



GLOBALFOUNDRIES
noun | glō-bəl-faun-drēs
def. one of the world's leading semiconductor foundries, offering unique solutions developed in collaboration with customers

- Specialized technology portfolio
- Rich suite of intellectual property
- Broad range of technologies and service

Optimizing selection of GLOBALFOUNDRIES ASIC and Foundry to achieve optimal IC Solutions

Sebastian Ventrone,

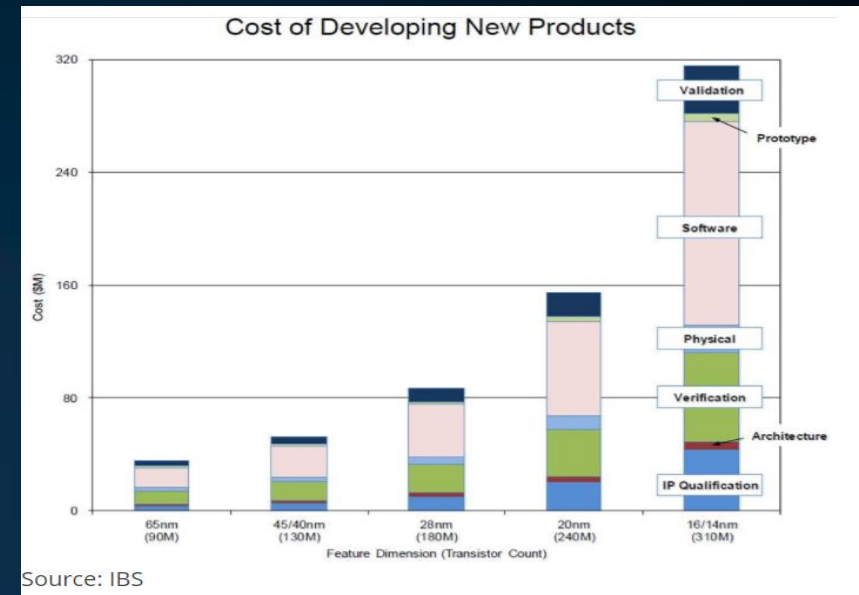
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Problem Statement

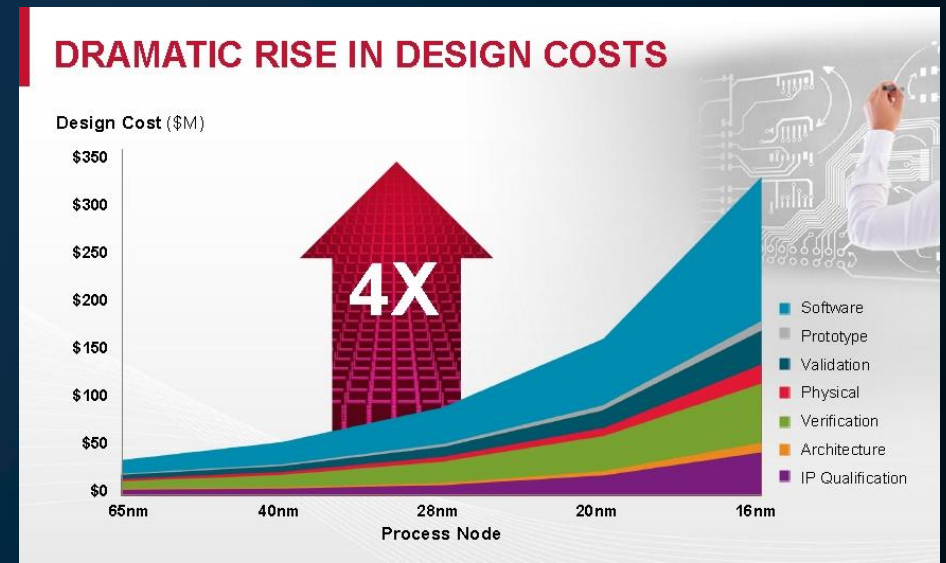
- Design costs are rising dramatically as nodes advance*¹
 - 28nm - \$30M 14nm - \$80M 7nm - \$271M
- Complex technology driving skill requirements, higher risks*²
 - Highly complex IP and ballooning IC content drives integration and verification complexities
 - Routing congestion and timing closure challenges due to increased IP content and longer thinner wires
 - Tighter design margins, power supply noise sensitivity, overdesign risk to address variations . . .
- Program budgets spread over multiple years
 - Limits scope in any given year, drives phased projects, increases total cost
- GlobalFoundries' engagement models allow tradeoff to help optimize each program
 - Foundry / Customer owned tools (COT) *³
 - GlobalFoundries ASIC flow *⁴

*1 <https://semiengineering.com/racing-to-107nm/>
 *2 <https://semiengineering.com/design-for-silicon-success-at-7nm/>
 *3 <https://www.globalfoundries.com/technology-solutions/cmos/performance>
 *4 <https://www.globalfoundries.com/technology-solutions/asics>



Source: IBS

<http://semiengineering.com/how-much-will-that-chip-cost/>



<http://electroiq.com/petes-posts/2015/01/26/exponentially-rising-costs-will-bring-changes/>

