FLOW SOFTWARE

Turn Historic & Real Time Data Into Calculated Tags, KPIs, & Events

@ ENTERPRISE SCALE

Take Your Analytics To The Next Level

IT'S ABOUT TIME

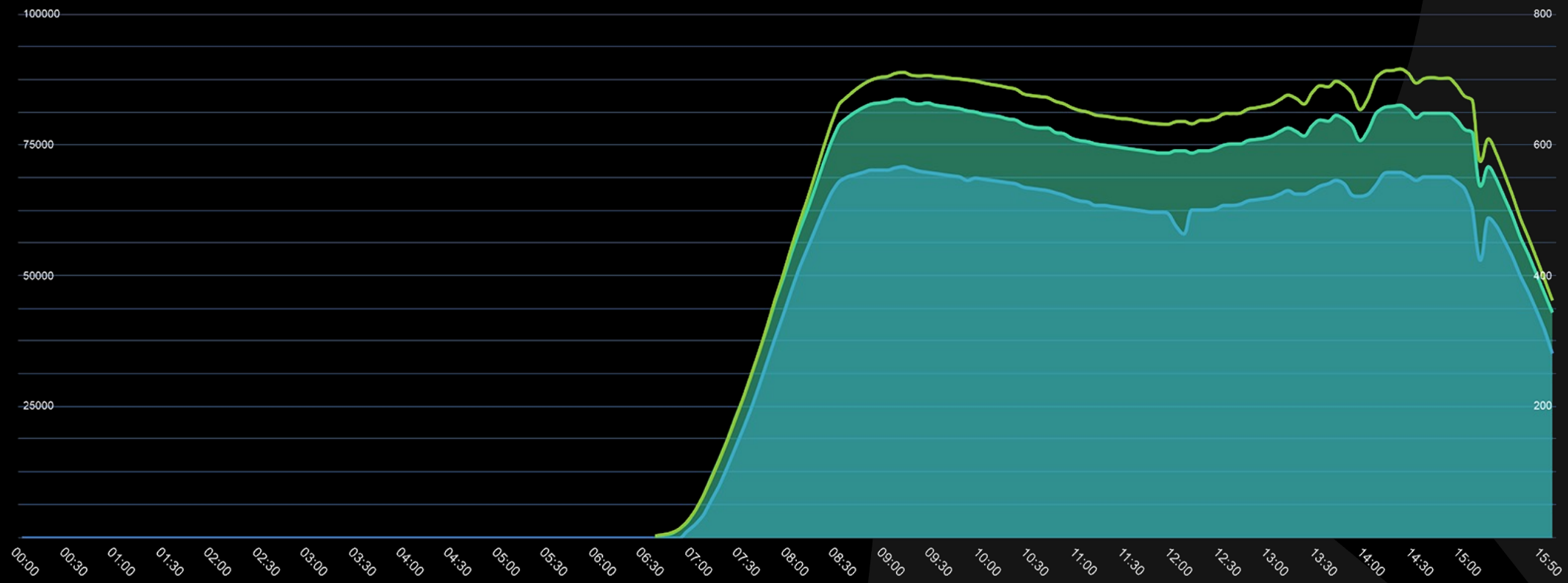
flow-software.com

What Data Source Is KEY for Analytics?

A. Real time / Current Value

B. Historic Records

C. Manual Data



FLOW SOFTWARE

What Value Is Data Without Contextualization?

Inherit Minimal Context at the Edge

Real Time
Gateway

▲ 87,290 GAW_78730_FQ.PV

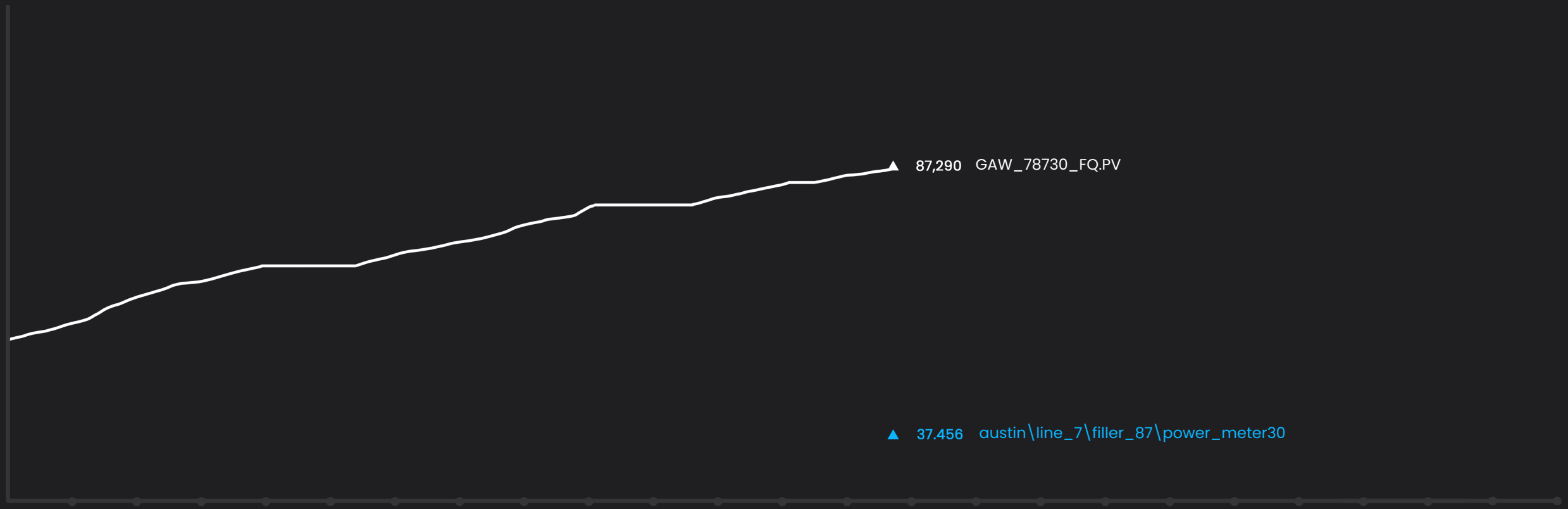
▲ 37.456 austin\line_7\filler_87\power_meter30

