Heterogeneous Integration & SiP

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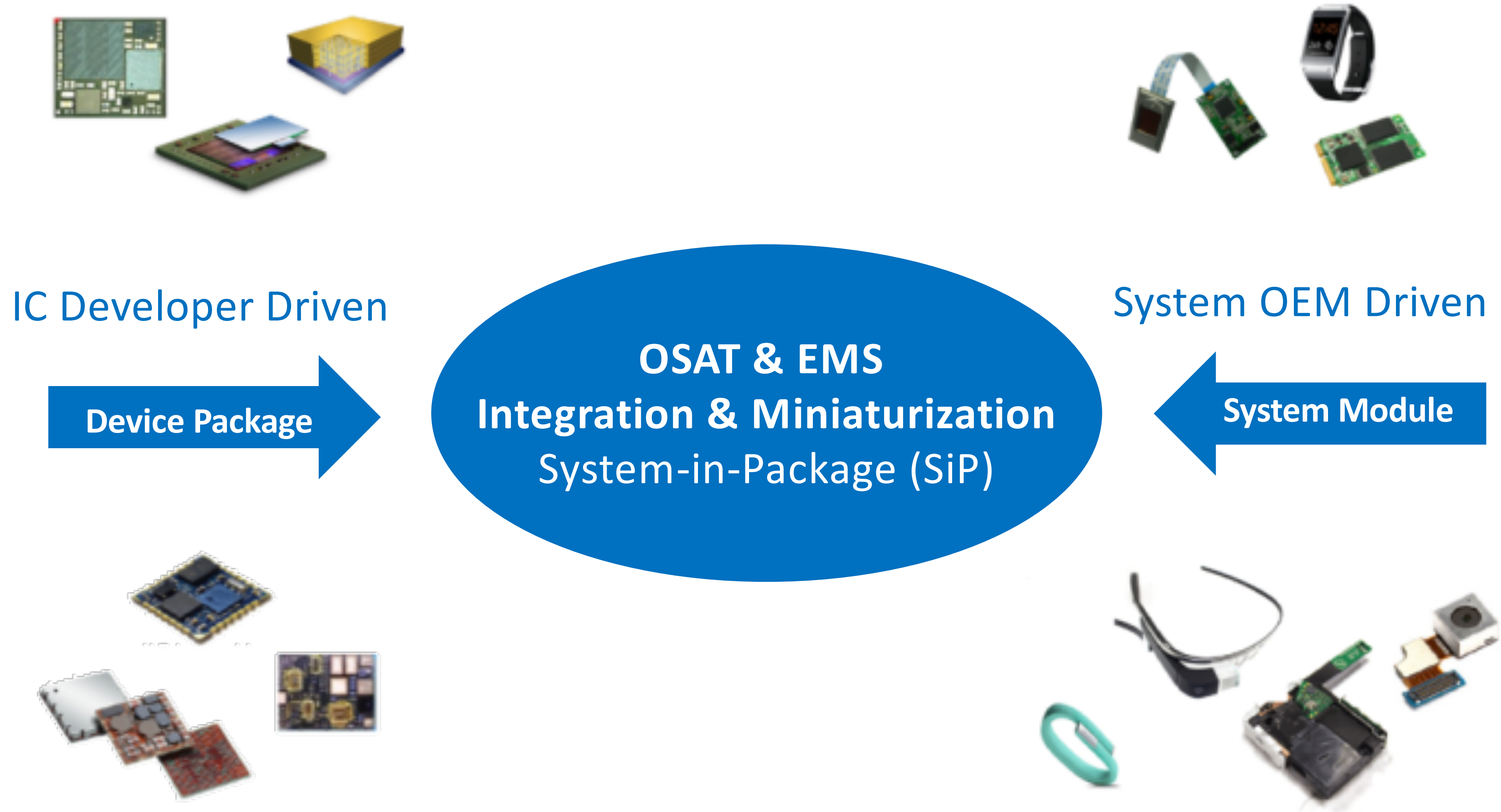
Convergence of Packaging and System Integration



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From Single Building to Metropolitan

Financial Center, Business Headquarters

Density (Manhattan)

Hybrid (Taipei)

