

Bringing Design Data Management into the Developer Workflow

Accelerating Digital and Mixed-Signal Engineering with Keysight SOS for Visual Studio Code

Executive Summary

Modern digital design teams rely heavily on text-based development environments to create, review, and maintain RTL, HDL, scripts, and verification assets. Visual Studio Code (VS Code) has become a preferred environment for these workflows due to its flexibility, extensibility, integrated tooling, and ability to keep engineers focused within a single workspace.

However, while development workflows have evolved, design data management has often remained disconnected. Engineers frequently move between coding environments, command-line tools, and separate data repositories to manage versions, collaboration, and design history. This fragmentation introduces unnecessary friction, increases the risk of inconsistency, and makes it more difficult to maintain a complete view of complex projects.

Keysight SOS for Visual Studio Code addresses this challenge by bringing enterprise-grade EDA data management directly into the developer workflow. By integrating version control, collaboration, governance, and configuration management capabilities into VS Code, SOS enables engineers to manage digital design data alongside existing analog, RF, and system-level assets within a unified environment.

The result is a more efficient engineering workflow where teams can collaborate faster, maintain stronger traceability, and accelerate time to market.

The Challenge: Modern Design Requires Connected Workflows

Engineering teams today operate in increasingly complex environments where digital, analog, RF, verification, and automation workflows must come together to deliver advanced semiconductor designs. A single project may include RTL code, HDL files, simulation models, scripts, documentation, configuration data, and design objects managed across multiple tools and teams.

Historically, these different disciplines have relied on separate workflows and repositories optimized for their individual needs. While this approach can support individual tasks, it often creates disconnected data environments that make collaboration more difficult. Engineers may spend significant time moving data between systems, resolving inconsistencies, or manually consolidating project information. As designs become larger and teams become more distributed, maintaining a complete and accurate view of the project becomes increasingly challenging.

A modern design data management approach must therefore do more than provide storage. It must provide a connected foundation that allows engineers to work naturally within their preferred environments while ensuring that all design data remains controlled, traceable, and accessible across the organization.

Why Visual Studio Code Has Become Central to Digital Design

Visual Studio Code has become a widely adopted development environment for engineers working with text-based design assets, including RTL, HDL, scripts, and verification files. Its popularity comes from its lightweight architecture, extensive extension ecosystem, integrated terminal, and ability to provide a flexible environment tailored to individual workflows.

For digital design teams, VS Code provides a familiar workspace where engineers can write, review, debug, and manage design files without interrupting their development flow. However, traditional data management processes have often remained separate from this environment. Engineers may need to leave their editor to perform version control operations, interact with command-line tools, or transfer data into another system.

This disconnect creates unnecessary friction. Every time an engineer switches tools, they introduce additional steps into the workflow and increase the opportunity for errors or inconsistencies. By bringing data management directly into VS Code, teams can maintain productivity while still benefiting from enterprise-level control and governance.

SOS: An EDA-Native Data Management Foundation

SOS provides an EDA-native data management platform designed to support the complexity of modern engineering workflows. Rather than treating design data as simple files, SOS understands the need for structured versioning, collaboration, traceability, and controlled reuse across the entire product development lifecycle.

The platform provides a governed system of record where engineering teams can manage data from multiple domains within a single environment. Whether the data consists of analog design objects, RTL files, verification environments, scripts, or supporting project assets, SOS provides a consistent framework for managing revisions, tracking changes, and maintaining design history.

