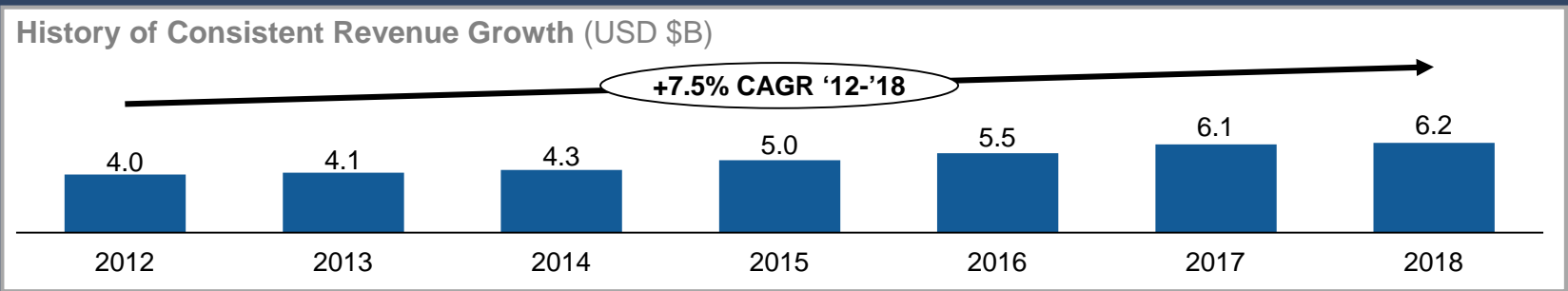
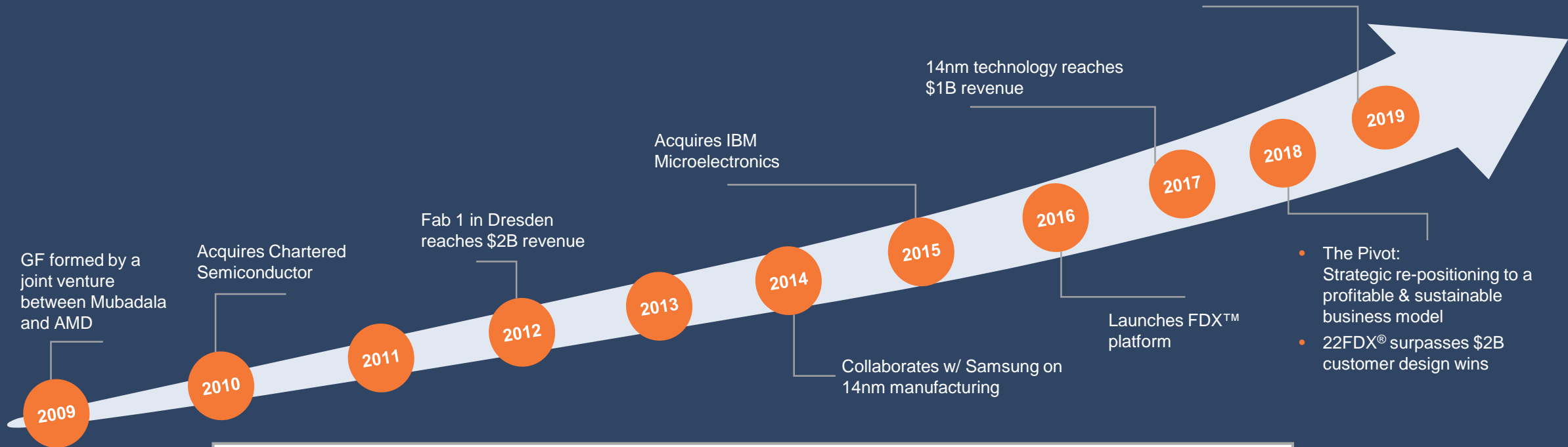
Singapore

