



iPaaS for Science: Enabling the Modern Laboratory





Science has advanced. Scientific laboratories have not.

Scientific labs are essential across a broad range of industries and sectors. They are critical to the discovery, development and quality testing of pharmaceuticals; diagnostic testing of patients; the development of new materials; and food and water safety.

However, unlike other business areas, scientific labs have been slow to adopt emerging digital technologies that increase efficiency, enable collaboration, improve quality and reduce cost.

Additionally, while other industries have begun moving in the direction of what Gartner defines as the “Composable Enterprise,” whereby packaged business capabilities sourced externally and internally are assembled and combined based on business needs¹, scientific labs have not.

This failure can be traced to several challenges unique to a scientific lab’s complex environment of applications, web services, simple devices and sophisticated instruments.

To accelerate innovation in laboratory-dependent organizations, a solution to these challenges is required.



The need for universal connectivity

Scientific labs employ a variety of instruments, applications and services (tools) to fuel innovation and ensure product quality. As the challenges scientists face become more complex, the tools they use to overcome them become more varied and advanced.

Without a universal, enterprise-wide interface for these tools, two fundamental problems arise.

Firstly, data—the lifeblood of science—cannot be transferred easily or efficiently to data consumers or decision makers. Secondly, bi-directional and/or multi-directional data exchange is typically limited to complex, bespoke systems or vendor-specific “walled gardens,” in which the vendor controls operations and capabilities within a closed ecosystem.

The results are deeply problematic:



Scientists spend time manually transcribing data between tools, increasing the likelihood of errors.



Lab assets are not managed holistically, leading to unnecessary down-time.



Poor connectivity means simple, repetitive workflows cannot be automated, which reduces lab efficiency.



Data archival is bespoke and not automated, which creates data silos and incomplete backups.



Tools like AI and ML cannot be fully leveraged because data is not curated or properly formatted, resulting in fewer insights.



Compliance monitoring is cumbersome and not automated, increasing regulatory risks.

All these problems significantly slow the pace of innovation in science. In fact, it is estimated that up to 50% of lab time is spent on data preparation and deployment²—and it is widely recognized that a solution is urgently needed.

But while other industries have been able to leverage modern technology to improve automation and gain efficiencies, scientific labs face a variety of unique requirements that have made it difficult to follow suit, such as the need for compliance in regulated markets, flexibility in research environments, data integrity demanded by decision makers and regulators, and a mix of legacy and modern technologies.

Despite these challenges, the dire need for digital transformation within the lab environment has driven innovation that promises to change the game.

Meet the modern lab™

A seamless, multi-directional data exchange calls for a new caliber of laboratory informatics. Revvity Signals now provides such a solution: Signals Digital Lab Exchange

(DLX™)—an integration Platform-as-a-Service (iPaaS) purpose-built for scientific settings and researchers' needs.

Powered by Scitara®, Signals DLX breaks down longstanding barriers to connectivity. It enables instruments, systems, and services to communicate bidirectionally via a flexible integration fabric in the cloud. By effortlessly bridging islands of data and functionality, it liberates scientists to focus on innovation instead of integration challenges.

Signals DLX offers three key breakthroughs essential to enabling data mobility across all lab resources and business systems:



1. An easily expandable backplane that connects the entire universe of lab instruments, applications, and services—and provides an open architecture that can support both legacy and modern instruments and applications.
2. A modern “code-optional” environment in which workflows can be automated and integrated with other modern business applications.
3. The ability to build other applications that modernize the lab environment (e.g., provide contextualized, normalized data for internal data lakes and AI/ML models, asset utilization).

Signals DLX is based on Integration Platform as a Service (iPaaS) technology, the fastest growing segment of the software industry. iPaaS effectively addresses unique integration challenges for organizations that rely on both cloud-based and on-premises software solutions—and must maintain data integrity while supporting a broad diversity of instruments and systems.

Additionally, Signals DLX allows labs to leverage applications that can be easily reconfigured for specific needs—so scientists can avoid waiting for monolithic products to be supplemented with the needed applications.