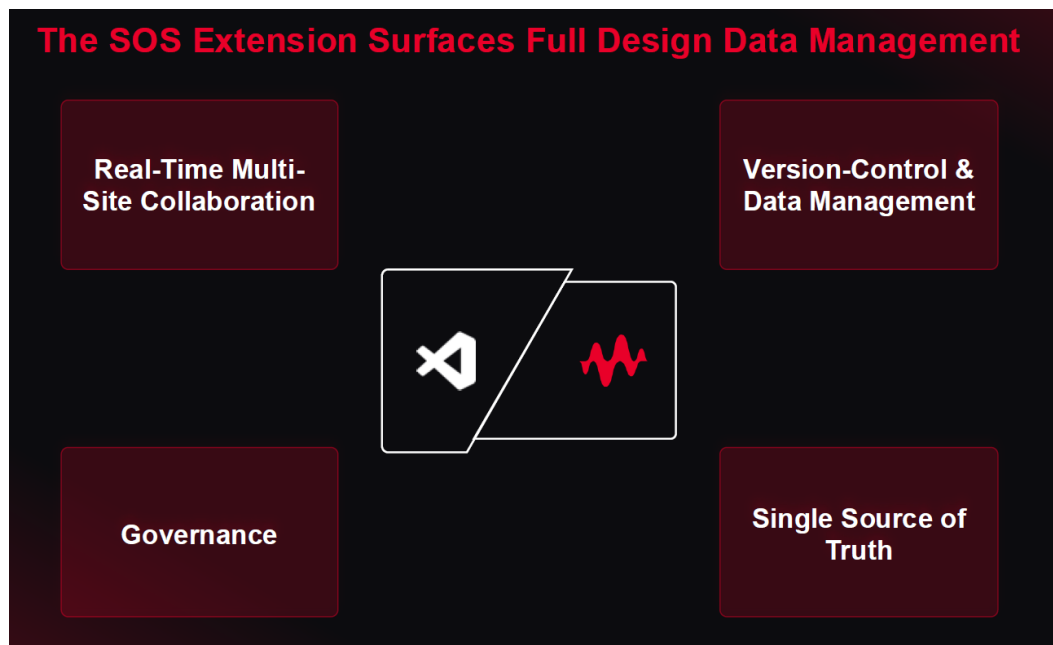
This approach enables teams to move beyond disconnected repositories and create a unified engineering data foundation. Designers can continue working in the environments best suited to their tasks while contributing to the same controlled project infrastructure.

Bringing SOS Into Visual Studio Code

The SOS integration for Visual Studio Code extends enterprise design data management capabilities directly into the developer environment. Instead of requiring engineers to move between their editor and separate data management tools, SOS functionality becomes available within the workflow where design work already happens.

The integration provides visibility into project status, file changes, revisions, and collaboration activities directly inside VS Code. Engineers can see when files have changed, compare revisions, review differences, and manage updates without leaving the editor. This creates a more seamless experience while maintaining the powerful version control and governance capabilities of SOS.

The goal is not to replace familiar development practices, but to enhance them by embedding EDA-aware data management into the tools engineers already use every day.



A Familiar Workflow with Enterprise Control

The extension introduces a workflow that mirrors modern development environments:

Local workspace

Engineers work with files directly inside VS Code.

Change visibility

The extension highlights modified files and provides visual indicators of project status.

Staging and commit

Users can review, stage, and commit changes directly within the editor.

SOS check-in

Teams can also use traditional SOS operations when preferred.

This flexibility allows engineers to adopt the workflow that best matches their existing practices.

Improving Collaboration Across Teams

One of the biggest challenges in large engineering organizations is maintaining alignment across distributed teams.

SOS for Visual Studio Code enables:

Real-Time Project Awareness

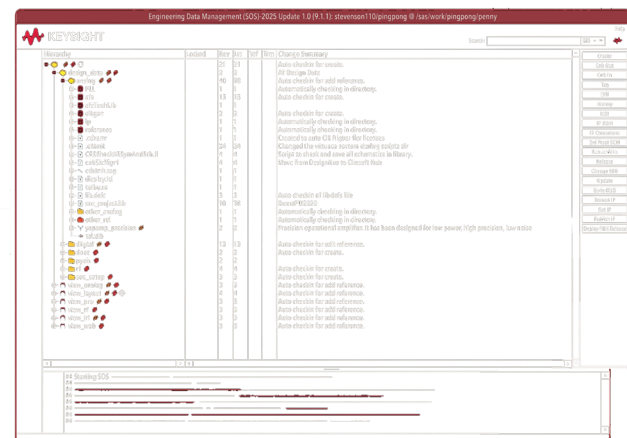
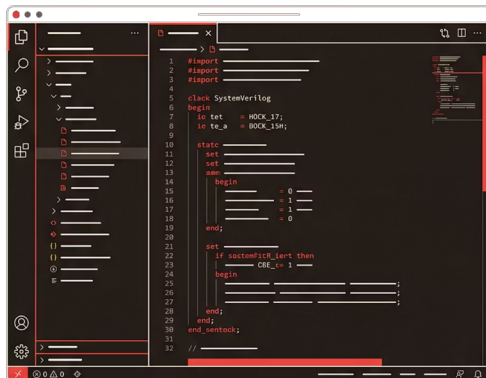
Visual indicators show the state of files and changes, helping engineers understand:

- What has changed
- Who is working on an object
- Which revision is active

Shared Source of Truth

Digital assets created in VS Code and analog assets managed through EDA integrations exist within the same SOS repository.

This means teams are not synchronizing separate databases; they are accessing different workflows into the same managed environment.



