

# MOVING FROM DATA TO DECISIONS WITH SHOP FLOOR BUSINESS INTELLIGENCE SOLUTION

CASE STUDY FEATURING  
A PET NUTRITION MANUFACTURER





## THE CHALLENGE

For years a technology solution provided wide-reaching data on shop floor operations for a manufacturer of pet nutrition products. The customer wanted real-time reporting of Wonderware Historian and MES data for analysis by control technicians, quality teams, shift managers, maintenance, and operators. Some questions that are being asked of the data are: *what is currently running on a specific machine, what was running at a specific time in the past, is the system set at ideal configuration, a comparison of tags over time, and more.*

The original solution, built in the in the 1990s, was comprised of more than 400+ ASP pages that allowed stakeholders to view information in a standard browser. The company needed to migrate to a modern, secure, and compliant browser, but newer browsers did not support the ASP solution.

The company used Wonderware historian with limited methods to access shop floor data. Data returned by the ASP pages was occasionally inconsistent and in need of better governance.

## THE PROCESS

The first step in addressing these challenges was to gain a deep understanding of the current and desired future state. Flexware's team engaged the customer extensive upfront interviews to understand business and technical requirements, analyze existing technology and infrastructure, and determine where gaps existed between existing systems and requirements.

During this phase, the client agreed to look more broadly at what a replacement system might offer, taking advantage of new systems and functionality.

### Requirements were defined as:

1. Report from multiple servers and databases.
2. Ability to customize the content of reports without need for developer.
3. Responsive reporting of historian values via web interface.
  - Live values
  - Historical values for combination of any timeframe
  - Trending features
4. Replace 400+ ASP pages.

# THE SOLUTION

**Solution overview:** Microsoft SQL Server was used to integrate a large amount of disparate data for a central reporting solution. Power BI Premium was used for reporting the various charts, summary screens, tooltips, and drill-through elements to dive deeper into specific areas of data. This provided users easier access to information without having to navigate to many different reports, saving time in the end. The graphical representations and central location of the data gave better context for the historical data, made decision-making more reliable, and provided more accurate forecasting.



**Requirement #1:** Report from multiple servers and databases.

**Solution:** Build SQL Server data warehouse as source for reporting.

- Ingest source data from source, leaving minimal impact, load into data warehouse
- Clean, transform, prep data in data warehouse
- Serve data in semantic models such as Power BI
- Reports built off semantic models and delivered to users

**Requirement #2:** Ability to customize the content of reports without need for developer.

**Solution:** Utilize public tag group hierarchy in Wonderware historian for governance of dynamic reporting.

**Problem:** Variations across pages, i.e., recipe descriptions

**Solution:** Standardized dimensions providing consistent, accurate reporting.

**Problem:** Machine specific tag configuration was non-consistent. Unknown tags used and/or hard-coded

**Solution:** Ability for customer to configure machine tags and names providing consistent, accurate reporting and ability for customer to “own” their own data.

**Problem:** Code was pulling from various servers and databases

**Solution:** Source report data from one server/one database providing better usability, readability, and data lineage.

**Problem:** Previous t-sql resided in a combination of asp code, SSRS, and various databases

**Solution:** Put all t-sql in the data warehouse allowing data lineage, usability, manageability, & audit security.

**Problem:** Mismatch of security resulted in difficulty tracing, troubleshooting, and auditing permissions.

**Solution:** Simplified security model from end-to-end with 1 account leading to secure and simplified security/management.

**Requirement #3:** Responsive reporting of historian values via web interface.

1. Live values
2. Historical values for combination of any timeframe
3. Trending features

**Solution:** Power BI Premium with delivery through PBI App.

1. Real-time reporting - Composite models
  - Direct Query mode facts
    - Historical - loaded 15 min for "cold" data channel
    - Current/live - linked server for "hot" data channel
  - Import mode dimensions
  - Pages use auto-refresh
2. Historical - paginated reports w/ date range parameters
  - System versioned temporal tables report dimension data at point-in time

**Requirement #4:** Replace 400+ ASP pages.

**Solution:** Reduced to 20 reports.

- 14 Power BI Reports (by machine category)
- 6 Paginated Reports

### Additional Requests During Project

Request	Solution
Ability for users to use data models and self-serve	Centralized data architecture/warehouse Separate data models/data sets based off machine type/business function
Capture and calculate centerline "golden rule" for each machine's unique recipe and run rate . Compare centerline to current values.	1. User can configure tags for centerline capture in historian groups 2. Tag values captured when ideal metrics are triggered 3. Display over/under/good status indicators (+/- 5% threshold)
Save custom tag groups and report value for any point in time	Ability to configure favorite tags in Historian tag hierarchy and report via paginated reports