

An Executable RF Design Workflow Whiteboard

Capturing Design Methodology, Including Decision
Trees and Structured Simulation Data, with Nexus
Connect in RF Circuit Simulation Professional

Managing Knowledge Continuity in RF Design

RF design organizations increasingly face the challenge of translating complex engineering expertise into repeatable, scalable product development processes. Critical design methodology often resides as undocumented institutional knowledge — insights and practices that experienced engineers apply intuitively but are rarely captured in formal documentation or may not be accessible to junior team members.

At the outset of a project, teams typically define requirements and explore potential architectures on whiteboards, combining explicit specifications with implicit assumptions derived from prior experience. Senior engineers typically guide these early discussions, shaping design direction through hard-earned judgment. While individual contributors bring strong analytical foundations and tool proficiency, the transfer of practical, application-specific design methodology remains inconsistent.

And as projects progress, engineers evaluate circuit topologies, device characteristics, and performance tradeoffs, assembling simulation-driven workflows to support intermediate design decisions. Without a systematic approach to capturing and organizing design methodologies, RF teams risk widening talent gaps, reducing productivity, and slower development cycles as design complexity continues to increase.

This misalignment is where the use of advanced RF EDA tools, such as Keysight's Nexus Connect in RF Circuit Design Professional, enables multi-domain simulation, optimization, intermediate decision branches and parameter settings, allowing teams to iterate toward viable designs and prepare results for technical design review.

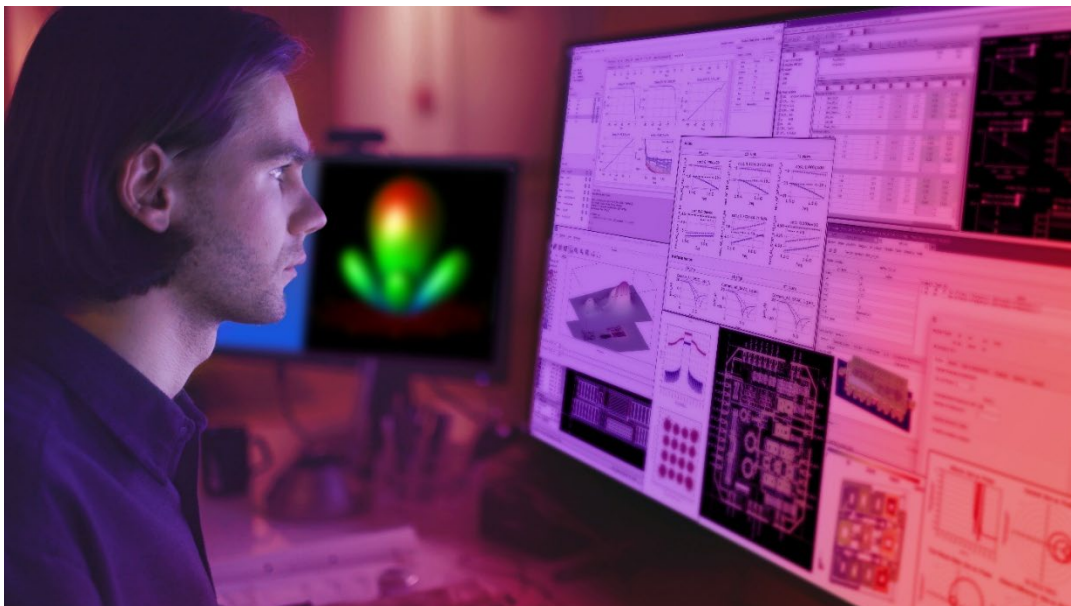


Figure 1. RF Circuit Simulation Professional (Nexus) orchestrates complex multi-domain simulation, optimization, intermediate design decisions and parameter settings as reusable application-specific design workflows.

Inefficiencies Challenging RF Design Workflows

Systemic inefficiencies limit productivity, slow decision-making, and introduce risk throughout the design cycle. The most common challenges faced by teams fall into four interconnected areas:

Loss of Institutional Knowledge

RF design success often depends on undocumented practices developed over decades. These methodologies rarely exist in structured form and are difficult to transfer to less-experienced engineers. With some organizations anticipating expert RF engineer retirement rates approaching 30%, critical expertise is increasingly at risk.

Inefficient Design Workflows

Teams routinely face:

- Manual handoffs between simulations and design decisions
- Difficulty resuming interrupted work
- Limited traceability and visibility of prior design steps
- Repeated rediscovery of established approaches

These inefficiencies slow development and increase the likelihood of errors and repeated mistakes.