Nodes: 180 – 40 nm
Wafer size: 200/300 mm

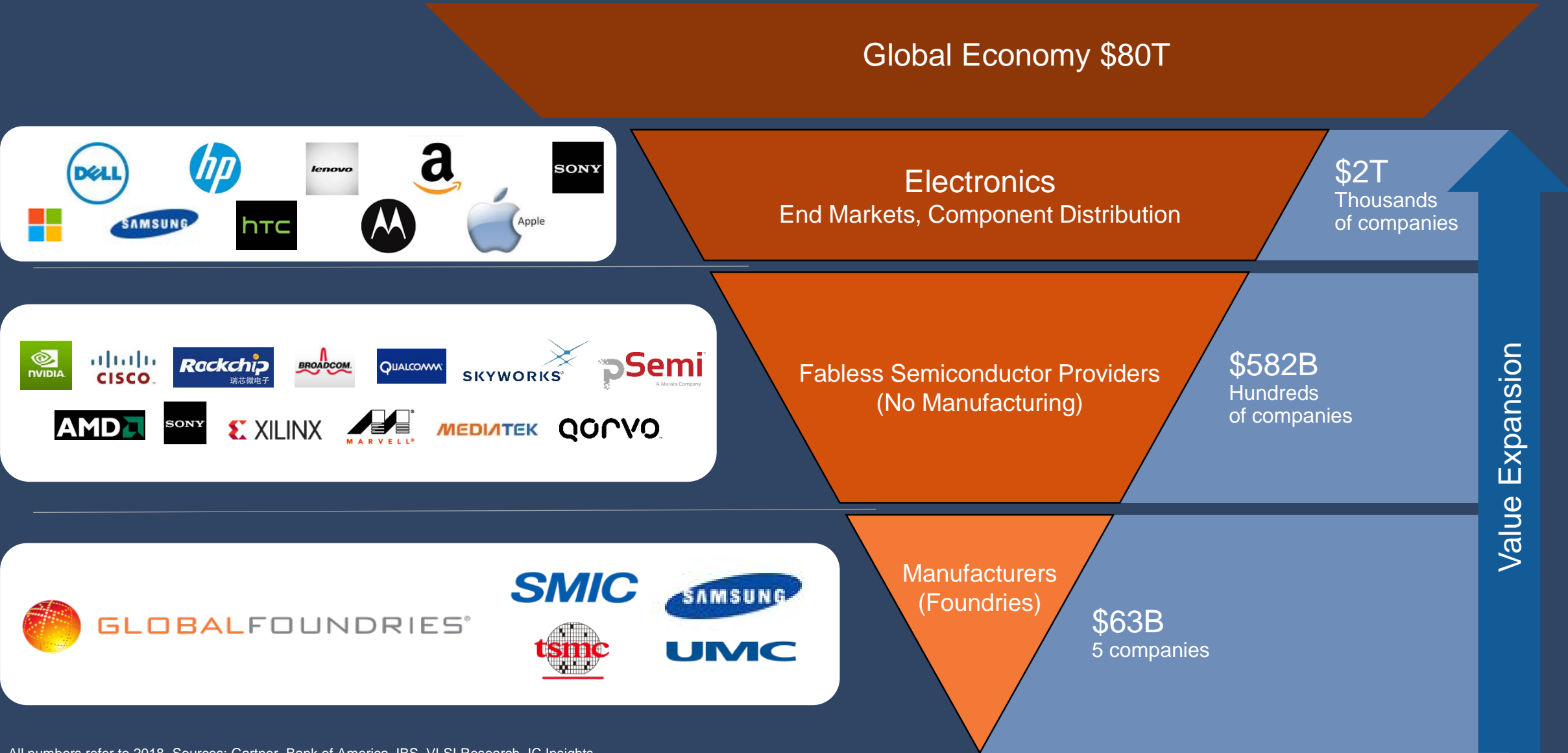


The journey to build an at-scale global semiconductor manufacturer

- 10 year anniversary 
- Carves out and sells ASIC business
- Optimizes at-scale global manufacturing footprint
- 8SW delivers more than \$1B customer design wins



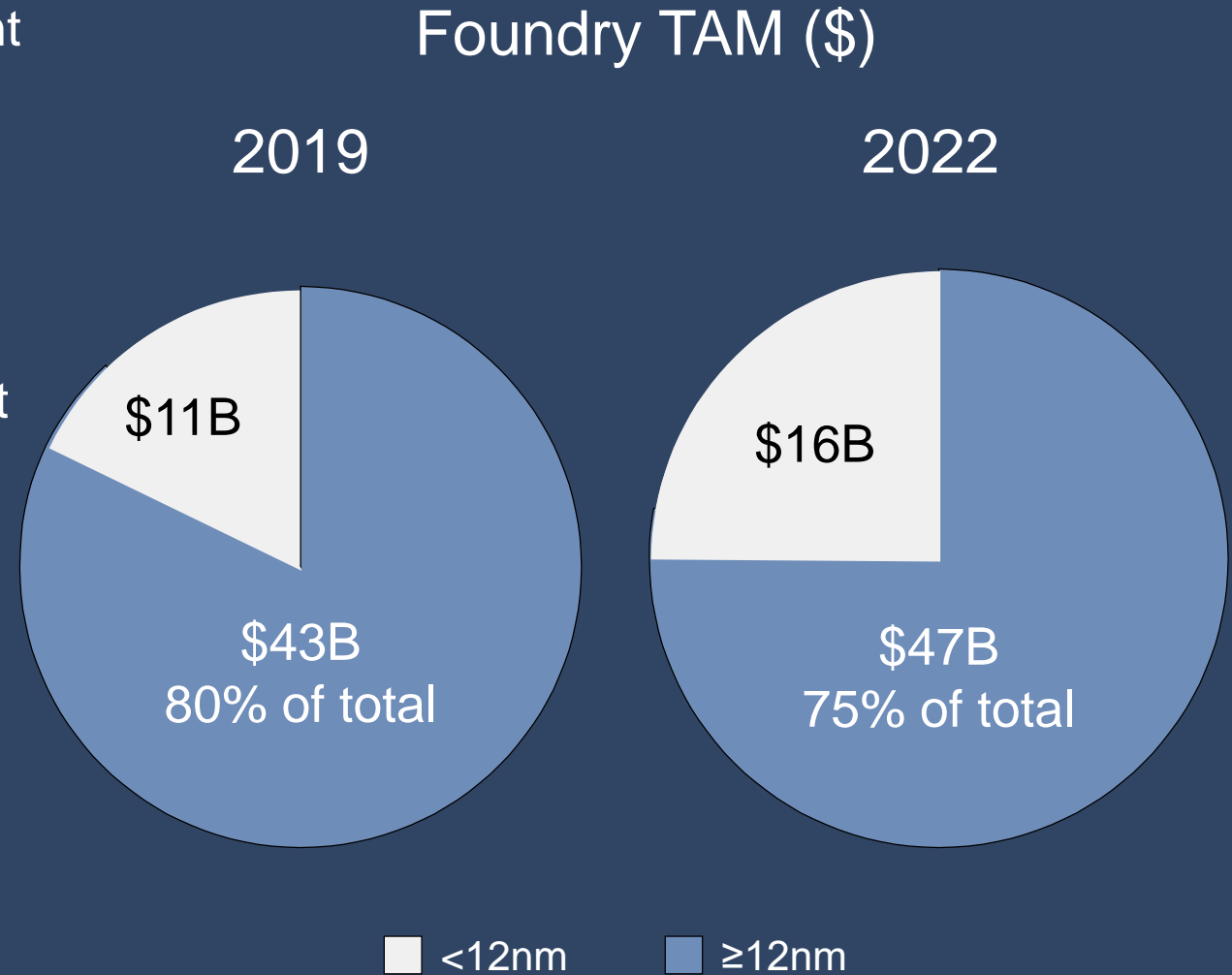
Electronics manufacturing ecosystem



All numbers refer to 2018. Sources: Gartner, Bank of America, IBS, VLSI Research, IC Insights

