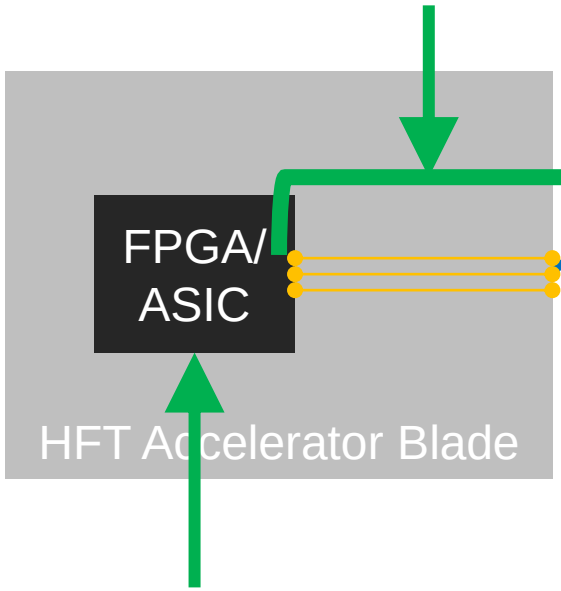
The Edge of the Edge: PCB Latency in Trading Reaction Time

May 2023

cadence®

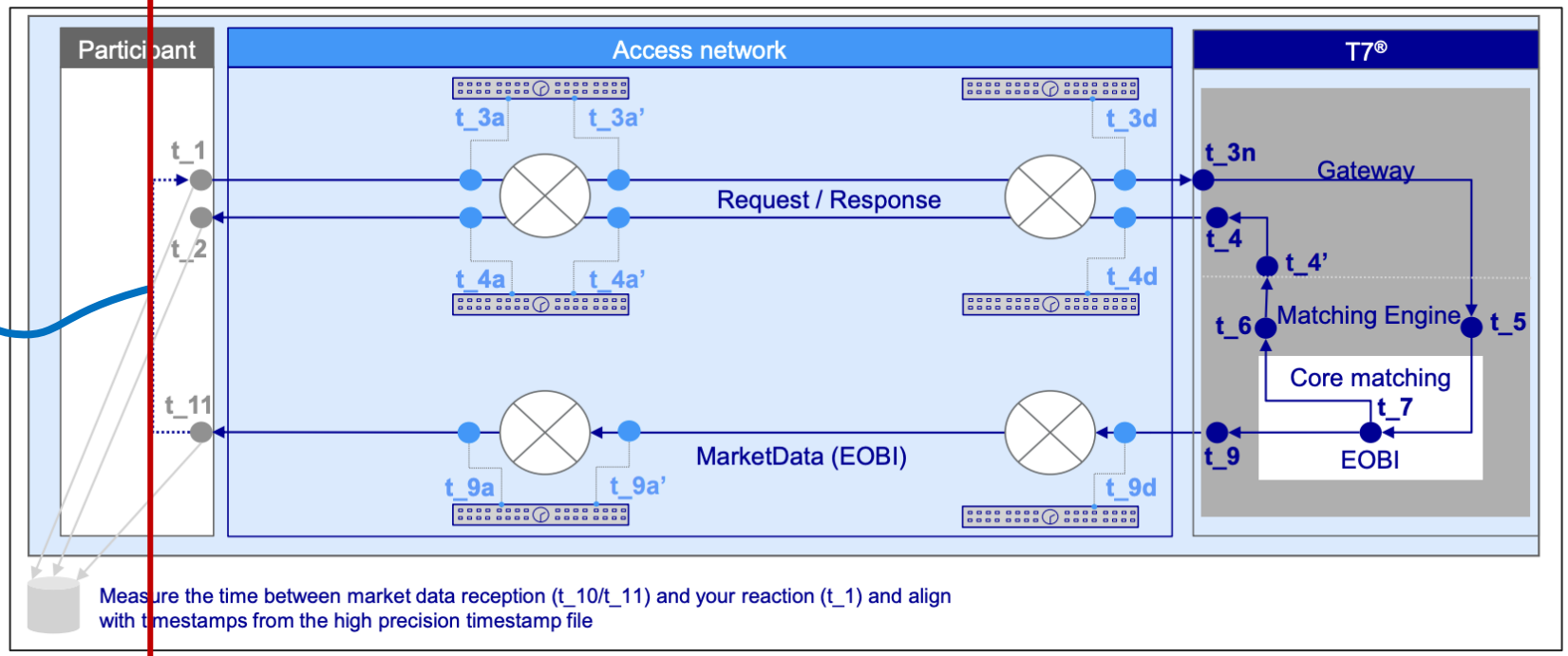
The Edge of the Edge: Extracting PCB Latency from Reaction Time