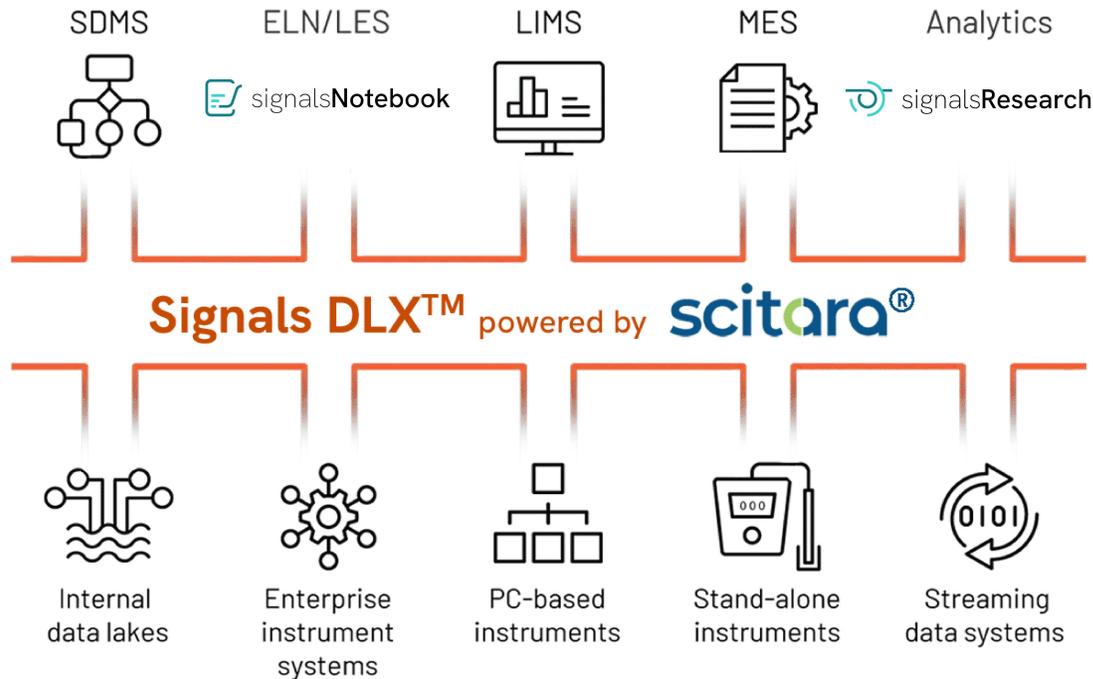
Making the shift

Signals DLX enables labs to radically accelerate efficiency and agility through a targeted infrastructure that drives data mobility.

FROM	TO
Manual data transcription	Controlled, automated data exchange
Transcription errors	100% accuracy
Manual workflows	Fully automated/semi-automated workflows
Underutilized assets	Optimized asset utilization
Manual data curation and transfer	Automated curation and transfer
Manual compliance monitoring	Automated compliance monitoring
Legacy data archival	Modernized data archival
Fragmented asset management	Centralized asset management

The transformative power of Signals DLX

Signals DLX is an industry-changing iPaaS solution that connects the world's scientists, instruments, applications and services.



Signals DLX is a product that:

- Automates the exchange of scientific data across multiple network endpoints through proprietary connector technologies that drive data mobility.
- Creates a flexible ecosystem in which integrations and automation for instruments, applications, and services can be switched in and out on-demand as business needs change.
- Accelerates the delivery, accessibility, and exchange of compliant data across the entire scientific enterprise.

Signals DLX's unique plug-and-play connector technologies ensure unparalleled data connectivity, while flexible, vendor-agnostic configuration tools make it easy to support hundreds of instruments and applications—both old and new.

Signals DLX technologies include:

- Simple device connectors that support non-PC-based instruments, including a QR code technology that identifies simple devices.
- Instrument application connectors that support multi-directional digital data exchange for PC-based instruments and applications.
- Informatics and web service connectors that support enterprise informatics applications.
- Integration with Signals platform capabilities that make it easy to quickly add new devices and applications.

Within Signals DLX, an intuitive orchestration engine automates most routine, complex and repetitive tasks—and provides an auditable digital custody chain that eliminates the need for manual transcription and ensures data integrity.