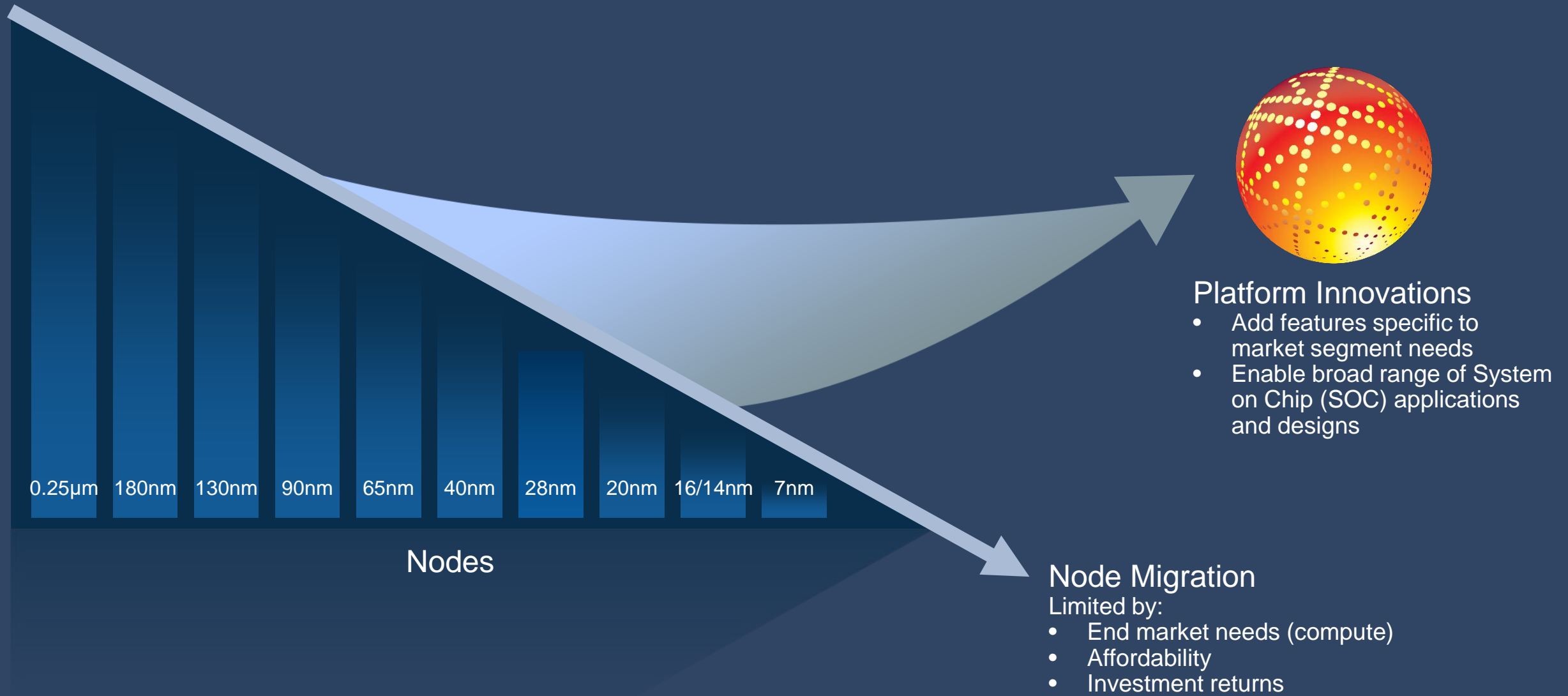
“The Pivot”

- New business model and strategy consistent with our scale and industry realities
- Redefined technology leadership and differentiation
- Create value with feature rich solutions
- Participate more broadly in attractive market segments



Source: Gartner Forecast: Semiconductor Foundry Revenue and Supply and Demand Worldwide, 2Q18 Update

Moore's Law bifurcated several nodes ago



Moore's Law over time

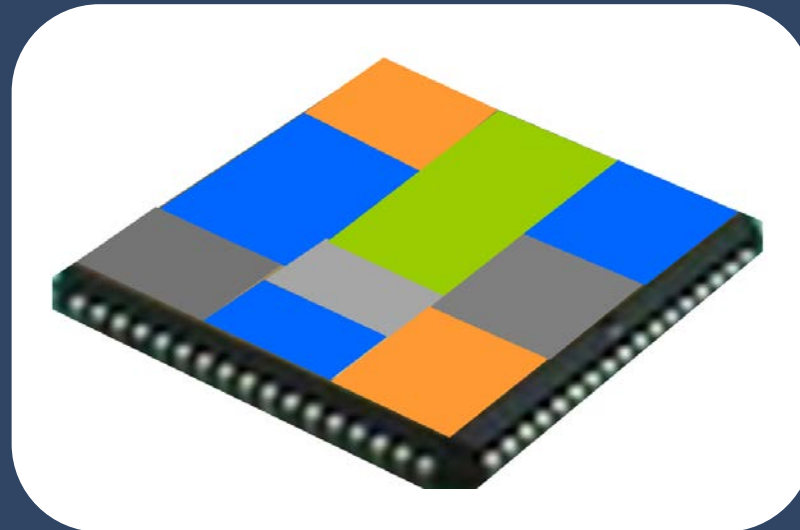
From multiple chips



to integrated system-on-chip...



Systems were comprised of numerous discrete single purpose chips



System designers integrated multiple functions onto a single SOC

Moore's Law over time

From multiple chips

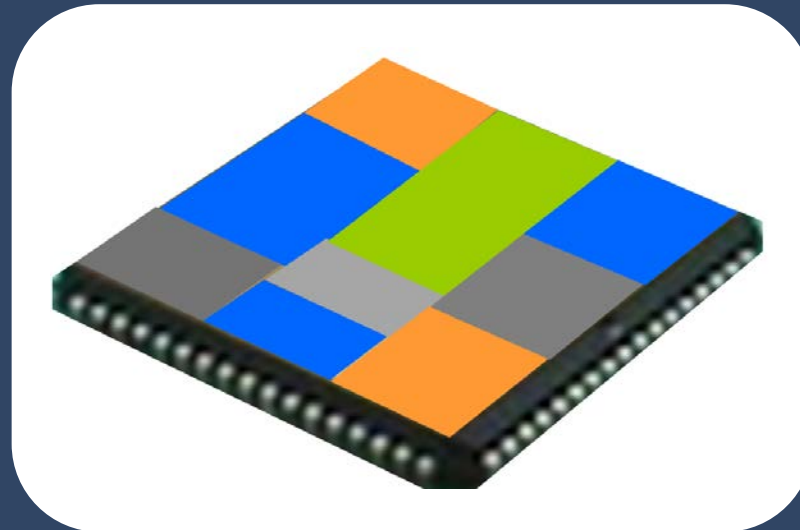


to integrated system-on-chip...