Multi-dimensional Solution Approach

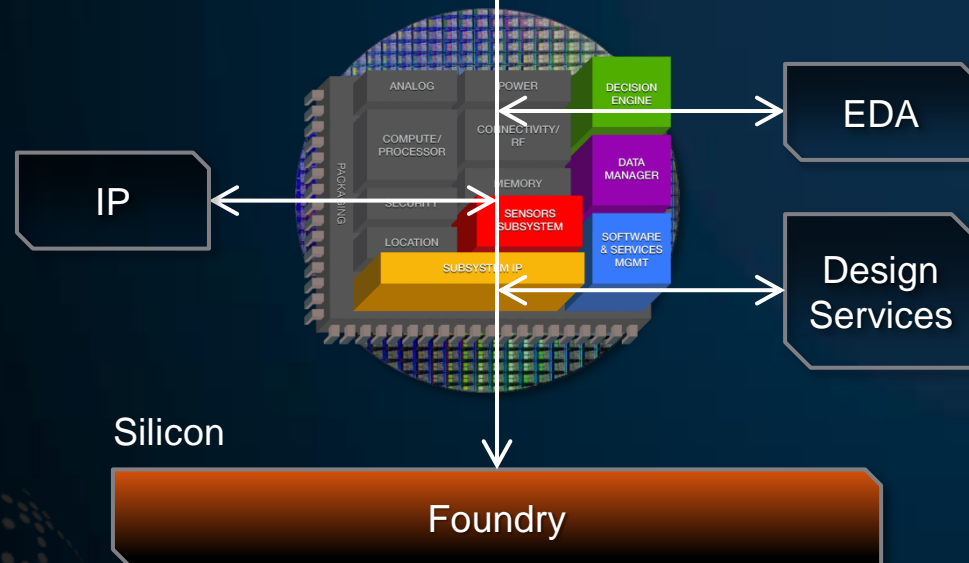


Networks, Data Center Clouds & Services

Applications & Solutions

Systems Companies

Hardware & Software



Focus on systems and solutions for the end-space markets

Integrate value with platforms, collaborative partnerships and ecosystems

Differentiate through a rich portfolio of Intelligent Technologies to meet customer needs

Technologies and Solutions Focus

Extensive suite of offerings and services fully enable customers across a range of markets



CMOS

Broad technology portfolio across leading-edge and mainstream nodes

RF

Comprehensive enablement and extensive, optimized RF portfolio including RF SOI and SiGe



ASIC

Deep expertise and richest portfolio of best-in-class IP for wireless/wired network and data center applications in the foundry industry