Simulation Bottlenecks

Although modern EDA tools provide powerful multi-domain simulation and optimization, engineers must often wait for intermediate results before deciding next steps. This human-in-the-loop dependency introduces unnecessary delays, especially when simulations or optimizations complete outside working hours.

Automation Barriers

While the integration of Python into some EDA tools enables workflow automation, many RF engineers prefer to focus on design rather than coding. This creates friction between available automation capabilities and practical adoption.

Visually preserve and share design intelligence

Keysight's RF Circuit Simulation Professional (Nexus), introduced in 2025, launched a modular RF simulation and optimization engine that works identically in Keysight ADS, Cadence Virtuoso and Synopsys Custom Compiler. Its UI can also be programmatically controlled fully through a Python API, enabling automated operation. Recently, Keysight development teams added Nexus Connect, an executable RF design workflow whiteboard. Nexus Connect captures an RF design team's thought process and methodologies, tightly coupled with the simulation-optimization engine and structured data it produces. Nexus Connect orchestrates the workflow in a visual flowchart (Figure 2) that brings together specifications, simulations, optimizations, decision branches and intermediate parameter settings and indicates progress as each step runs.

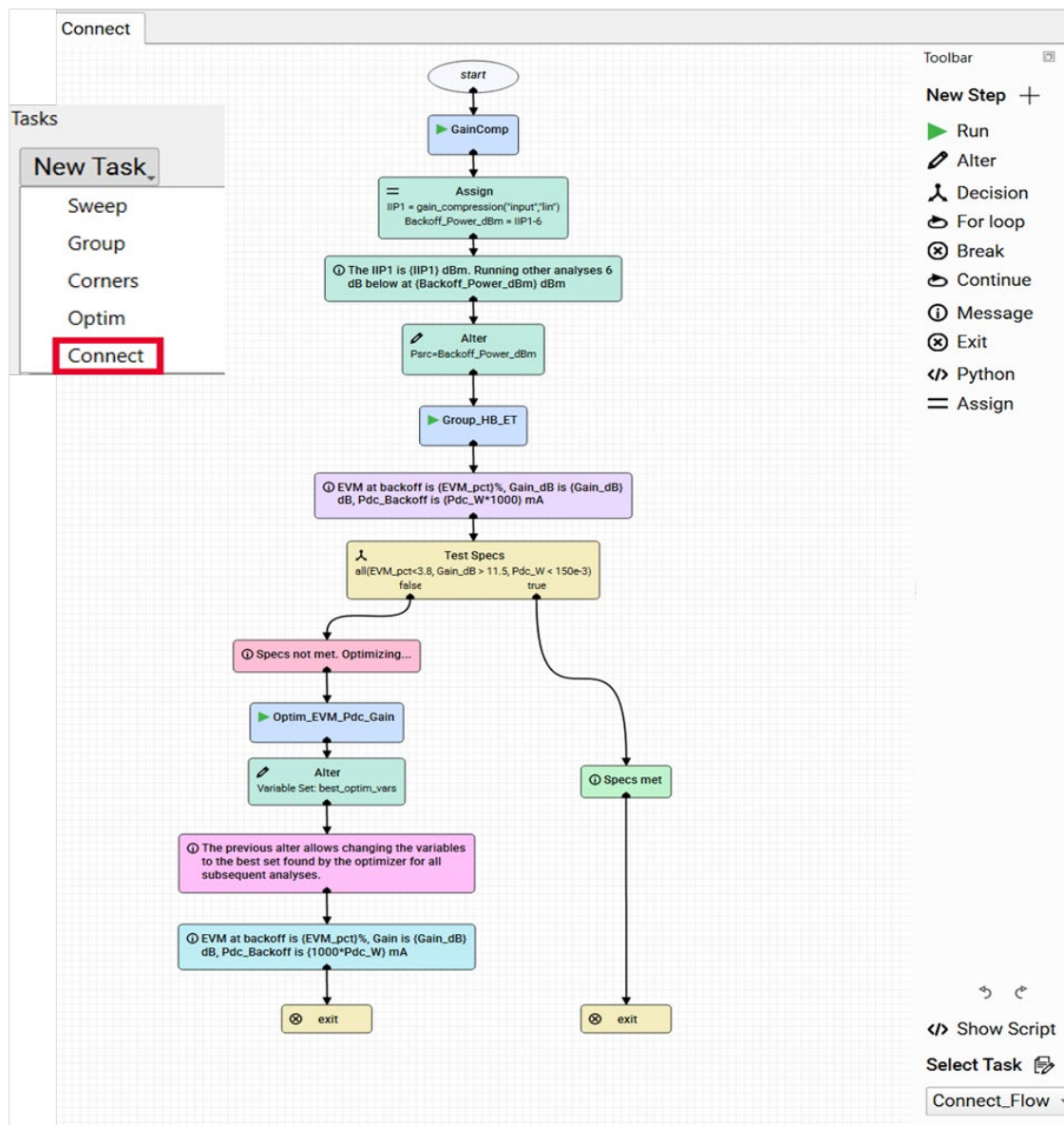


Figure 2. Nexus Connect whiteboard is an editable, executable, and shareable workflow for RF design. It also self-documents the design methodology for technical reviews and reuse.

