

From Silos to Systems, from Data to Insight

Unlocking Organizational Knowledge and Winning in
the AI Era with Keysight SOS Enterprise

Executive Summary

The semiconductor industry is undergoing unprecedented growth in complexity, scale, and data volume. Engineering teams now manage larger projects, more diverse methodologies, and an expanding ecosystem of tools, while simultaneously facing stricter compliance, traceability, and security requirements. In this environment, data — not compute or talent — has emerged as the primary bottleneck.

Keysight SOS Enterprise addresses this challenge by transforming fragmented, siloed data into a governed, connected, and reusable organizational knowledge base. By providing a single source of truth that spans tools, sites, and workflows, SOS Enterprise enables collaboration at scale, accelerates IP reuse, and lays the foundation for successful AI and Machine Learning (AI/ML) adoption. This whitepaper explores the industry challenges driving the need for modern data management, the platform-based approach of SOS Enterprise, and real-world results achieved by organizations adopting it.

The Industry Challenges: Data as the New Bottleneck

Exploding Complexity in Semiconductor Development

Semiconductor projects are becoming more complex across multiple dimensions because of:

- Larger and more numerous design files
- A growing number of methodologies combined within a single project
- Globally distributed teams and partners
- Increasing dependence on heterogeneous toolchains

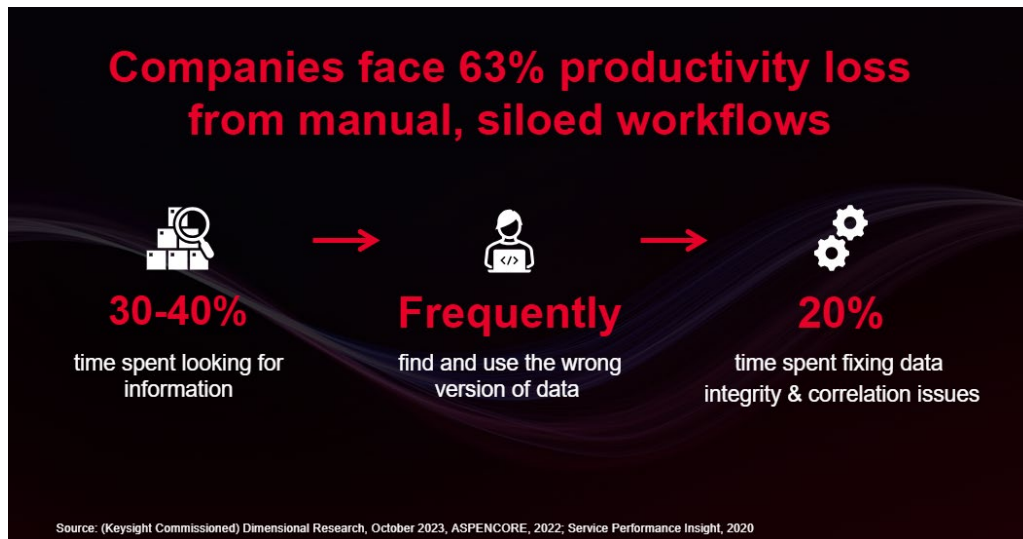
Standardizing how data flows across these dimensions is no longer optional. Collaboration today means not only sharing data, but ensuring that access is controlled, traceable, and compliant with internal policies and external regulations.

The Cost of Data Silos

Isolated data silos impose a severe productivity penalty. Industry studies show that organizations can lose up to 63% of productivity ¹ when information is fragmented across disconnected systems. Engineers spend disproportionate amounts of time searching for assets that already exist, validating whether information is current, and correcting downstream issues caused by the accidental use of any outdated or incorrect data.

¹ (Keysight Commissioned) Dimensional Research, October 2023, ASPENCORE, 2022; Service Performance Insight, 2020

For example, in a typical team of ten engineers, this inefficiency can translate into approximately \$1.8 million in wasted effort per year ². As workflows grow more intricate — with over two-thirds of engineers using six or more tools — manual workarounds become the norm rather than the exception. These improvised bridges between tools increase operational risk, reduce repeatability, and further erode productivity.



The AI Imperative — and Its Hidden Dependency

Artificial intelligence is now a dominant growth driver across the industry. Most organizations are experimenting with AI, and many report innovation benefits. Yet only a small fraction of initiatives deliver material business impact.

