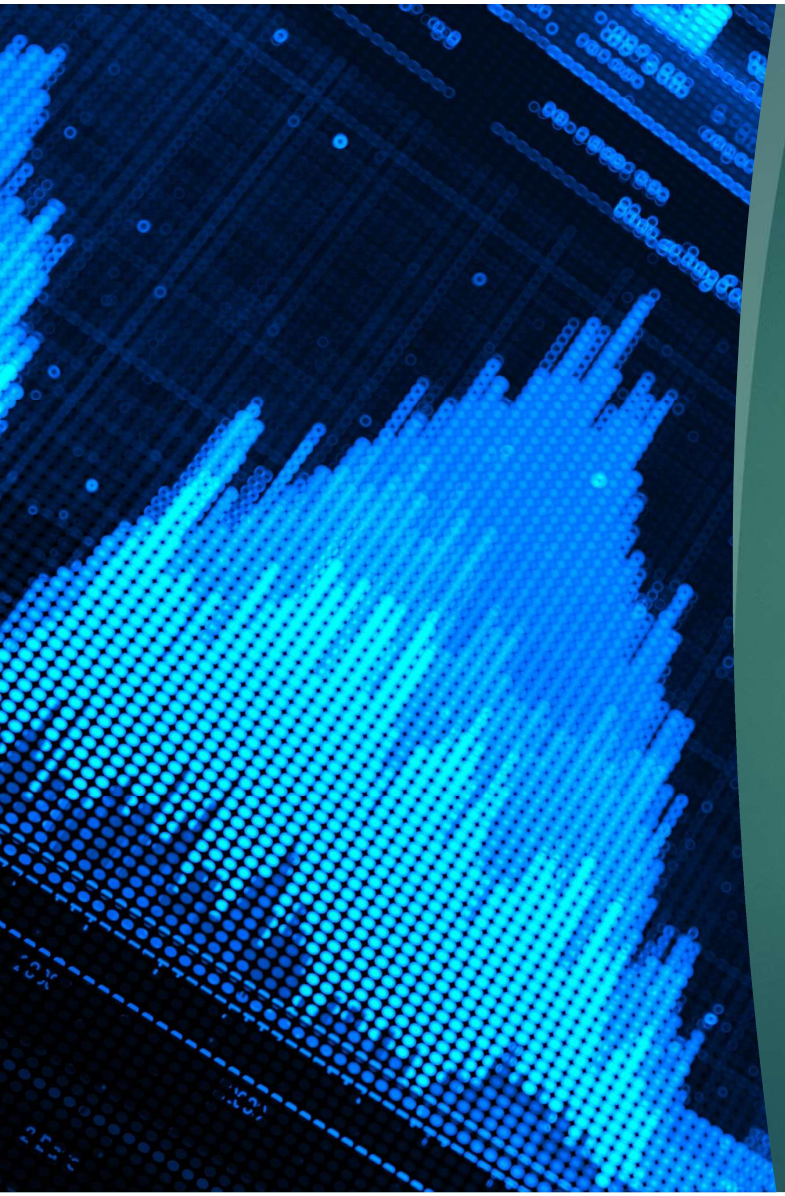


Overview of Allegro IDA and Optimality Explorer

EXPLORING ADVANCED TOOLS FOR DATA ANALYSIS AND OPTIMIZATION

Outline

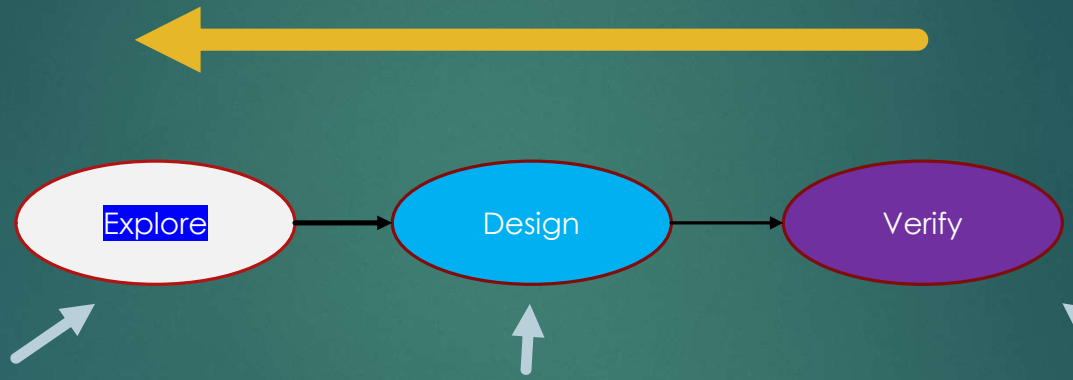
- Why IDA….shift left
- What is IDA (In Design Analysis)
- How can IDA improve you designs and speed up time to market
- Optimality how can this optimize your design with AI

Why IDA
To Constrain or Not To Constrain

- Constraint driven design is the backbone of any solid design methodology
  - Focus is on finding and resolving violations
    - Traditionally involves Constraint Manager and DRC Markers
    - Existing options for Impedance, Coupling and Return Path
  - Rules are required
    - But may be a hinderance to starting any kind of analysis
- Screening Analysis also has a place
  - Rules are not required
    - Easier to get a snapshot of the entire design or any portion
  - Focus is on result viewing
    - New Analysis Workflows offer new methodologies to enhance existing design flows

Problem Statement

- With time-to-market, cost, and performance pressures, system designers are seeking a "shift left" to streamline their methodologies



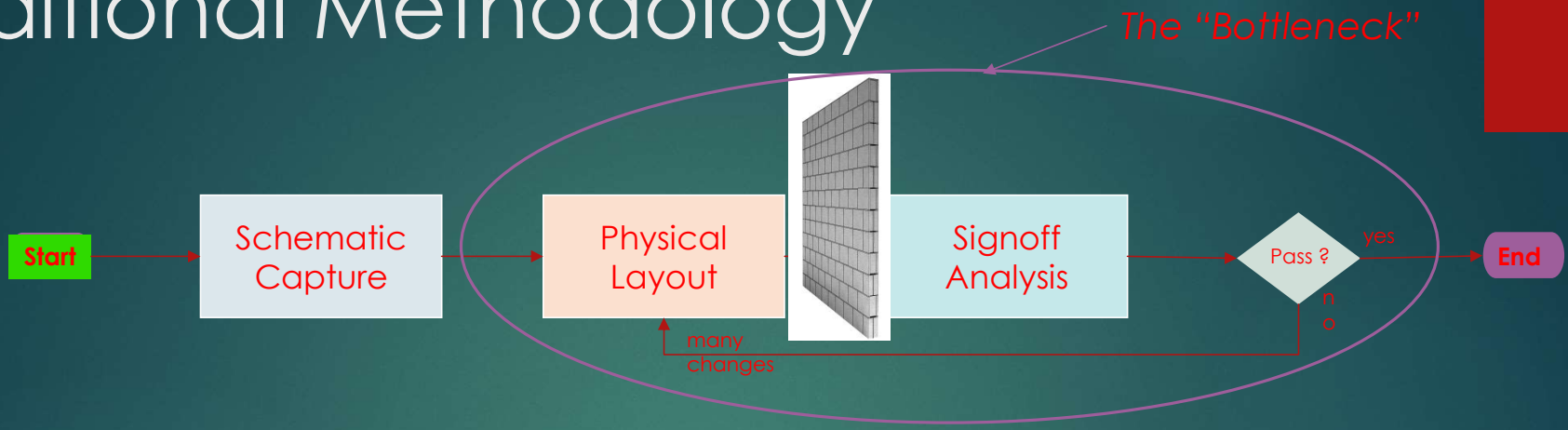
The best opportunity to avoid problems in the first place

Most efficient stage to find and fix design problems

Most expensive stage to find and fix problems

Must move beyond just post-layout verification
Accomplishing this involves tools, methodology, and some re-thinking of organizational roles

Traditional Methodology



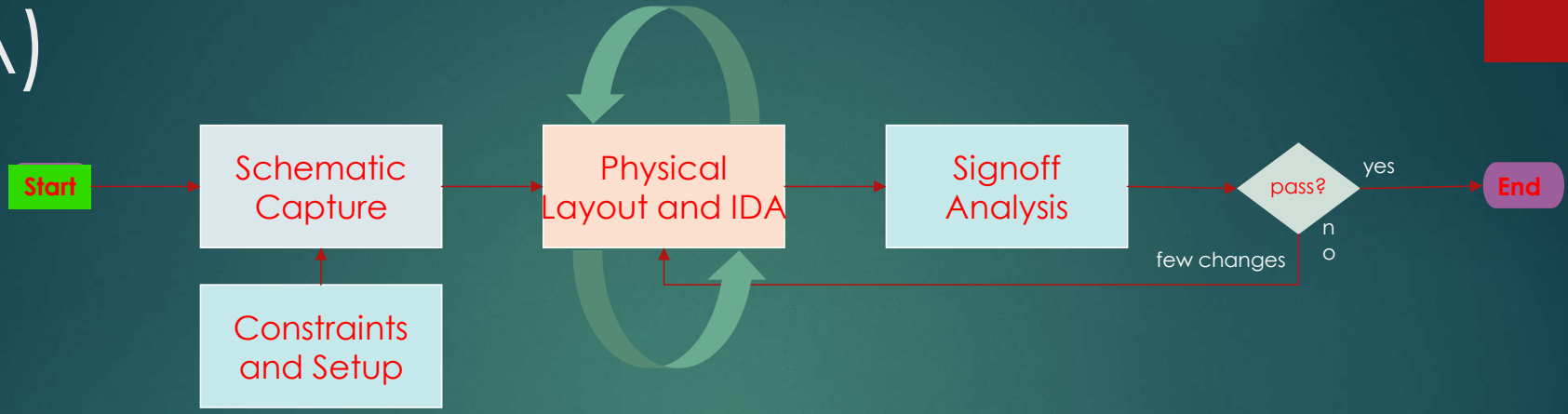
- Physical layout goes "over the wall" to analysis expert
- Eventually some requested changes go back to layout designer
- Changes get manually implemented; issues resolved?
- Back over the wall the layout goes
- Inefficient:
  - Multiple iterative loops, disrupting schedule
  - Manual changes
  - Across organizations
  - Bottlenecked by Analysis Expert resources

Design Engineer

Layout Designer

Analysis Expert

Methodology with In-Design Analysis (IDA)



- The design engineer and analysis expert provide constraints and analysis setup before the physical layout
- Layout designer empowered with actionable, real-time analysis feedback in their native environment, where they can quickly make edits and re-analyze independently
- Fewer issues at the signoff stage
- Efficiency goes up and schedule compresses

Design Engineer

Layout Designer

Analysis Expert

Collaboration and Workflow

Collaborative Design Environment

Multi-Stakeholder Participation

Allegro IDA enables multiple stakeholders to actively participate in the collaborative design process.