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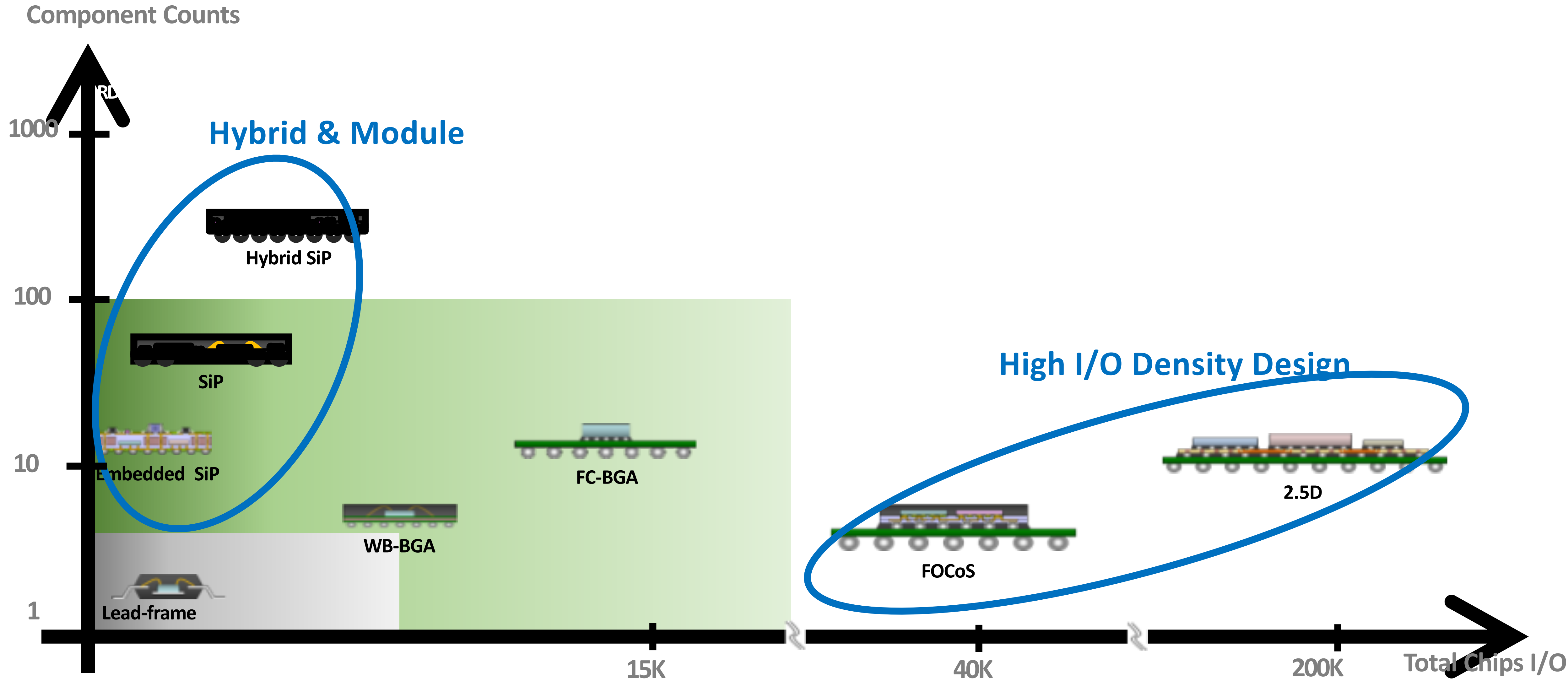
SiP – Dual Direction of Design Solutions



