

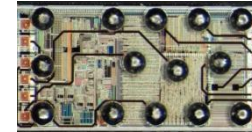
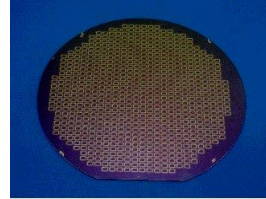


***The Role of Wafer Foundries in
Next Generation Packaging***

- David McCann, VP Packaging R+D
- May 28, 2013

Solutions are Increasingly Silicon-Based

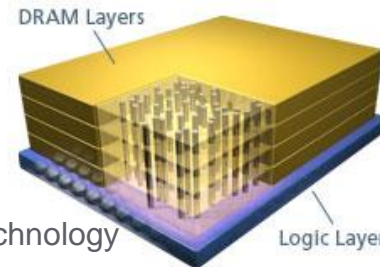
- RF moves from QFN to wLCSP
 - Driven by footprint and cost



- Memory moves much closer to the logic in 2.5D and 3D
 - Driven by power reduction and increased bandwidth

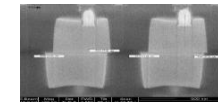
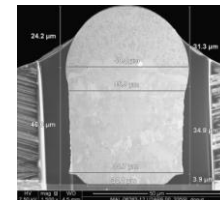


- 3D memory stacks replace 2D DIMMs
 - Driven by bandwidth, density, footprint



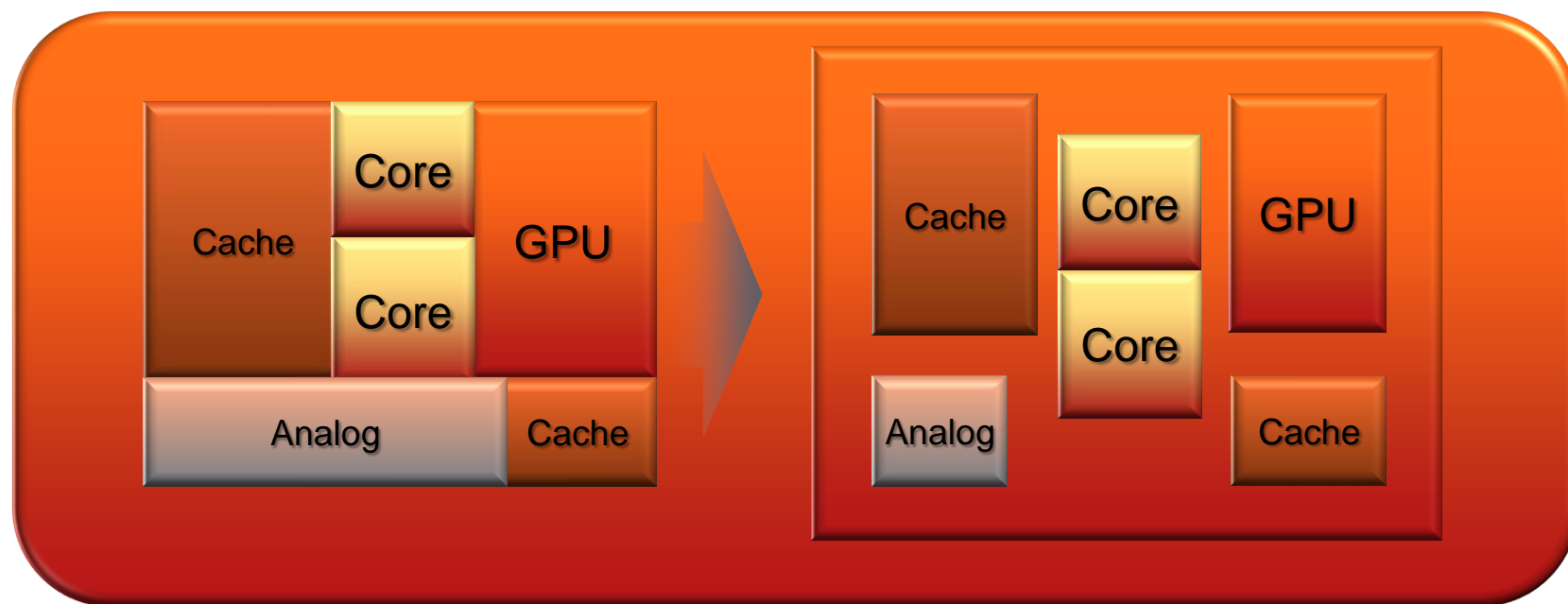
Courtesy: Micron Technology

- Interconnect density increases
 - Driven by progressively denser Si nodes
 - Driven by SoC disaggregation