FLOW SOFTWARE
flow-software.com

We Need More than Just Real Time Data

Real Time Gateway

Process Historian



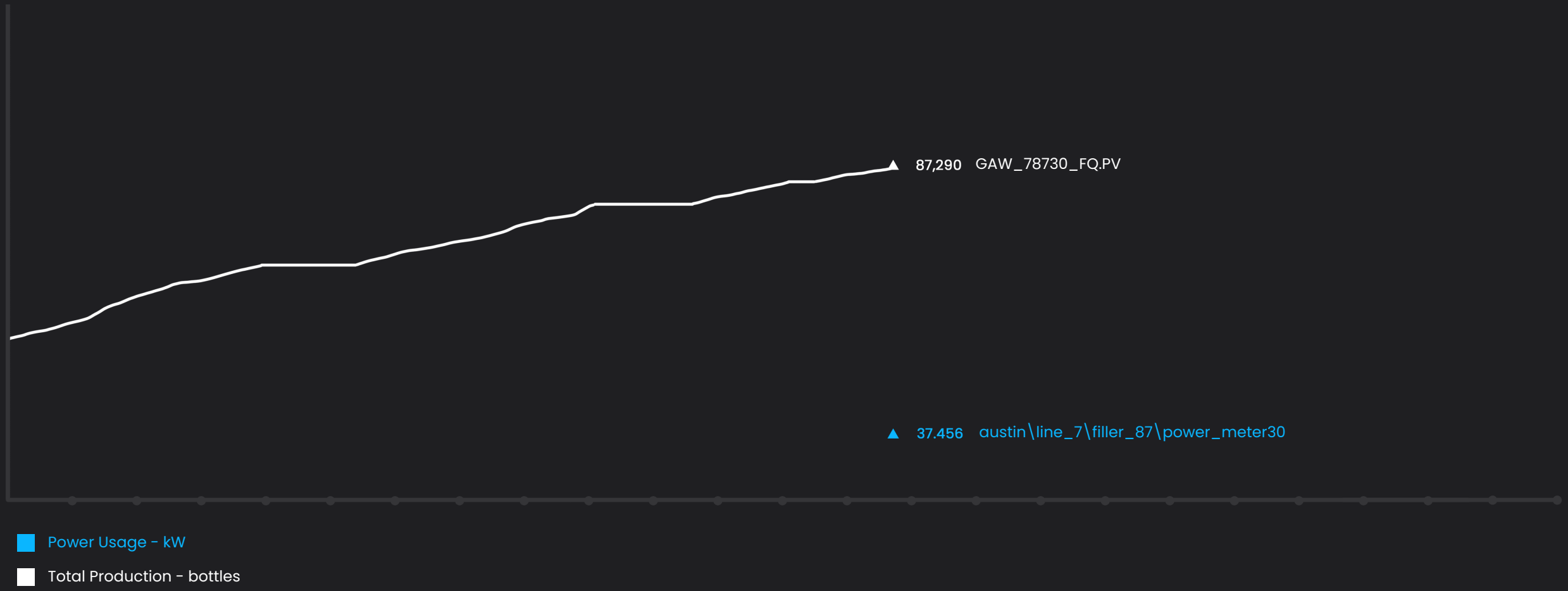
FLOW SOFTWARE

flow-software.com

Abstract a Common Information Model

Real Time Gateway

Process Historian



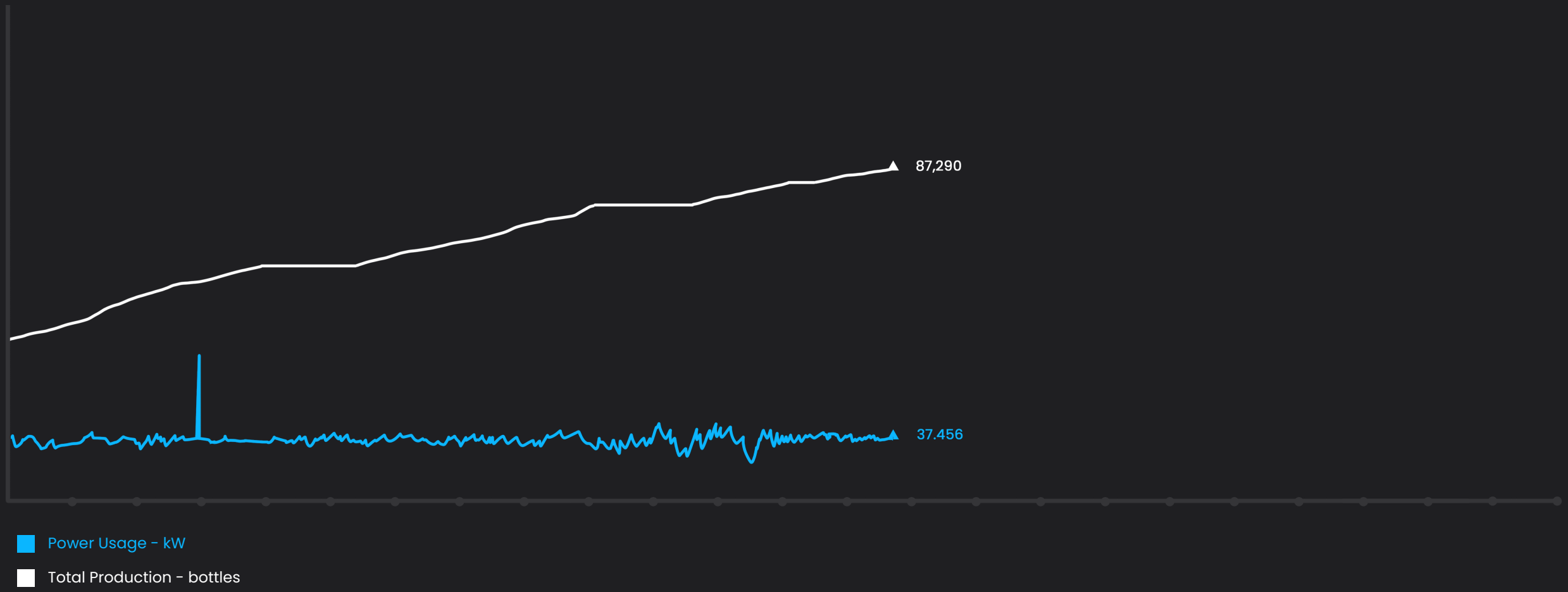
FLOW SOFTWARE

flow-software.com

Add History for Real Time Sources

Real Time Gateway

Process Historian



FLOW SOFTWARE

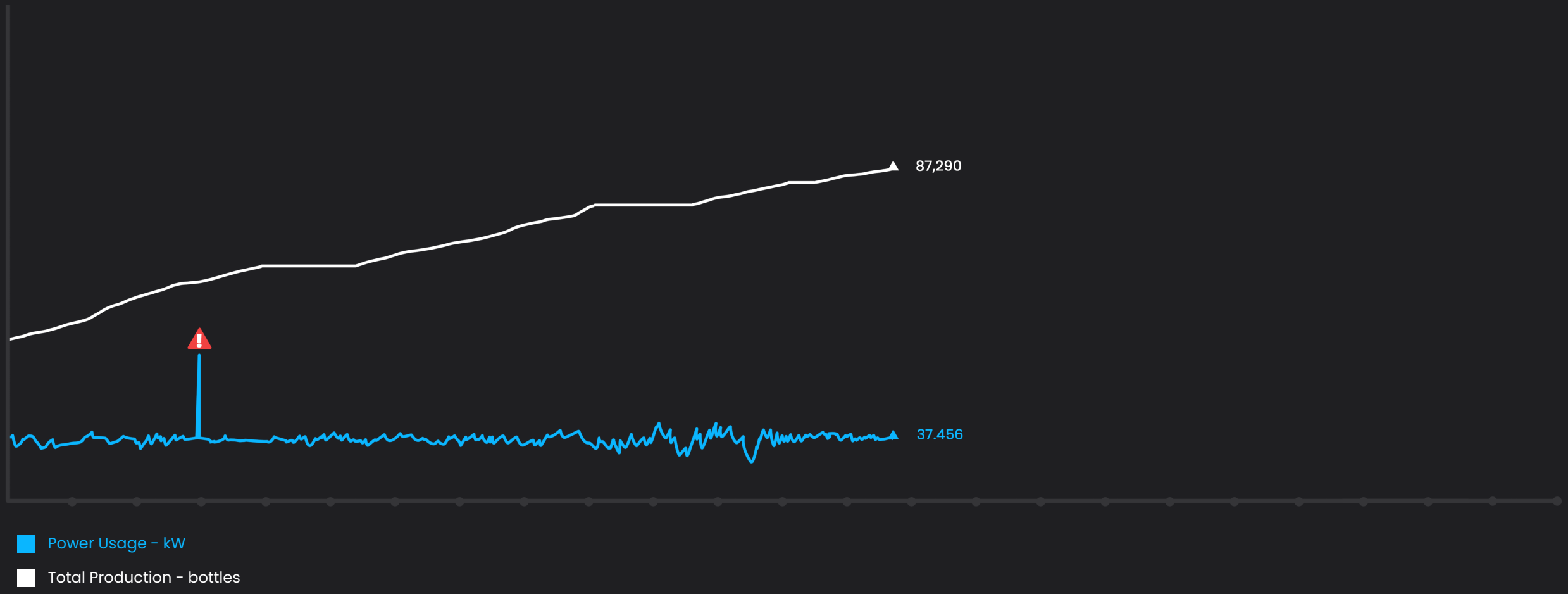
flow-software.com

Provide Data Cleansing

Real Time Gateway

Process Historian

Flow Calc Engine



FLOW SOFTWARE

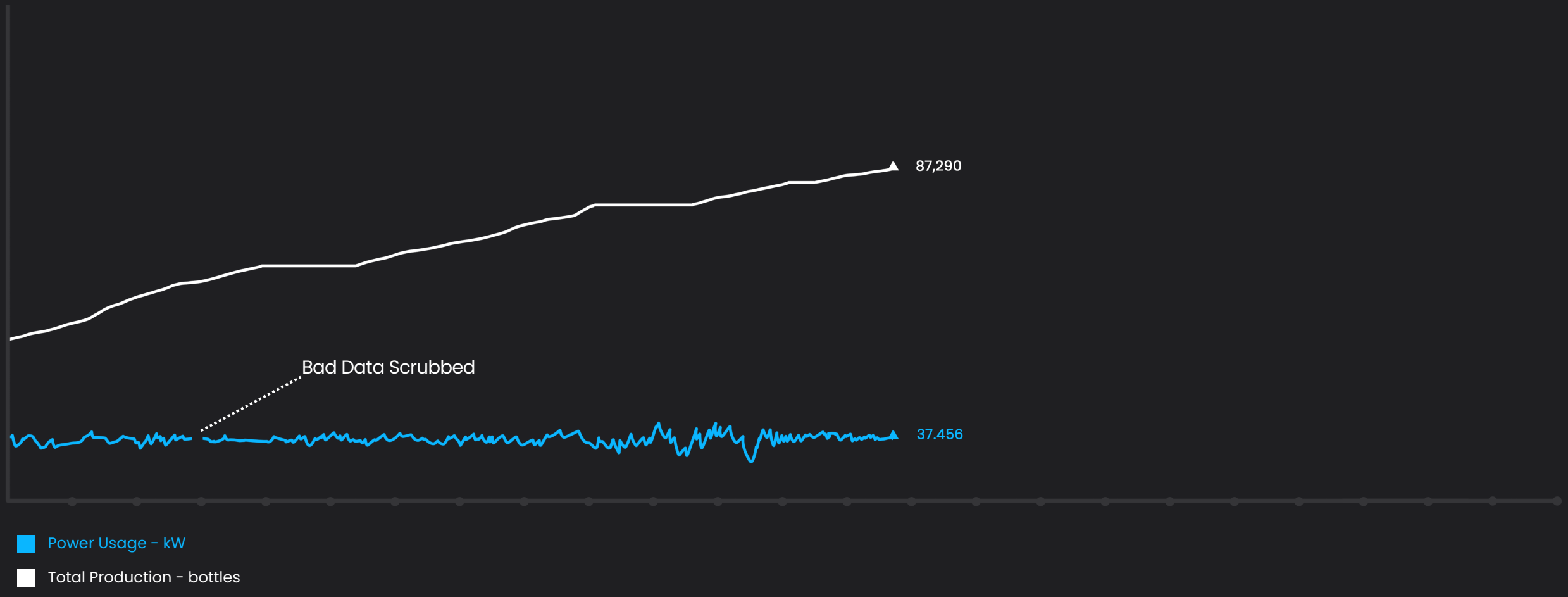
flow-software.com

Provide Data Cleansing

Real Time Gateway

Process Historian

Flow Calc Engine



FLOW SOFTWARE

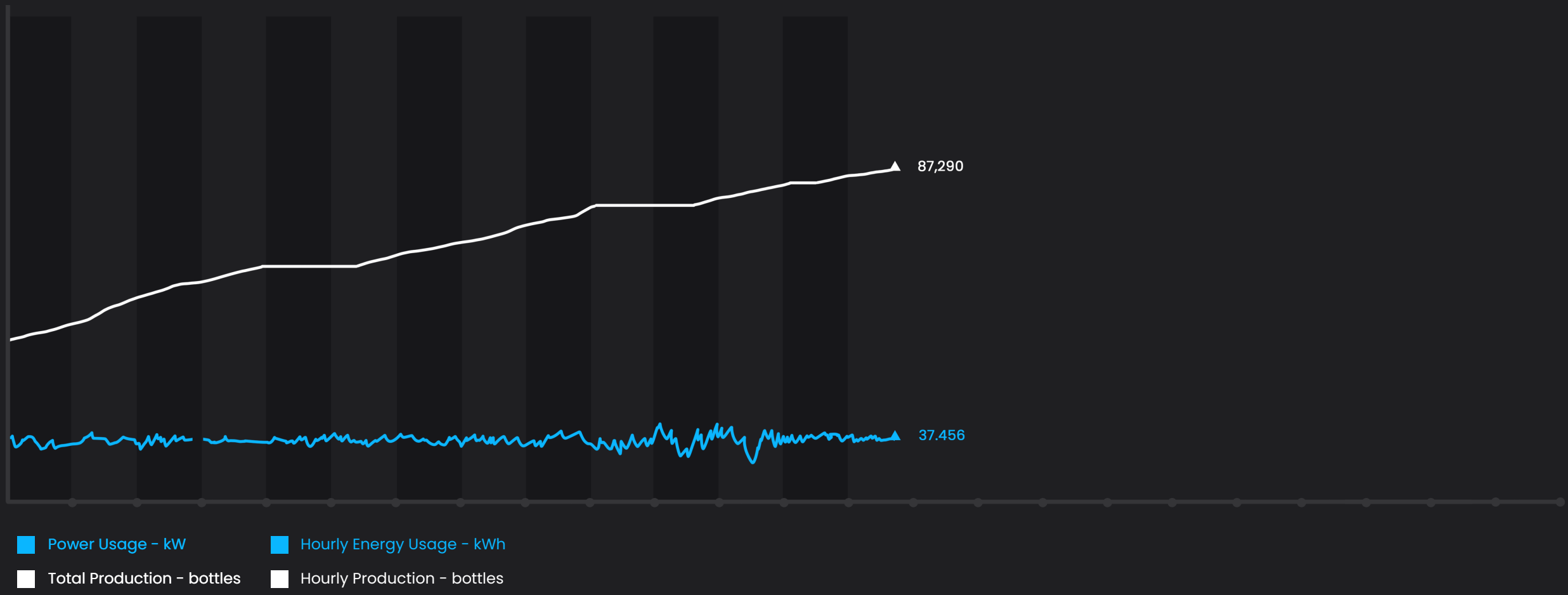
flow-software.com

Aggregate KPIs Based on Time Interval

Real Time Gateway

Process Historian

Flow Calc Engine



Power Usage - kW

Hourly Energy Usage - kWh

Total Production - bottles