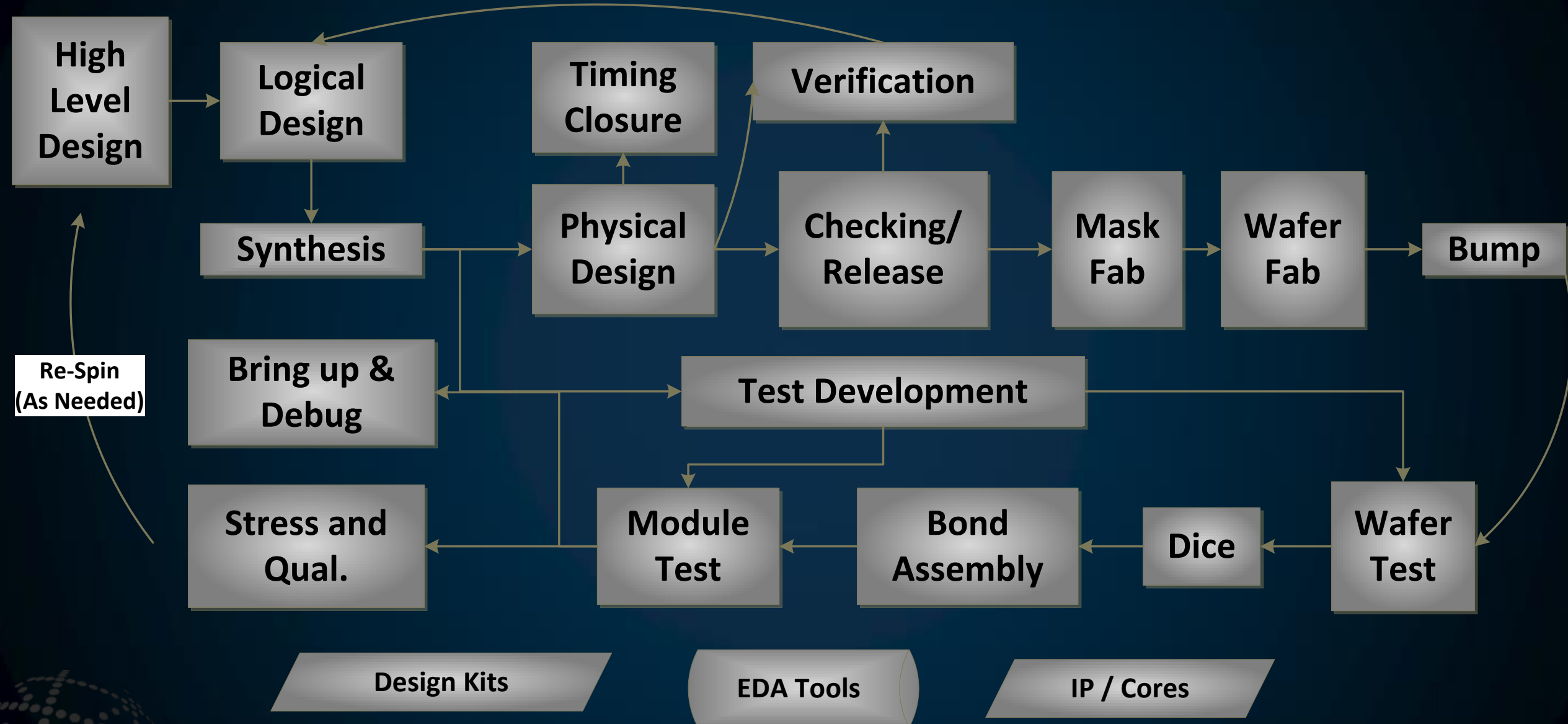


Aerospace & Defense

Leverages offerings across the GLOBALFOUNDRIES portfolio to provide solutions for Trusted and Aerospace and Defense applications for both government and commercial markets



Typical IC Development Activities



Technology Portfolio Focus

	Logic	RF CMOS	mmWave RF CMOS	Embedded Memory	BCDLite®/BCD	High Voltage CMOS	RF SOI	SiGe PA	High Performance SiGe
7nm	○								
12nm	○								
14nm	●	●							
22nm	●	●	●	●					
28nm	●	●							
45/40nm	●	●	●	●			○		
55nm	●	●		●	●				
65nm	●	●			●				
90nm	●								●
110nm	●	●							
130nm	●	●		●	●		○		●
180nm	●	●			●	●	●		●
250nm	●	●							●
350nm								●	●
MEMS	200mm MEMS and MEMS + CMOS integration								