Disaggregation

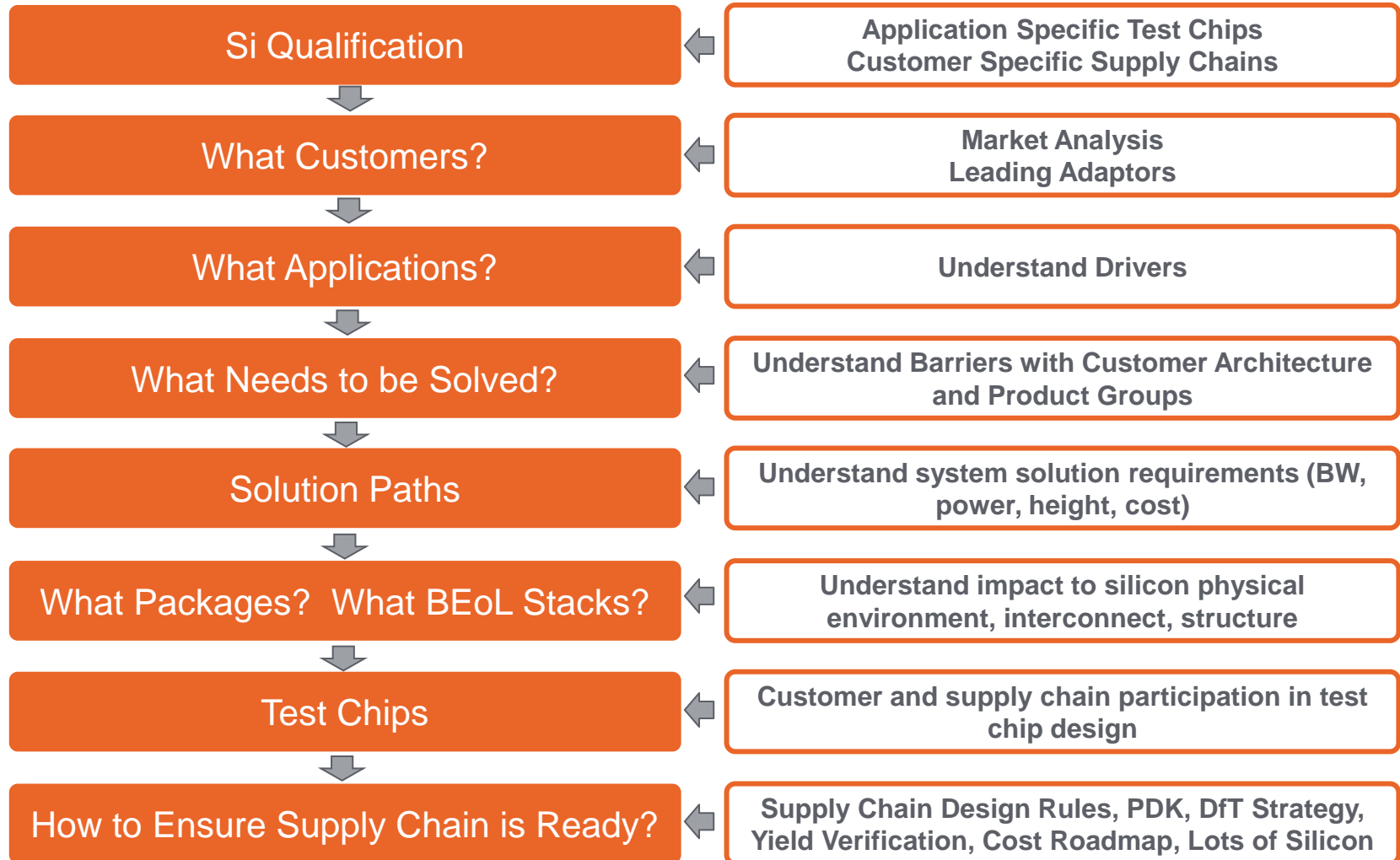
- SOC scaling is not delivering full entitlement of cost/area improvement
- Enables SoC “fission” into best cost-performance fit node for each chip
- Enables high bandwidth and increased performance per joule
- Enables re-use without re-design...lower risk and lower cost