Hourly Production - bottles

FLOW SOFTWARE

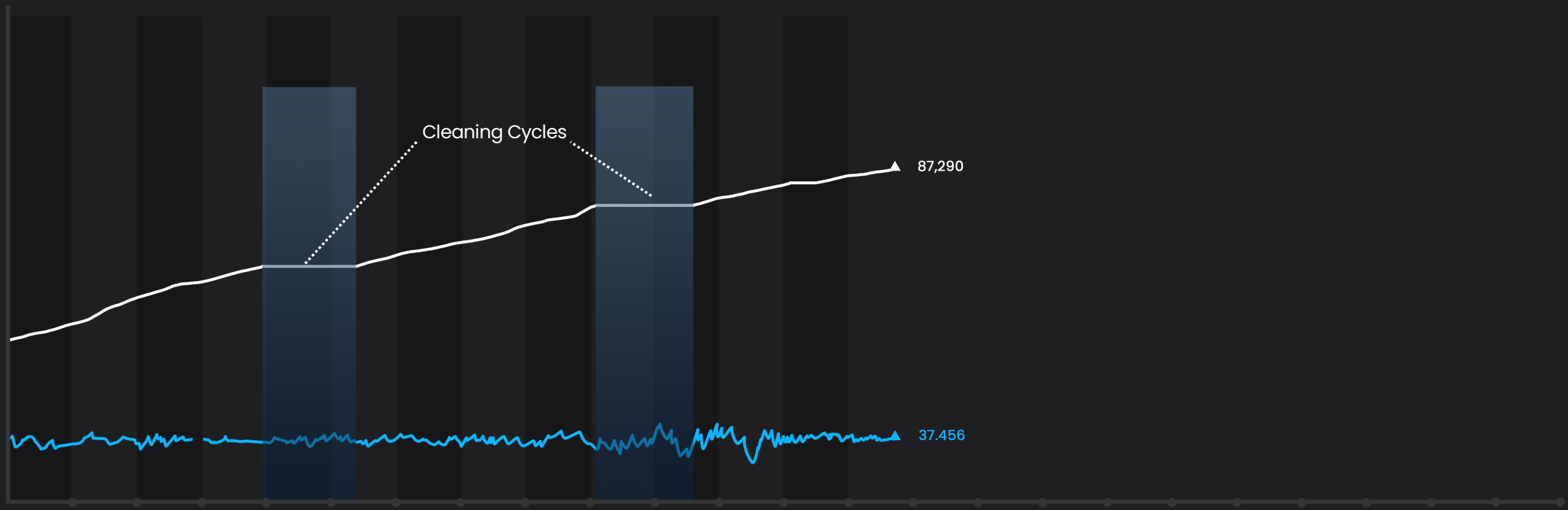
flow-software.com

Define States & Monitor Events

Real Time Gateway

Process Historian

Flow Calc Engine



Power Usage - kW

Hourly Energy Usage - kWh

Energy Usage per Cleaning - kW

Total Production - bottles

Hourly Production - bottles

FLOW SOFTWARE

flow-software.com

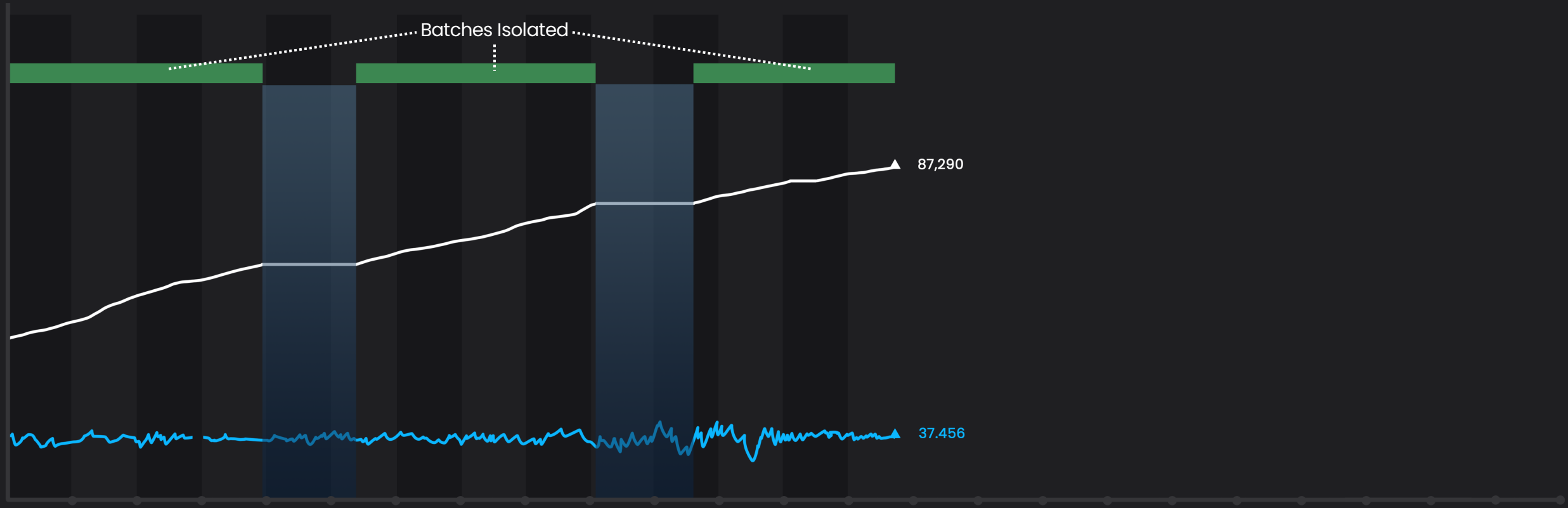
Add Batch & Product Context

Real Time Gateway

Process Historian

MES

Flow Calc Engine



- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Total Production - bottles
- Hourly Production - bottles
- Batch Production - bottles
- Batch Energy Usage - kWh

FLOW SOFTWARE

flow-software.com

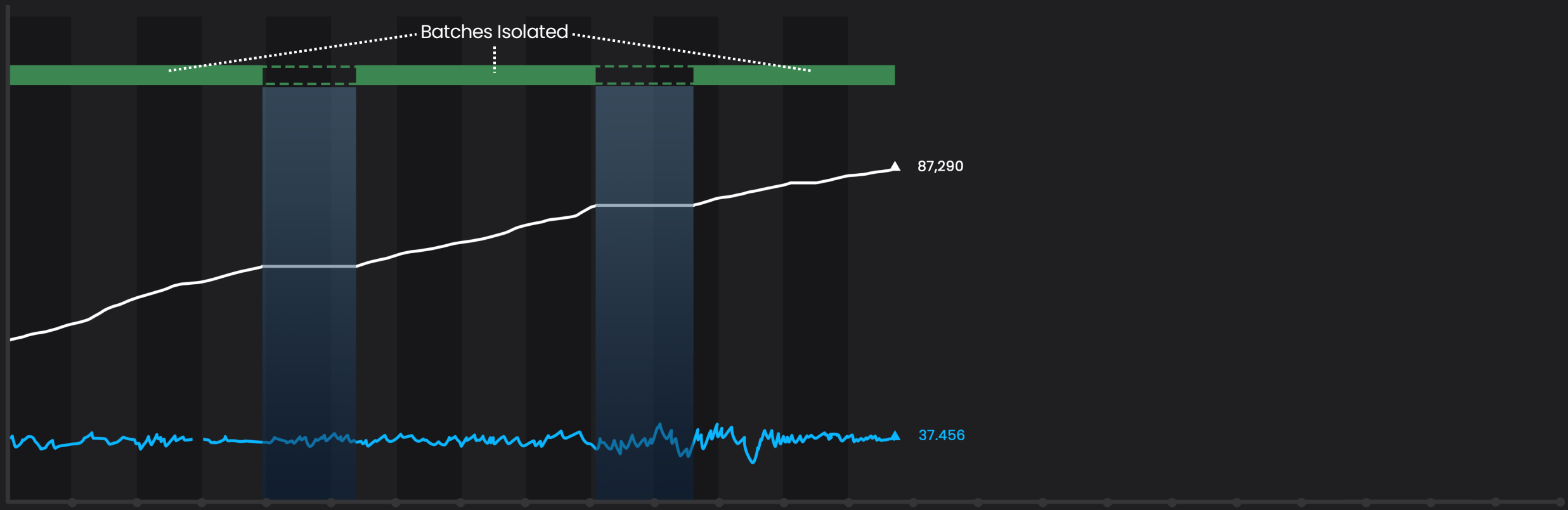
Add Batch & Product Context

Real Time Gateway

Process Historian

MES

Flow Calc Engine



- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Total Production - bottles
- Hourly Production - bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - sec