Real-Time Feedback

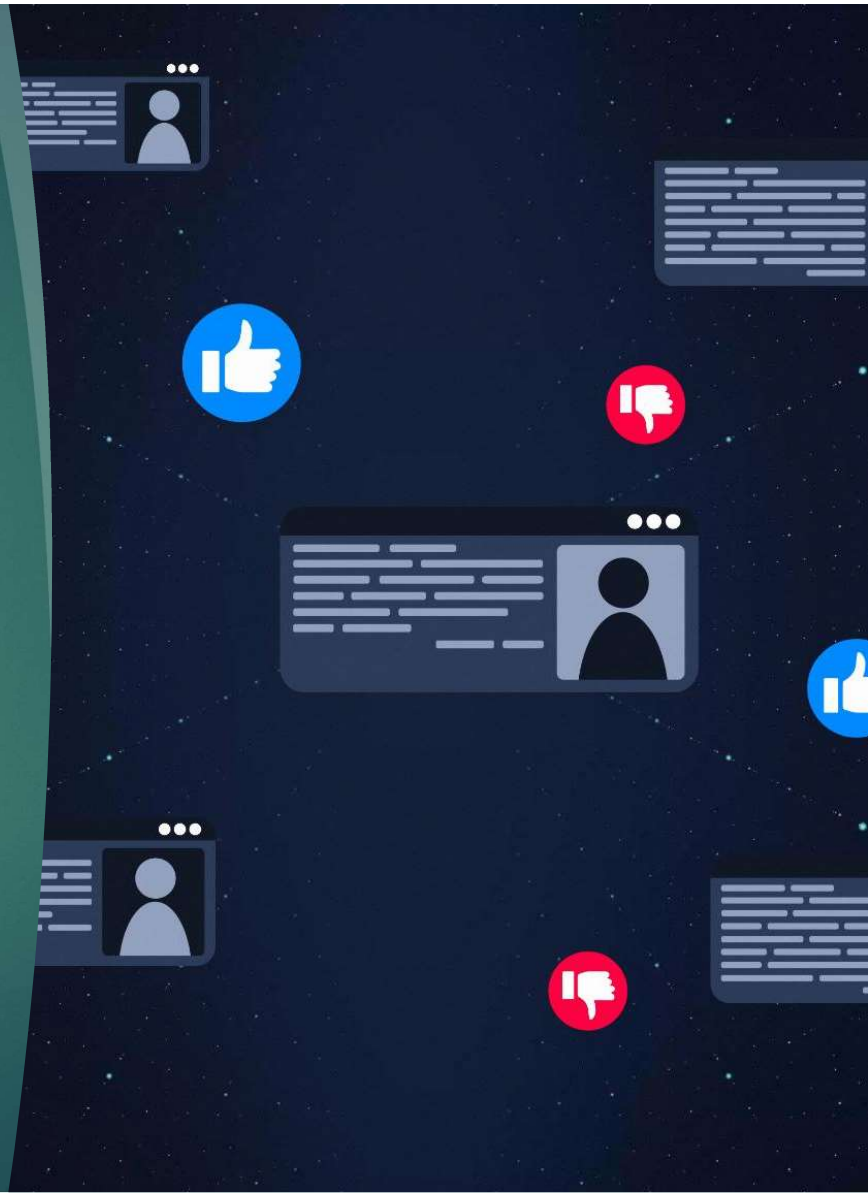
Real-time feedback and shared analysis results enhance communication and decision-making among team members.

Integrated Communication Tools

Integrated communication tools streamline teamwork and ensure alignment for higher quality designs.

Seamless Workflow Integration

The workflow supports seamless integration with other platforms, boosting overall project efficiency.



Collaboration and Workflow

Workflow Integration and Benefits

Seamless Workflow Integration

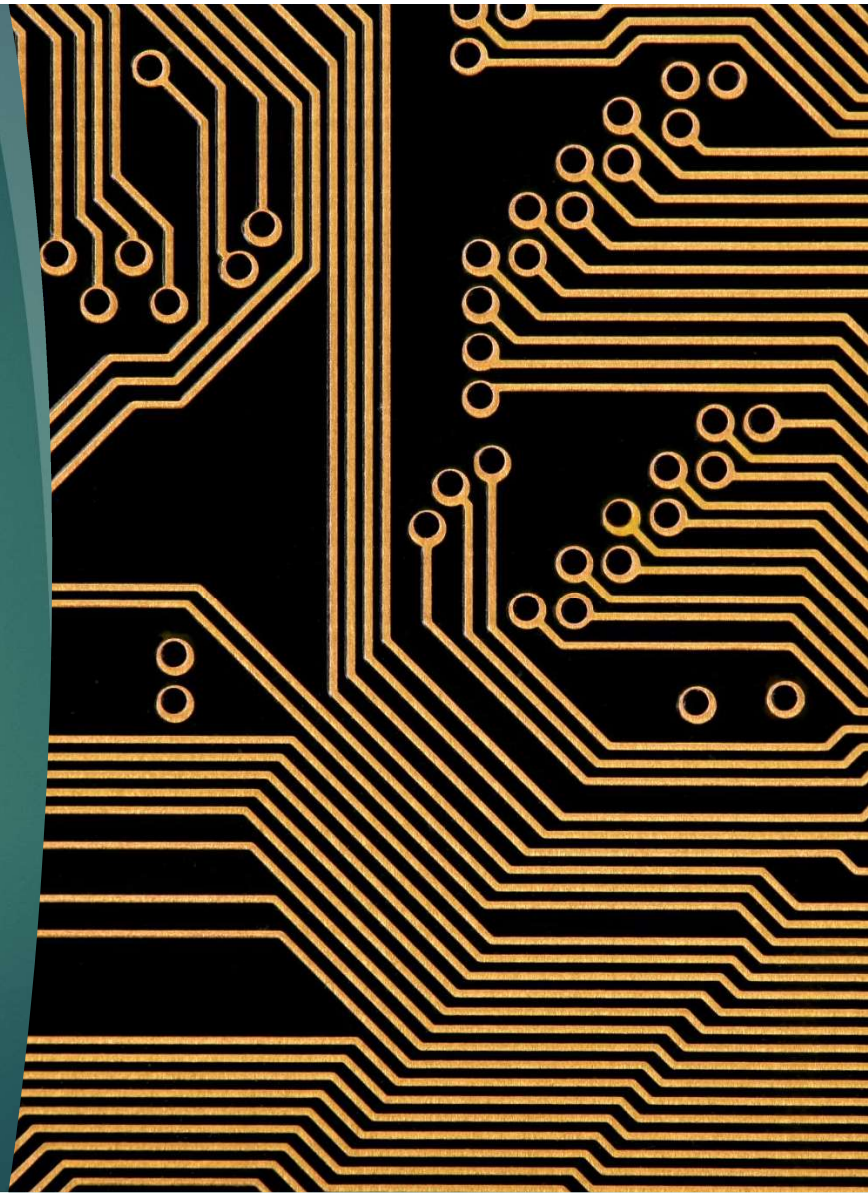
Integration facilitates smooth transitions between design, analysis, and optimization phases, streamlining the overall process.

Error Reduction and Efficiency

Reducing manual effort and errors accelerates the design cycle and improves overall productivity and accuracy.

Comprehensive EDA Solution

Supports schematic capture, layout design, and system-level optimization for a complete electronic design automation workflow.



Why Use IDA

Real-Time Analysis

IDA provides real-time analysis, allowing designers to detect and solve issues during the design process promptly.

Integrated Checking

The tool offers integrated checking capabilities that improve design quality by identifying problems early.

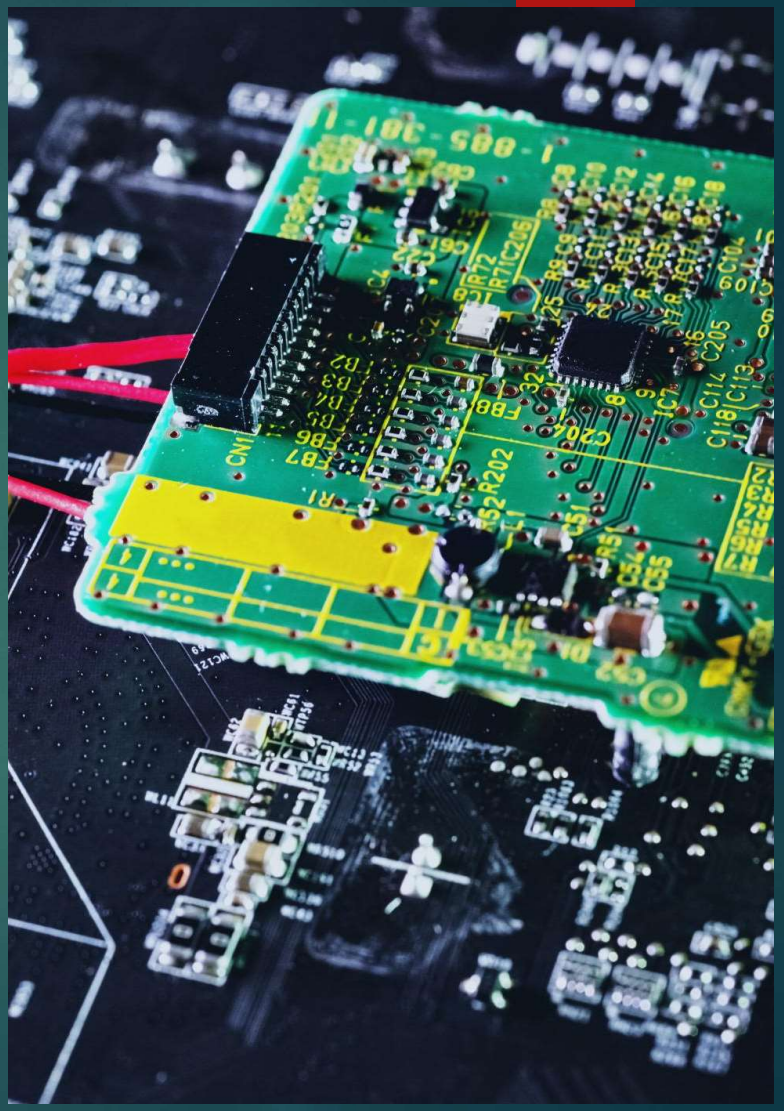
Enhanced Collaboration

IDA enhances team collaboration by seamlessly integrating with other design tools and supporting communication.