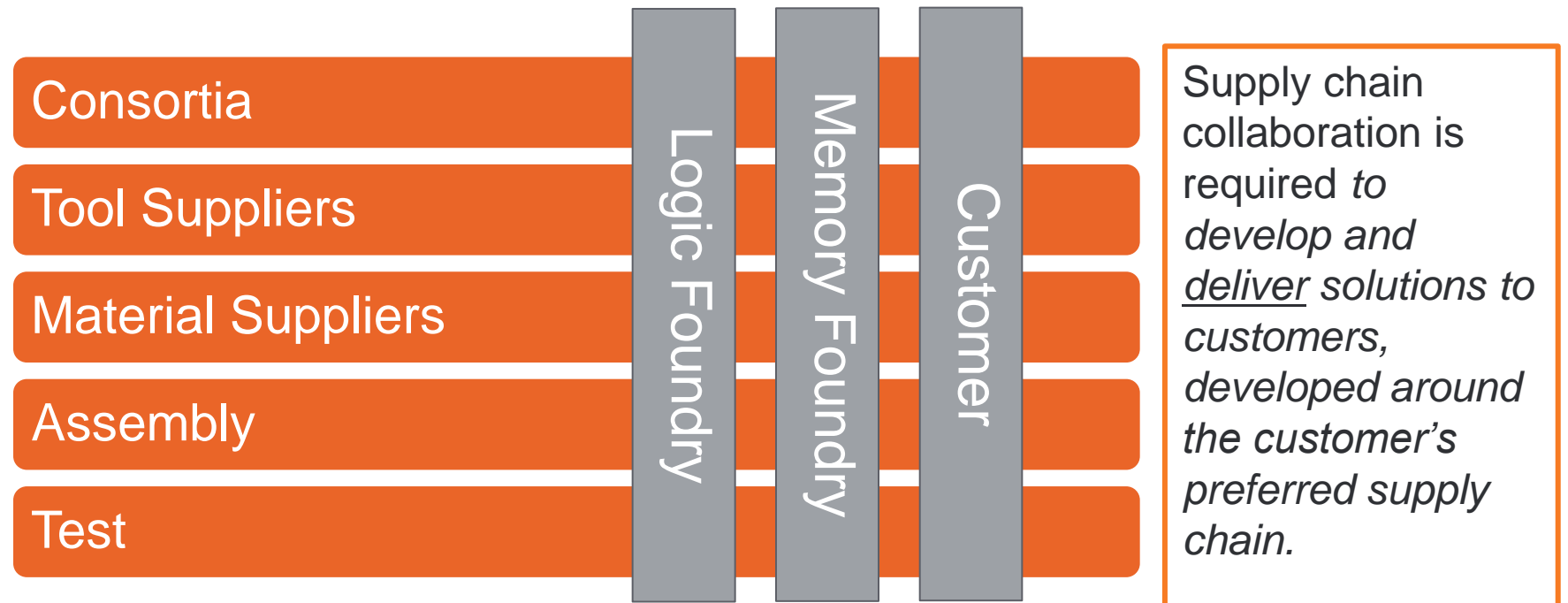
- But requires more complex packaging solutions



Reliability in New Packaging Technologies



New Supply Chain Model: Collaboration



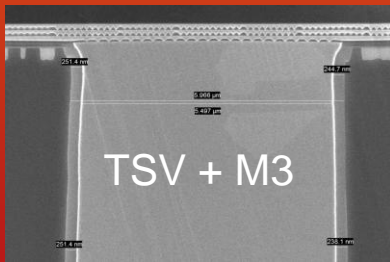
- Collaboration by the experts in each field
- Development of solutions in one location with partners, aligned to customers preferred supply chain
- Early development to support BEoL definition
- Aligned Design Rules, PDK, Systems
- Partners fan-out technologies to their factories for smooth production ramp



Supply Chain Inter-Dependencies

3D

- ✓ Impact of Packaging on TSVs and Transistors
- ✓ Impact of Thinning
- ✓ Design Rules for Supply Chain Yield
- ✓ Definition of Yield Loss Ownership



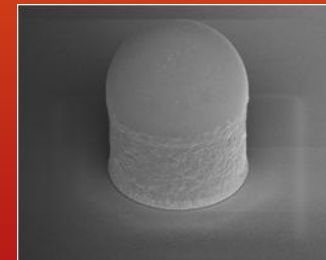
2.5D

- ✓ Interposer Supply
- ✓ Design Rules for Supply Chain Yield
- ✓ Metallurgy and Process Decisions
- ✓ Definition of Yield Loss Ownership