● Available

○ In development

Dual Track Roadmap

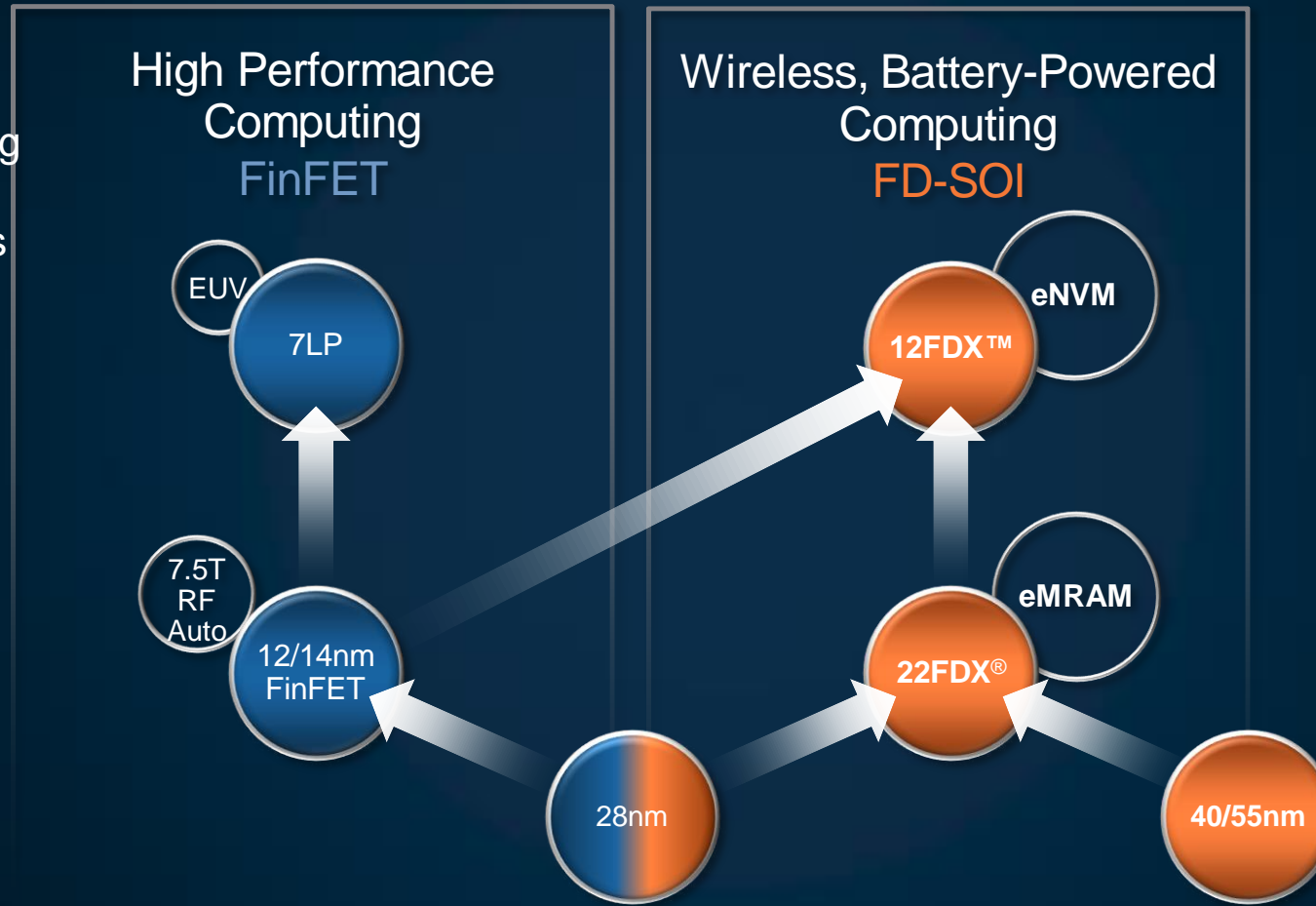
Applications

- Servers
- HPC / Core Networking
- Graphics
- High-end smartphones

Premium Tier

Features

- High-performance
- Balanced-cost



Applications

- Low & mid-end smartphones
- Wireless
- IoT
- Autonomous vehicles
- Mobile camera

Volume Tier

Features

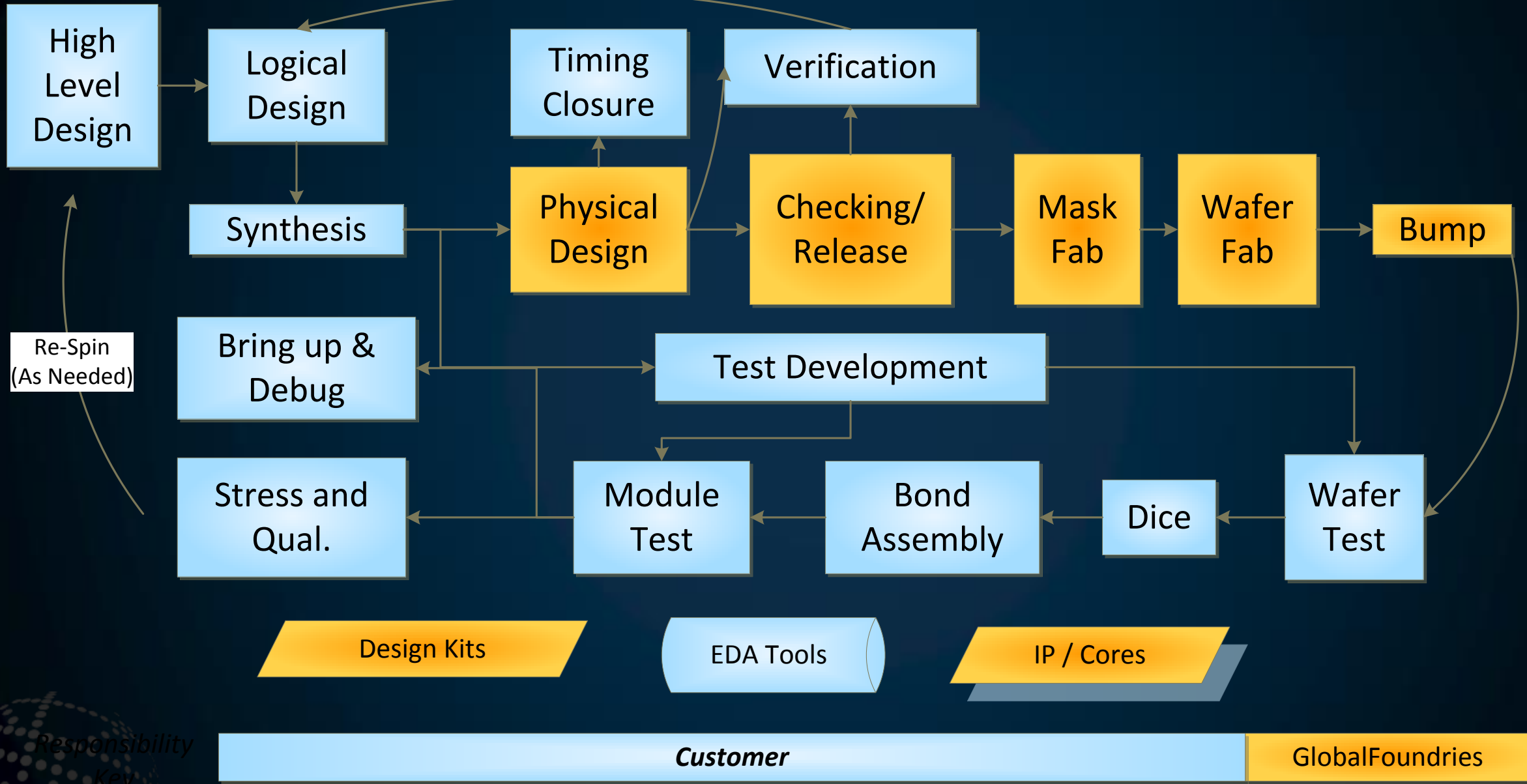
- Low-power
- Cost-effective performance
- RF
- Embedded memory

the *Right Technology* for the *Right Application*[™]