Edge of the Edge
New focus area now that fastest vs mainstream reaction team is < 100ns



Existing edge computing to reduce reaction time

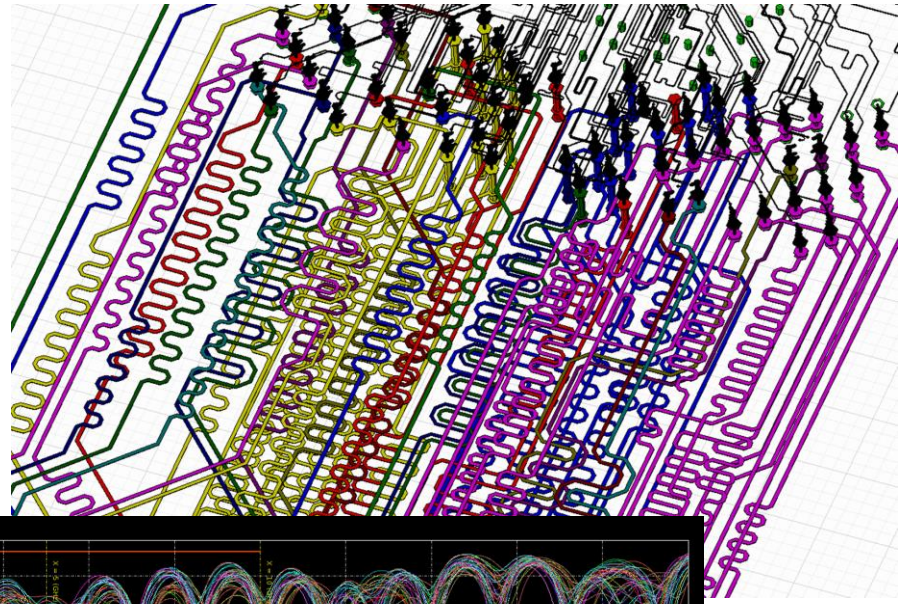
Fixed/Commercial latency: switches, networks