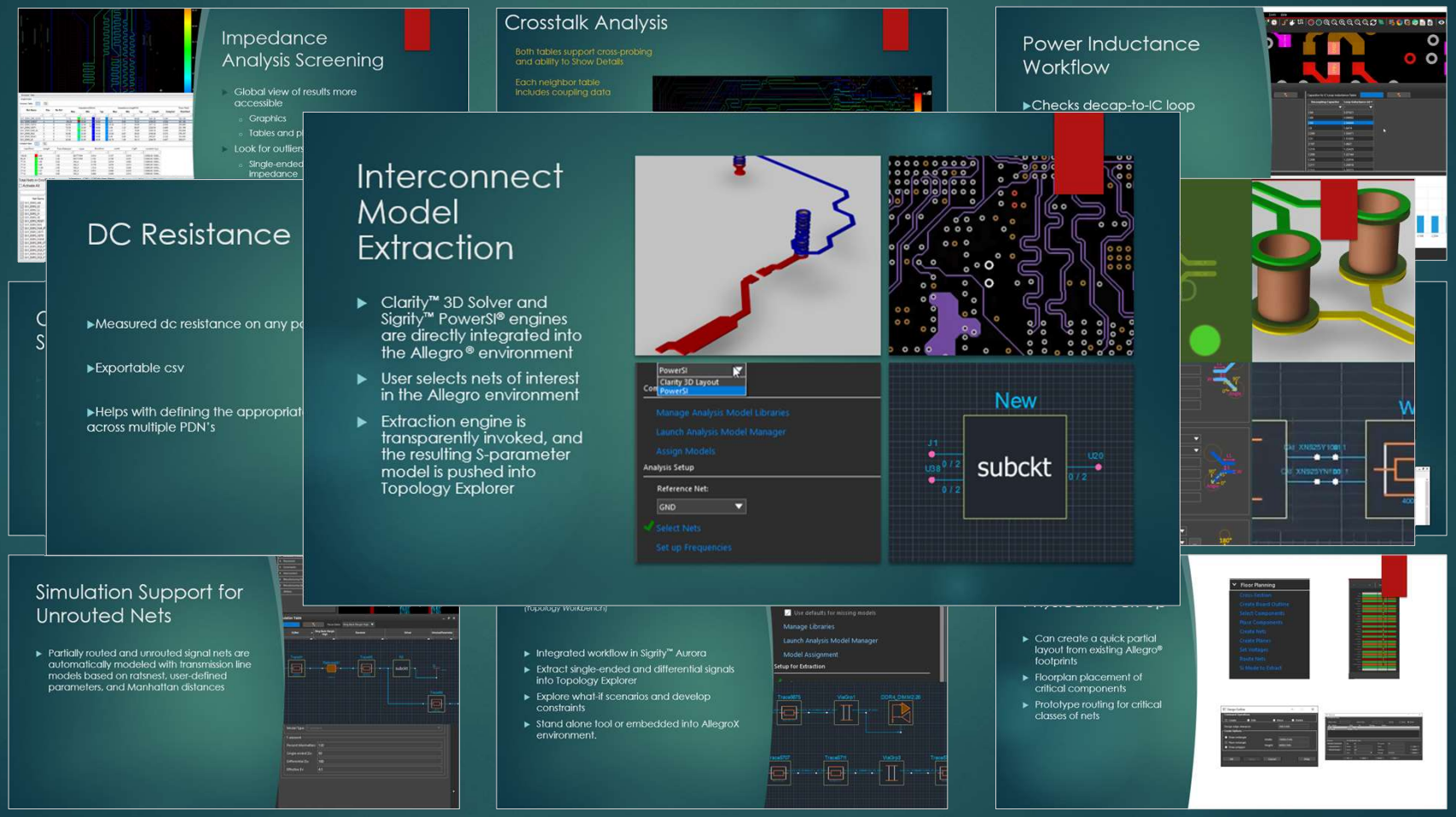
Supports Various Analyses

It supports multiple analysis types like signal and power integrity, ensuring comprehensive design validation.

IDA Features and Flows



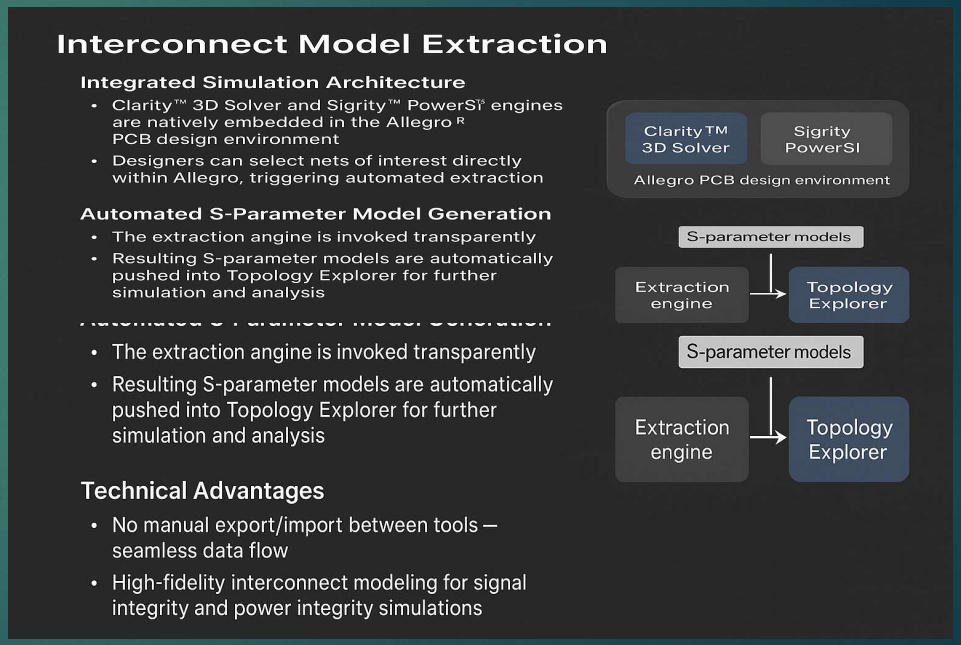
Aurora IDA workflows



IDA Features and Flows

Interconnect Model Extraction

- Integrated Simulation Architecture
  - Clarity™ 3D Solver and Sigrity™ PowerSI® engines embedded in Allegro® PCB design environment
  - Direct net selection within Allegro triggers automated extraction
- Automated S-Parameter Model Generation
  - Transparent invocation of extraction engine
  - S-parameter models pushed into Topology Explorer for simulation
- Technical Advantages
  - Seamless data flow between design and analysis tools
  - High-fidelity interconnect modeling
  - Accelerated design validation

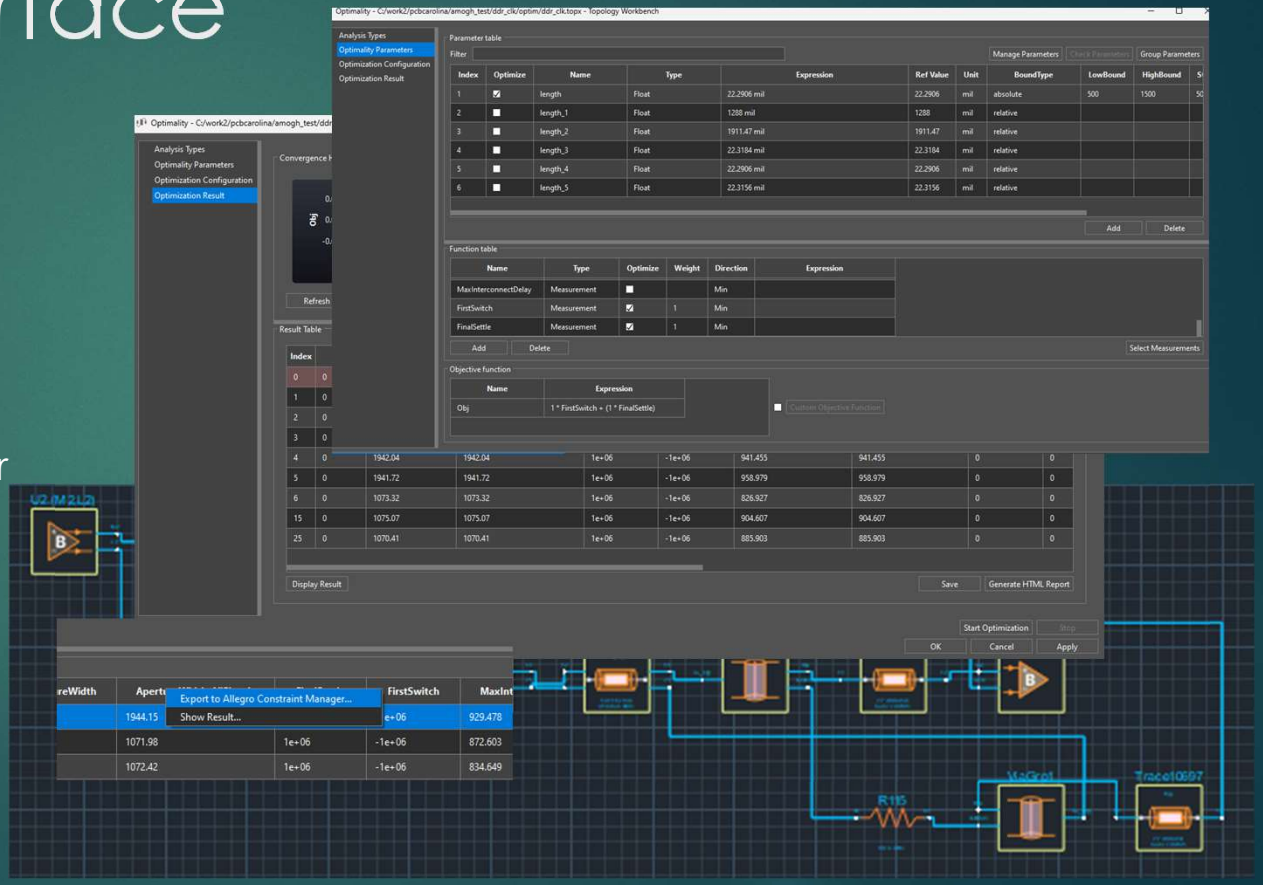


Topology Workbench and Optimality interface

Optimized simulation based upon defined criteria. Using an AI agent to help pick most optimum simulation and results

This could help predict and produce constraints based up your extracted nets in simulation.