Semiconductor Manufacturing Locations

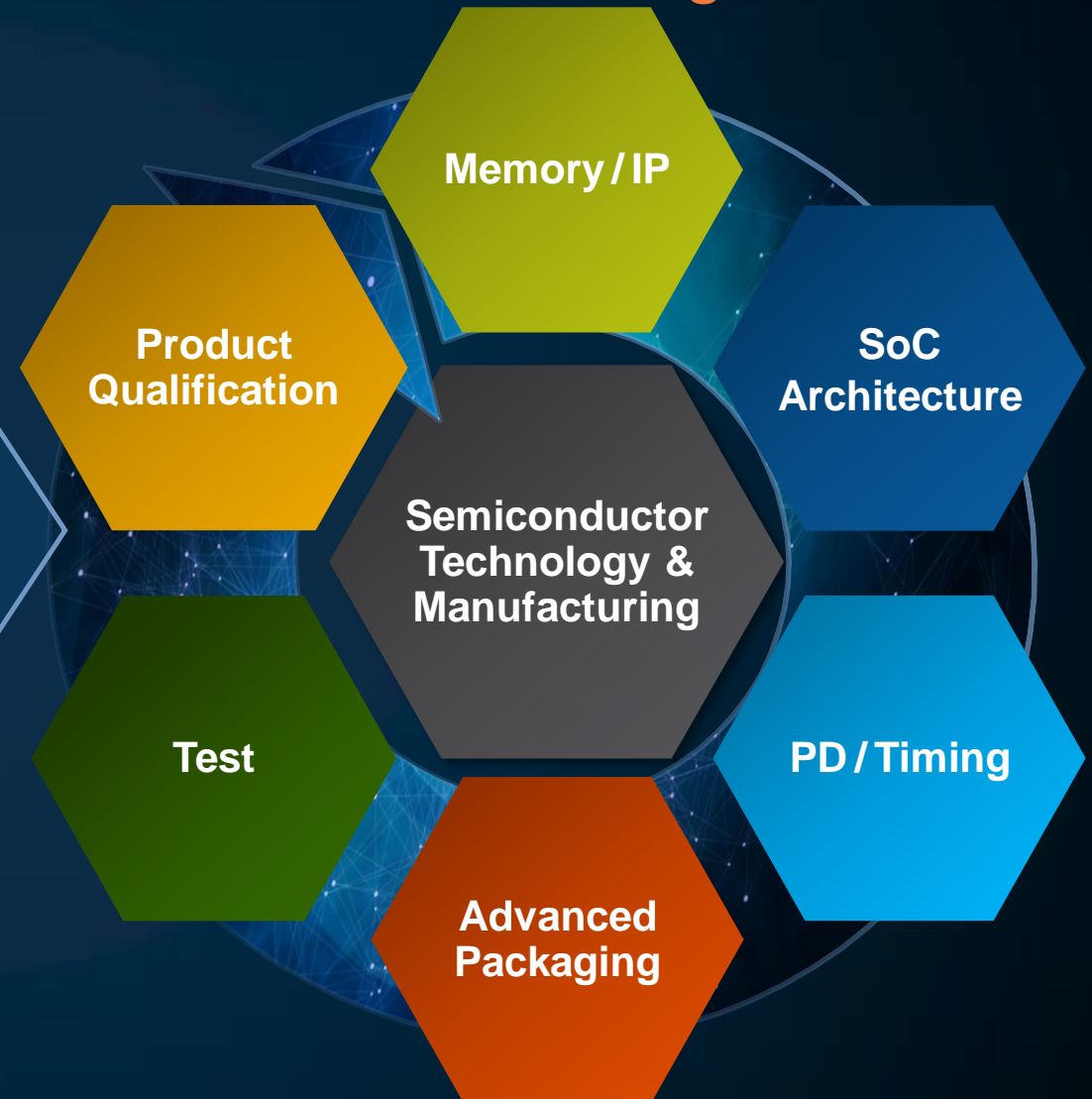


Typical COT / Foundry Scope Ownership



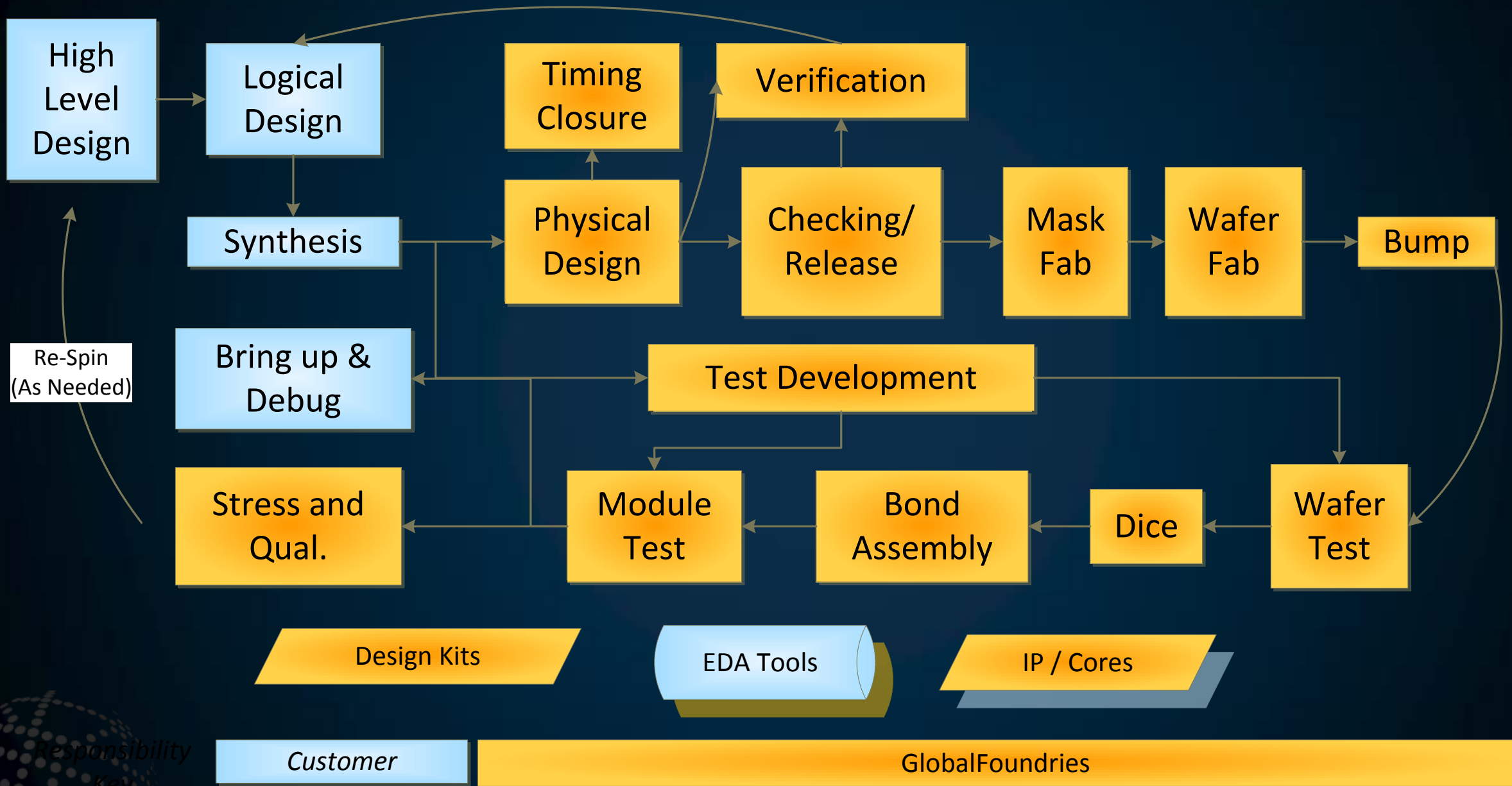
Vertically Integrated Solutions Provider = Your Advantage