Execution of a Nexus Connect whiteboard – running an underlying Python code – proceeds in a repeatable, step-by-step manner, eliminating delays between intermediate results of simulation or optimization runs by evaluating expression-based decision criteria and automatically transitioning to the next step. Engineers can toggle between the visual flowchart and the Python script (Figure 3) and work in whichever mode they prefer, reducing learning curves and automating expertise. Connect whiteboards also self-document design steps, decision criteria and results, eliminating hours of manual transcription and the risk of forgetting details after the design.

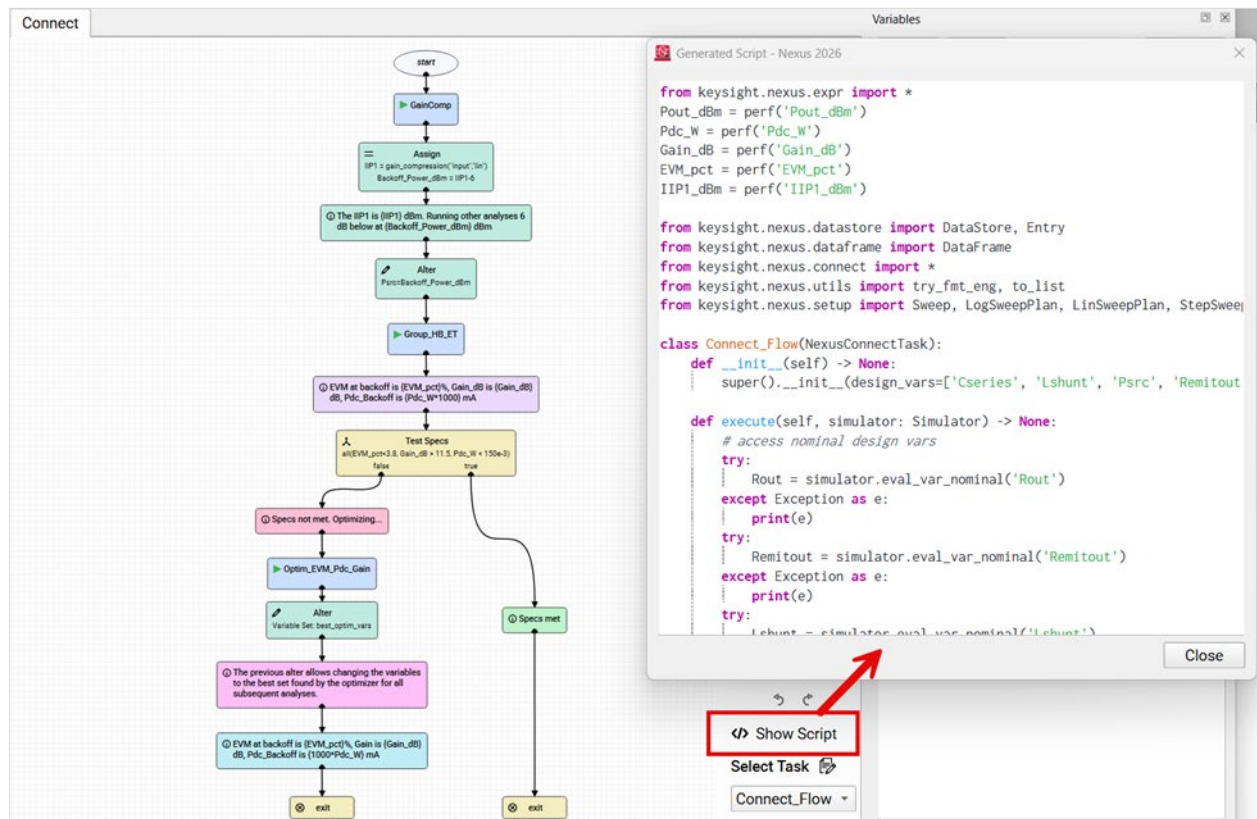


Figure 3. Python script controls evaluation and execution in Nexus Connect, including calls to the Nexus circuit simulation-optimization engine

Nexus Connect takes teams beyond the hope that all necessary steps to get to the finished design IP unfolded correctly and efficiently. Instead of losing that physical whiteboard design strategy from the kickoff session, teams can now capture and refine it with simulation and optimization data generated directly from the Nexus Connect executable whiteboard. Capturing and refining design strategy like that was never possible in an RF EDA tool. Nexus Connect executable whiteboards naturally integrate into a team's workflow, orchestrating activities, sharing and preserving design intelligence, and supporting cycles of learning for RF engineers at any experience level.