Cut detailed simulation sweeps down by 100x



Optimization Workflows

Comprehensive System Design

Optimization workflows address thermal management, signal integrity, and mechanical constraints in system design.

Guided Problem Solving

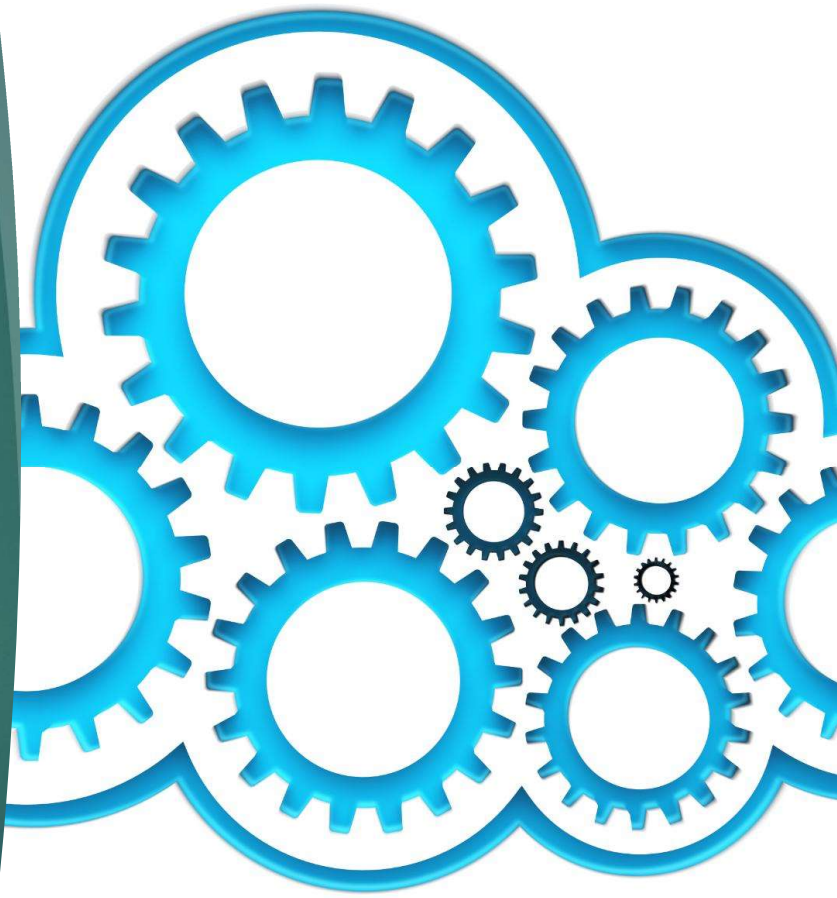
Workflows assist users in identifying issues, evaluating alternatives, and implementing effective solutions.

Iterative Optimization

The tool supports continuous improvement through iterative optimization and refinement processes.

Enhanced Performance and Reliability

Following optimization workflows leads to optimal product performance and enhanced reliability.



System Design Strategy

Strategic Planning in Design

System design strategy involves careful planning and execution to meet defined project goals effectively.

Optimality Explorer Benefits

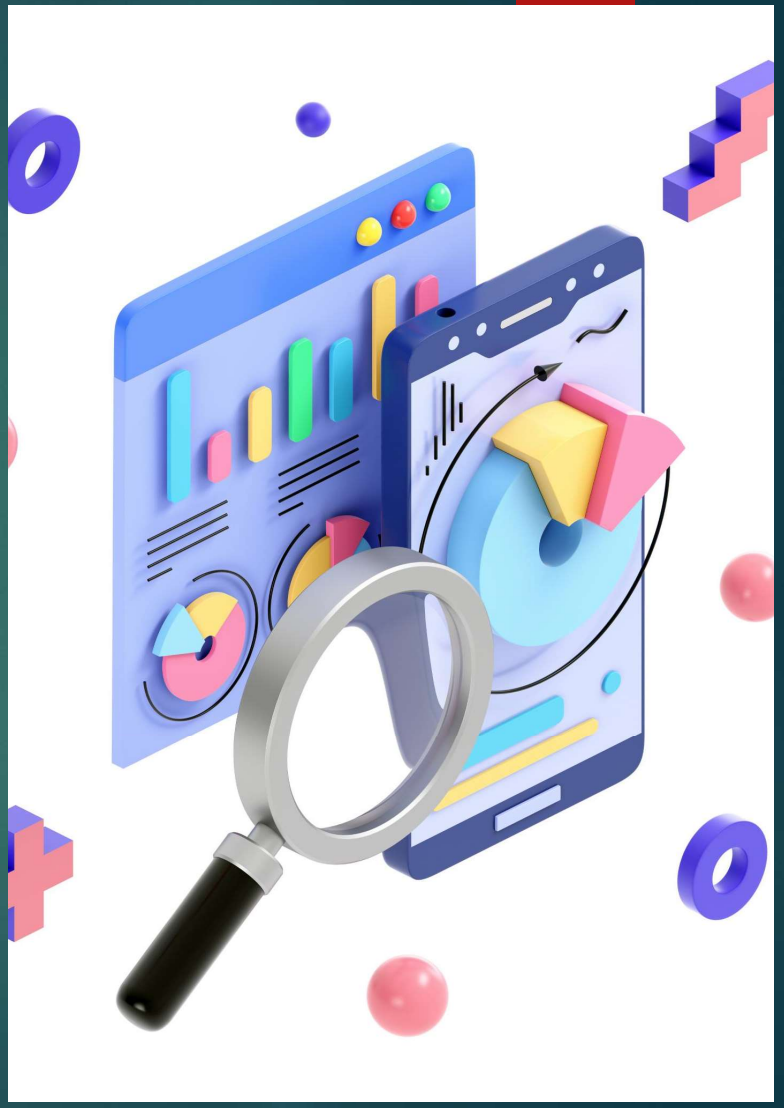
Optimality Explorer aids in strategic decisions by revealing design trade-offs and key performance metrics.

Alignment with Objectives

The tool helps align design choices with project goals to ensure all requirements are fulfilled.

Improved Outcomes

A well-defined strategy increases efficiency, reduces risks, and improves overall design results.



Overview of Optimality Explorer

Advanced Algorithm Optimization

Optimality Explorer uses cutting-edge algorithms to enhance system design strategies efficiently.

Multi-Discipline Support

Supports optimization workflows across thermal, mechanical, and electrical system analyses.

Actionable Insights and Recommendations

Provides clear insights and design recommendations to guide informed decision-making.

User-Friendly Interface

Features an intuitive interface that enhances user experience and accessibility in design workflows.

Optimality Explorer and Future Directions

Future Directions and Innovations

AI Integration Enhancement

Enhanced AI integration aims to improve analysis and design optimization in Allegro IDA and Optimality Explorer.

Expanded Analysis Capabilities

Expanding analysis capabilities enables deeper insights into design performance and problem-solving.

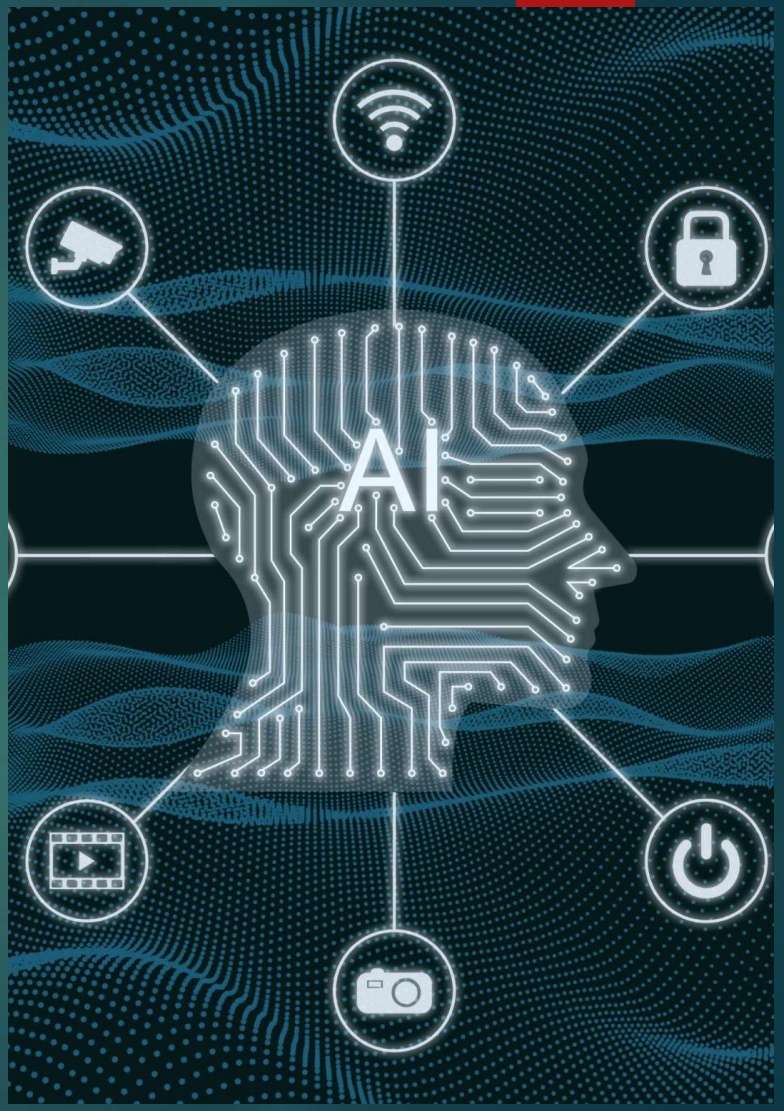
Improved User Interfaces

Improved user interfaces streamline workflows and enhance user experience for designers.

Automation and Workflow Streamlining

Innovations focus on increasing automation to speed up processes and improve product delivery time.