FLOW SOFTWARE

flow-software.com

Manual Input & Classification

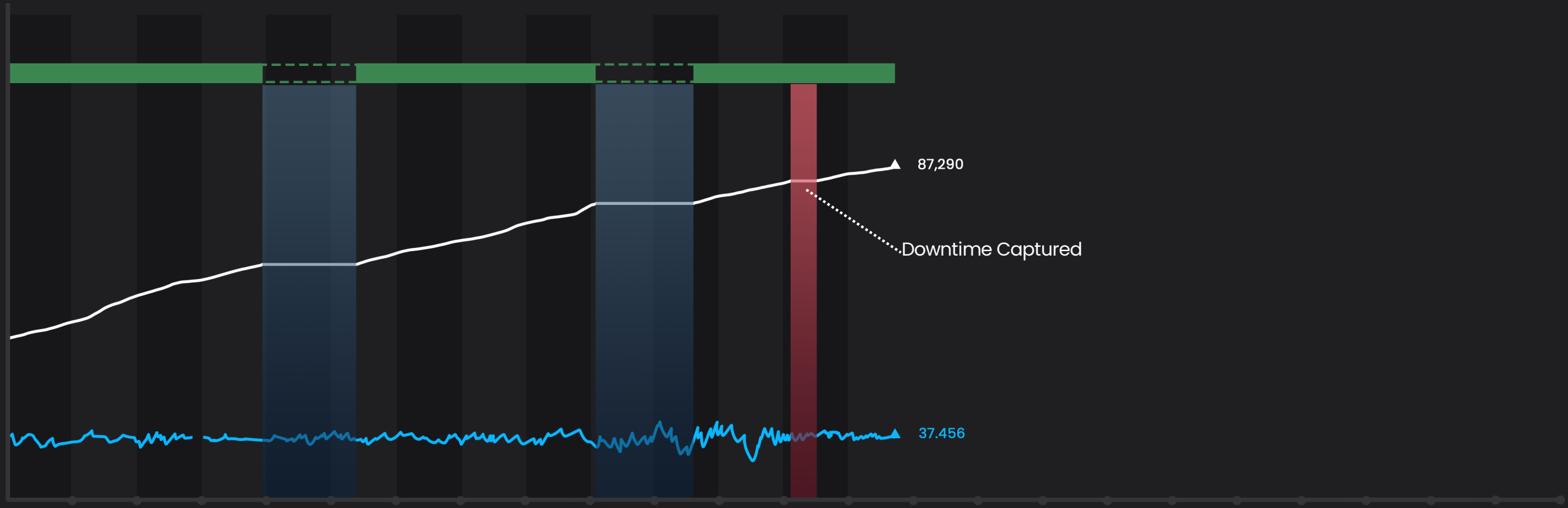
Real Time Gateway

Process Historian

MES

Manual Input

Flow Calc Engine



- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Total Production - bottles
- Hourly Production - bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency

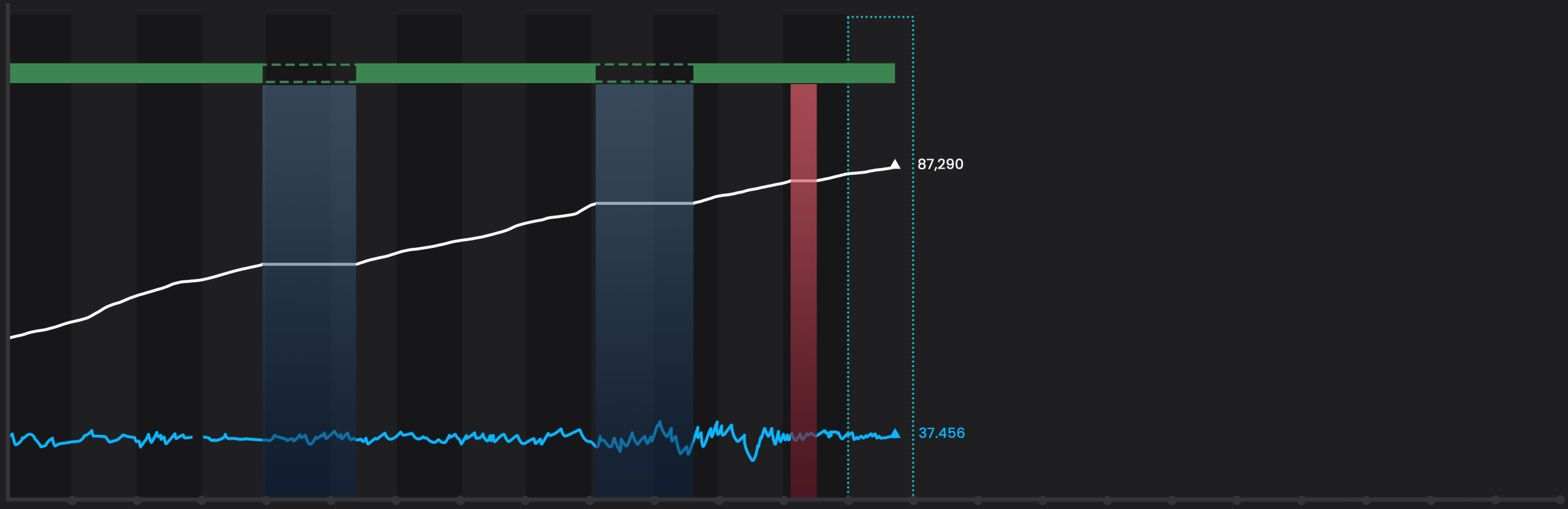
FLOW SOFTWARE

flow-software.com

Running Totals & Time Latching

Real Time Gateway | Process Historian | MES | Manual Input

Flow Calc Engine



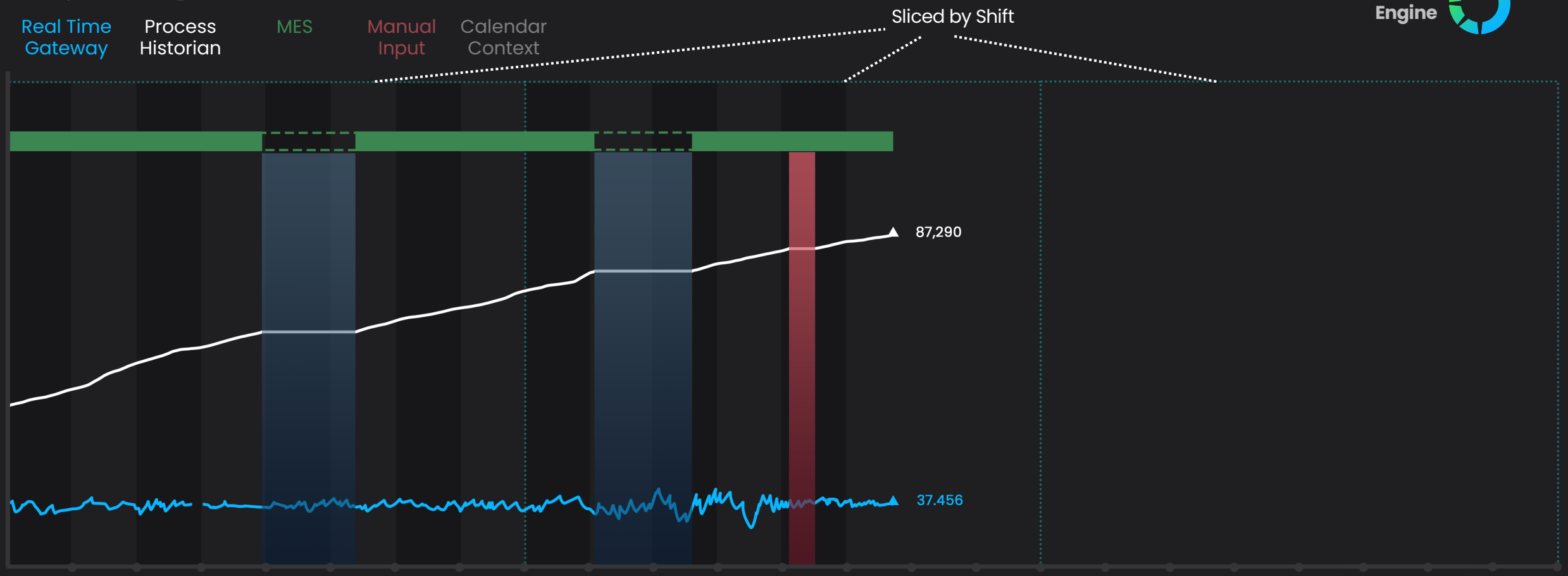
- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Total Production - bottles
- Hourly Production - bottles
- Current Hour Total - bottles
- Throughput Rate Change - %
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency

FLOW SOFTWARE
flow-software.com

Shift Patterns & Other Localized Calendars

Real Time Gateway | Process Historian | MES | Manual Input | Calendar Context

Flow Calc Engine



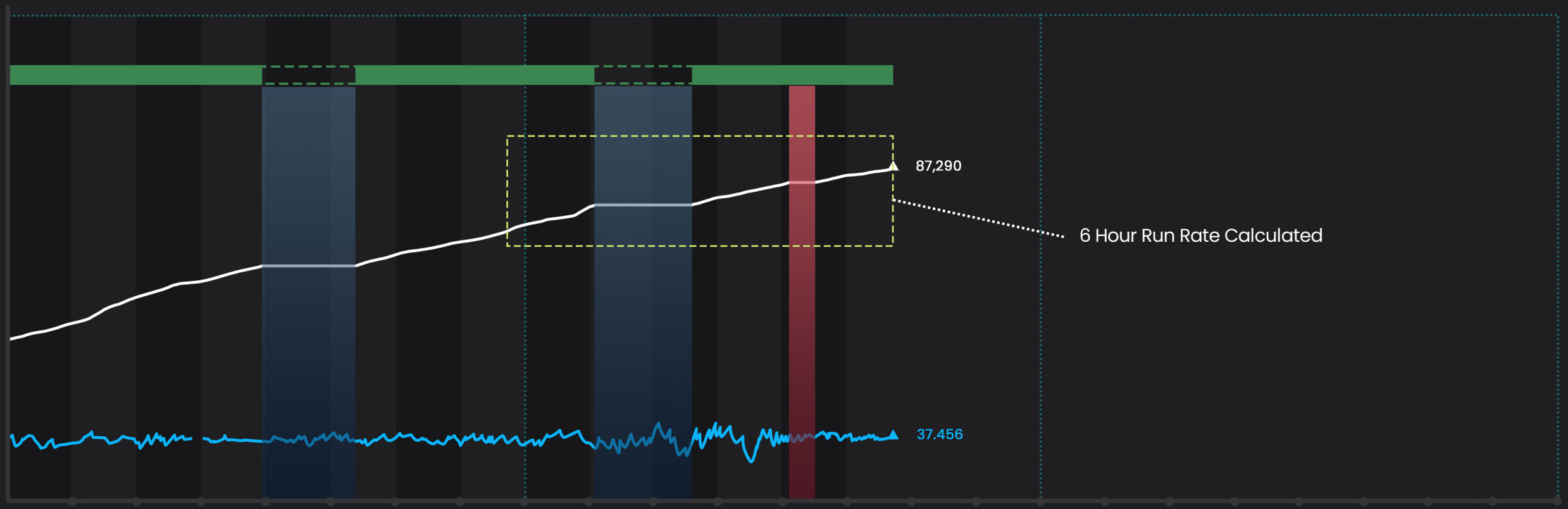
- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Shiftly Energy Usage – kWh
- Total Production - bottles
- Hourly Production - bottles
- Current Hour Total - bottles
- Throughput Rate Change - %
- Shiftly Production – bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency

