tetrascience

Solution Brief

# Tetra Workflows: AI-Powered Scientific Data Workflow Automation

## Overview

Science slows to a crawl when laboratories are burdened by manual, error-prone data processes. Instead of focusing on outcomes, scientists often spend up to half their time transferring data between instruments, electronic laboratory notebooks (ELNs), laboratory information management systems (LIMS), laboratory execution systems (LES), and manufacturing execution systems (MES). This creates bottlenecks, compliance risks, and missed opportunities for insight.

**Tetra Workflows**, built on the Tetra Scientific Data and AI Cloud™, solves this by automating and orchestrating scientific data workflows at scale. With intuitive, AI-powered tools and a library of proven workflow recipes, it enables scientists and IT teams to eliminate transcription errors, streamline integrations, and accelerate time to clinic.

Core highlights of Tetra Workflows include:

- **Automated Data Movement to Systems of Record:** Seamlessly pushes data to your ELN, LIMS, MES, and other critical lab systems in near real-time, eliminating manual data entry and ensuring validated, traceable experimental data.
- **AI-Powered Workflow Creation Assistant:** Empowers scientists and IT to take an AI-forward approach with simple, no-code tools for mapping data to systems of record.
- **Visual Pipeline Builder:** Enables users to build complex, multi-step data pipelines with an intuitive drag-and-drop interface, doubling development speed.
- **Library of Proven Recipes:** Hundreds of pre-built workflows handle the complete data journey—from instruments and CRO/CDMOs to open formats to your systems of record. Integrates leading lab systems (Benchling, Biovia, Signals, IDBS, LabWare, LabVantage, Veeva) using industry best practices.
- **Productized Integrations:** Pre-built connectors for hundreds of scientific instruments and informatics systems enable frictionless data movement, eliminating custom point-to-point integrations.

Unlike generic data automation tools, Tetra Workflows is purpose-built for life sciences, designed with a deep understanding of scientific file formats, instrument protocols, and regulatory requirements such as GxP and 21 CFR Part 11.

## The Challenge

Scientific organizations face a convergence of challenges that make data automation urgent but difficult. Manual processes dominate daily lab work, forcing scientists to spend valuable hours moving files between instruments and informatics software. These handoffs slow research, create opportunities for error, and heighten compliance risk.

Yet the problem goes beyond inefficiency. Data is increasingly fragmented across dozens of instruments and systems, each requiring bespoke scripts or custom code to connect. The result is a brittle web of point-to-point integrations that delay transformation and pile technical debt onto IT teams. Meanwhile, many instruments still lack digital output altogether, leaving critical results inaccessible. Layered on top of this is the constant demand for regulatory compliance and audit-ready workflows—expectations that manual processes simply can't meet.

# The Solution

Tetra Workflows directly addresses the most persistent challenges in modern labs by turning fragmented, manual processes into automated, scalable workflows.

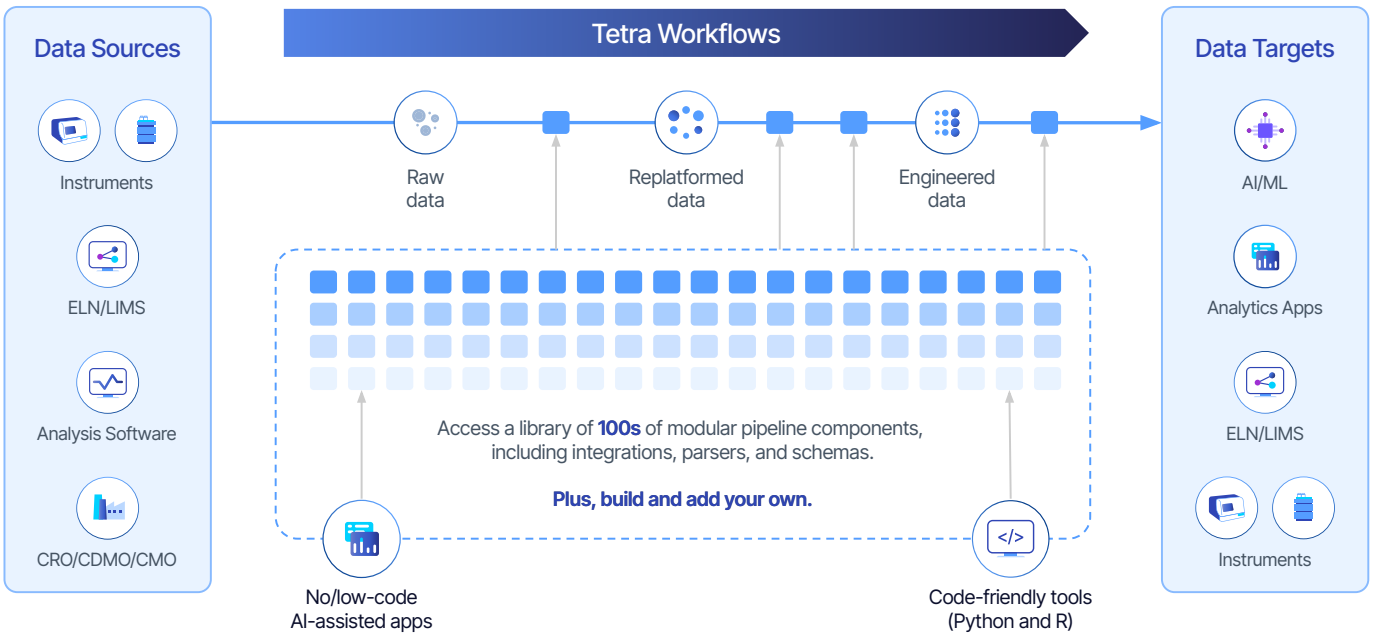
First, it tackles the growing complexity of integration. Rather than relying on brittle, custom scripts for each instrument or assay, the **AI-powered Workflow Creation Assistant** automatically maps engineered scientific data to the right systems, reducing human error and freeing scientists to focus on discovery.