Optimality Explorer and Future Directions



Overview of Allegro IDA & Optimality Explorer

Integrated Analysis

Real-time SI/PI checks within PCB design

Correct-by-Design

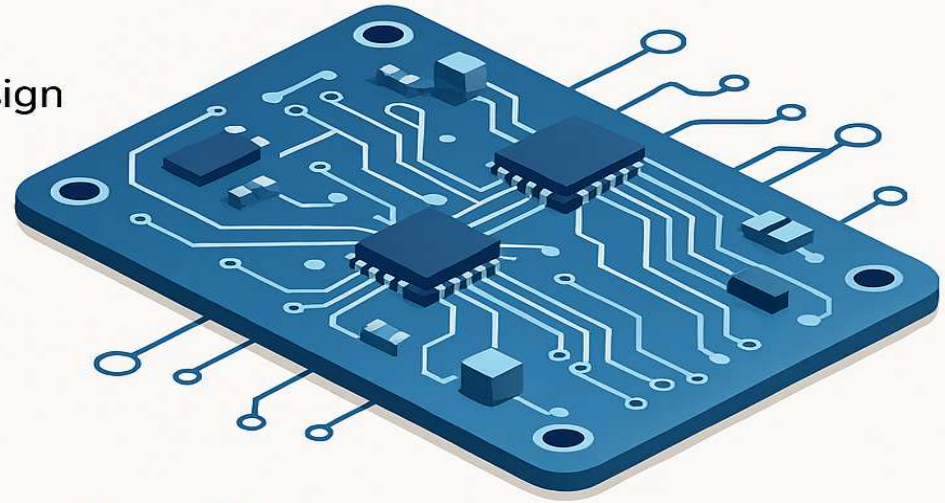
Embedded verification reduces errors early

Collaboration

Multi-stakeholder workflows with real-time feedback

Optimization

Intelligent algoritons for thermal, mechanical, electrical design



Benefits

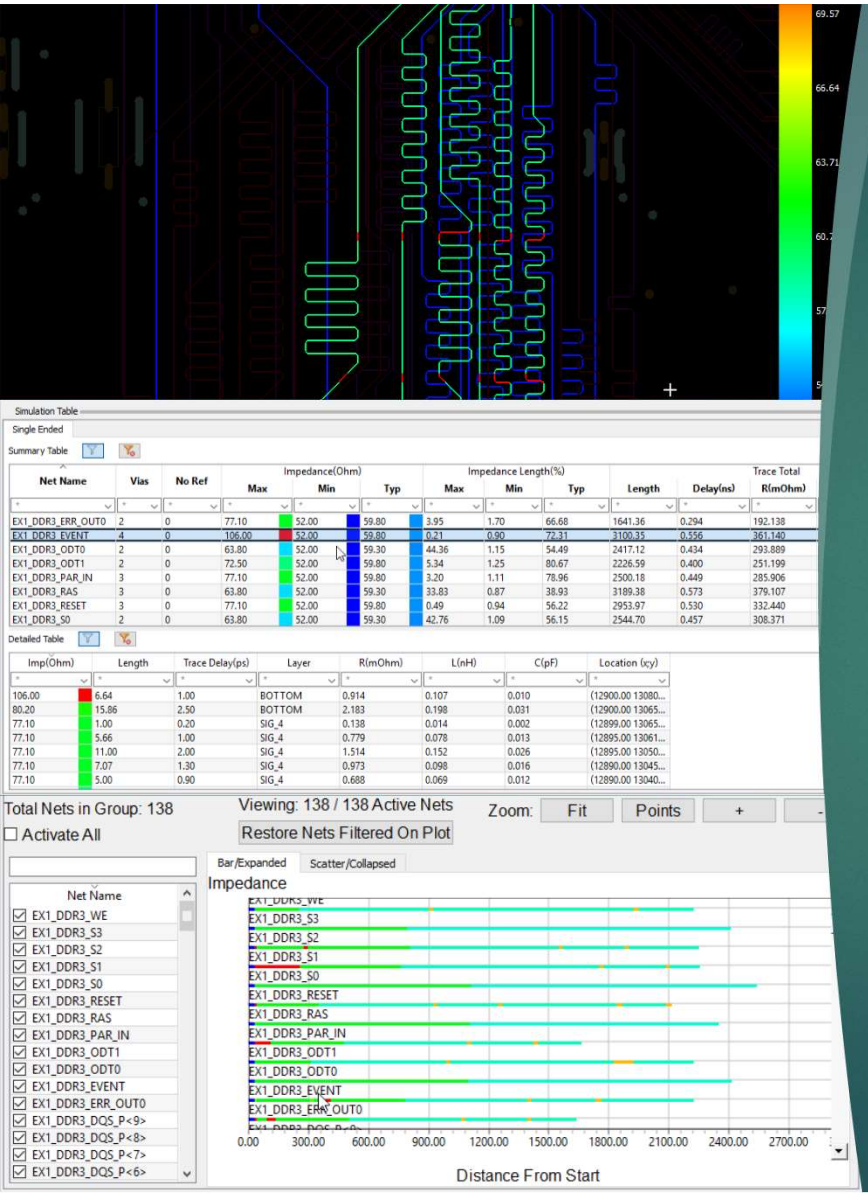
Faster cycles, fewer errors

Improved design quality

Future

AI integration

Expanded analysis

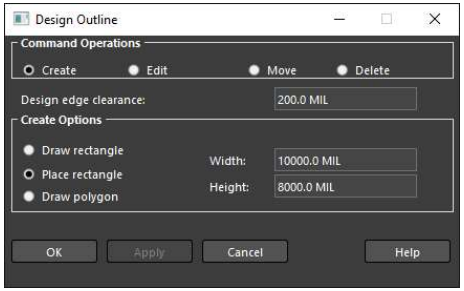


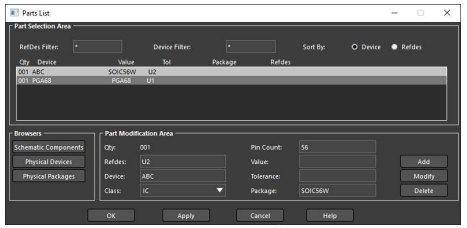
Impedance Analysis Screening

- Global view of results more accessible
  - Graphics
  - Tables and plots
- Look for outliers
  - Single-ended and differential impedance

Easily Create a Physical Mock-Up

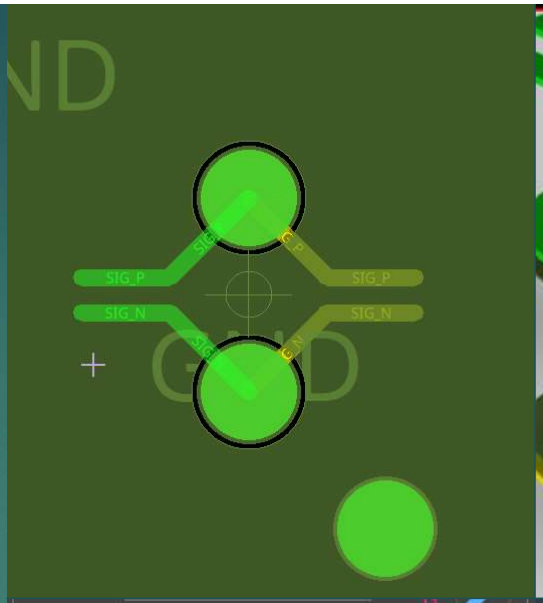
- Can create a quick partial layout from existing Allegro® footprints
- Floorplan placement of critical components
- Prototype routing for critical classes of nets