The most commonly cited obstacle is AI inaccuracy, which often stems from poor data quality, lack of context, and missing traceability. Publicly trained models offer little differentiation. The true competitive advantage lies in an organization's private, domain-specific data.

However, when that data is locked in silos, AI systems cannot access the context needed to produce meaningful, trustworthy results.

In practice, successful AI adoption requires:

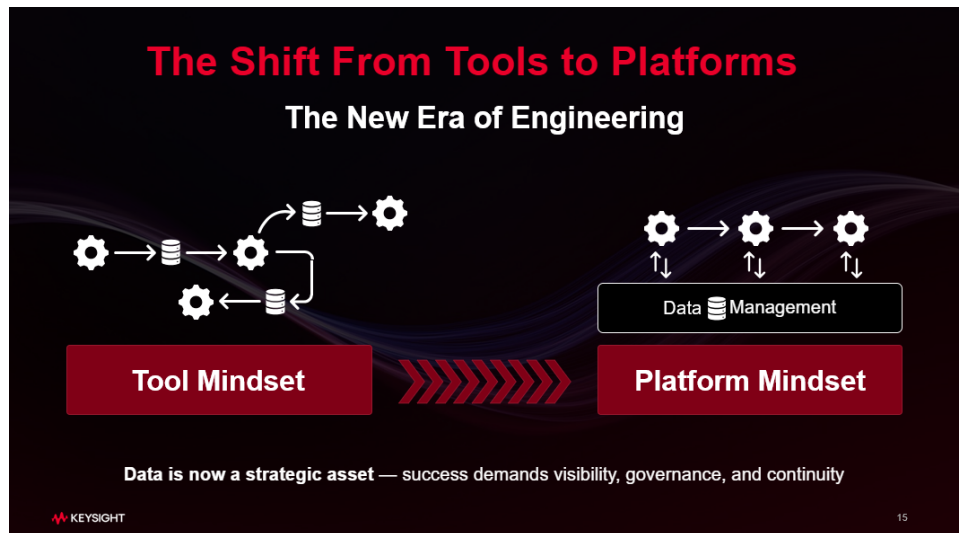
- Clean, well-organized, and versioned data
- Clear lineage from raw data to deployed models
- Governance and access control across the AI lifecycle

Breaking down silos is therefore a prerequisite for winning in the AI era.

² (Keysight Commissioned) Dimensional Research, October 2023, ASPENCORE, 2022; Service Performance Insight, 2020

From a Tool Mindset to a Platform Mindset

Traditional approaches treat data management as just another tool in the workflow. Each tool performs a narrow function and hands data off to the next, which often then requires manual intervention. But this approach means that this model is not scalable.



SOS Enterprise enables a platform mindset:

- All tools connect to a shared data infrastructure
- Data is versioned, tracked, and governed centrally
- Workflows are automated rather than manually bridged

By creating this single source of truth, it not only streamlines collaboration today, but it also ensures the organization is ready to augment its workflows with AI tomorrow.

Keysight SOS Enterprise: A Layered Approach to Organizational Knowledge

SOS Enterprise extends the SOS platform to support collaboration at organizational scale. Its architecture is built in layers, each addressing a critical aspect of modern data management.

Universal Data Ingestion

SOS Enterprise interfaces with existing data systems—including file systems, Git repositories, simulators, and instruments—without forcing teams to abandon familiar tools. Data remains where it is, while SOS Enterprise provides a unified control plane and visibility layer.

The platform is data-agnostic, supporting all file types, from documentation and scripts to design databases and binaries.

Objects and Metadata

Above the file layer, SOS Enterprise introduces an objects layer that abstracts raw files into meaningful entities such as IP blocks, projects, documents, datasets, or models.

Organizations can define custom metadata templates that reflect their own definitions of value. An “IP” might be a single file, a library, or an entire system—SOS Enterprise accommodates all of these by treating them as managed objects.

These objects:

- Are versioned and lifecycle-managed
- Appear in a searchable, standardized catalog
- Are handled consistently from creation to deployment

Relationship Tracking and Digital Thread

SOS Enterprise captures relationships between objects, enabling end-to-end traceability. Users can see:

- Which IP is consumed by which projects
- Where a given component is reused across the organization
- How assets evolve over time

For AI workflows, this digital thread connects models to scripts, datasets, and ultimately to the raw data, providing the lineage required for trust and compliance.