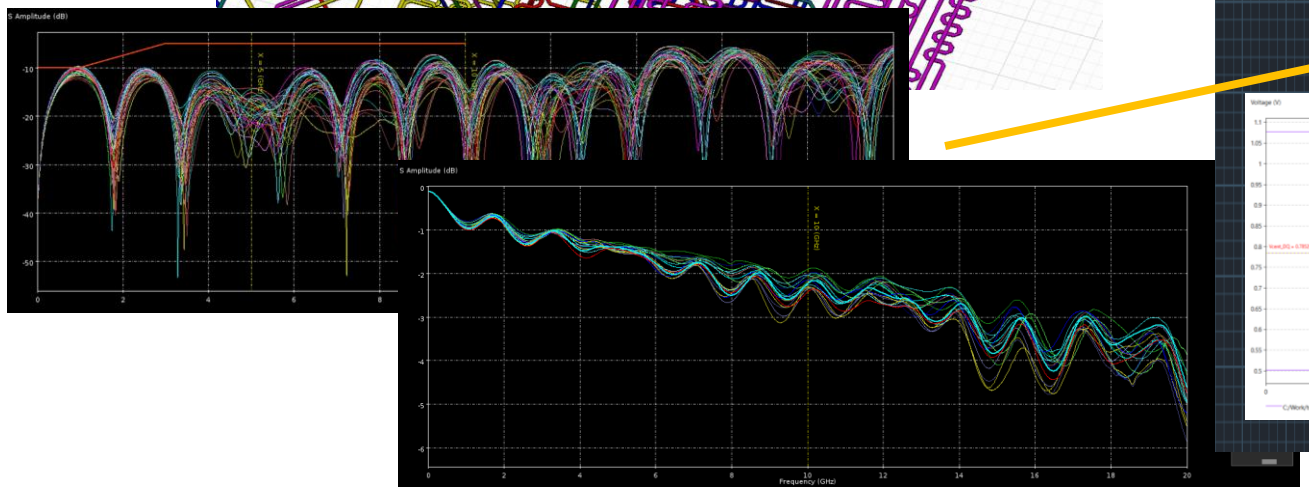


Source: Insights into Trading System Dynamics, Deutsche Börse Group, July 2021

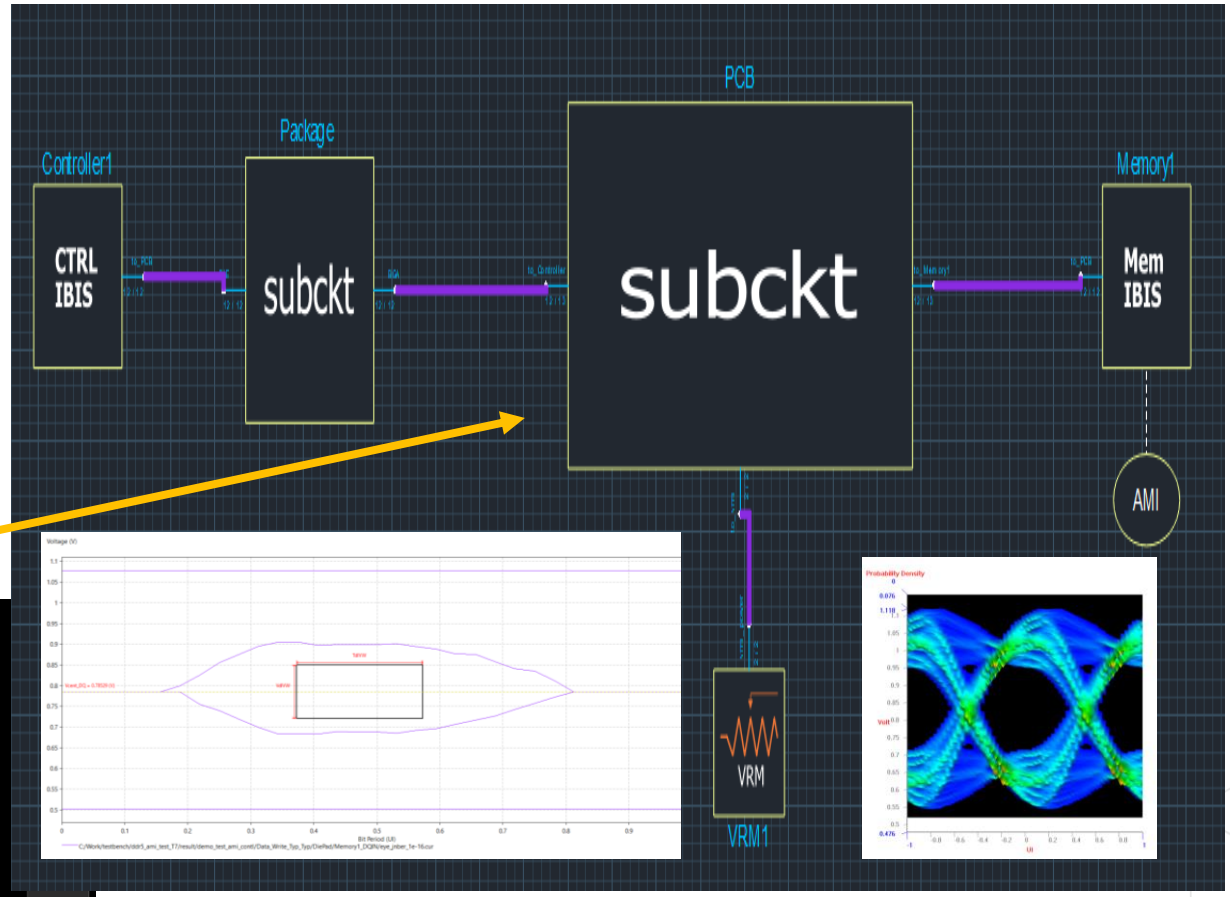
Cadence MSA/PCB Solution

- Full Wave 3D Extraction with Clarity



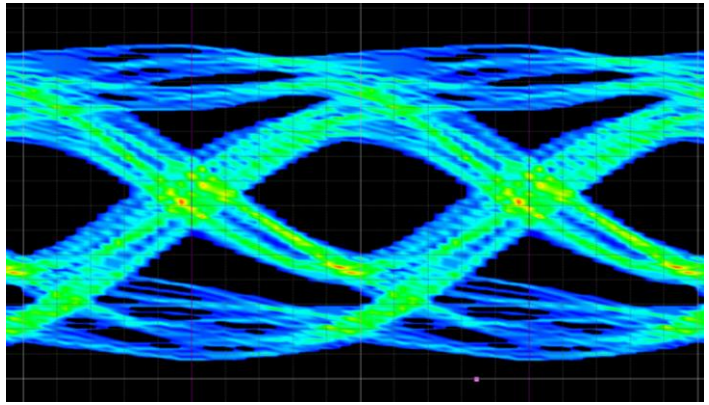


- Time Domain Simulation / Compliance Verification with SystemSI



