LITMUS
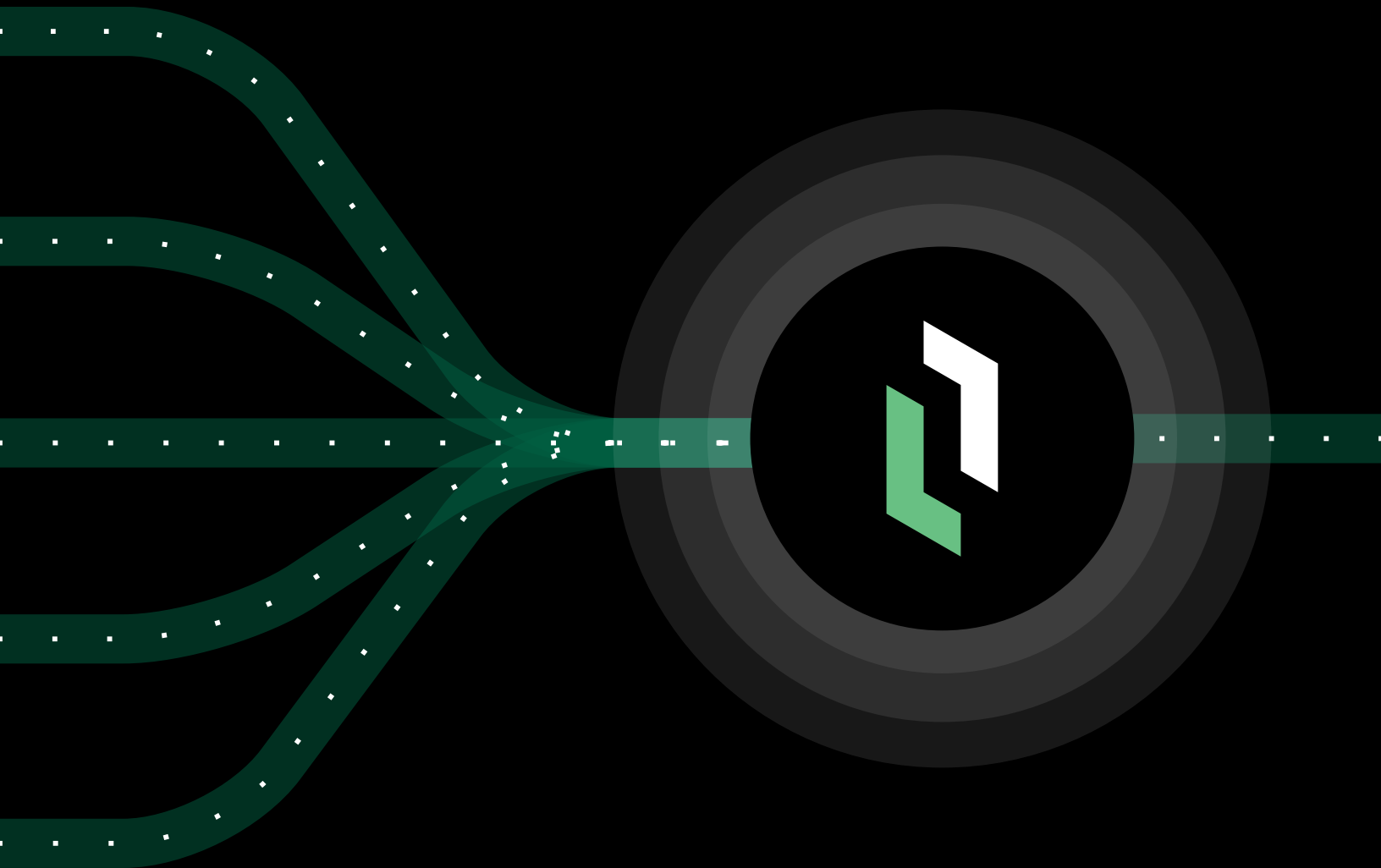
Industrial IoT Playbook

Connecting OT Assets at Scale

Enterprise-Scale OT Connectivity Made Easy
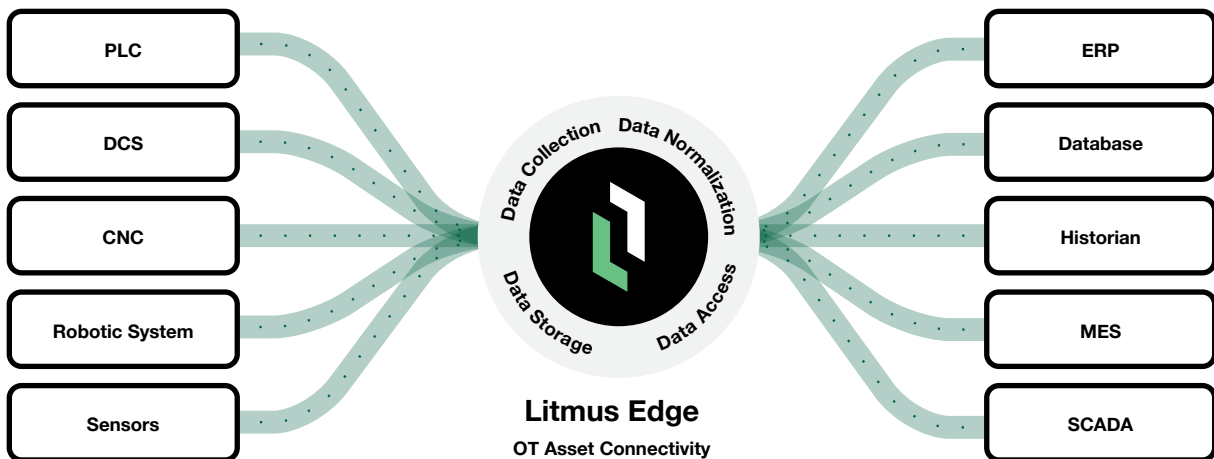
The number one challenge our enterprise customers face when enabling Industrial IoT is how to connect to all their OT assets at scale. With so many different types of industrial assets, data sources and protocols being used – the need for a rapid, secure and scalable OT connectivity solution is real.

At Litmus we make it easy. Our Industrial IoT Edge platform provides the foundation you need for IIoT at scale by creating a unified OT data layer at the edge. We allow you to quickly connect to every type of device or system with ease. Then we handle the four key parts of OT asset connectivity – data collection, data normalization, data storage and data access. Once the foundation is in place, you can use data intelligence to power any use case across the enterprise.

Read this guide to learn how we've helped hundreds of customers solve their OT asset connectivity challenges once and for all to achieve complete, secure, enterprise-scale data flow. Understand why other OT systems simply don't go far enough to connect to every asset and share data intelligence at scale. Then see how you can put the data to work to power applications that improve operations.

What is OT Asset Connectivity?

Complete OT asset connectivity is the critical first step and foundation for any successful Industrial IoT deployment. At Litmus we define success by connecting to every OT asset to enable four key functions: data collection, normalization, storage and access. When these four things happen at scale, you can activate Industrial IoT use cases for rapid ROI across the entire organization.

PLC — **DCS** — **CNC** — **Robotic System** — **Sensors**

Data Collection · Data Normalization · Data Storage · Data Access