* System in Package-intelligent design

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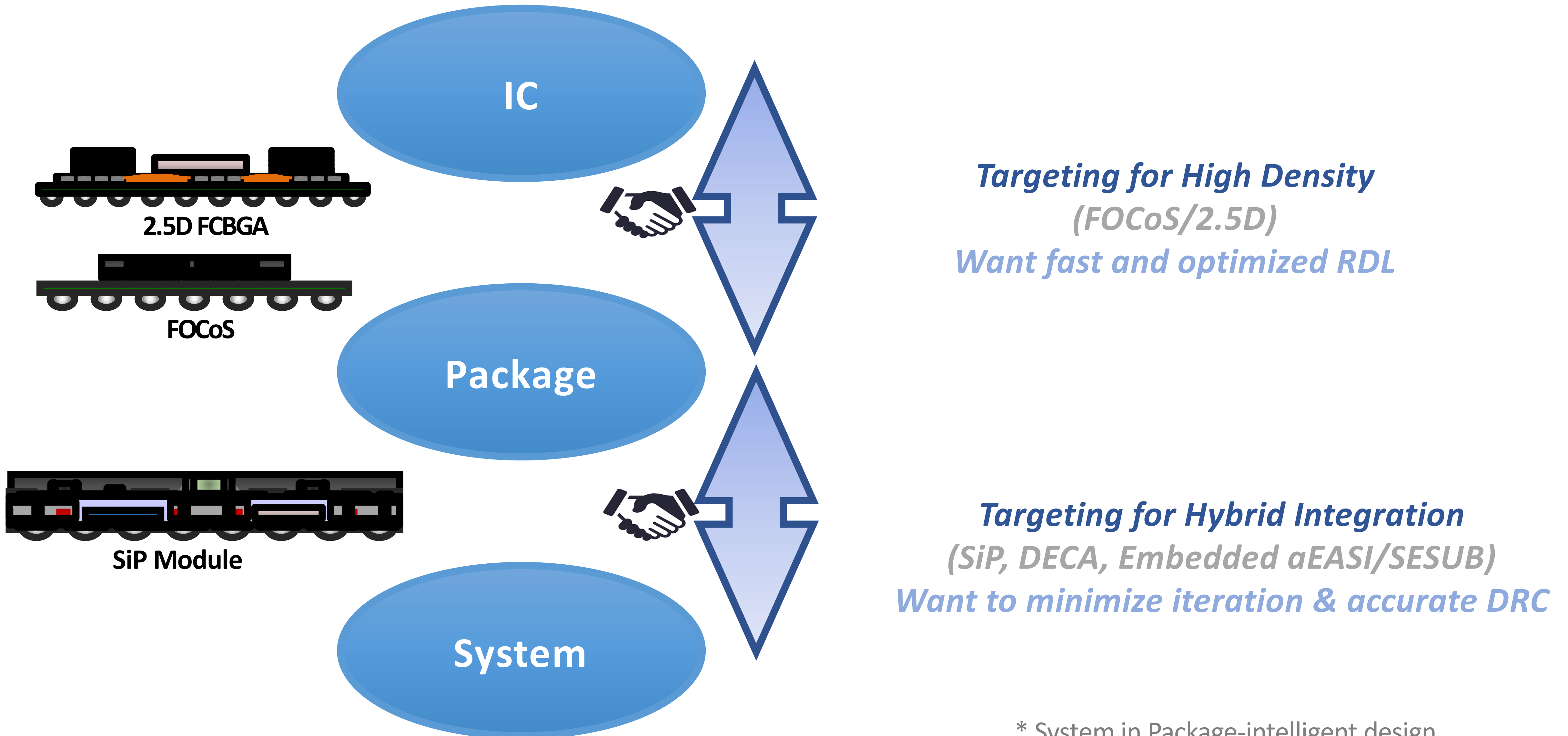
SiP Design Flow: Integrating w/IC & System



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Design Challenges

- Tangible Benefit for Integration
  - Performance, Cost, TTM
- System and Component Specs Met when Co-exited in Package
  - Power, PI, Thermo, Wrapage, SI, RF, MEMS, …
- D4M, Yield
- Test
- Reliability for Applications

- Co-Design Among Designers from IC, Package, and System
- Co-Design with Multi-physics Considerations, Simulations

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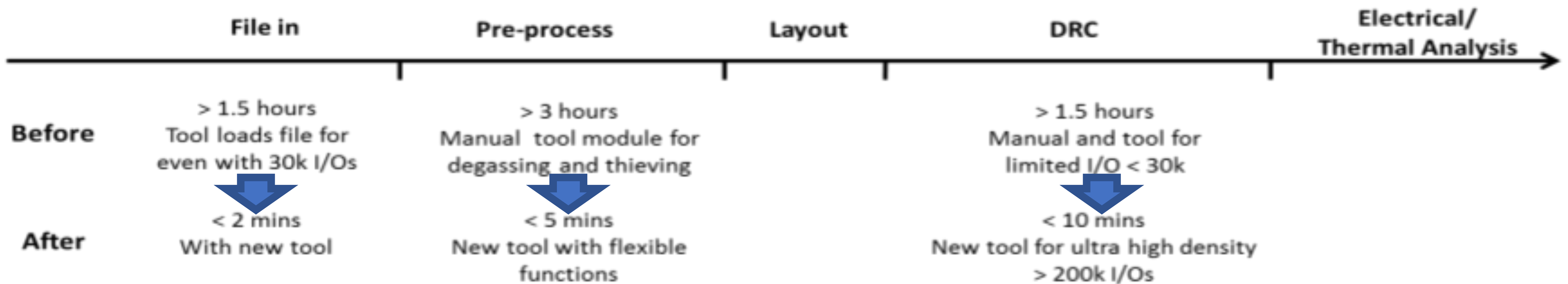
SiP-id for High Density Design

- Advantages of SiP-id for high density package design
  - ✓ Import chip netlist
  - ✓ Design operations
  - ✓ Design rule checking