Supporting Mixed-Signal Design Collaboration

Modern semiconductor development increasingly depends on close collaboration between digital and analog teams. A mixed-signal SoC, for example, may combine analog schematics and layouts with RTL, verification environments, and digital implementation data. Managing these elements across disconnected systems can make integration difficult and reduce visibility across the full design.

SOS addresses this challenge by providing a single repository and governance model across domains. Analog designers can manage their design data through existing EDA integrations, while RTL designers can manage digital assets through the Visual Studio Code extension. These workflows do not represent separate databases that must be synchronized; they are different interfaces into the same underlying data infrastructure.

This means a project configuration can bring together the correct revisions of analog and digital components, creating a single design history and audit trail across disciplines. Teams gain greater confidence that they are working with the correct versions while improving their ability to reuse existing IP.

Governance Without Workflow Disruption

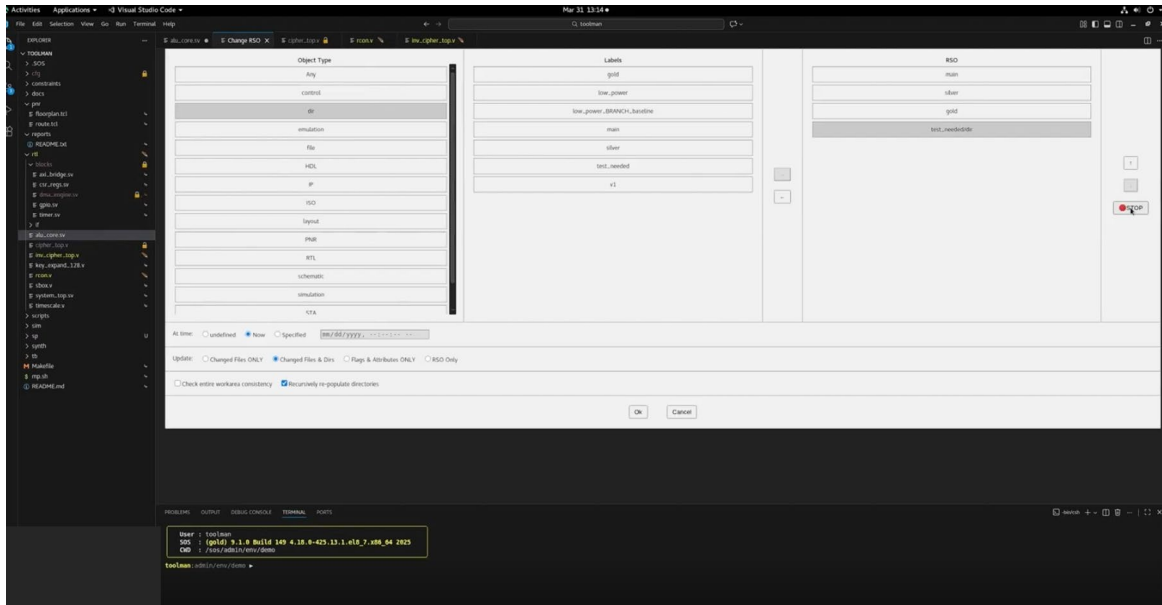
Security, permissions, and locking are managed by SOS itself.

The VS Code integration simply exposes this information within the developer environment.

Teams benefit from:

- Controlled object ownership
- Visibility into file states
- Managed collaboration
- Branch-based development

Engineers can continue working efficiently while maintaining enterprise-level governance.



Business Impact: Faster Development, Lower Complexity

By integrating SOS into Visual Studio Code, organizations can reduce the friction caused by disconnected engineering workflows. Engineers spend less time managing data movement between systems and more time focused on design activities that directly contribute to product development.

A unified data management approach improves collaboration by giving teams greater visibility into project changes and design history. It also reduces infrastructure complexity by eliminating the need to maintain multiple disconnected repositories with separate governance models.

The result is a more efficient engineering environment where teams can accelerate development cycles, improve confidence in design decisions, and maximize the value of existing intellectual property.

Conclusion

Engineering workflows continue to evolve, but data management must evolve with them.

SOS for Visual Studio Code bridges the gap between modern developer environments and enterprise EDA data management. By bringing collaboration, governance, and version control directly into the tools engineers already use, SOS enables organizations to create a connected design ecosystem.

The result is a more efficient, traceable, and scalable approach to digital and mixed-signal development, helping teams accelerate innovation while protecting valuable engineering knowledge.

[Learn more: Engineering Data Management | Keysight](#)



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