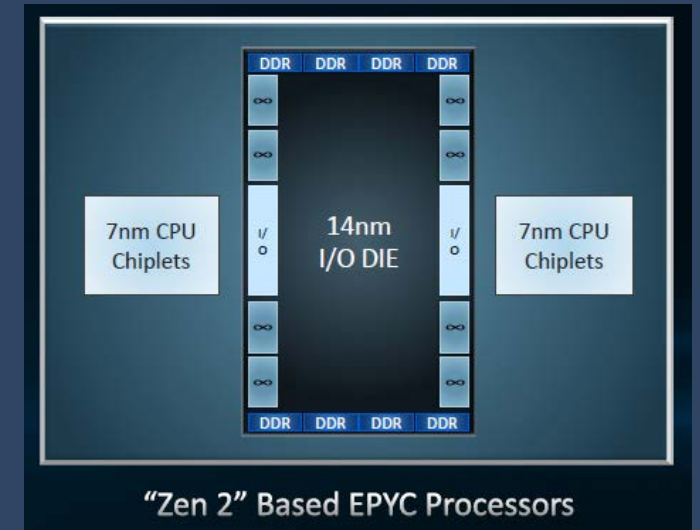
and for leading edge



Systems were comprised of numerous discrete single purpose chips



System designers integrated multiple functions onto a single SOC



Multiple chiplets integrated onto a common substrate with advanced connectivity

Industry virtual cycle of design / technology co-optimization is intensifying as complexity increases

