Phizzle

Connected Plant:

Simple and Secure Instrument Integration

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Executive Summary

The Three Challenges Holding Back Laboratory Digitization:

Modern laboratories face three critical barriers to achieving Industry 4.0 transformation: inconsistent data flow from instruments to informatics systems, blind spots in automated workflows that cause undetected failures, and integration complexity that scales poorly with growth. These challenges force labs to choose between limiting their automation expansion or drowning in IT complexity, turning scientific advancement into an operational burden.

Where Phizzle Fits In:

Phizzle's Connected Plant platform, powered by our cleanroom-certified Edge Puck gateway, transforms laboratory instruments into an integrated IoT ecosystem. Through our three-pillar approach (Connect, Automate, and Integrate) we enable universal instrument connectivity (serial, USB, ethernet, etc), provide real-time monitoring with predictive alerts, and ensure built-in 21 CFR Part 11 compliance. Labs gain immediate productivity with plug-and-play connectivity, reduce failed runs through intelligent oversight, and maintain complete data integrity without custom integration projects.

The Competitive Edge for our Customers:

A partnership with Phizzle enables automation providers and instrument manufacturers with an enterprise-ready solution that provides connectivity out of the box. While competitors leave customers to manage complex integrations independently, Phizzle’s integrated solution delivers Day 1 productivity, lower total cost of ownership, and instruments whose life cycle depends on functionality rather than connectivity limitations. For decision makers, this means an elimination of the hidden IT burden that typically accompanies laboratory automation expansion.

3 Critical Challenges

Holding Back Modern Laboratories Industry 4.0 Realization

1) Inconsistent Data Pipelines

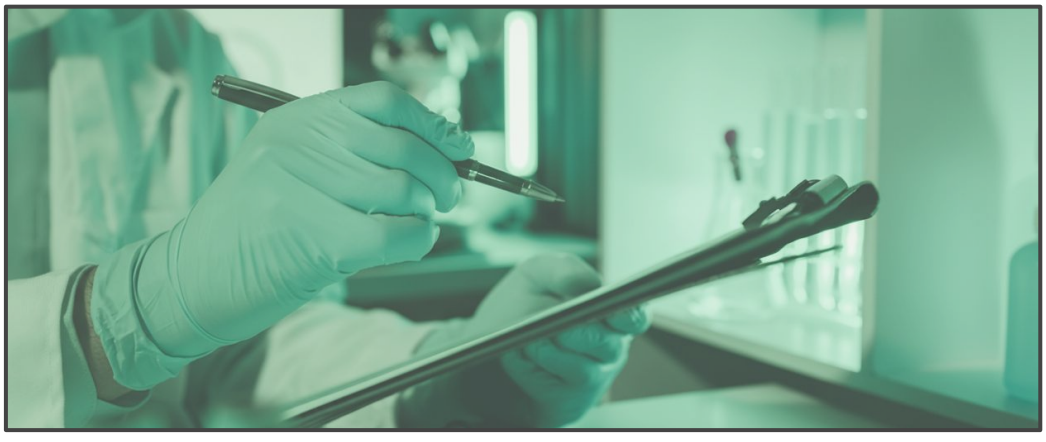
Plate readers generate simple CSV files (KBs to low MBs), flow cytometers producing complex event-level datasets (100s of MBs to GBs per sample), and older instruments connect via serial/USB ports. Without standardization of communication protocols and data outputs between different readers and instruments, scientists waste hours manually collecting, reformatting and entering data into centralized data hubs like LIMS, MES or ELN.

2) Blind Spots in Automation Workflows

There are no alerts when instruments fault or stop mid-run, no visibility into whether samples are processing correctly, no audit trail of what happened during unattended operation, and discovery of failures only happens after time and materials are wasted.

3) Integration Complexity That Scales Poorly

Custom integration projects take months, specialized IT knowledge of instrument protocols, ongoing maintenance as systems evolve, and separate solutions for each site or department. This complexity grows exponentially when an operation scales, making what was functional at 5 instruments, shaky at 15, and completely untenable at 30 connected instruments and readers.



Phizzle Makes Laboratory Digitization a Reality

We provide a unified platform that enables the connection of instruments, regardless of age or connectivity options, to central informatics systems while adding intelligence layers for monitoring, alerting, and compliance.