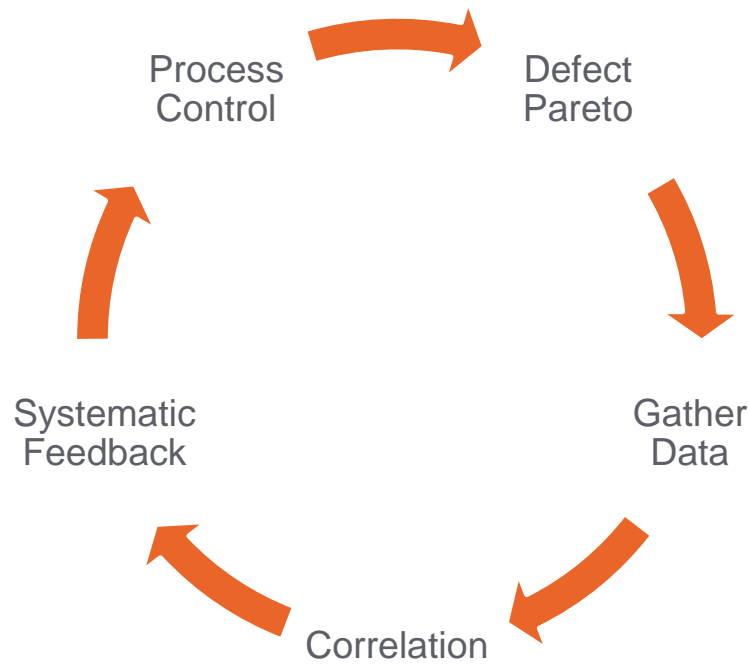


CuPillar

- ✓ Impact of Packaging on BEoL stack
- ✓ Stress of CuP on ELK
- ✓ Design Rules that Work for Packaging
- ✓ Test Chips for Supply Chain



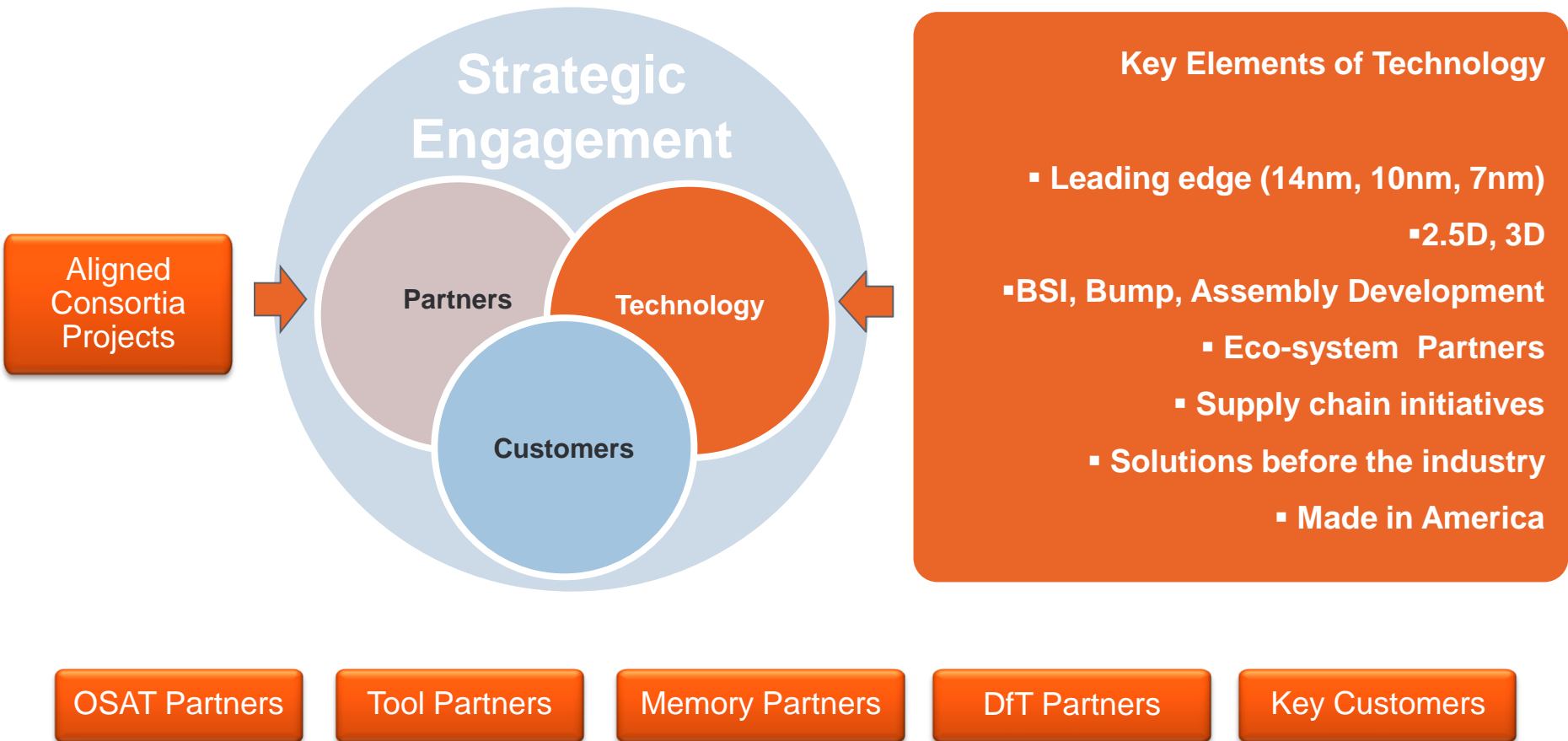
Drive Adoption by Driving Yield which Drives Cost



Technology Development Center at Fab 8 Ground Break April, 2013



Collaborative Development at TDC for Solutions





Thank You

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