FLOW SOFTWARE
flow-software.com

Establish Rate of Change from History

Real Time Gateway | Process Historian | MES | Manual Input | Calendar Context

Flow Calc Engine



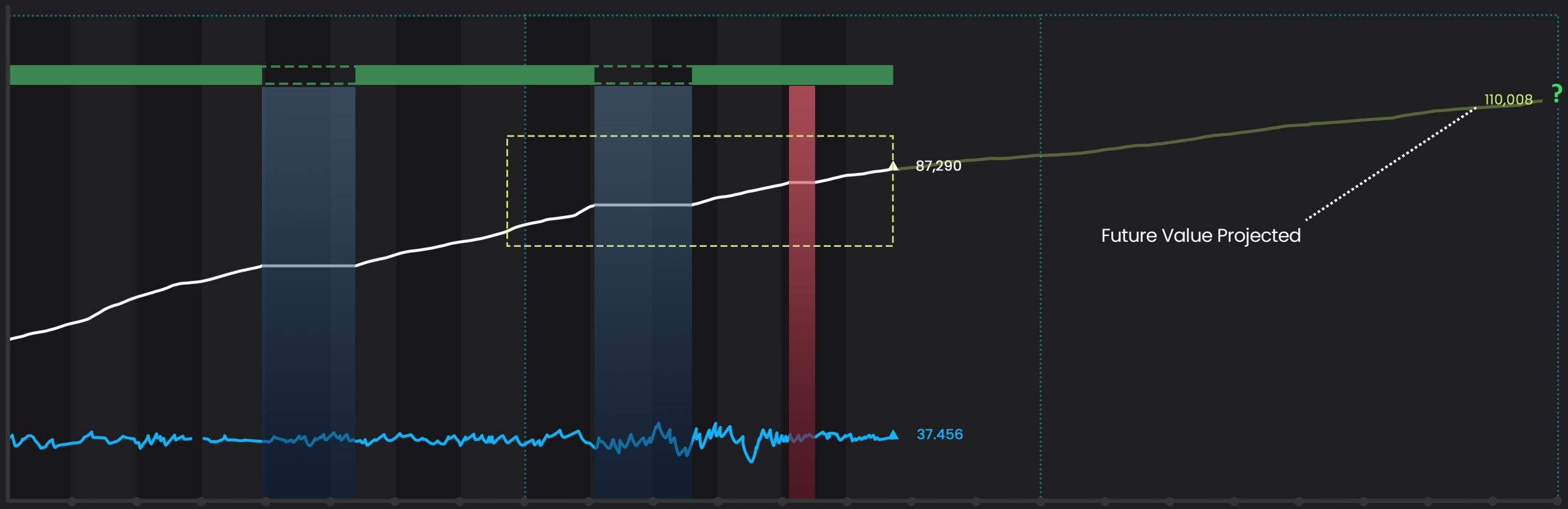
- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Shiftly Energy Usage – kWh
- Total Production - bottles
- Hourly Production - bottles
- Current Hour Total - bottles
- Throughput Rate Change - %
- Shiftly Production – bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency
- Run Rate - bottles

FLOW SOFTWARE
flow-software.com

Project Future Values

Flow Calc Engine

Real Time Gateway | Process Historian | MES | Manual Input | Calendar Context



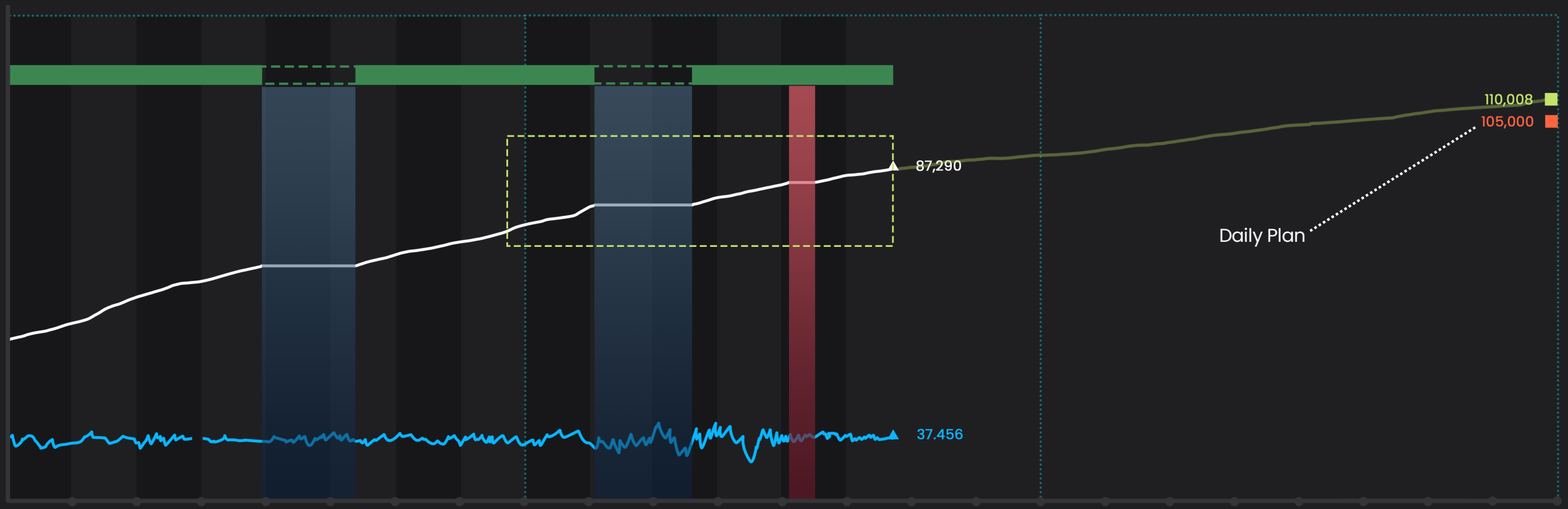
- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Shiftly Energy Usage – kWh
- Total Production - bottles
- Hourly Production - bottles
- Current Hour Total - bottles
- Throughput Rate Change - %
- Shiftly Production – bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency
- Run Rate - bottles
- End of Day Total - bottles

FLOW SOFTWARE
flow-software.com

Compare to Plan & Adjust Accordingly

Real Time Gateway | Process Historian | MES | Manual Input | Calendar Context | ERP Solution

Flow Calc Engine



- Power Usage - kW
- Hourly Energy Usage - kWh
- Energy Usage per Cleaning - kW
- Shiftly Energy Usage – kWh
- Total Production - bottles
- Hourly Production - bottles
- Current Hour Total - bottles
- Throughput Rate Change - %
- Shiftly Production – bottles
- Batch Production - bottles
- Batch Energy Usage - kWh
- Cleaning Duration - seconds
- Downtime Cause
- Downtime Duration - min
- Downtime Frequency
- Downtime Opportunity Loss - $
- Run Rate - bottles
- End of Day Total - bottles
- Plan Reliability - %

FLOW SOFTWARE
flow-software.com

What Data Source Is KEY for Analytics?

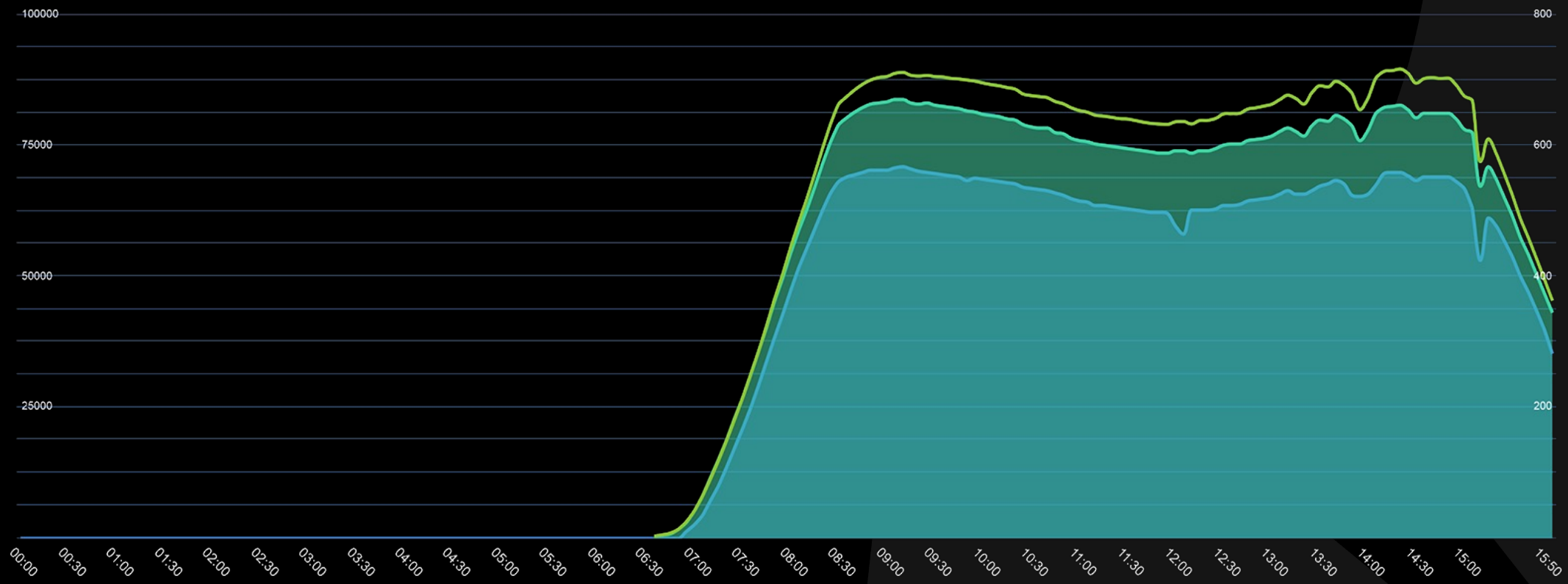
The past 40 years have focused on two types of analytics:

Descriptive

What happened?