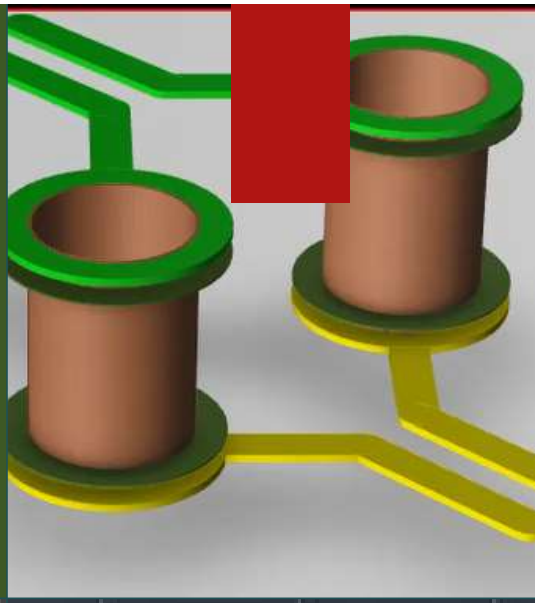


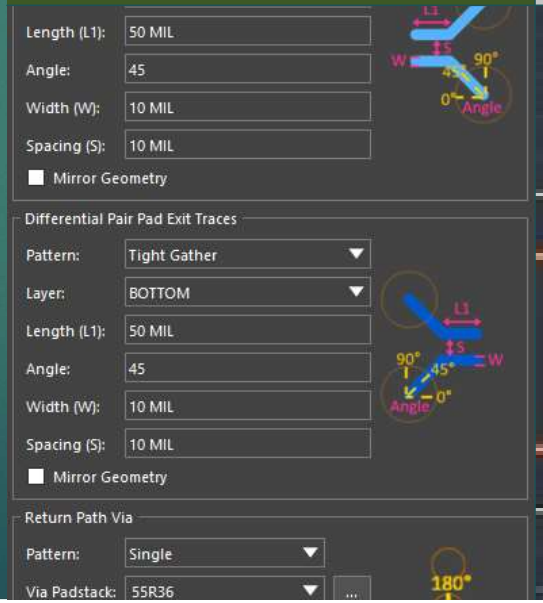


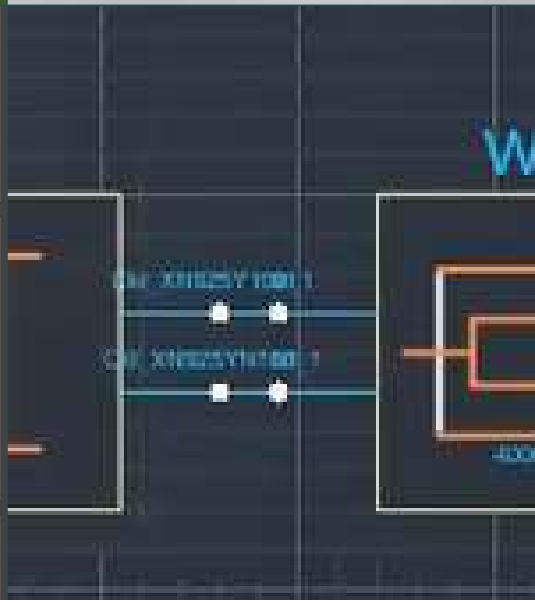
Via Wizard

- Topology Explorer via block
- Allegro® Via Generation
- Clarity™ Solver



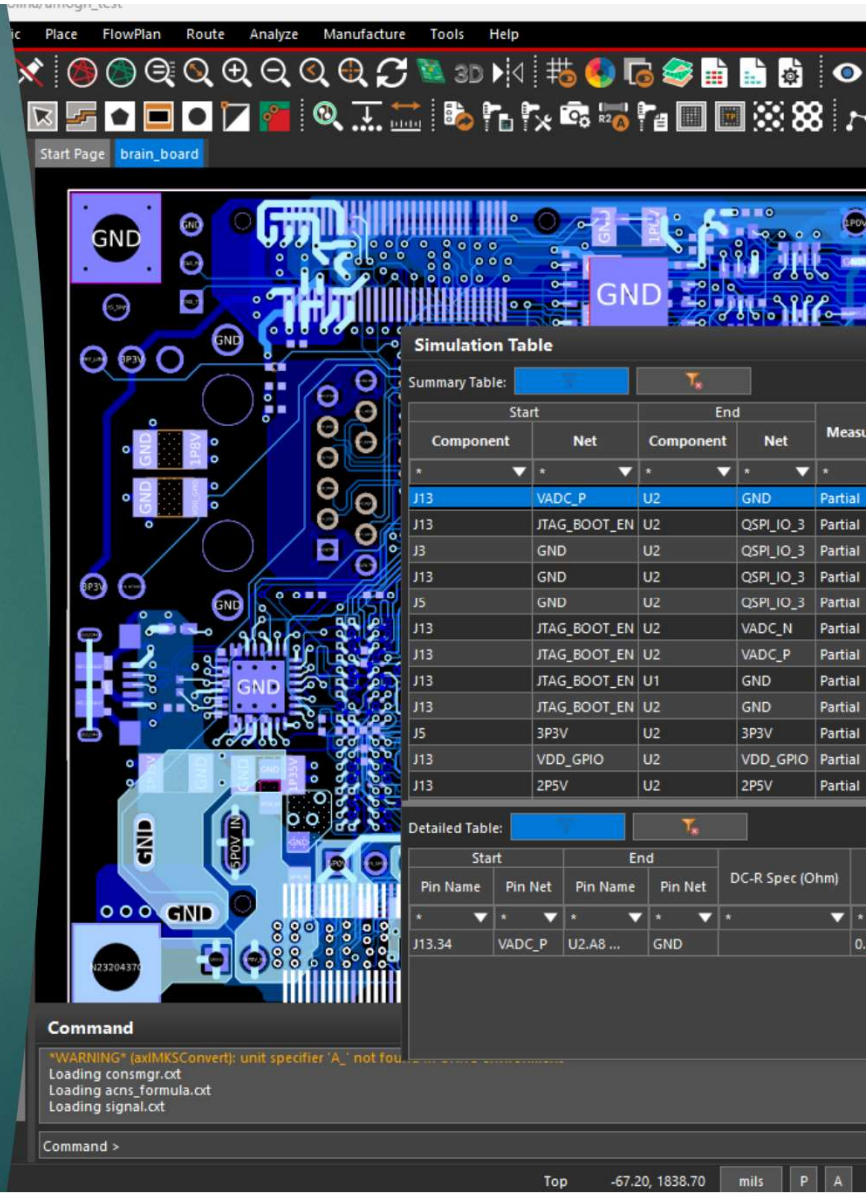






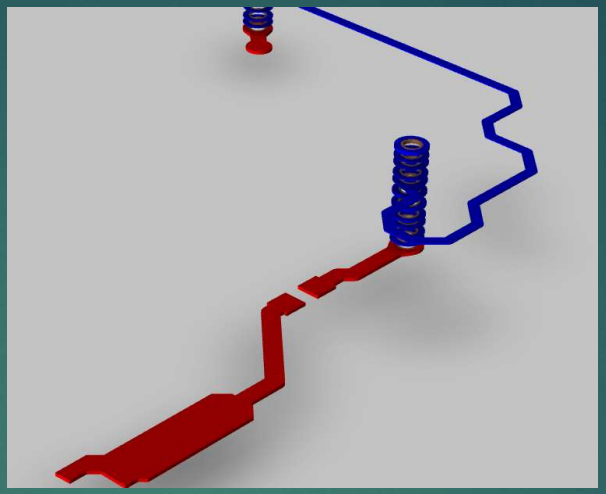
DC Resistance

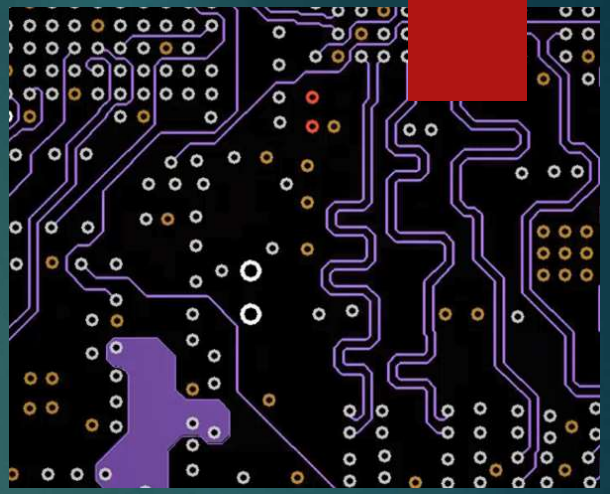
- Measured dc resistance on any power net/plane
- Exportable csv
- Helps with defining the appropriate power delivery across multiple PDN's

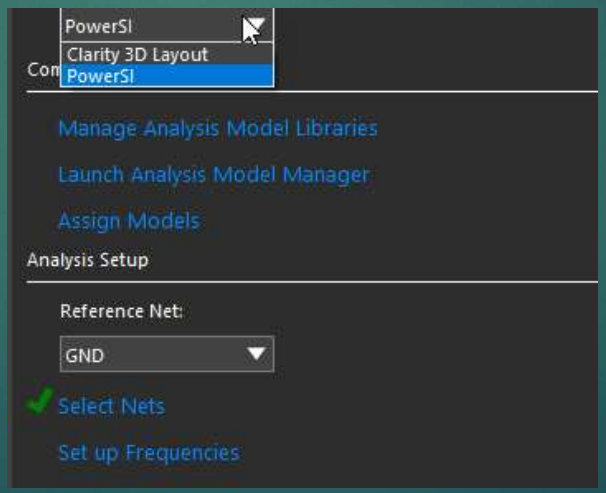


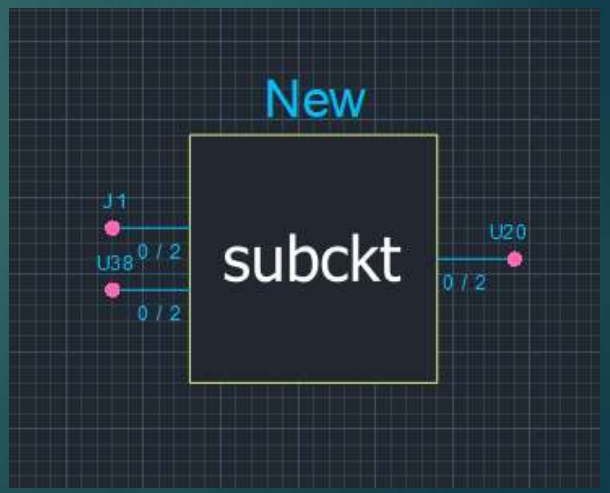
Interconnect Model Extraction

- Clarity™ 3D Solver and Sigrity™ PowerSI® engines are directly integrated into the Allegro® environment
- User selects nets of interest in the Allegro environment
- Extraction engine is transparently invoked, and the resulting S-parameter model is pushed into Topology Explorer