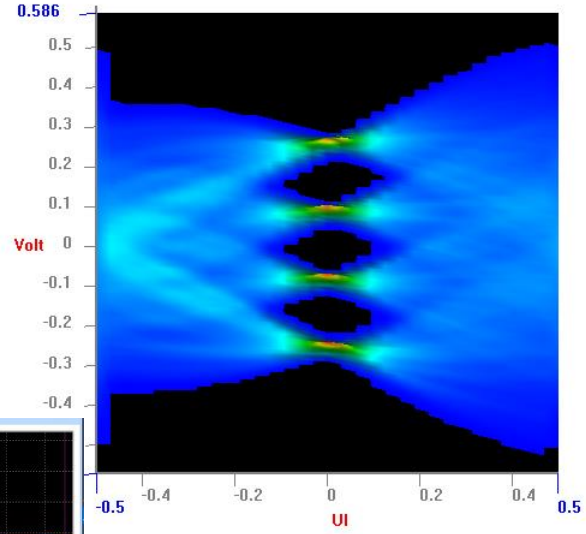
Innovations in High Speed Bus Design

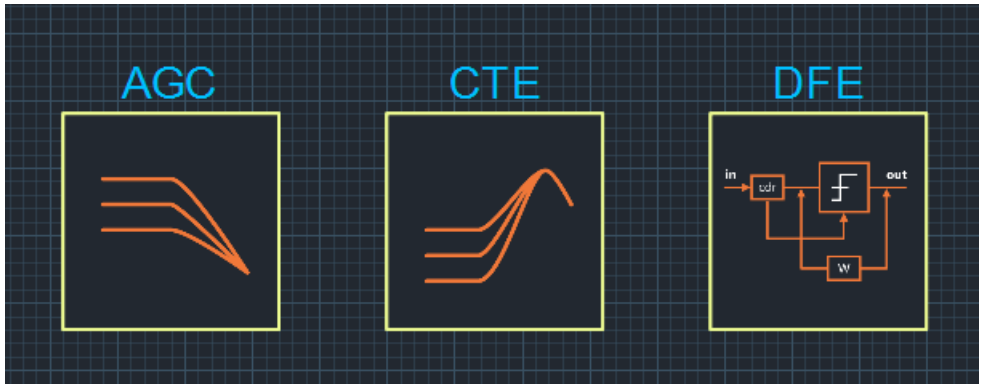
- Signal integrity is crucial
- Advanced equalization enabling major high speed data throughput
- Pulse Amplitude Modulation (PAM) signaling allows multiple bits per transmitted symbol



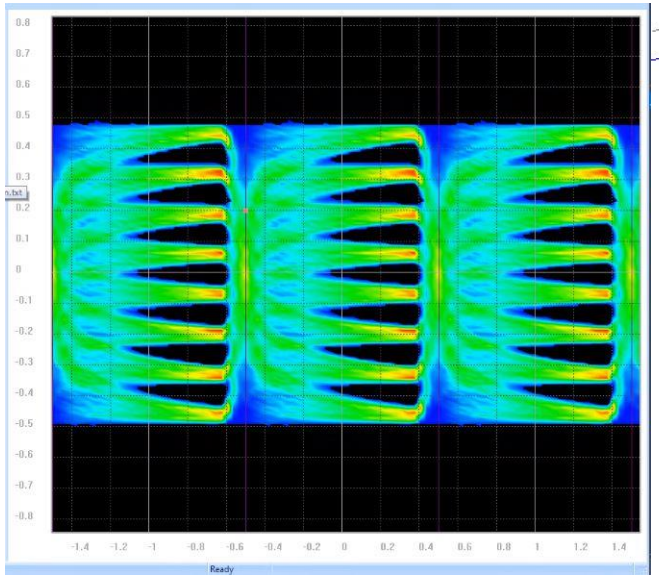
"PAM2" @ 16Gbps (GDDR6)