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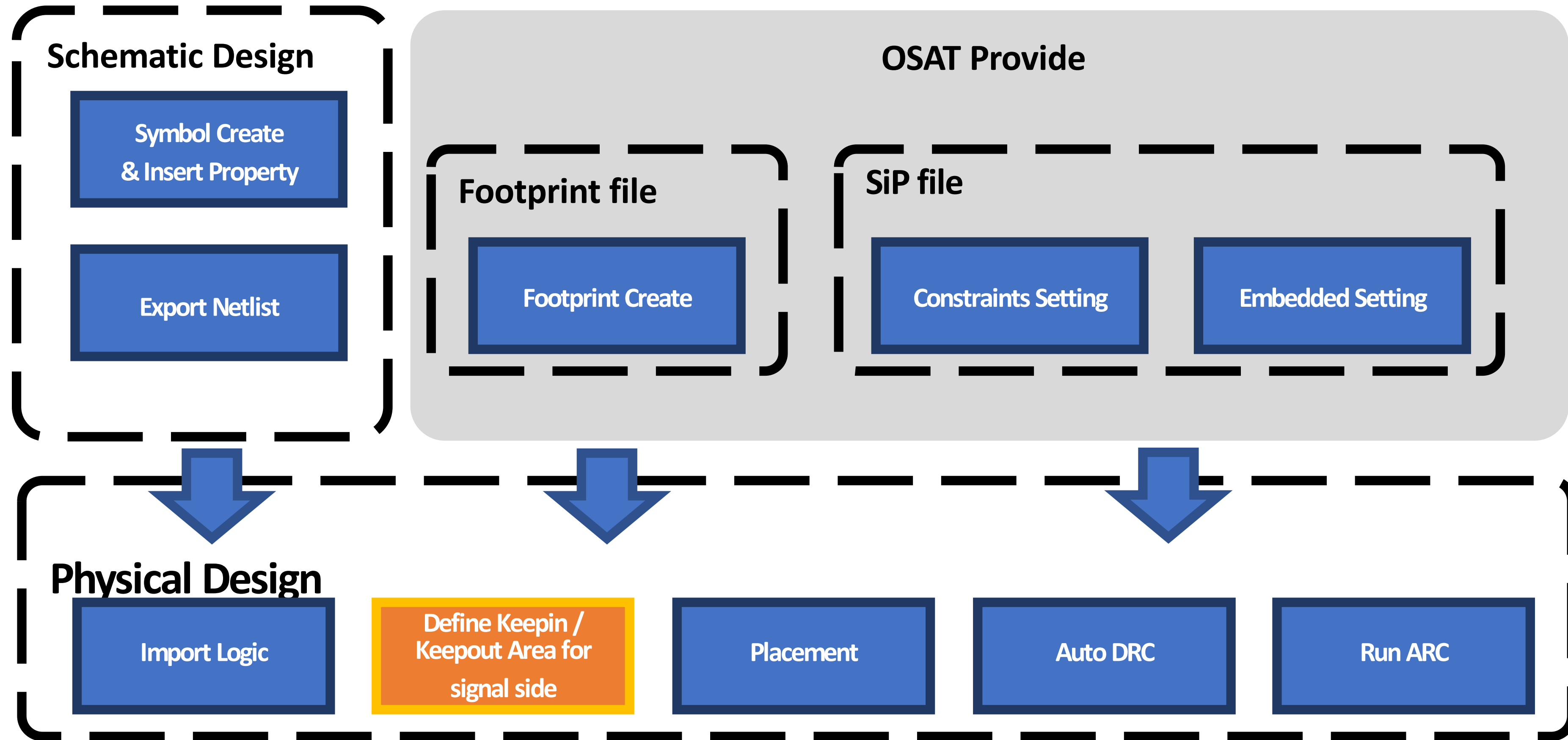
SiP-id for Hybrid SiP Design

Design for manufacturability Auto DRC

Component placement made simple

Reduce back and forth communication

Compatible to OrCAD/Allegro SIP Layout SPB 17.2 and above



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Discussion

- **What is the state of the art in co-design?**
  - ✓ **Co-design among designers from IC, package, and system**
  - ✓ **Co-design with multi-physics considerations, simulations**
- **What are the key challenges that need to be overcome?**
  - ✓ **Tangible benefit for integration**
    - Performance, Cost, TTM
  - ✓ **System and component specs met when co-exited in package**
    - Power, PI, Thermo, Wrapage, SI, RF, MEMS, ...
  - ✓ **D4M, yield**
  - ✓ **Test**
  - ✓ **Reliability for applications**
- **What needs to happen for these challenges to be overcome?**
  - ✓ **An Design Flow that integrates these element, and is agreed across the IC, packaging, and system industries**

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