Figures 2 and 3 show the same binary decision tree; however, with multivariate evaluation and multiple outcome states, decisions can be much more complex, leading to more branches. Nexus Connect whiteboards can nest to create more complex design strategies. Nexus Connect provides much more than task sequencing – it enables automated workflows and decision-making in

advanced RF design methodologies, efficiently producing designs that meet all specifications simultaneously.

The scarcity of experienced RF designers can have a significant impact on the competitive and financial performance of an organization. Before Nexus Connect, that experience of valuable design methodology either walks out the door at retirement or is incompletely transferred, if at all, to less-experienced engineers. Companies also face steep costs from missed market windows as design methodologies are relearned, and initial prototypes fail to meet specifications by repeating past mistakes.

Embracing RF Circuit Simulation Professional with Nexus Connect provides a path to capture RF design methodologies as flexible reusable IP. Unlike traditional fixed finished design IP, RF designers and organizations benefit from reduced design cycle time and improve design quality.

The Benefits of Nexus Connect

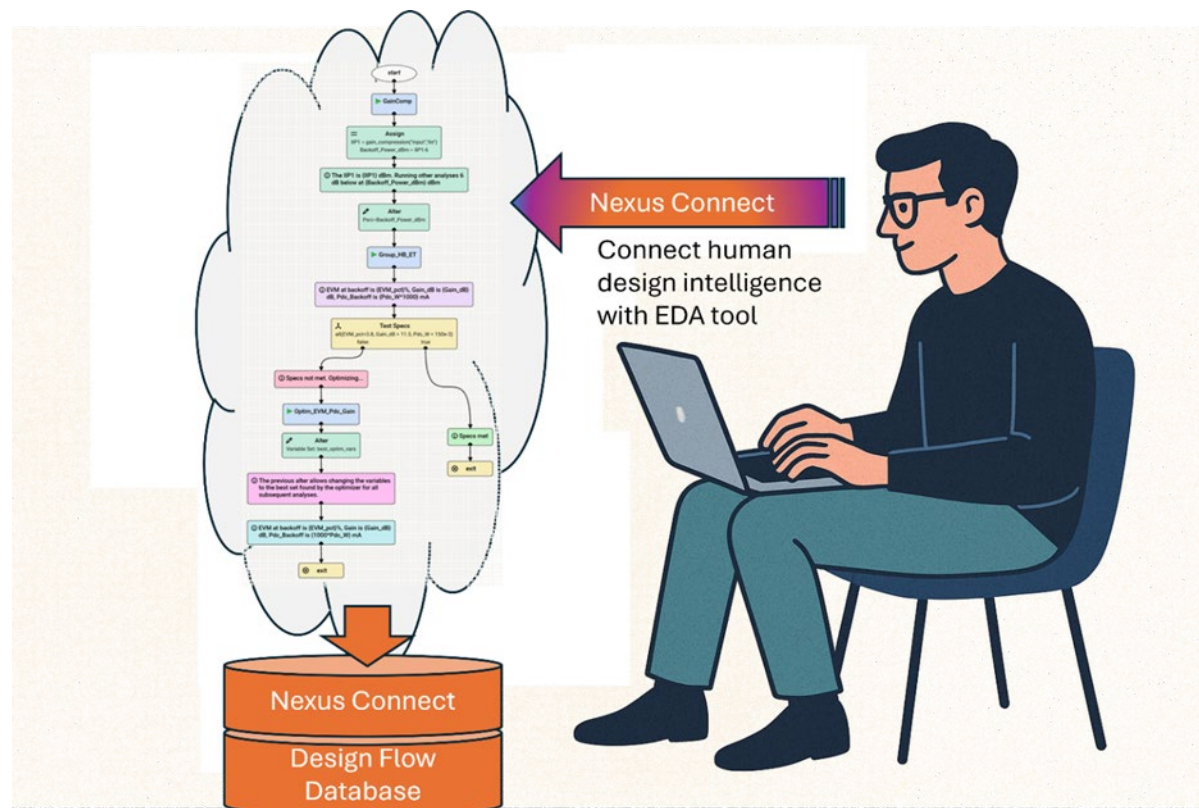


Figure 4. Nexus Connect captures and orchestrates design simulation, optimization and decisions in accordance with your design strategy. Nexus Connect can be saved, edited, shared and reused to compare multiple design approaches quickly. It is the vehicle for retiring experienced designers to pass design skills onto new engineers