This includes:

Automation Level Capabilities

Real-Time Alerting provides instant notifications via email and text for run starts and completions, faults and errors with specific error codes, samples stopping mid-run due to interruptions, and out-of-spec conditions (temperature, pressure, etc.). Comprehensive Audit Logging tracks every action for GxP and 21 CFR Part 11 compliance. Role-Based Access ensures users only see and receive alerts relevant to their responsibilities.

Instrument Level Capabilities

Universal Connectivity through our Edge Puck communicates with instruments across all major connection types including: modern ethernet, legacy serial (RS-232), and USB. Once connected, it continuously captures instrument data and generates data files ready for analysis that support multiple formats (CSV, Excel, JSON, PDF), metadata preservation (run conditions, operator, timestamps), and automatic file naming and organization.

Analysis Level Capabilities

Seamless LIMS/ELN Integration enables direct push with any major platform. Our Data Transformation Engine standardizes outputs across different instrument models handling everything from simple plate reader data to complex flow cytometry datasets while maintaining data integrity throughout transformation.

Storage Level Capabilities

The Connected Plant Platform Data Warehouse provides a centralized repository for all processed results, complete compliance audit trails, historical data for trend analysis, and backup and disaster recovery built-in.

Our Three-Pillar Approach to an IoT Laboratory

1) Connect: Modernize Every Instrument

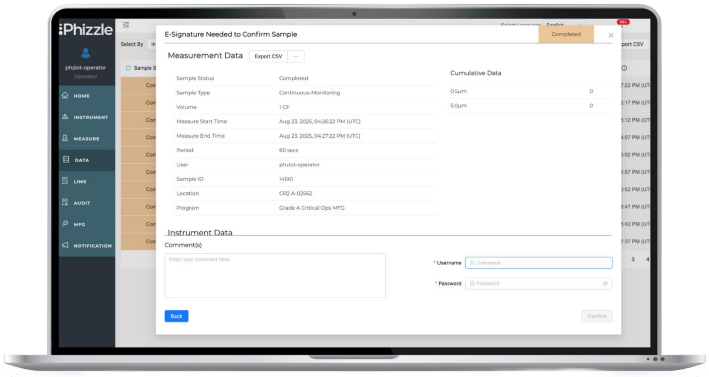
The **Phizzle Edge Puck** serves as our hardware solution that bridges the connectivity gap with physical connections including Serial (RS-232), USB, and Ethernet ports. It provides protocol translation that converts legacy protocols to modern IP-based communication while offering plug-and-play functionality that's pre-configured for supported instruments and operational in minutes. This extends instrument life by eliminating the need to replace functioning instruments just for connectivity. Legacy instruments become network-enabled without expensive replacements or modifications. This protects customer investments while enabling modern data workflows.

2) Automate: Intelligence Beyond Connection

Complete Operational Oversight includes smart monitoring for continuous tracking of instrument status and run progress, predictive alerts that notify teams before failures cascade, and contextualized data and file creation in CSV, Excel, JSON, and PDF formats. Remote Operations capabilities allow teams to initiate samples remotely (avoiding touchscreen errors from gloves), implement screen lockout during critical operations to prevent accidental interruptions, and manage queues for scheduled runs. Offline Resilience captures data even during network interruptions, and synchronizes when connectivity is restored. Teams gain visibility and control over their automation, dramatically reducing failed runs and wasted materials.

3) Integrate: Enterprise-Ready Compliance

21 CFR Part 11 Compliance is built-in with electronic signatures providing full user authentication and authorization workflows. Comprehensive Audit Trails capture instrument data and status updates, user activities (logins, sample initiations, reviews), network events and synchronization with LIMS/ELN, and timestamp integrity for all actions. Data Integrity Controls include prevention of unauthorized data modification, secure data transfer protocols, and encrypted storage and transmission.



Gaining the Competitive EDGE

While other platform providers provide IT headaches, a Phizzle integration solution offers a complete solution. Day 1 Connectivity means instruments are productive immediately, not after months of integration. Lower TCO eliminates hidden consulting fees or the need for dedicated integration staff. Faster ROI allows labs to start generating compliant, integrated data from day one. Most importantly, the instrument lifecycle is no longer dependent on communication protocols and connectivity, but actual instrument functionality.