Second, it eliminates the productivity drain of manual data handling. Scientists no longer need to copy, paste, or transcribe results across instruments, ELNs, or LIMS. Instead, the **Visual Pipeline Builder** lets users assemble multi-step workflows through an intuitive, drag-and-drop interface. This dramatically reduces the time and technical expertise required to create new pipelines, while embedded AI intelligently suggests components and flags potential issues before deployment.

Third, Tetra Workflows ensures data quality and compliance at scale. By **automating lineage, validation, and traceability**, the platform helps labs maintain audit-ready records that meet stringent regulatory standards, such as GxP and 21 CFR Part 11. Scientists can trust that data is consistent, reproducible, and compliant—without needing to rely on manual checks.

Finally, it overcomes the limitations of unconnected instruments and siloed systems. With a **library of proven recipes and productized integrations** covering hundreds of instruments and informatics platforms, labs can digitize previously isolated processes and accelerate end-to-end automation. IT no longer spends months stitching together point-to-point integrations; instead, they gain a centralized, future-ready automation environment that scales with business needs.

By combining these capabilities, Tetra Workflows replaces costly technical debt with a flexible, robust automation layer. The result is a platform that empowers scientists to self-serve, IT to focus on strategy, and organizations to accelerate the path from data to outcomes.



## Workflow Creation Assistant

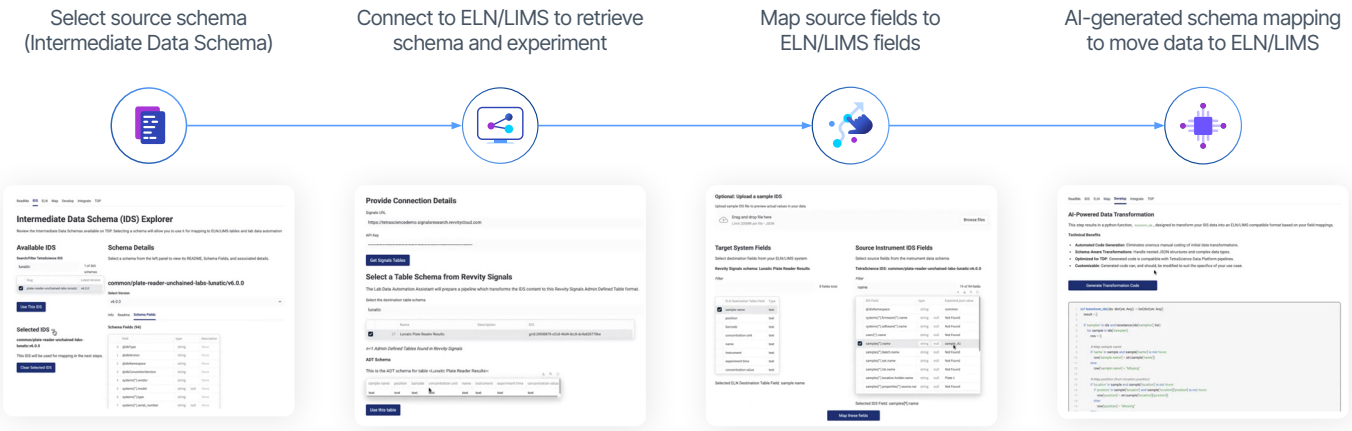
The Workflow Creation Assistant is an AI-powered tool that makes sophisticated workflow automation accessible to both scientists and IT professionals. Instead of relying on complex scripting or scarce technical resources, users can design, configure, and deploy data workflows through an intuitive, guided experience.

The assistant streamlines integration in several critical ways:

- **Intelligent Mapping:** AI automatically maps engineered scientific data to downstream systems such as LIMS or ELNs, replacing error-prone manual transcription with reliable, automated dataflows.
- **Faster Integration:** With guided prompts and smart recommendations, users can create custom workflows up to 40% faster than traditional methods.
- **Built-in Quality Control:** The assistant proactively identifies anomalies and validates workflow integrity before deployment, ensuring that automations are both compliant and robust.

Beyond efficiency, the Workflow Creation Assistant empowers scientists to work independently. With self-service automation, they can build and customize workflows without waiting on IT, while built-in error checking minimizes troubleshooting and support needs.