- ✓ Improved time to market
- ✓ Lower risk
- ✓ Fully optimized solutions



Over 2,000 designs successfully executed

Typical ASIC Scope Ownership

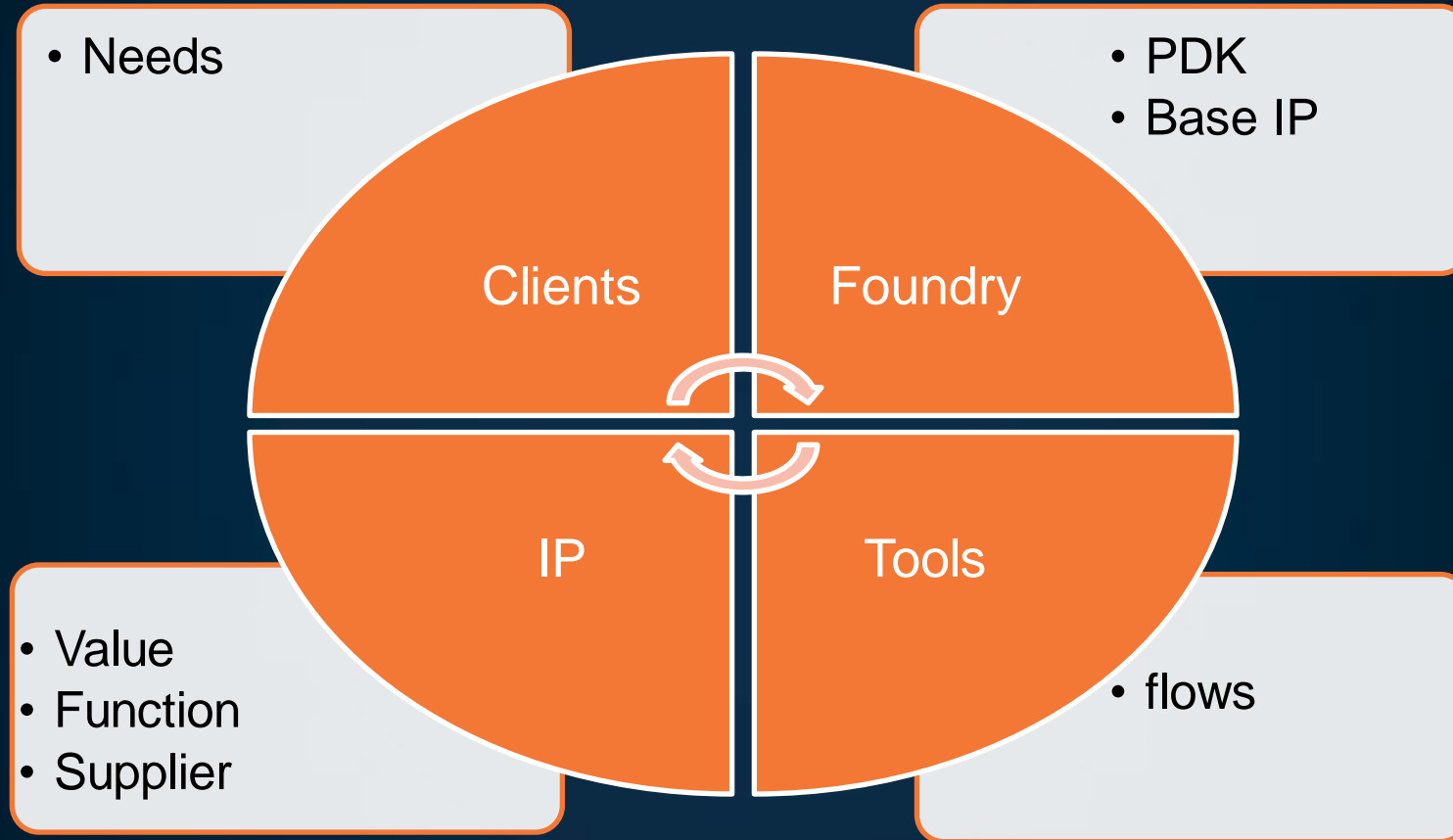


Responsibility Key

COT and ASIC Characteristics Compared

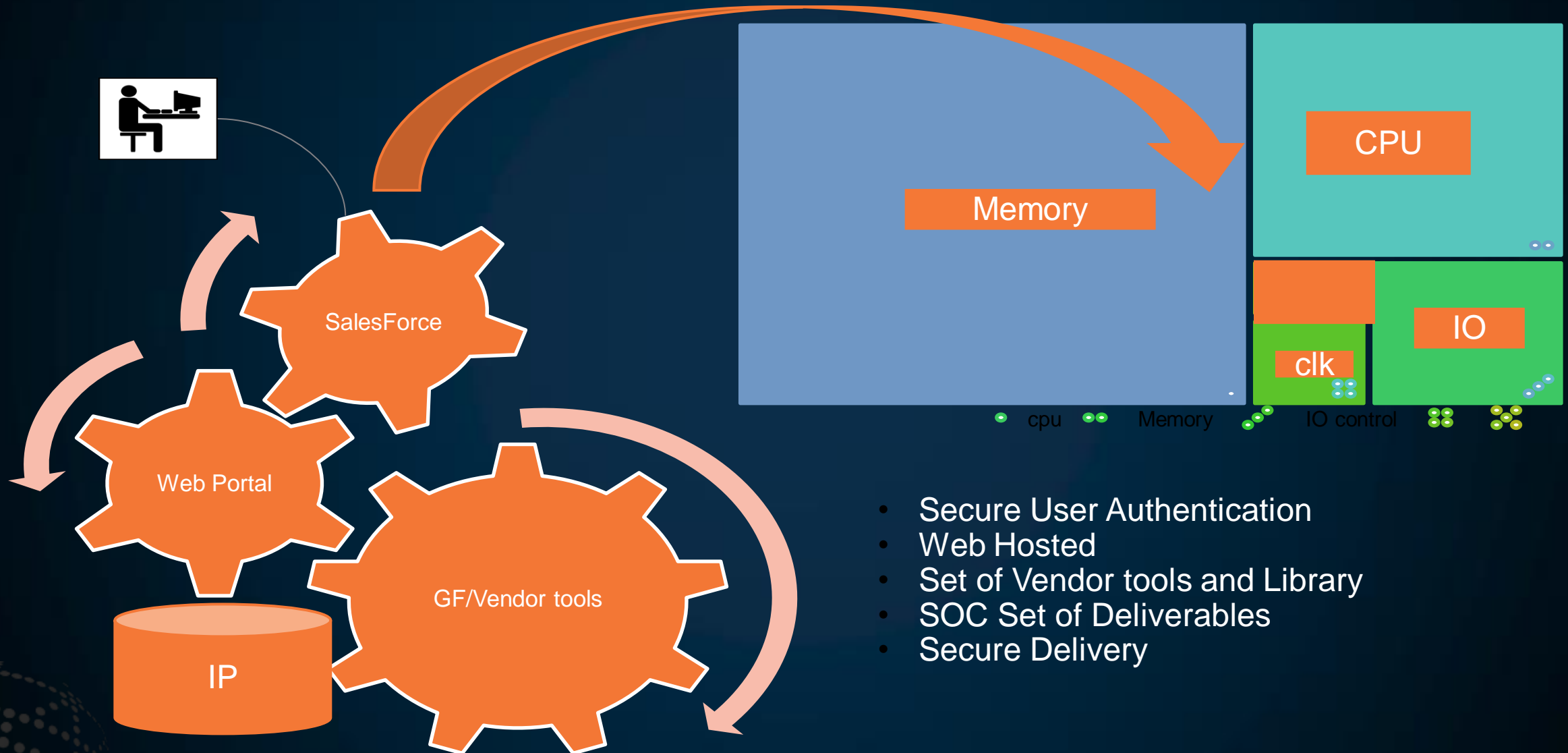
Metric	COT	ASIC
Flexibility	 Greatest	ASIC methodology + Customer hard core(s)
Customer Effort & skills	Greatest	 Least
Deliverable to Customer	Untested Wafer	 Tested, qualified, warranted Module
Product yield ownership	Customer owns Yield, wafer price	 GF owns yield, firm fixed module price, committed supply line
Product Power	Neutral / Baseline	 >20% lower with integrated power methodology
Supply Chain Complexity	Greatest	 Least
Development Cost	Higher	 Lower
Schedule	Usually longer	 Usually shorter
Production Cost	 Potential to be lower	Can be higher
Risk	Highest	 Lowest
Outgoing Quality	 GF Owned	 GF Owned
Product Reliability	Customer Owned and verified	 GF Owned and warranted