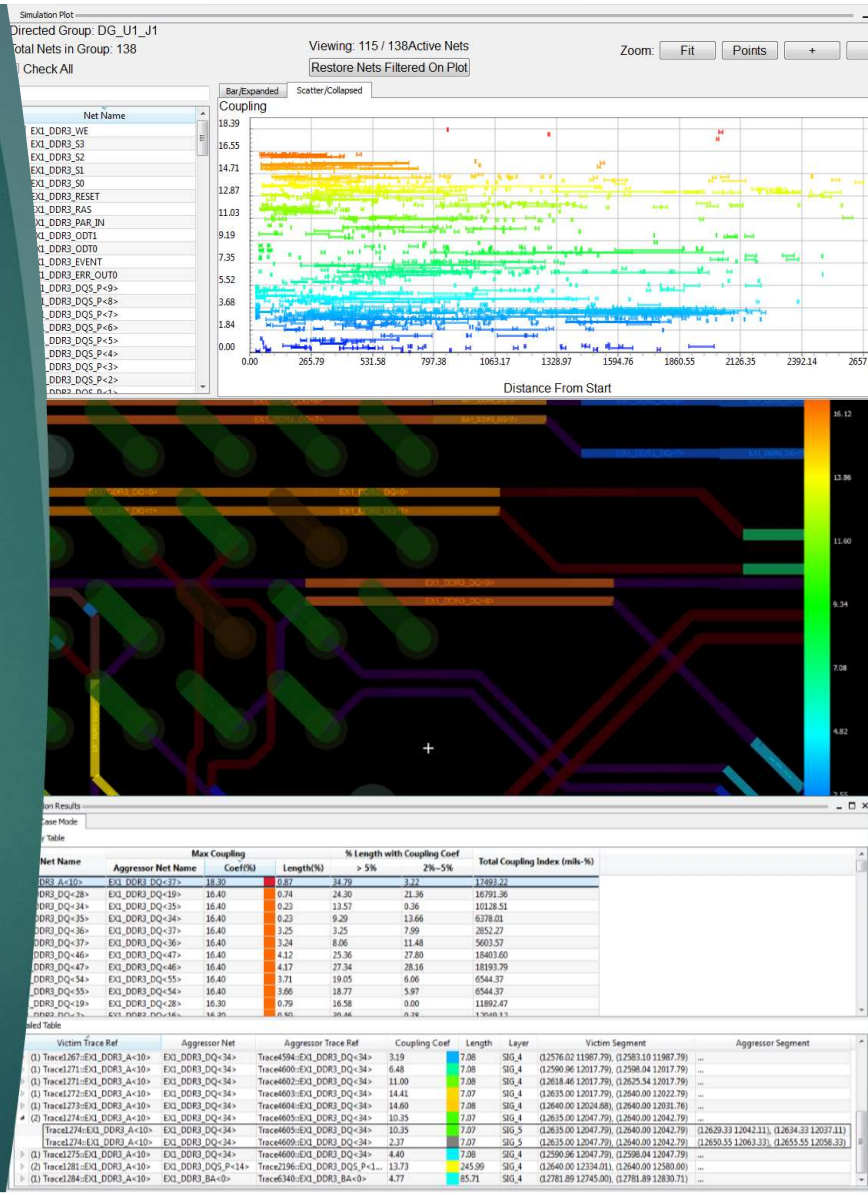






Coupling Analysis Screening

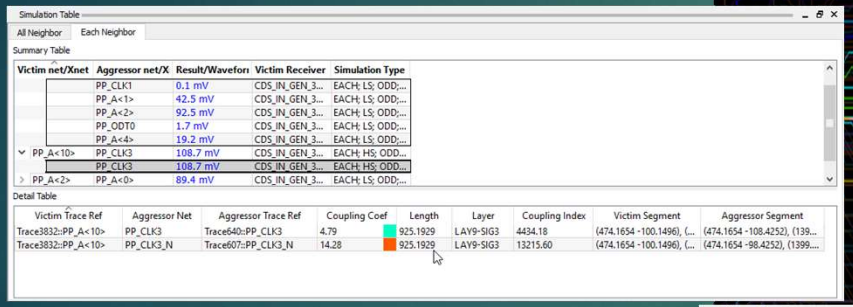
- No SI models required
- Electrical coupling is more accurate than geometrical methods
- Global view of results
  - Graphics
  - Tables and plots