Market Segments



Automotive



Consumer



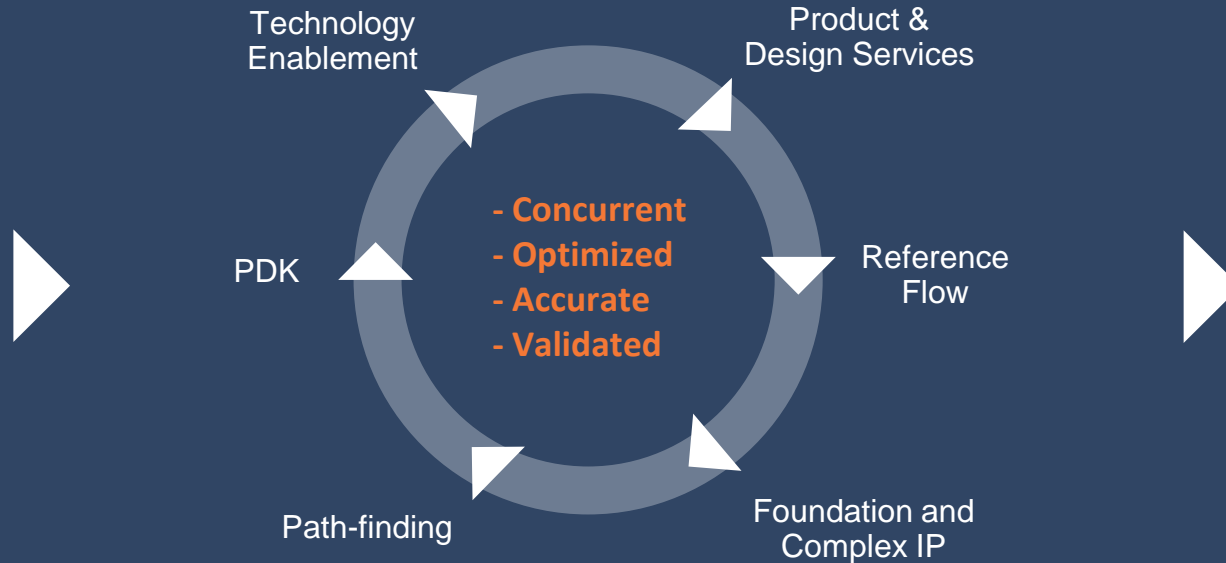
Mobility



Computer,
Connect &
Store

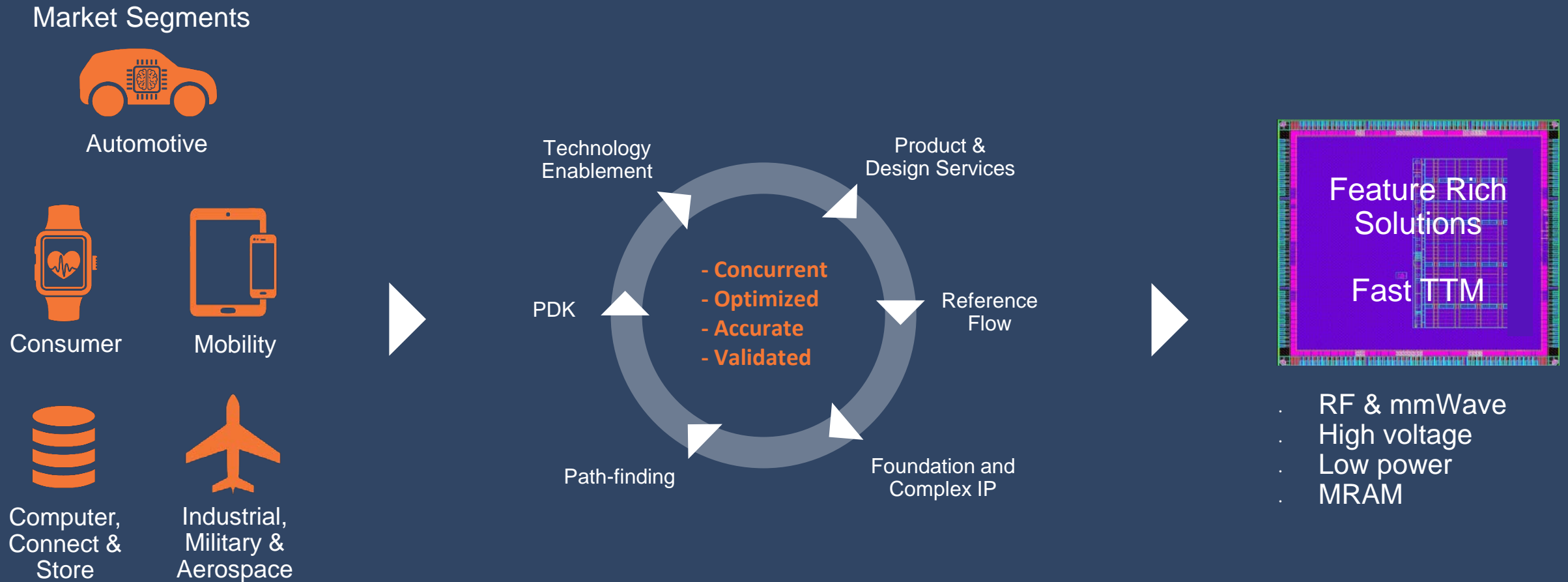


Industrial,
Military &
Aerospace



- RF & mmWave
- High voltage
- Low power
- MRAM

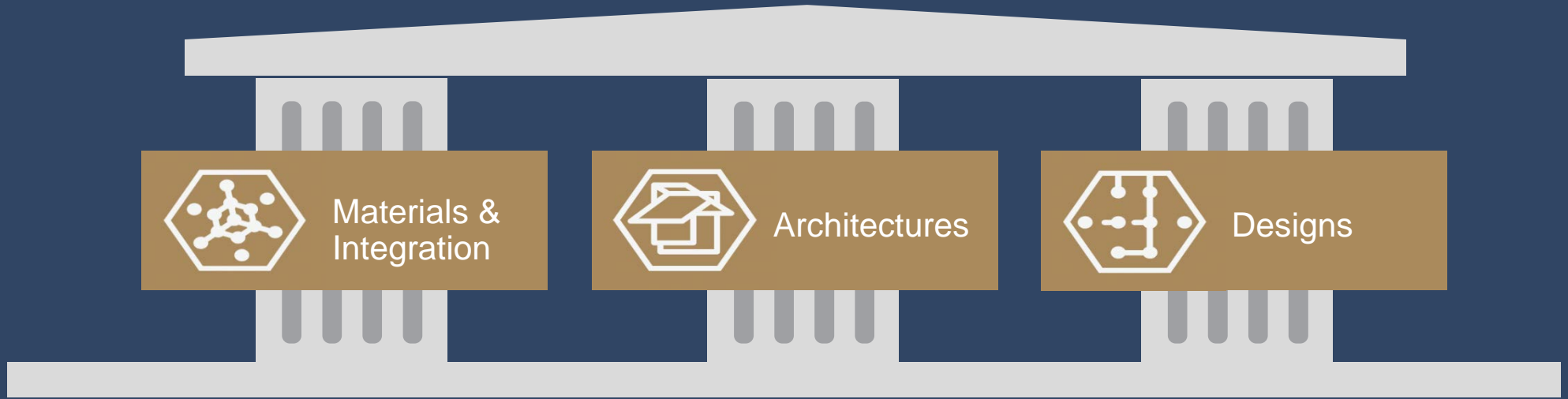
Industry virtual cycle of design / technology co-optimization is intensifying as complexity increases



Enhanced focus on Materials & Integration, Architectures and Designs

DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
ERI pillars



DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
ERI pillars



Materials &
Integration



Architectures



Designs

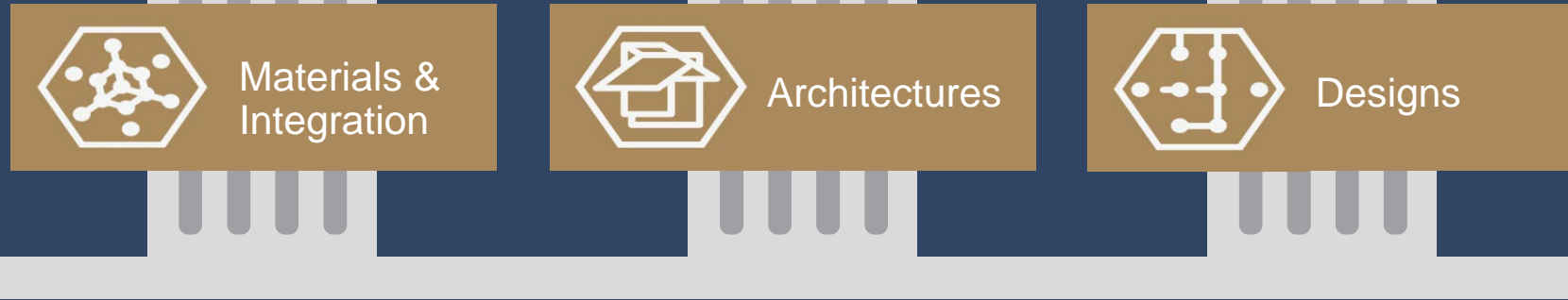
DARPA
Keys to the
future

Store

"Memory as a compute
accelerator"

DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
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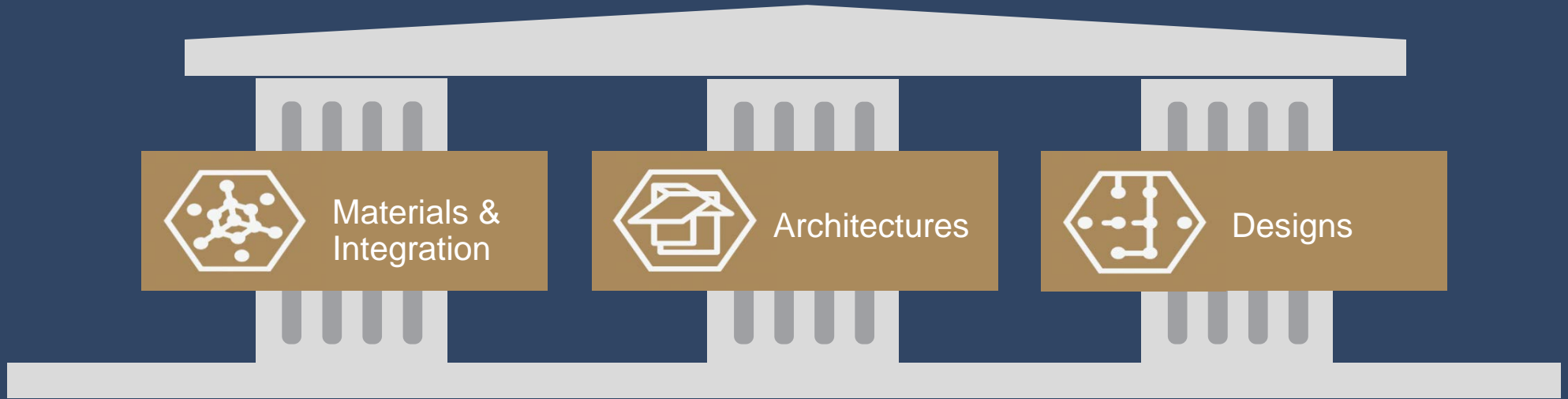