Signals DLX provides:

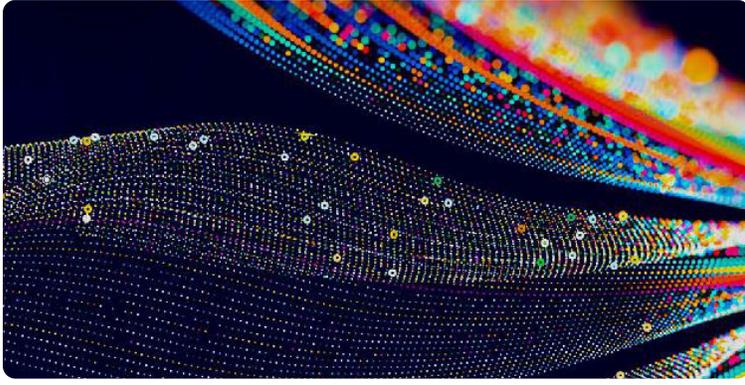
- Support for simple instruments, file processing, web services, long-tail applications and multi-step requests within Signals.
- User and group notifications for data review, confirmation, and sign-off steps.
- Technologies that enable scientists to identify and structure key data.
- Access to data in flight—which makes it possible to re-shape or perform calculations as needed.

Signals DLX event stream and audit trail provide real-time visualization of digital transactions and enable each to be captured for analysis. The result? Unprecedented insight into lab operations within Signals.

The Signals DLX event stream and audit trail provide:

- Instrument and connection status updates that improve monitoring.
- An orchestration dashboard that makes it possible to track workflow progress and avoid bottlenecks.
- Compliance for data in flight.
- Access to the full, end-to-end custody data chain.

Unlocking a lab's potential



Underlying Signals DLX technologies deliver a wide range of transformational capabilities.

Data Archival

Signals DLX provides modern, state-of-the-art tools that link result data to raw data, strengthening the very fabric and business logic behind data archival.

Asset management

Signals DLX offers a unique utilization method based on the volume of result data produced, allowing for a more impartial analysis.

Compliance Monitoring

Signals DLX delivers end-to-end data integrity & compliance for data in flight, along with documented evidence based on the event stream.

Advanced Analytics

Signals DLX makes it possible to transfer high-quality, context-rich data payloads between multiple sources, improving the performance of analytics, AI and ML.

The next step in lab evolution

Fueled by the industry's first verticalized integration platform, Signals DLX powered by Scitara effectively and efficiently solves the longstanding lack of universal connectivity for scientific labs. It brings scientists, data, instruments, applications, and devices together in the Signals platform to improve quality, accelerates innovation and facilitates digital transformation.



Achieve true data mobility

- Rapidly create a fully integrated scientific environment.
- Automate the exchange of data across the entire scientific enterprise.
- Build a flexible ecosystem where integrations, APIs and automations are delivered on-demand as needs arise and change.
- Accelerate accessibility to critical data.

Modernize your lab

- Give scientists timely access to the cross-functional data they need to advance science.
- Reconfigure workflows on-the-fly, rapidly deploy instrumentation and easily implement best-of-breed informatics systems.
- Automate simple and complex tasks while ensuring compliance with the most stringent market requirements.
- Leverage a unique combination of AI and analytics to provide new insights that accelerate decisions and speed-to-market.

Powering digital transformation

iPaaS for Science

Revvity Signals DLX platform powered by Scitara offers an industry-leading iPaaS for science that connects the world's scientists, data, applications, instruments, and devices. The DLX technology drives scientific data mobility by:

- Automating the exchange of scientific data across multiple endpoints in the scientific network.
- Creating a flexible ecosystem where integrations and automations for laboratory instruments, applications, and other resources may be switched in and out, and the platform reconfigured on-demand as business needs change.
- Accelerating the delivery, accessibility, and sharing of scientific data across the enterprise.

Signals DLX

Signals DLX powered by Scitara, is designed for operation in our Signals platform. The Signals DLX delivers a seamless digital data exchange experience by incorporating unparalleled connectivity and unrivaled automation, resulting in unprecedented scientific insights and real time decision making. Signals DLX integrates natively with Signals Notebook further enhancing the user experience by centralizing experimental data, analysis, and collaboration. Signals DLX and Signals Notebook provide an unmatched digital ecosystem for modern science and research.

Meet the Modern Lab™

For the first time, organizations in life science can achieve a data mobility strategy. By implementing a fully connected and compliant laboratory infrastructure with data mobility as standard, the vision of the lab of the future comes a significant step.

For more information on how to build a connected laboratory:

[Request a Demo](#)

REFERENCES

1. Gartner. "Future of Applications: Delivering the Composable Enterprise", February 11, 2020.
2. International Data Corporation (IDC). "The data dilemma and its impact on AI in healthcare and life sciences," June 2021

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