For Every RF Designer

- **Organizing design strategy.** Nexus Connect captures evolving thinking on RF design, formalizing the necessary simulations and optimizations through decision branches that guide a path to completing a multi-spec design.
- **Instant recall.** Saved Nexus Connect whiteboards from previous projects provide engineers with a jump-start on new designs, ready to edit in either the visual flowchart or Python (or both). There's no guessing what steps were or will be applied; each whiteboard is the documentation.
- **Curated design methodology IP repository.** Teams using Nexus Connect will build workflows that vary by RF design type – power amplifiers, low-noise amplifiers, filters, multiplexers, oscillators, mixers, and more – and by application context. No more manually scouring notebooks and recreating EDA tool setups for design steps.
- **Streamlined sign-off.** Once tedious steps of design review, what-if analysis and response, and compliance testing become part of a Nexus Connect workflow. Many questions that used to go offline for follow-up can now be answered quickly through live whiteboard adjustments and execution.
- **Less waiting, more designing.** Execution of Nexus Connect workflow whiteboards bypasses the built-in delay of waiting for simulations and optimizations to finish before deciding what to do next. Kicking off multiple whiteboards can help explore several design approaches simultaneously.

For RF Design Organizations

- **Consistent, repeatable methodology.** Teams build on a captured knowledge base from the collective experience of designers creating prior IP. Design methodology becomes jointly owned by each design team, not just by its gurus, and talented designers can innovate and grow faster. Repeatability concerns disappear, shifting the focus to scalability using HPC and other parallelization tactics.
- **Shrinking talent gaps.** Connect helps mitigate talent loss and reduce the learning curve for new hires as they come up to speed on tribal knowledge. It captures the technical soul of successful but retired RF designers for rapid deployment by the less experienced – giving them shoulders to stand on.

The next logical step is AI-assisted RF design and optimization. Nexus Connect workflows automatically generate Python code and produce structured data from execution, effectively distilling expert design intelligence into an organized, AI-training-ready data stream tailored to each team's design methodology and context, not abstract theory. Disappearing guru-level talents, their scarcity and inexperience of entry-level talents may likely be mitigated by trained AI assistance in a growing, highly competitive RF design market.

Reimagining Workflows with Nexus Connect

Never have RF designers had an EDA orchestration tool like Nexus Connect that captures all the steps in a design methodology, deploys them in customized workflows with simulation and optimization immediately, and documents each workflow visually so everyone on the team can see and discuss what's happening. It also gives teams a choice of working visually on an executable whiteboard flowchart or programmatically in Python. Nexus Connect removes the barrier of having to stop and think about sharing design intelligence, unlocking powerful undocumented tribal knowledge. It helps teams improve their RF design acumen and focus on innovation in more projects more quickly.

Nexus Connect is now available as part of RF Circuit Simulation Professional 2026, which provides platform-independent RF simulation and optimization capability for environments including Keysight Advanced Design System (ADS), Cadence Virtuoso, and Synopsys Custom Compiler. Token-based licensing can be stacked or shared for maximum flexibility, with a recommended 60 tokens for an HPC cluster supporting parallel simulation and optimization, including running multiple Nexus Connect whiteboards simultaneously to explore design strategy alternatives.

What to Buy:

Nexus requires a pre-requisite host platform such as Keysight Advanced Design System (ADS), Cadence Virtuoso, or Synopsys Custom Compiler. Nexus is purchased through token licenses, which can be stacked or shared amongst users for parallel, multi-domain simulation or optimization.

1. **W5600E Nexus** – 60 tokens are recommended for typical enterprise to use for
 - a. HPC parallel simulation and optimization
 - b. Running multiple Nexus Connects to compare design strategies
2. **N3249R** – Dedicated training by Keysight Experts to help deploy Nexus Connect

For more information on Keysight's next-generation RF Circuit Simulation Professional and its Nexus Connect executable whiteboard capability, licensing, and integration with ADS, please visit:

Product page: [RF Circuit Simulation Professional](#) | [Keysight](#)

[RF Circuit Simulation Professional Brochure](#)

[RF Circuit Simulation Professional White Paper](#)

[IEEE paper: Bring Your Own Code: A Simulation Framework to Harness Optimization](#)

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