Litmus Edge
OT Asset Connectivity

ERP — **Database** — **Historian** — **MES** — **SCADA**

Data Collection

Litmus collects data from every asset – legacy or modern - including PLC, DCS, CNC, SCADA, Historian, ERP, sensors and more. We use native industrial protocols for device-to-Litmus data collection and make the process simple for users with pre-loaded drivers and no coding. Add any number of assets and data points with just a few clicks to achieve complete data collection across all sites.

Data Normalization

Next, we normalize the data so any on-premise, cloud or enterprise system can put the data to work. Litmus uses the open standard JSON format for its flexibility and language independence. With a unified OT data layer, any data consumer can connect to the Litmus platform securely and ingest the normalized OT data needed to enable any application or use case.

Data Storage

Litmus stores data at the edge in a scalable and secure time series database for transitional data storage. Both raw and analyzed data can be stored at the edge for easy access. Storing data at the edge keeps it contained close to the source to save time and money while making it easily available to OT, IT and data teams.

Data Access

The goal is to make ready-to-use OT data available to the people, processes and systems that need it. Litmus publishes data to a local message broker for immediate consumption and feeds big data implementations with native Kafka and a database interface. Pre-built connectors to leading cloud and enterprise systems provide easy integration and secure data access.

Top Connectivity Challenges

OT and IT teams face several challenges when it comes to connecting all industrial assets at scale. As you choose a platform, consider the roadblocks and requirements for both OT and IT since both will need to access and use the data.