Diagnostic

Why did it happen?



FLOW SOFTWARE

How Will You Scale?

Next generation of analytics

Predictive
what will happen?

Prescriptive
what action should I take to ensure the best outcome?

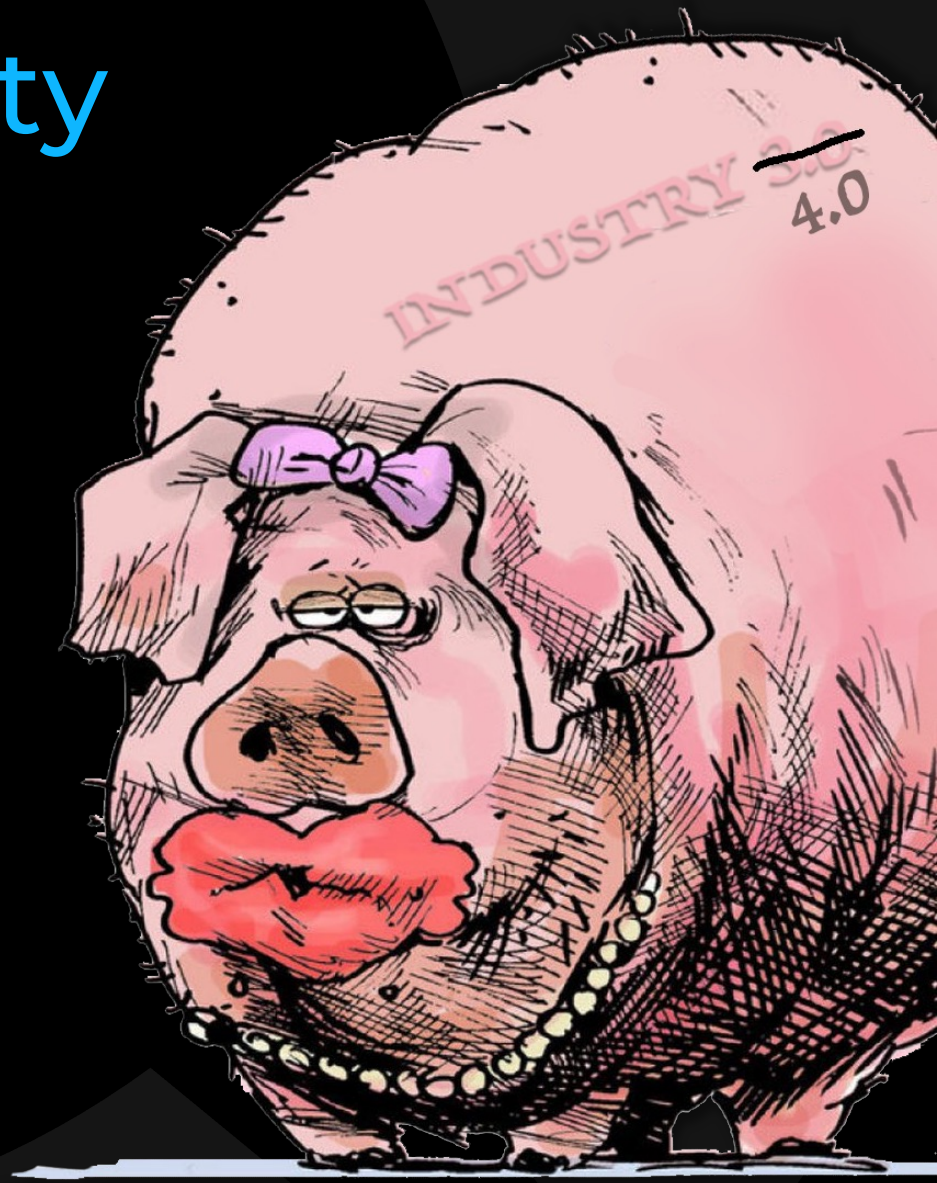
Both require massive amounts of data from many sources

Data must be cleansed, normalized, and contextualized prior to using

FLOW SOFTWARE

The ~~Problem~~ Opportunity

We cannot leverage new analytics tech using an Industry 3.0 approach

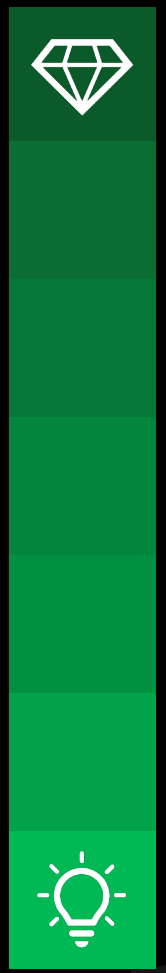


FLOW SOFTWARE

The Industry 3.0 Way

We silo analytics integration work within our SME's application of choice

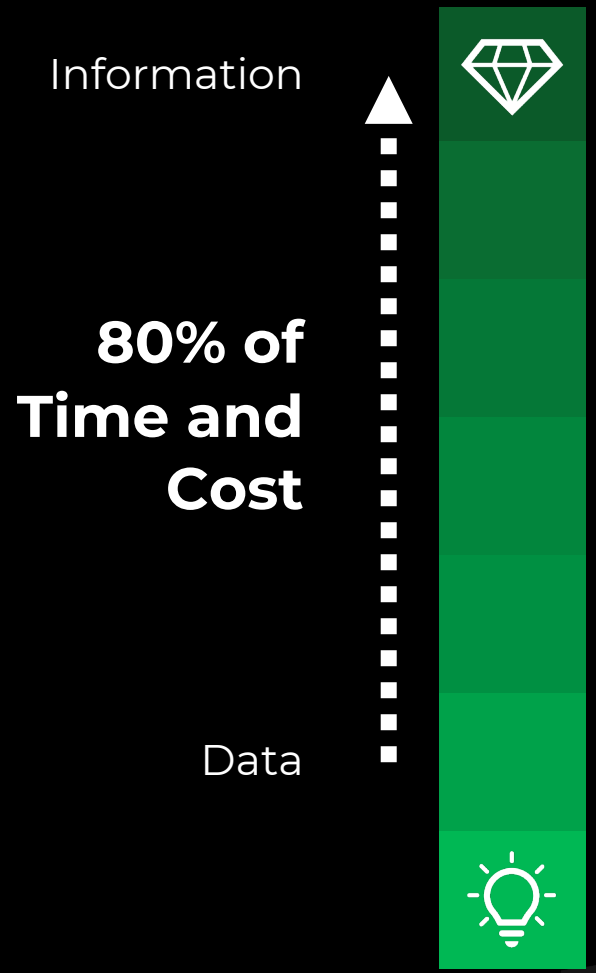
1. Driven by a business use case
2. Identify an application to land the work within
   - PowerBI, Excel 😵‍💫, AVEVA PI, AWS…
3. Build custom integration
4. Discover value



- Validate results
- Perform calculations/aggregations
- Add minimal context necessary
- Standardize and cleanse
- Connect and ingest data sources

FLOW SOFTWARE

Where is the cost?



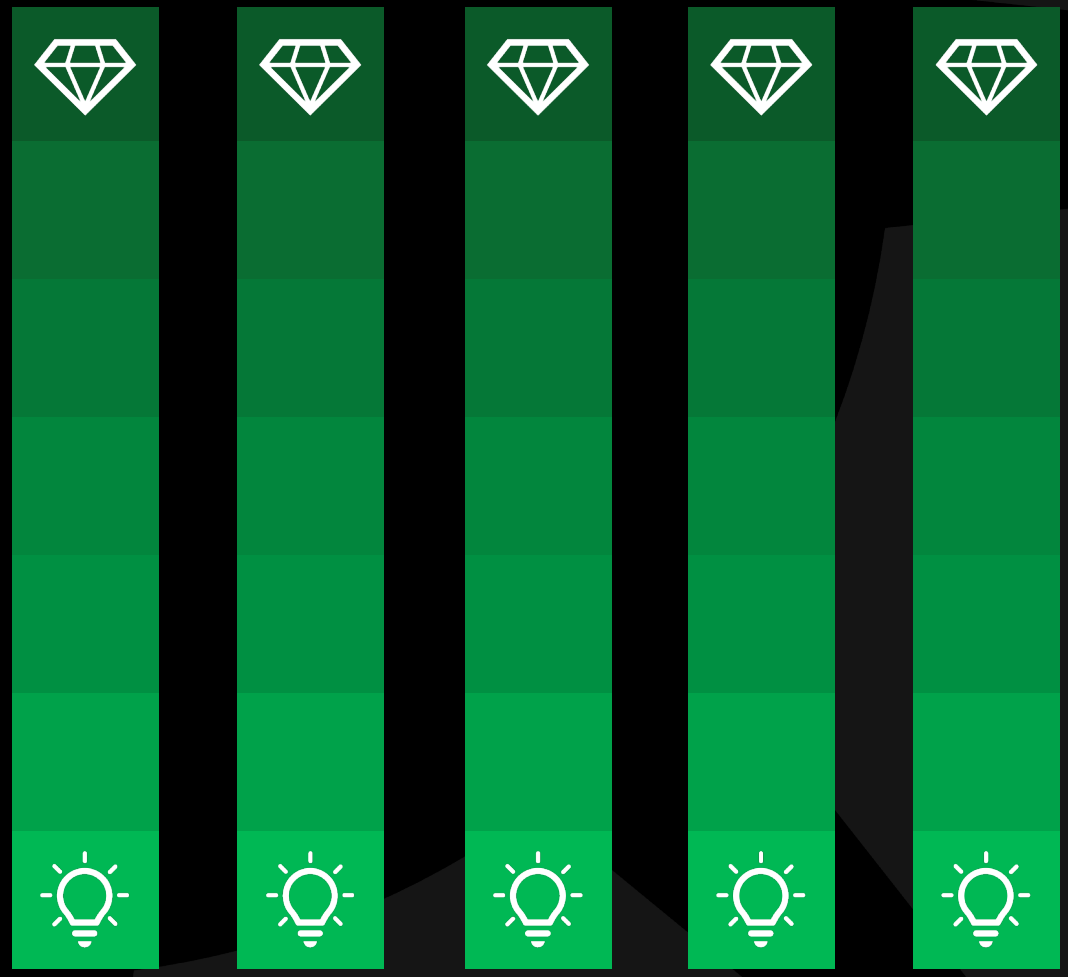
Orphaned in a Stovepipe

- Validate results
- Perform calculations/aggregations
- Add minimal context necessary
- Standardize and cleanse
- Connect and ingest data sources

FLOW SOFTWARE

How Do We Try To Scale?