By combining ease of use with AI-driven intelligence, the Workflow Creation Assistant plays a pivotal role in digital transformation by accelerating lab productivity, reducing compliance risks, and enhancing the reliability of scientific data at scale.




The Workflow Creation Assistant provides step-by-step guidance to build scripts for scientific data workflows.

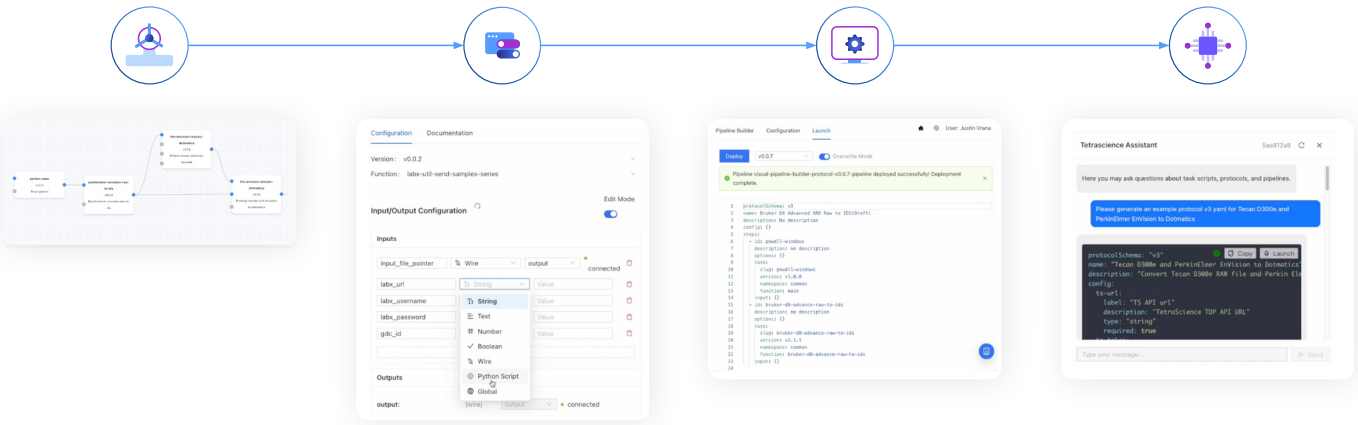
## Visual Pipeline Builder

The Visual Pipeline Builder is an intuitive, drag-and-drop interface that enables scientists, data engineers, and IT professionals to design, deploy, and manage complex data pipelines without writing code. It transforms the way labs assemble and maintain data flows by making pipeline creation fast, flexible, and accessible.

The builder simplifies pipeline development through several key capabilities:

- **No-Code Assembly:** Users can rapidly configure multi-step workflows by dragging and dropping validated components, eliminating the need for custom scripting.
- **AI-Powered Guidance:** Embedded AI suggests pipeline steps, optimizes workflow structure, and automates repetitive engineering tasks, accelerating development and reducing errors.
- **Reusable Components:** A curated library of pre-built modules for parsing, transformation, and integration ensures consistency, speeds implementation, and enforces best practices.
- **Instant Deployment:** Pipelines can be launched directly to the Tetra Scientific Data and AI Cloud, reducing development cycles from weeks to minutes.

With enterprise-grade flexibility, the Visual Pipeline Builder supports everything from simple data transfers to complex, multi-system integrations. By dramatically reducing the time and expertise needed to build pipelines, it empowers scientists to innovate faster, while IT gains a scalable, compliant foundation for workflow automation.




Build or edit pipelines using a library of parsers, integrations, and analyses—**no coding required**

Modify pipeline steps and settings with a **visual editor**

Update and version pipeline definitions, then **deploy to the platform directly from the app**

**Use AI** to explore templates and components, or create new pipelines from scratch

The Visual Pipeline Builder makes it easy to create, edit, and deploy scientific data pipelines with no or low code.

# Benefits

Tetra Workflows delivers measurable improvements for both scientists and IT:

## For Scientists

- Automate repetitive data handling without writing code
- Increase productivity by up to **40%**
- Cut errors by **75%**, improving data integrity and compliance
- Reclaim time to focus on science, not data handling

## For IT & Data Teams

- Replace brittle point-to-point integrations with scalable, reusable workflows
- Reduce implementation time by **90%**, accelerating digital transformation
- Lower total cost of ownership by eliminating technical debt
- Enable scientists to self-serve while IT focuses on strategic projects

## Proven Results

- **60%** fewer workflow steps
- **40%** higher productivity
- **75%** fewer errors
- **90%** faster implementation
- **$2.5 million** savings from end-to-end automation

# Conclusion

Tetra Workflows redefines scientific data automation. By combining AI-powered assistants, no-code tools, and a rich library of integrations, it eliminates manual data bottlenecks and compliance risks while accelerating time to discovery and time to patient.

With Tetra Workflows, life sciences organizations can unlock a future where scientists focus on science, IT drives innovation at scale, and data flows seamlessly, reliably, and compliantly across the enterprise.

Ready to transform your scientific data workflows? Get Started