GF solutions

Magnetic RAM Charge-trap
programmable
& secure

DARPA's ERI pillars — three keys to the future and GF's solutions

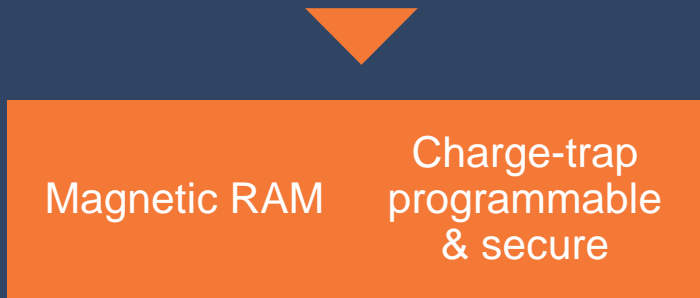
DARPA
ERI pillars



DARPA
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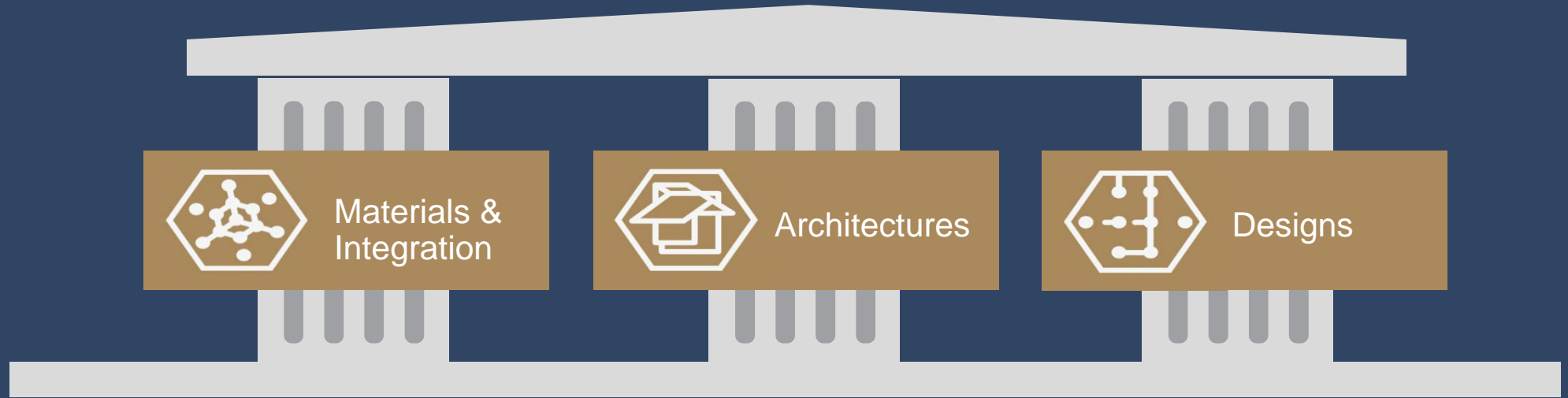



GF solutions



DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
ERI pillars



DARPA
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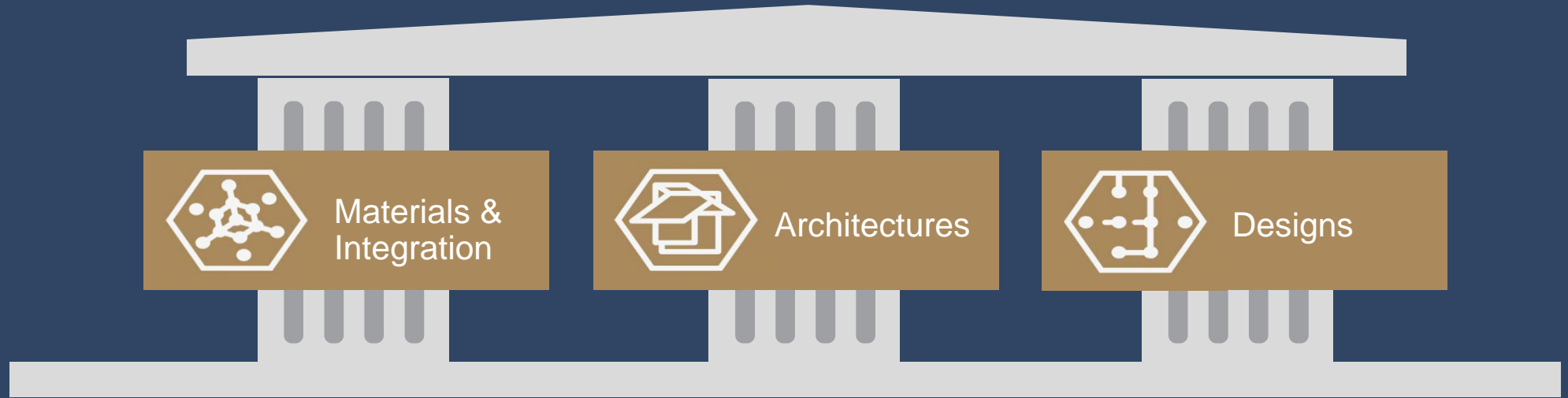