GF IP EcoSystem

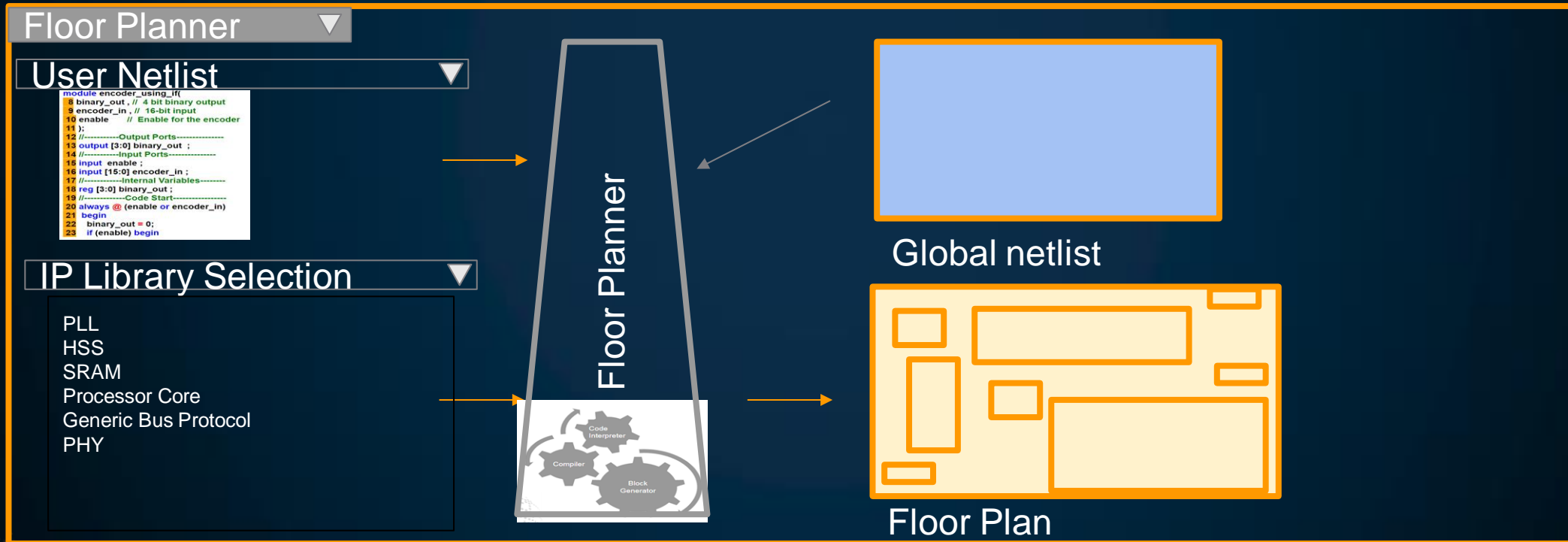


Focus on IP

Intelligent Asic Methodology (I-AM)



- Secure User Authentication
- Web Hosted
- Set of Vendor tools and Library
- SOC Set of Deliverables
- Secure Delivery



Conclusoin

- GF spans a broad Technologies from RF to FinFets
- GF spans from COT to full Turn Key solutions
- IP Ecosystem becoming Core to our business
- Exploring the Online Support model for our customers

Thank you



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