We do more stovepipe integration work within the applications our SMEs want to use

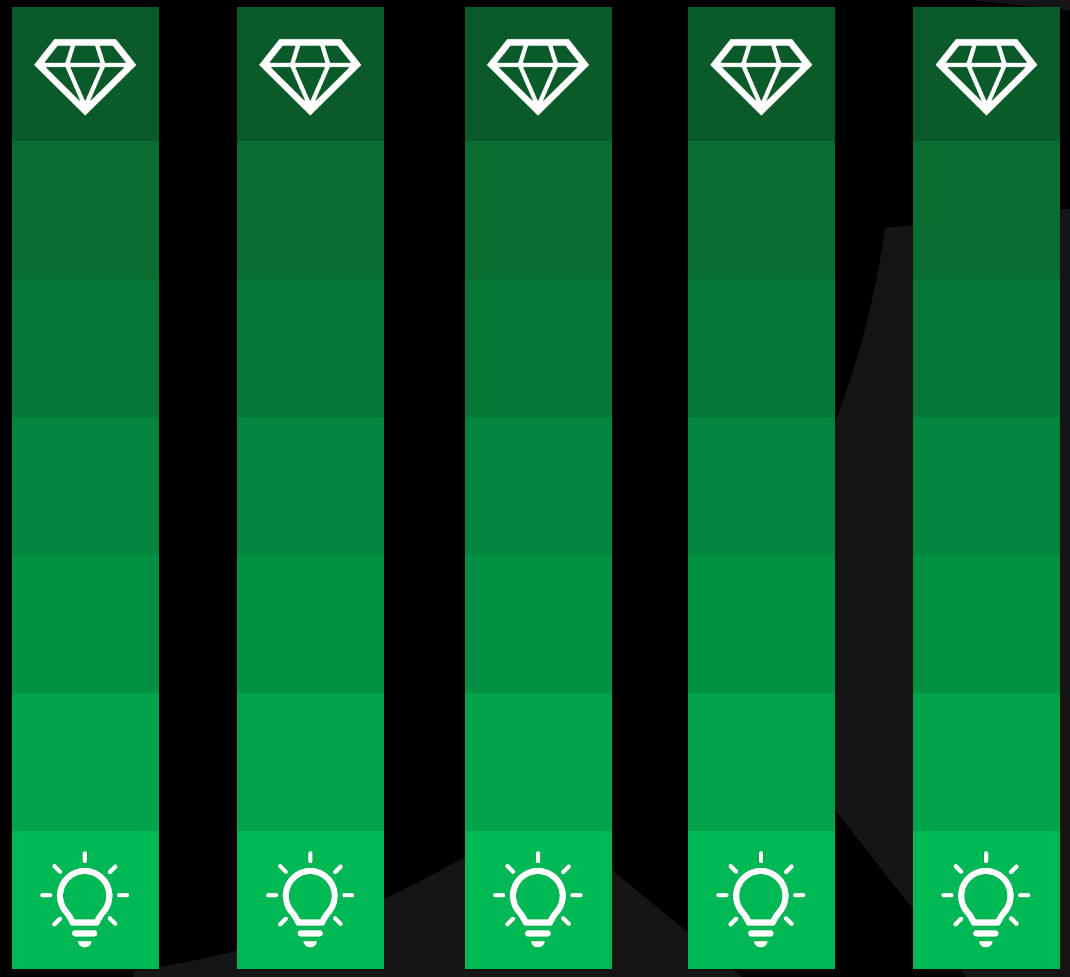


FLOW SOFTWARE

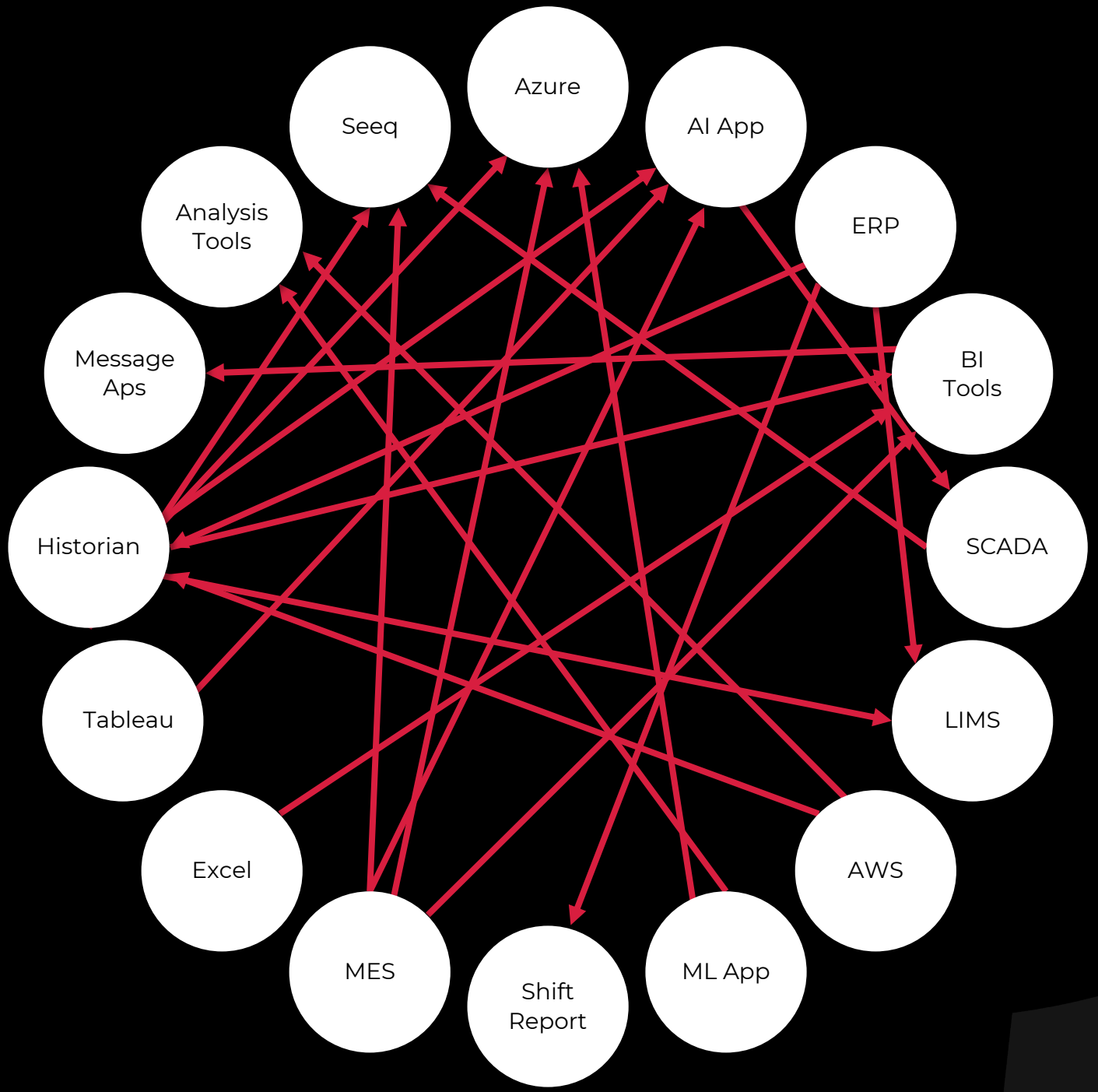
The Danger of Stovepipes

We never create:

- Single source of truth
  - Data access
  - Integration work
- SME collaboration
- Data governance
- Scalability



FLOW SOFTWARE



You Will Never Scale Analytics By Creating Stovepipes and Silos

FLOW SOFTWARE

Plant Ecosystem Example

What do you see?

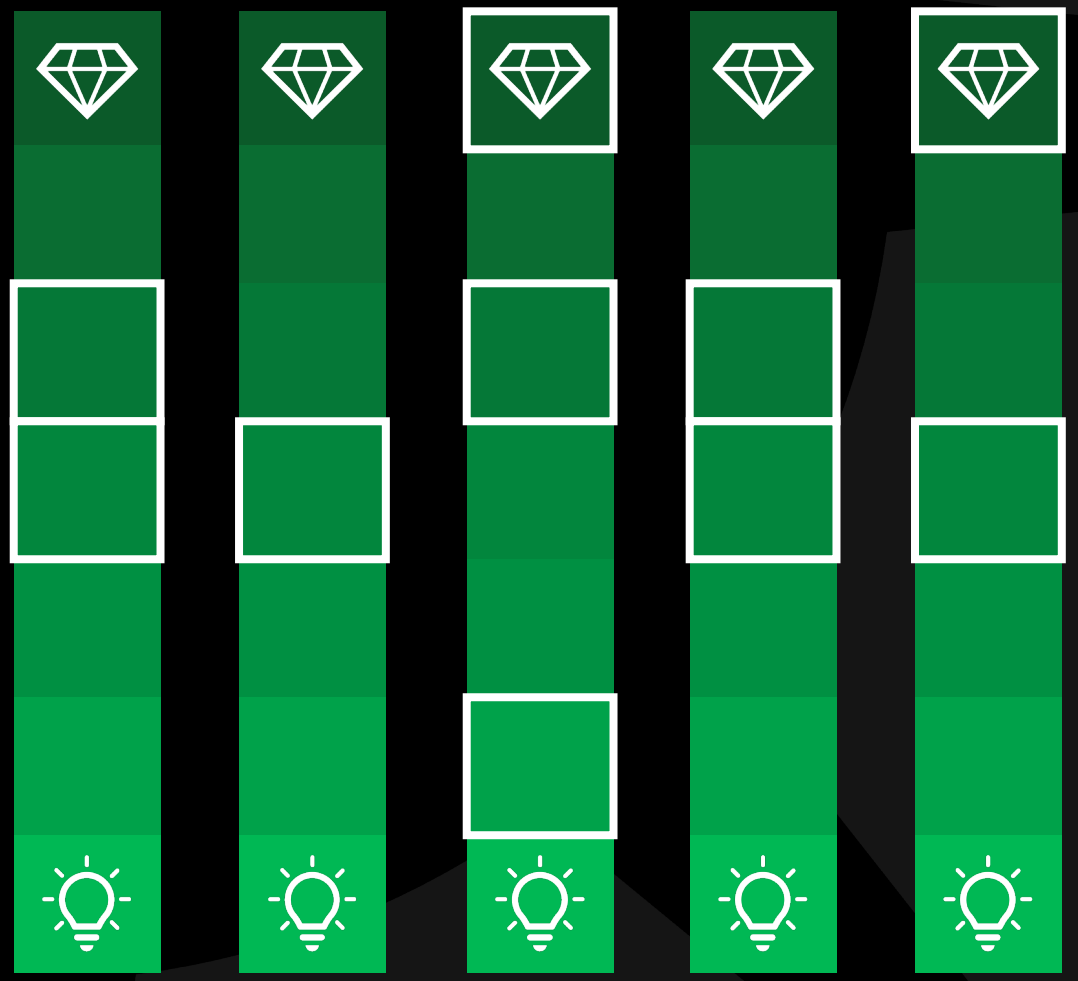
FLOW SOFTWARE

How do we extend this to Enterprise?