OT Challenges

1 The complex integration of existing brownfield data sources

2 Inconsistent, unstructured data formats that make it difficult to utilize data

3 Disparate data silos and systems across the OT shop floor

4 Legacy and distributed infrastructure with high system integration costs

IT Challenges

5 Huge diverse data sets with no process for collection, storage and management

6 Difficulty managing and utilizing data across several sites

7 Inability to securely move data between edge and cloud systems

8 Integration of data with IT systems such as ERP, MES and cloud platforms

Working with Other Solutions

Most manufacturers have made investments in OT systems to automate, control and track production processes. They have likely standardized on Siemens, Rockwell, ABB and other industrial automation systems to digitize production. They may have SCADA and MES systems to manage and control resources and plant processes. Many are using OPC UA for basic data collection and sharing data between OT and IT systems. Below is a breakdown of the most common OT systems, and how Litmus enhances and builds on those investments to solve connectivity and enable the free flow of data across the enterprise.

OPC UA Server

OPC UA Servers offer basic data collection and act as a source of industrial automation data exposed in its native format to bridge devices (PLC, DCS, CNS) and clients (SCADA, MES, Cloud). They cannot connect to every type of asset on the shop floor and have a hard time handling varied data structures but do the job of connecting to standard assets and exposing the data. Scaling is difficult as each instance must be managed individually.

Litmus

Litmus can either fill the gap to compliment an OPC UA Server and include it as a data source, or act as an OPC UA Server and replace the solution entirely. With more than 250 drivers Litmus has a wider range of connectivity and then normalizes and models the data for easy consumption by third party systems without any user effort. Litmus also adds edge compute power and analytics on top, plus the ability to centrally manage at scale.

SCADA

SCADA is a plant process control system that monitors equipment for data acquisition and supervisory control. SCADA systems ingest OT data and enable purpose-built applications in the SCADA environment but are not built for rapid change or data analytics and experimentation. SCADA systems are good at collecting and exposing the data for the things they control, plus adding alerts, but most have limited scope in the plant.

Litmus

Litmus and SCADA work well together to extend Industrial IoT use cases. Litmus unifies SCADA with all other OT data, then adds data normalization, edge computing and analytics, runtime applications and integration to enterprise systems on top. Litmus has the native integration into IT systems that SCADA lacks and can activate additional use cases by moving any workload to the edge. Litmus also feeds analyzed data into SCADA systems for further visibility into key OT KPIs in real-time.

Historian

A data historian collects and stores process data from SCADA or automation systems for long-term insight into trends, patterns and equipment performance. Historian records are time-stamped and include analog data, digital readings, quality assurance data and alerts for out-of-limit or return-to-normal. On their own historians require advanced skill sets and don't share data easily with cloud or enterprise systems, requiring custom code and data mapping.

Litmus

Litmus compliments historians bidirectionally – pulling data out or providing data to the historian. The Litmus platform makes it easy to unify historian data with all other sources, then move the data anywhere, experiment on the data with visualizations and edge analytics and connect to cloud systems to feed machine learning models. Litmus complements historians by adding more real-time functionality, scalability and ease-of-use.

Cloud

Many manufacturers adopt a cloud analytics platform and then need a way to collect and feed OT data to the cloud. They typically use a point solution such as a module on each PLC with MQTT to make a connection, expose the data and talk to the cloud directly. However, the process is labor intensive, not scalable, and requires security considerations and manual coding. Some assets may be difficult or even impossible to connect to directly.

Litmus

Instead of building connections manually, the Litmus platform can take care of all cloud data ingestion securely and natively. Litmus makes it easier, faster, more manageable, more secure, and scalable to add any industrial device or system and connect it to any cloud analytics platform with pre-built drivers and connectors. In addition, Litmus computes data at the edge so instead of sending every data point to the cloud, manufacturers can send based on change status or deviation to save cloud compute and transmission costs.
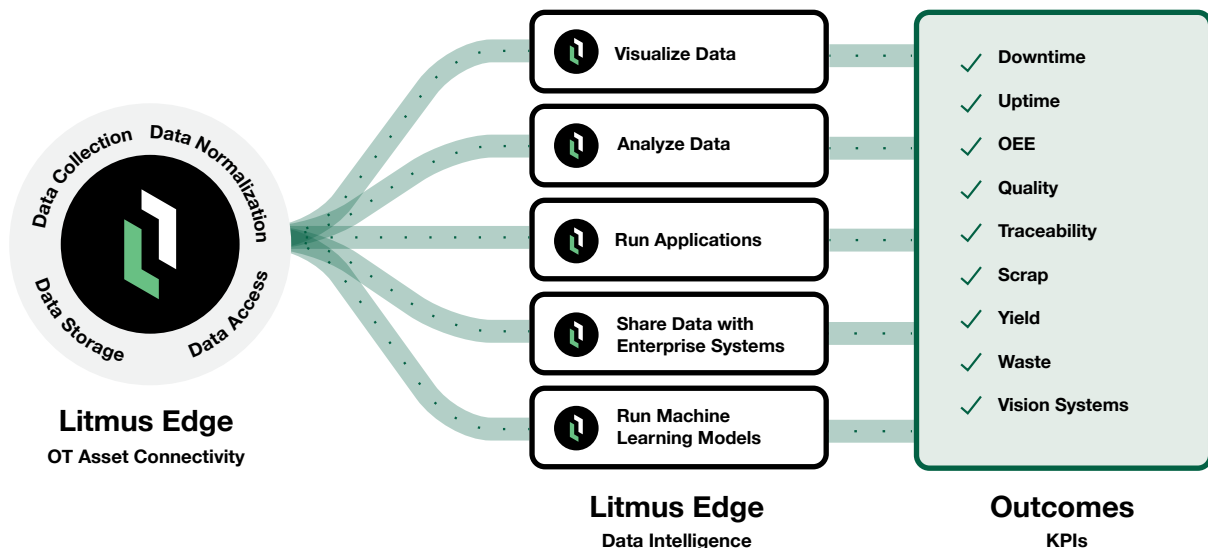
Homegrown