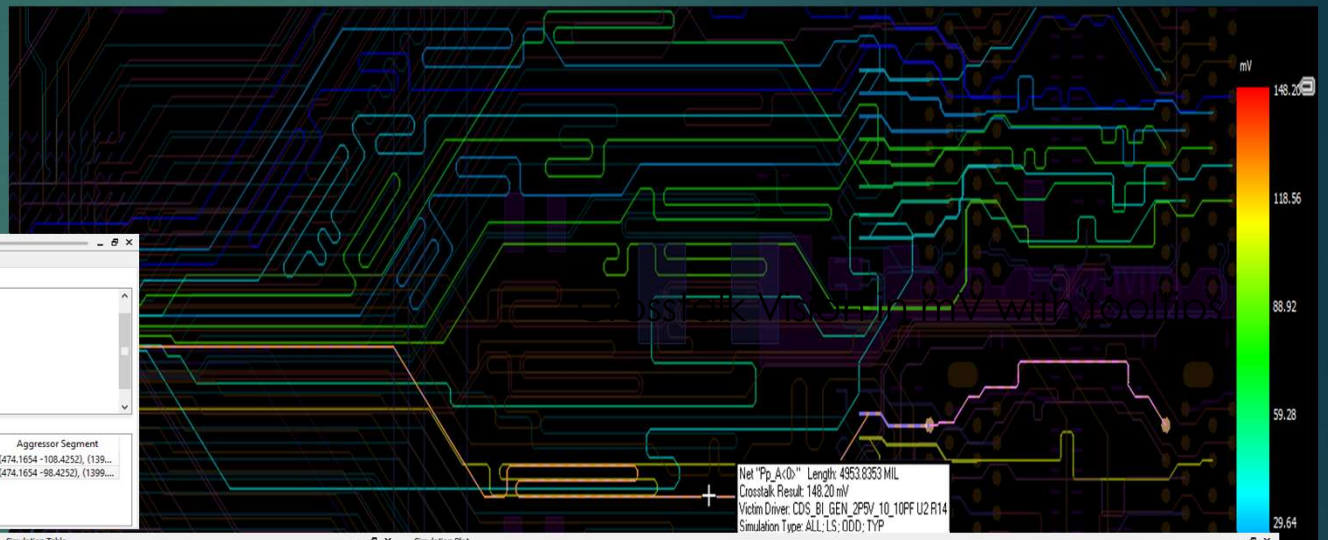


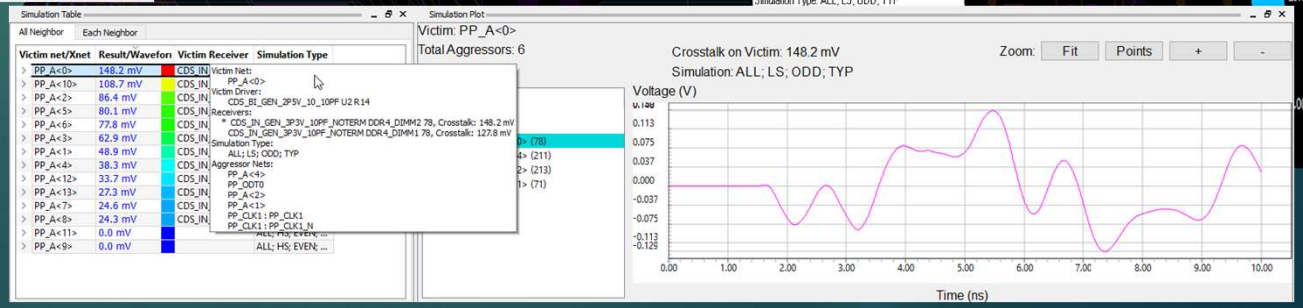
Crosstalk Analysis

Both tables support cross-probing and ability to Show Details

Each neighbor table includes coupling data



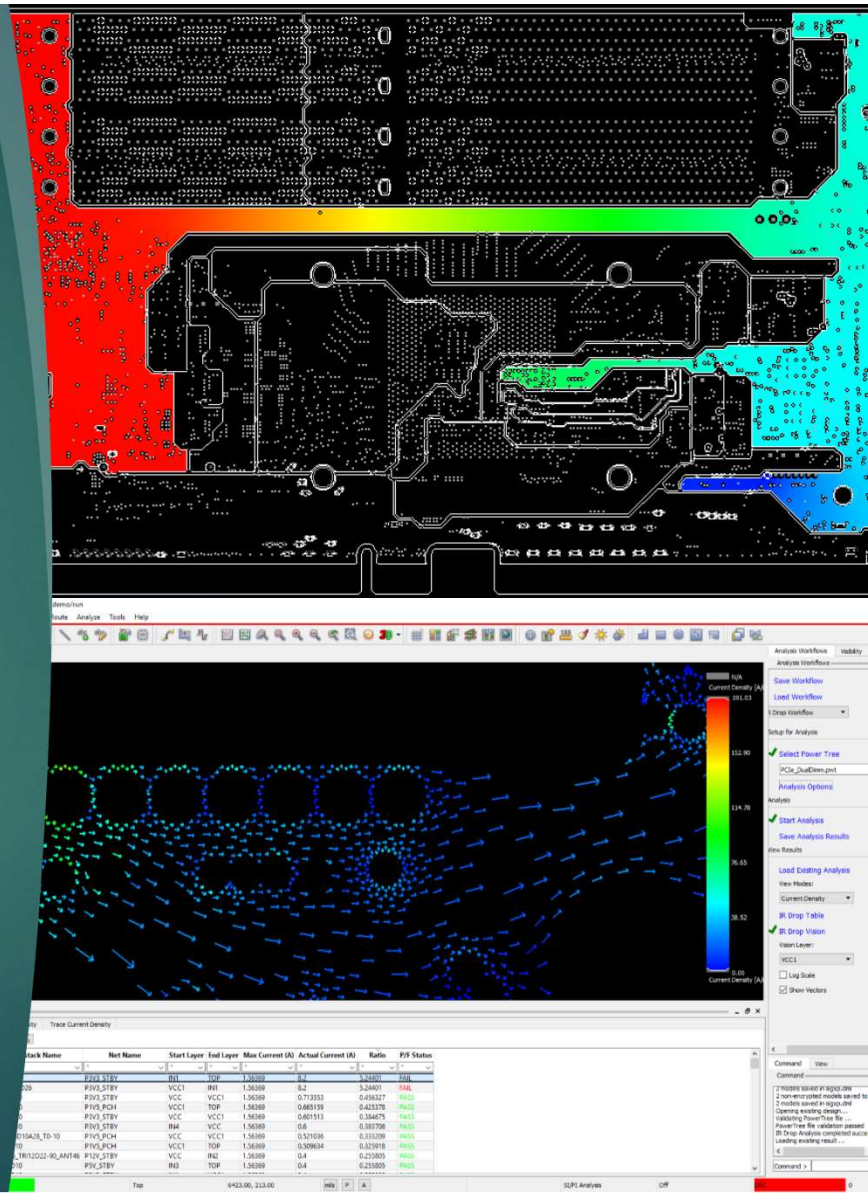




IR Drop Analysis

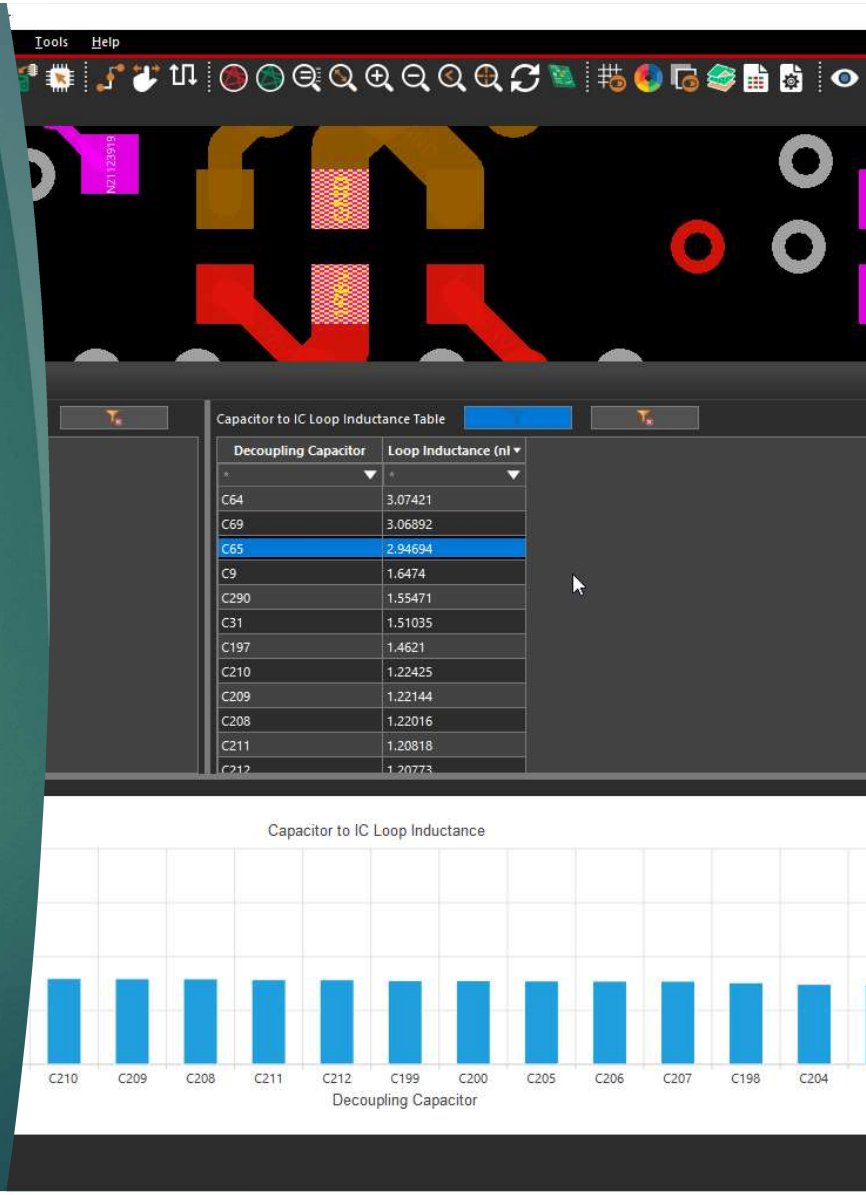
- IR drop vision can be displayed as voltage or IR drop

- Voltage drop
- Static voltage measurements
- Current flow and measured drops
- Graphical representation of individual or all power rails
- PowerDC engine



Power Inductance Workflow

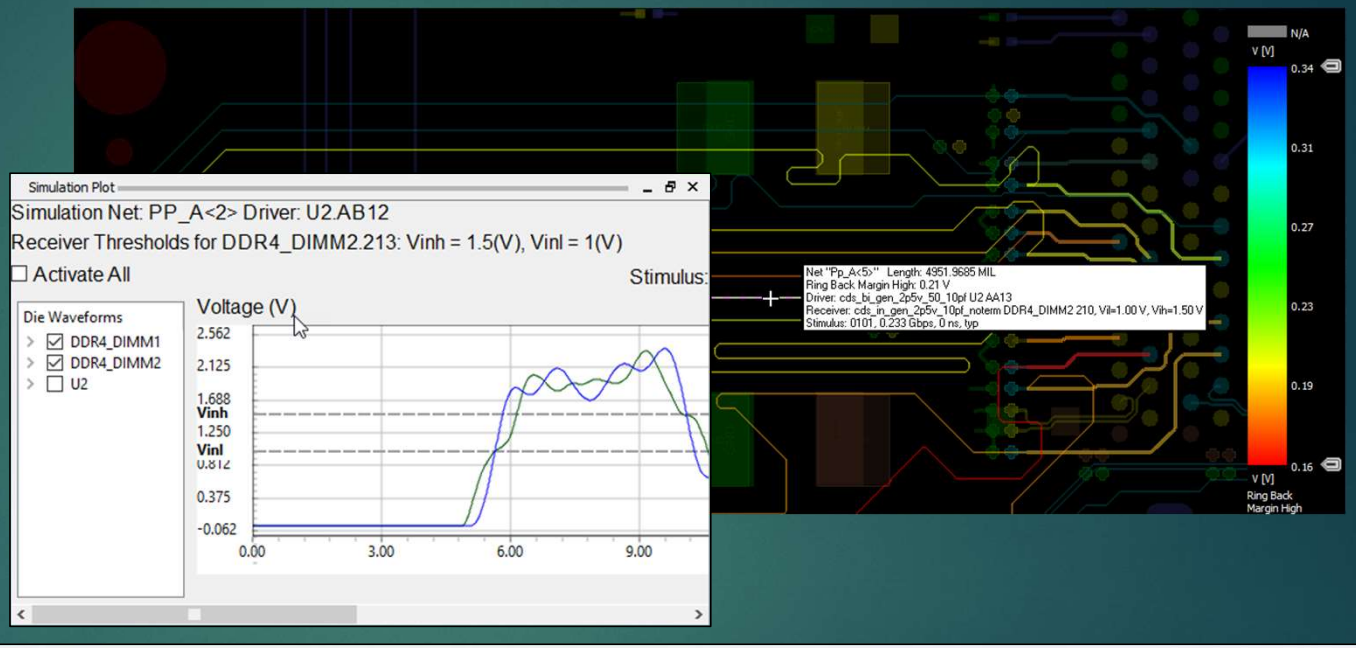
- Checks decap-to-IC loop inductance

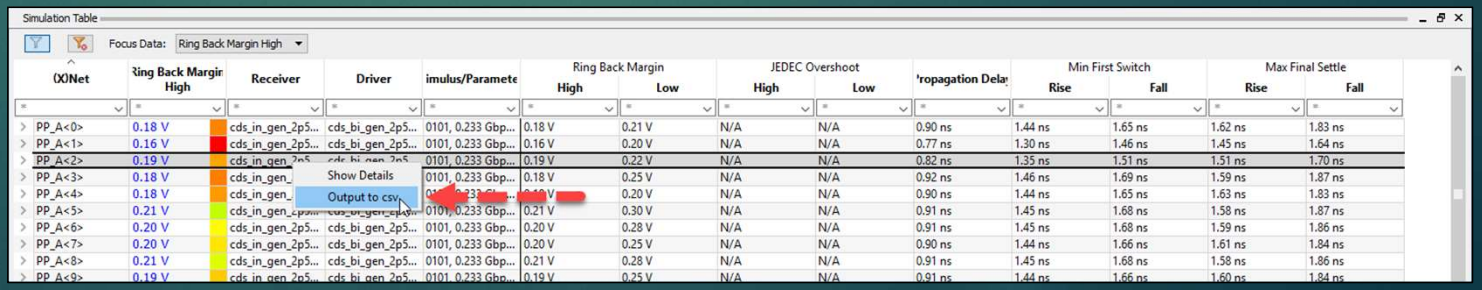


Reflection Analysis

Vision is selected Focus Data Measurement in Table

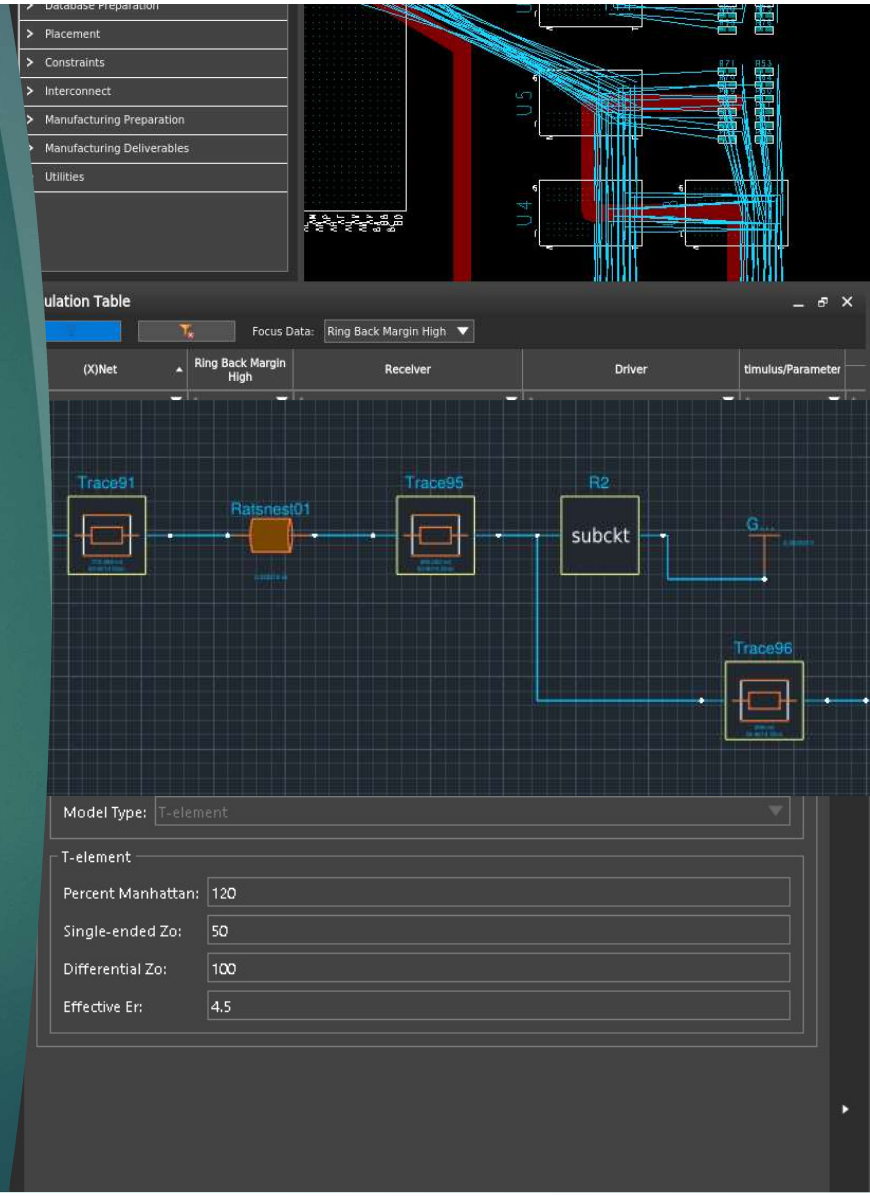
Table supports cross-probing, ability to Show Details, and CSV output





Simulation Support for Unrouted Nets

- Partially routed and unrouted signal nets are automatically modeled with transmission line models based on ratsnest, user-defined parameters, and Manhattan distances



Topology Extraction
(Topology Workbench)

- Integrated workflow in Sigrity™ Aurora
- Extract single-ended and differential signals into Topology Explorer
- Explore what-if scenarios and develop constraints
- Stand alone tool or embedded into AllegroX environment.