FLOW SOFTWARE

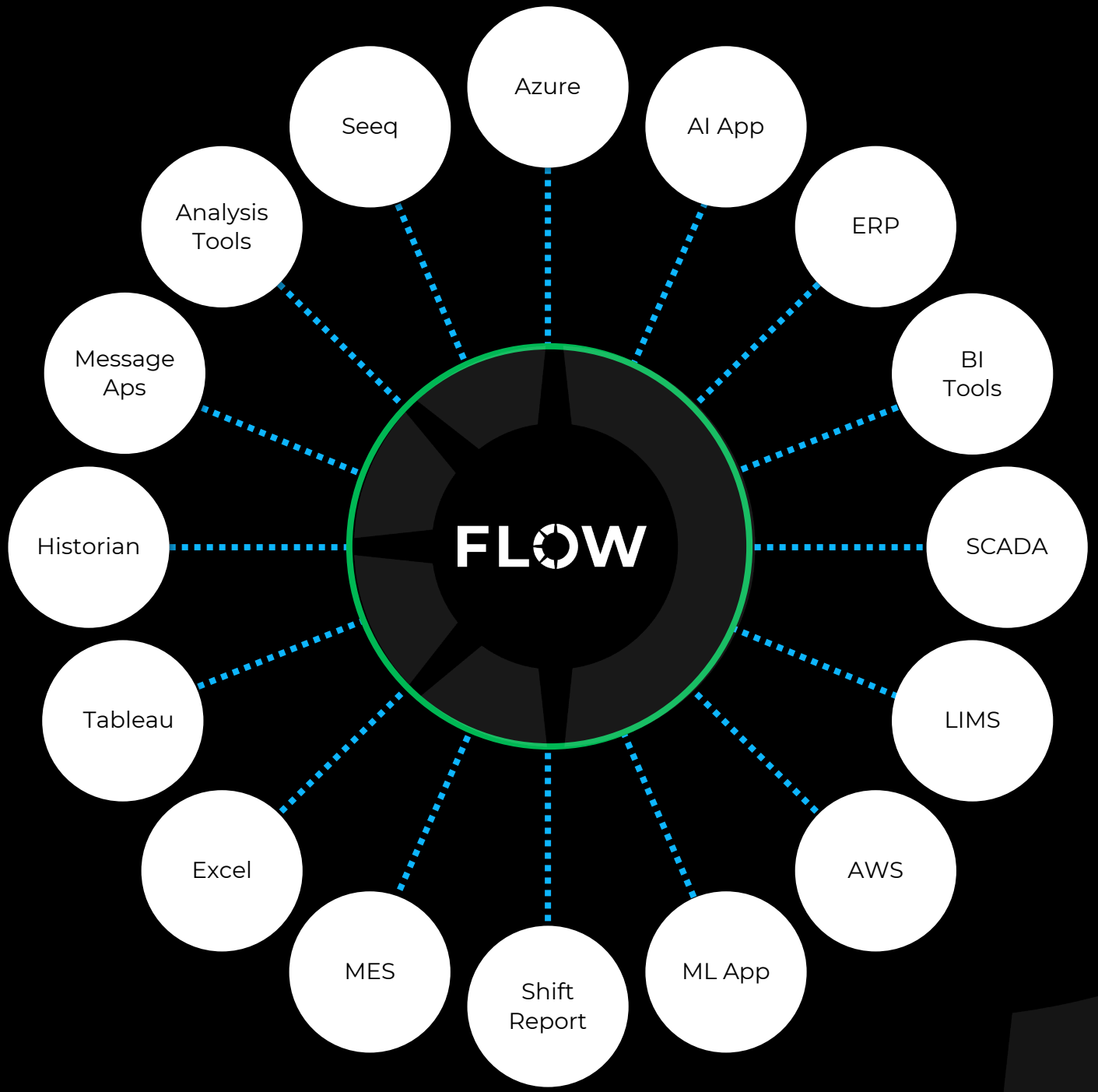
Eliminate the Loss of Work

Data integrations are duplicated across each stovepipe and orphaned in the application layer



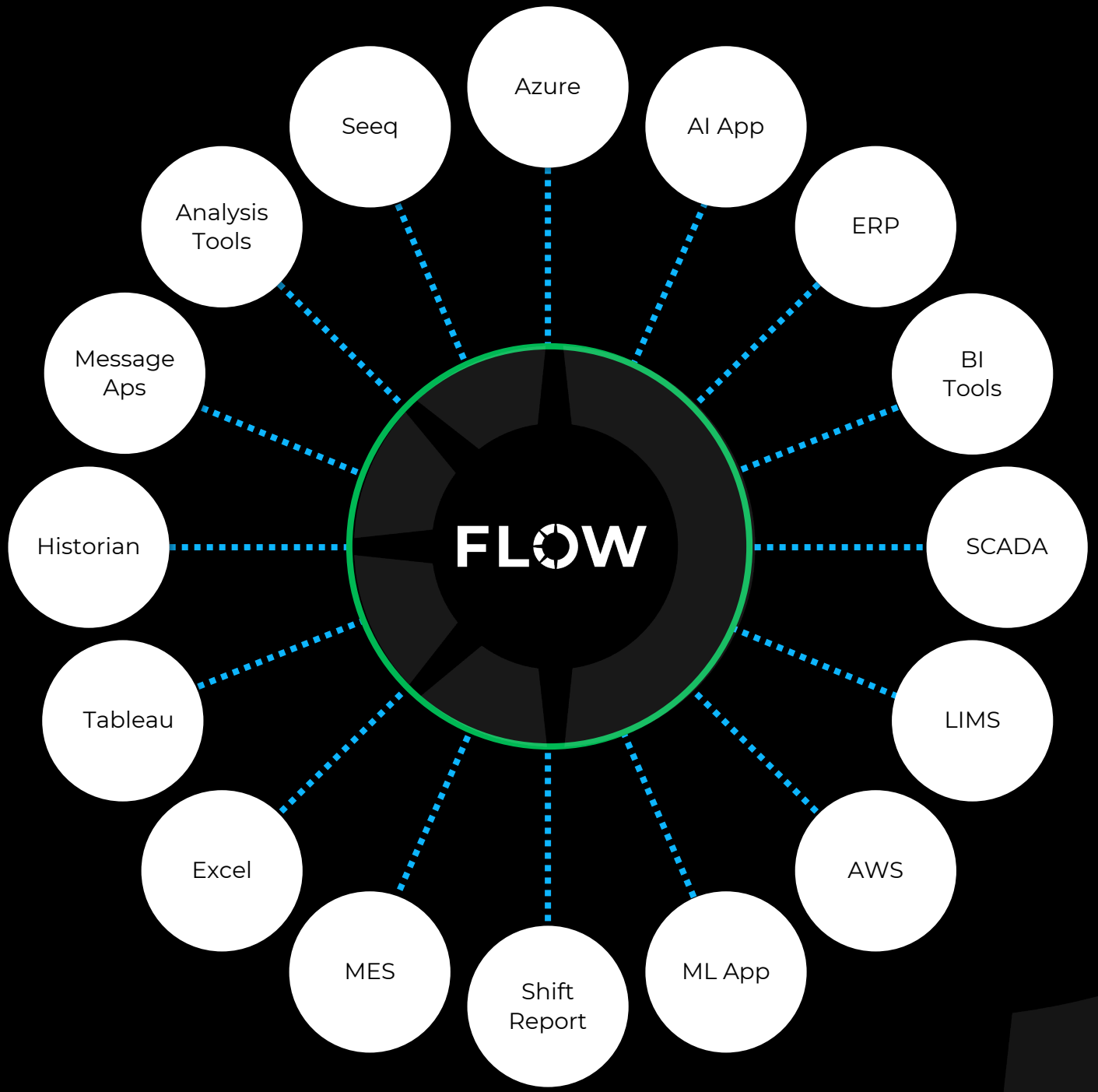
FLOW SOFTWARE

Flow Software’s Mission
is to Supercharge Decision-Making



Centralize Your Integration Work & Scale Your Analytics

FLOW SOFTWARE



The Benefits of Scale

Every project benefits from previous ones

Data & engineering governance

Highly contextualized & available information

SME collaboration

Historian, SCADA, & analytic app freedom

FLOW SOFTWARE

Success will require a strategy

Keys to Success

Add value quickly and equally

- Executive leadership
- Data scientists and analysts

- Plant managers
- Process engineers

FLOW SOFTWARE

Keys to Success

Creating Plant Champions

Plant Managers & Process Engineers

- Focus on operational support
- KPIs that drive every meeting
- Dashboards and reports that allow for deep interrogation
- Simplify manual data entry

FLOW SOFTWARE

Keys to Success

Creating Enterprise Champions

Executive leadership

- Enforce information governance
- Establish an enterprise information model
- Templatize and deploy KPIs & events
- Standard time periods across all plants (site / day / year)

FLOW SOFTWARE

Keys to Success

Creating Enterprise Champions

Data Scientists and Analysts

- Improve data readiness
- SSOT means a single endpoint for data access
- Standardized format and time normalization
- Combine multiple naming standards

FLOW SOFTWARE

Flow empowers the most data mature companies in the world