Manufacturers may program their own homegrown solutions to solve specific problems on the shop floor – anything from enterprise resource planning to machine monitoring. These applications may solve temporary problems but come with challenges: many homegrown applications can't integrate with other business systems, they are designed to address a particular issue without thoughts of growing and scaling, and they are not typically easy to use or maintain.

Litmus

Any homegrown application can be run inside of Litmus using Docker container technology. Litmus enables any application to communicate directly with OT assets, be managed in the cloud, pushed down to the edge and maintained or scaled over time. Additionally, we provide access to more than 250 device drivers out-of-the-box, built with patented technology that enables the rapid development of new or custom OT device drivers.

Putting OT Data to Work

Now that you have collected and normalized all OT data, the next step is to put that data to work. Our Industrial IoT Edge platform combines rapid OT asset connectivity with machine analytics and the ability to run any application at the edge. Utilize the data immediately with our workflow engine, access pre-built analytics based on common KPIs, integrate the data with enterprise systems or use it to feed applications. Easily run any private or public application at the edge via Docker container such as open source Grafana to visualize data or TensorFlow for machine learning. Litmus enables any Industrial IoT application for fast ROI.

Litmus Edge
OT Asset Connectivity

Data Collection · Data Normalization · Data Storage · Data Access

- Visualize Data
- Analyze Data
- Run Applications
- Share Data with Enterprise Systems
- Run Machine Learning Models

Litmus Edge
Data Intelligence

Outcomes — KPIs:
- ✓ Downtime
- ✓ Uptime
- ✓ OEE
- ✓ Quality
- ✓ Traceability
- ✓ Scrap
- ✓ Yield
- ✓ Waste
- ✓ Vision Systems

Outcomes
KPIs

Ready-to-Use OT Data

The first critical step is to securely connect to every modern and legacy asset to unify and normalize all OT data.

- Connect to any PLC, CNC, sensor, SCADA, MES, Historian, and more
- Collect, normalize and store data so it can be used by applications

Putting Data to Work

Once OT data is collected, analyze the data at the edge or use it to fuel any application.

- Monitor and analyze machine data with ready analytics and custom visualizations
- Feed and deploy containerized applications like databases, Grafana and more in a no-code environment
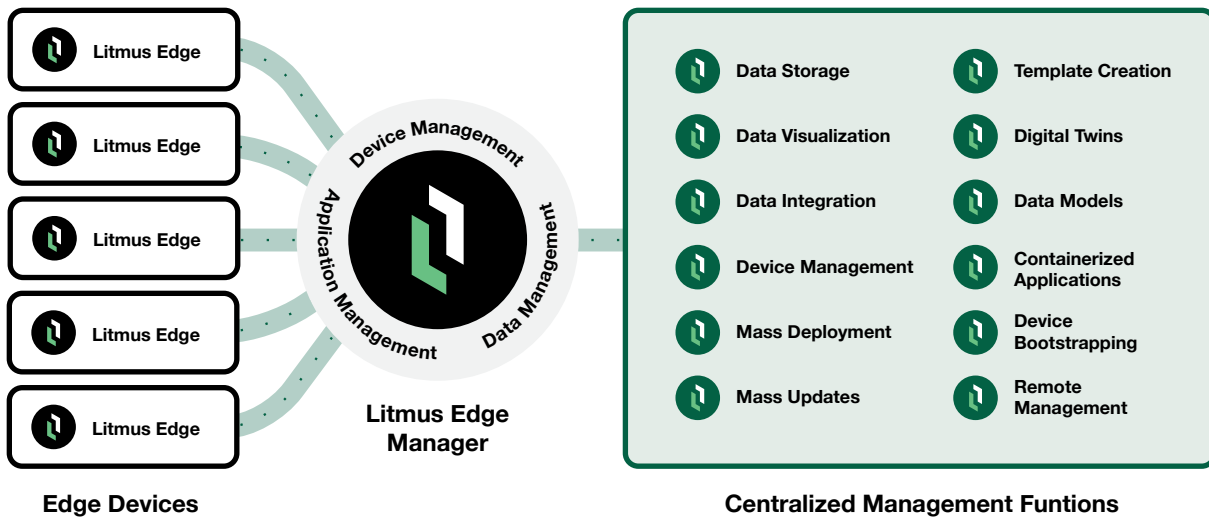
Outcomes