GF solutions

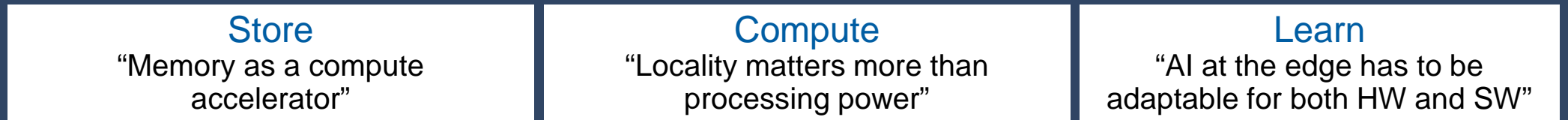


DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
ERI pillars



DARPA
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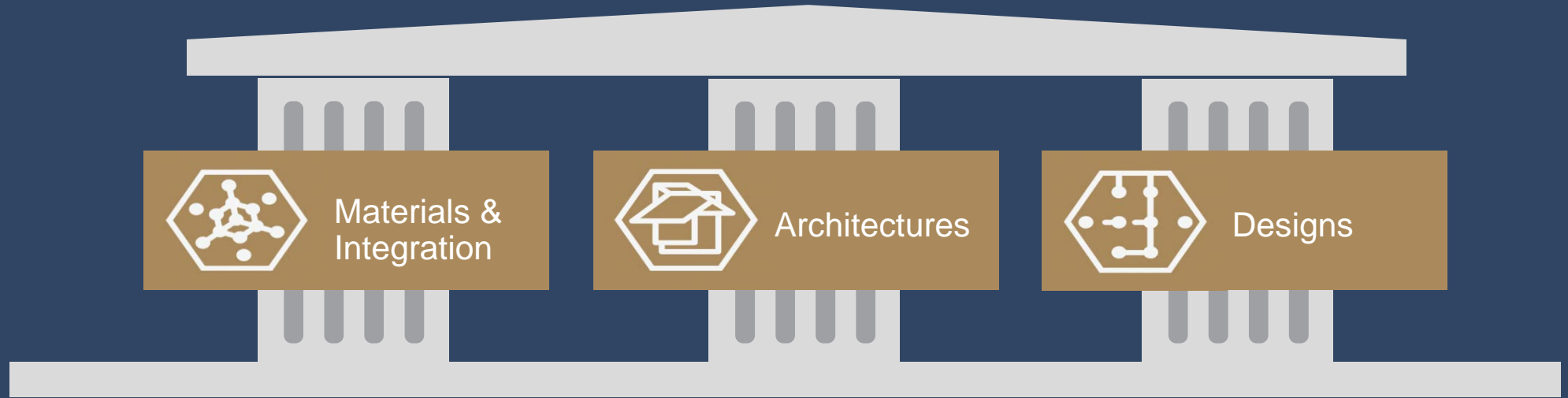



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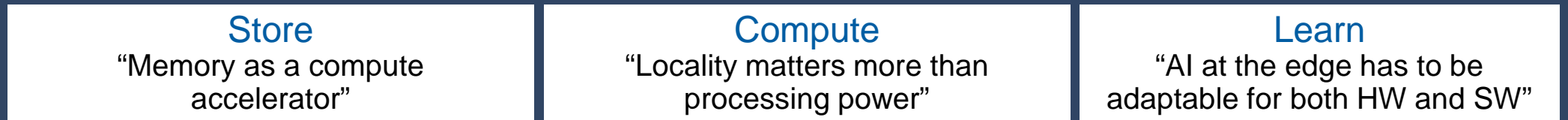


DARPA's ERI pillars — three keys to the future and GF's solutions

DARPA
ERI pillars



DARPA
Keys to the
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GF solutions



The DARPA approach

- Understand future needs
- Set ambitious goals
- Fund on pragmatic timelines



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- Set ambitious goals
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Seed and harvest great outcomes

DARPA programs springboard new market opportunities

Example: POEM Program delivers direct and derivative results

DARPA
~\$15M Seed



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Example: POEM Program delivers direct and derivative results



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DARPA
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7 Years



Direct

"Chip-scale, integrated
photonic technology
... within embedded
microprocessors"

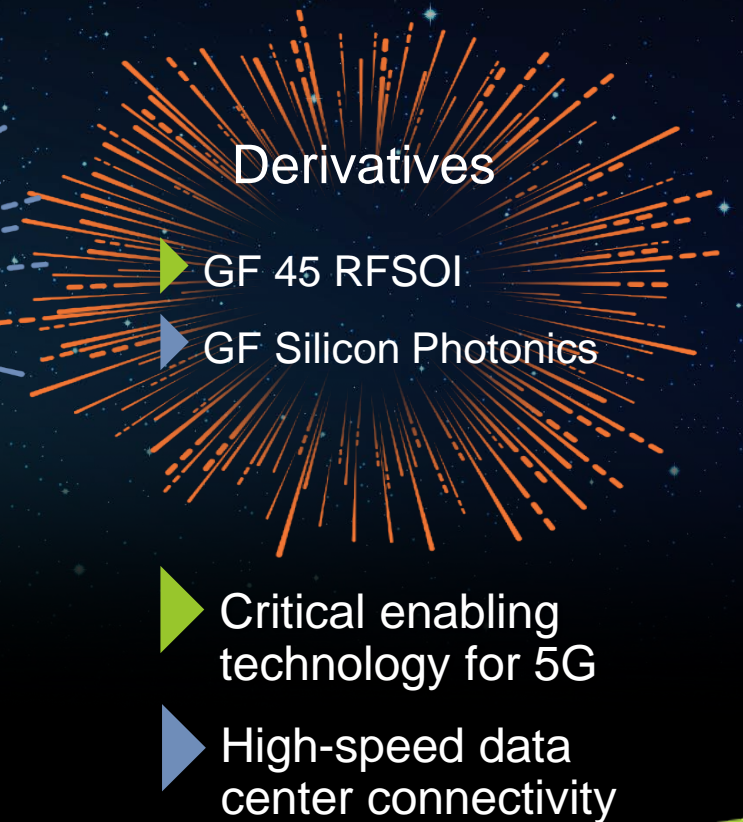
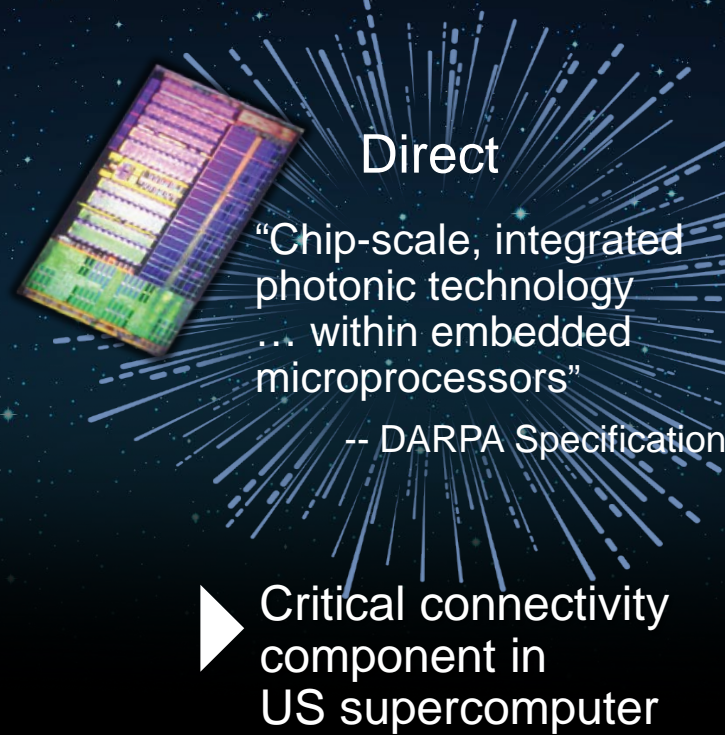
-- DARPA Specification