Governance without Friction

As access to data broadens across teams, sites, and partners, governance must scale without becoming an obstacle to productivity. SOS Enterprise embeds governance directly into the data infrastructure through fine-grained access controls, role-based permissions, and geographic segregation to address export control and data sovereignty requirements. Permissions can be defined not only at the object level, but even at the level of individual metadata attributes, ensuring that sensitive information is exposed only to those who are authorized to see it.

Audit trails provide continuous visibility into who accessed which assets and when, while an integrated automation layer replaces manual, email-driven approval processes. Users requesting protected resources are guided automatically through the required approval steps, allowing organizations to enforce policies consistently without slowing collaboration.

Workflow Integration and Automation

SOS Enterprise integrates directly with leading EDA and engineering tools. Data management and governance occur within the workflows engineers already use, minimizing disruption.

An automation layer allows organizations to:

- Trigger post-processing and reporting
- Enforce corporate policies
- Orchestrate interactions with external systems

The result is seamless reuse of knowledge across teams and projects.

Proven Results: Collaboration and IP Reuse at Scale

Large Analog/Mixed-Signal Design Organization

A large distributed design organization deployed SOS Enterprise to address manual IP reuse and scattered project knowledge. Prior to deployment:

- IP reuse relied on manual copying
- Critical information lived in emails and spreadsheets
- Rebuilding legacy project environments took up to a week

With SOS Enterprise:

- All IP was published into a curated catalog without relocating data
- Standardized reuse workflows replaced ad hoc processes
- Visibility into IP usage improved dramatically

Measured Outcomes Over Three Months Included:

- 35–50% increase in IP reuse
- 5–7× faster bill-of-materials orchestration
- Approximately 80% reduction in email traffic

SOS Enterprise as an AI Data Refinery

Once data is organized and governed, latent value becomes accessible. SOS Enterprise enables insight extraction through APIs, dashboards, automated reports, and advanced search.

More importantly, it provides the foundation for AI-driven solutions such as retrieval-augmented generation, copilots, and intelligent agents. Acting as the gateway to enterprise data, SOS Enterprise supplies the domain-specific context these systems require.



Managing the AI/ML Lifecycle

Successful AI adoption depends on disciplined management of data, models, and their relationships over time. SOS Enterprise supports this by treating datasets, scripts, embeddings, and models as first-class, versioned objects within a single system. Organizations can generate datasets directly from managed data, automate ETL and training workflows through the platform's automation layer, and catalog trained models so they can be discovered and reused across teams.

Critically, SOS Enterprise maintains a complete lineage from raw data through to deployed models. This traceability ensures that AI systems remain explainable, reproducible, and auditable, which is essential for trust, compliance, and long-term scalability.



AI Lifecycle Success Story

A specialized AI team used SOS Enterprise to streamline a complex, manual RAG pipeline. By replacing ad hoc storage and scripting with SOS-managed datasets and automation:

- Dataset versioning and diffing became native capabilities
- Embedding extraction and deployment were fully automated
- Human intervention was reduced to initial triggers

The result was a 98% reduction in pipeline cycle time, complete data-to-model traceability, and a dramatic reduction in errors.

The Four Pillars of Value

Keysight SOS Enterprise delivers value across four tightly connected dimensions:

Enabling performance at scale- providing a high-performance collaboration environment that spans global teams and heterogeneous toolchains.

Delivering effortless governance- embedding access control, compliance, and auditability directly into everyday workflows, rather than treating them as afterthoughts.

Driving knowledge reuse- through centralized catalogs and standardized reuse workflows, institutional knowledge is made visible and actionable. Finally, it provides

Providing AI-ready intelligence - ensuring that enterprise data is clean, contextualized, and fully traceable creates a solid foundation for advanced analytics, AI, and machine learning initiatives.

Conclusion: From Chaos to Competitive Advantage

In an era defined by data growth and AI acceleration, fragmented information is a strategic liability. Organizations that fail to connect their knowledge will struggle to collaborate, innovate, and differentiate.

Keysight SOS Enterprise transforms chaos into clarity. By breaking down silos, enforcing governance, and enabling reuse, it creates an organizational memory that scales with complexity. At the same time, it prepares enterprises for the AI era by delivering clean, contextualized, and traceable data.

SOS Enterprise is not just a data management solution — it is the platform that turns organizational knowledge into sustained competitive advantage.

Get in touch with Keysight's experts to request a demonstration or trial of [Keysight SOS Enterprise](#).



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