Putting data to work allows you to realize key KPIs, or outcomes, to improve operations at scale.

- Easily share key KPIs with anyone who needs the data to make improvements
- Make adjustments and realize ROI from outcomes in just weeks or months, not years

How to Scale Connectivity

Once you have solved connecting OT assets, the challenge becomes how to scale connectivity to all assets across multiple sites. While there is some value in optimizing one production line, true operational improvement comes when both OT and IT teams have complete visibility into the overall health of machines, reasons for downtime and parameters for optimal production so they can make adjustments that improve operations across the entire business. Every site has its own complexities – which is why scaling requires the right infrastructure that can handle any type of asset and then provide for the centralized management of OT devices, data and applications.

Edge Devices

Litmus Edge Manager

Centralized Management Funtions

Edge Devices list: Litmus Edge, Litmus Edge, Litmus Edge, Litmus Edge, Litmus Edge

Device Management · Application Management · Data Management

Centralized Management Functions: Data Storage, Data Visualization, Data Integration, Device Management, Mass Deployment, Mass Updates, Template Creation, Digital Twins, Data Models, Containerized Applications, Device Bootstrapping, Remote Management

Device Management

We allow you to control all Litmus Edge devices across all locations, removing the need for on-site management with Litmus Edge Manager. All of your Litmus Edge systems can be remotely configured, updated and monitored from a single point of control.

Data Management

With Litmus Edge systems up and running, integrate data from across the entire deployment for enterprise-wide visibility. Decide which data you need and where you want it to go, managing the data flow with Litmus Edge Manager to put machine data to work at scale.

Application Management

Litmus Edge Manager not only allows you to run any containerized application, it provides centralized control of how they are hosted, deployed and updated. Decide which applications should be deployed at which sites, who has access and keep them running as planned.

Capabilities Checklist

As you develop your IIoT Playbook, there are key capabilities that will help you successfully connect OT assets at scale. Any solution that checks all the boxes will allow you to achieve complete, secure asset connectivity across the enterprise, then put that data to work to run any application at the edge and realize advanced IIoT use cases. Use this checklist to compare and validate the essential connectivity features for any Industrial IoT platform.

	Litmus	Vendor 1	Vendor 2	Vendor 3
Connects to any OT asset securely out-of-the-box	✓			
Zero programming to setup OT data collection and data flow	✓			
Normalizes all asset data into a unified OT data layer	✓			
Stores data in a time series database ready for consumption	✓			
Offers machine analytics and pre-built KPIs at the edge	✓			
Streams ready-to-use data to any cloud or enterprise system	✓			
Provides a single point of control for all edge devices	✓			
Brings all OT data together with shareable dashboards and KPIs	✓			
Runs containerized applications and machine learning models at the edge	✓			

Getting Started

Complete OT asset connectivity is the essential first step to successful Industrial IoT – it can't be treated as optional or solved with a quick fix. Cloud platforms like AWS, Azure and Google need complete, structured OT data to perform advanced analytics and machine learning. OT teams need complete connectivity to improve operations at the edge. IT teams need access to OT data to power enterprise systems and data-driven decisions. Litmus was built for true enterprise-grade Industrial IoT – meaning it provides everyone with the data they need, when they need it, to power use cases at scale with rapid and secure connectivity.

Watch the How to Collect and Visualize Data from OT Assets Webinar

https://litmus.io/resource/how-to-collect-and-visualize-data-from-ot-assets/

Read the How to Deploy an Industrial IoT Platform for Smart Manufacturing

https://litmus.io/resource/smart-manufacturing-deployment-guide/

Book a Litmus Edge Platform Demo

https://litmus.io/get-started/

LITMUS

The Industrial IoT Edge Platform

Litmus.io