112Gbps PAM4 Signaling





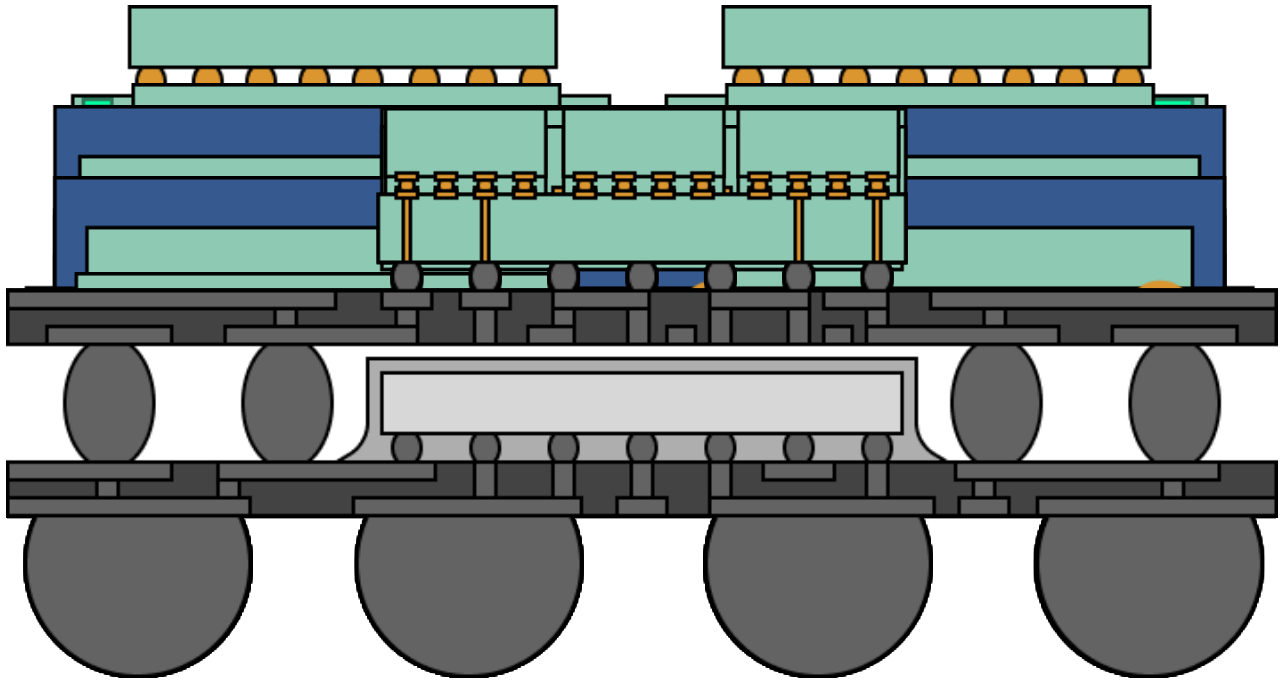
Advanced Equalization



PAM8 Signaling

Packaging Technology for Low Latency

- New packaging techniques reduce physical form factor, and associated interconnect delays
- Combinations of interposer, advanced package, and printed circuit board (PCB) technology are being rapidly adopted



Cadence: HFT Accelerator Partner

Contact us:
hft@cadence.com

Digital Design to Implementation

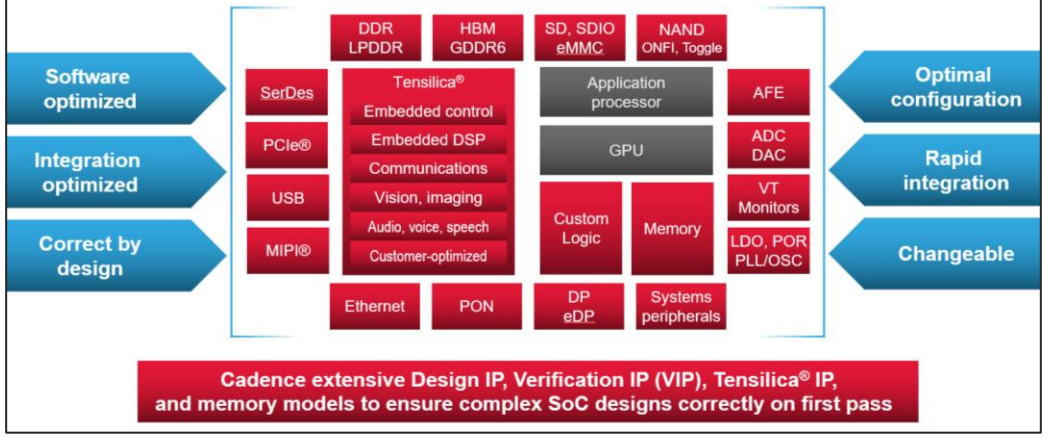
High Level Synthesis
Physical RTL Synthesis