Critical connectivity
component in
US supercomputer

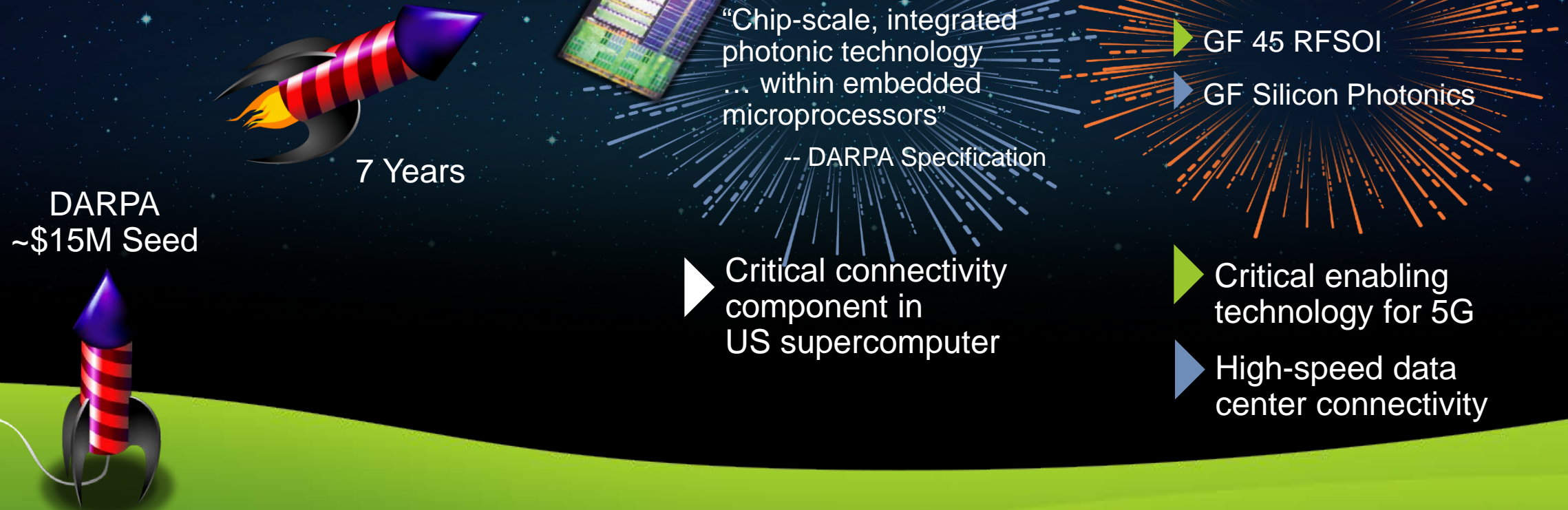
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Example: POEM Program delivers direct and derivative results



DARPA programs springboard new market opportunities

Example: POEM Program delivers direct and derivative results



The DARPA model works!

Our journey together

ACTIVE PROGRAMS

FUTURE JOINT PROJECTS

COMPLETED PROGRAMS

- ✓ POEM (Photonics)
- ✓ CHIPS, DAHI (Hetero-Integ'n)
- ✓ ACT (Phased Arrays)
- ✓ ELASTx (mmWave)

Our journey together

ACTIVE PROGRAMS

- MIDAS (mmWave)
- REIMAGINE (Imaging)
- SHIELD (RF)
- CRAFT (Design)
- DSSOC (SOC)
- FRANC (MRAM)
- POSH, IDEA (Design)

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FUTURE JOINT PROJECTS

- Photonics
- RF

COMPLETED PROGRAMS

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GF's commitment



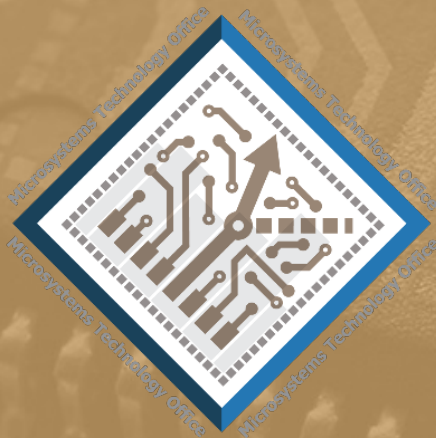
- Specialized – Pivoted and focused
- Sustainable and attractive business model
- Secure – Trusted facilities
- Leverage highly-automated advanced US manufacturing footprint

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In partnership with DARPA we are
changing the industry that's **changing** the world!



ERI ELECTRONICS RESURGENCE INITIATIVE

S U M M I T

2019 | Detroit, MI | **July 15 - 17**