Place and Route

- Liberate™
- Tempus™
- Voltus™
- Pegasus™
- Quantus™

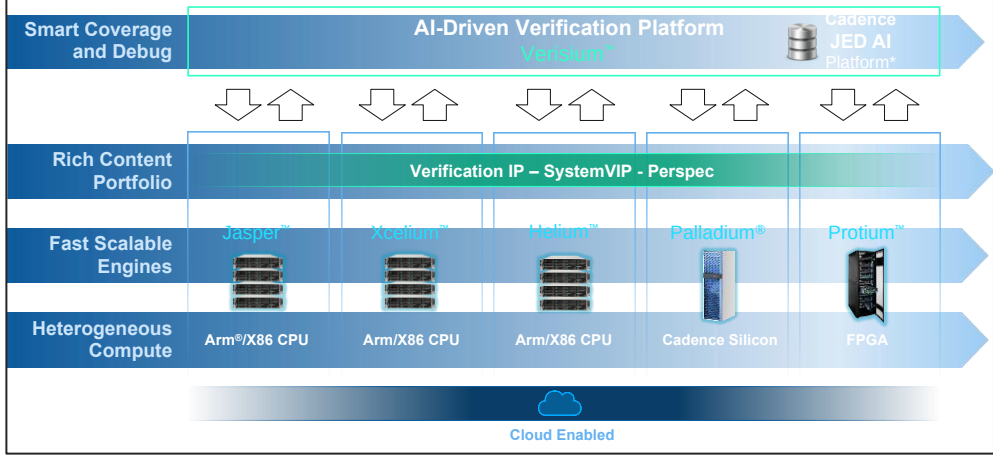
Cadence IP Solutions

Silicon-proven in advanced nodes



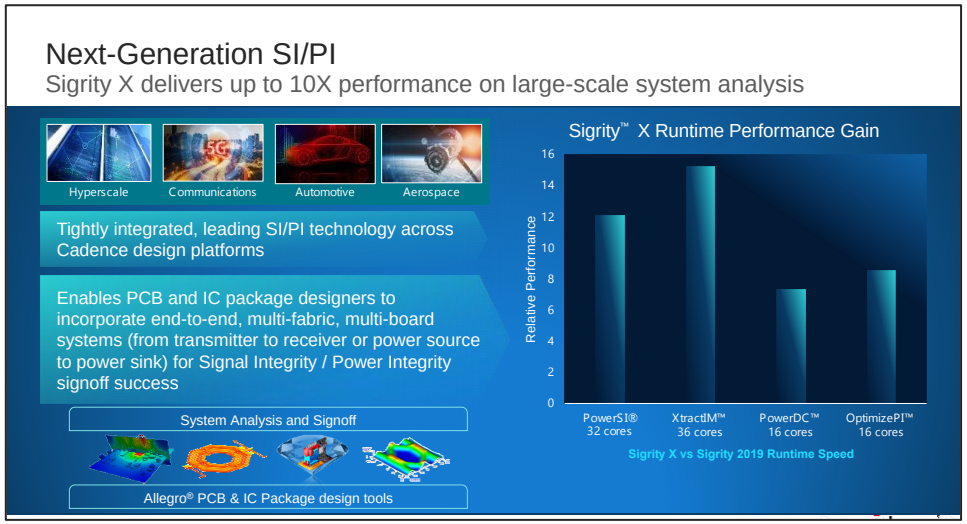
Cadence extensive Design IP, Verification IP (VIP), Tensilica® IP, and memory models to ensure complex SoC designs correctly on first pass

Cadence Verification Full Flow



Next-Generation SI/PI

Sigrity X delivers up to 10X performance on large-scale system analysis



- ASIC solution: Broadly adopted in high-speed comms and mission-critical applications
- High-performance IP: Proven in leading comms systems
- Tensilica® IP: Proven processor technology used in autonomous drive and other high-reliability apps
- Verification solution: Apply objective analysis to improve FPGA and prepare for ASIC
- High-speed PCB: Integrated Multiphysics Systems Analysis (SI/PI/Thermal)
- Services: Expert RTL to GDS design services