



The Test Data Management Challenge

Proligent Analytics

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TURNING RAW DATA INTO INFORMED DECISION-MAKING

Data is the lifeblood of manufacturing organizations. It provides the foundation on which companies base both normal and critical business decisions. It tells you where you are and where you're going. But how can you pinpoint the health of your business and make the right decisions when you are overwhelmed by large volumes of manufacturing data – from test, production, repair, and suppliers – which is often in different formats and locations?

Faced with these common business issues, many engineering, operations, and quality assurance managers ask three important questions:

1. How can we consolidate massive amounts of disparate data across our organization?
2. How do we analyze and interpret that data to benefit our company the most?
3. What are the best tools for our decision-makers to access and visualize that data?

1. THE DATA SOURCE CHALLENGE: COLLECTION AND PROCESSING

Given the global nature of consumer and electronics manufacturing – with design, engineering, and production activities often taking place in several countries and on different continents – just gathering and collating data from these sources is a huge challenge. There is live and historical data stored in various silos, databases, test stations and spreadsheets. And with standard business growth through acquisitions, new product introductions (NPIs), supply-chain adjustments, new contract manufacturers, etc., additional data is coming online all the time. Once the data is collected from these disparate sources it will likely require transformation and validation, because the source data models may not match the desired target data model.

Added to this, during the data collection phase many companies make an incorrect and costly assumption: since the data is well defined and usable in the original source systems or databases, they often assume it will work and make sense in the target system. However, data in the source systems may serve only one purpose, while the migrated data needs to serve another or multiple purposes, with completely different data-quality requirements. Thus, it is important to assess whether the data to be migrated is fit for its slated purpose or needs to be modified or enhanced.

One of the keys to creating a robust target data model is having the experience and expertise to understand the data within the source systems, including all its inconsistencies and anomalies, as well as understanding how to convert that data into a centralized data warehouse for business intelligence purposes. Certain key steps are critical for such a data migration project and should include:

- **Test data management assessment:** A strategy for evaluating the composition and quality of the data generated by your test systems. For example, are your test stations producing similar amounts of data? What is the most salient data? Is any of the data incomplete, unnecessary or even erroneous?
- **Data schema analysis:** This step involves in-depth understanding of the source databases and data models, how they are structured, what purposes they serve, and how each data source will have to be mapped for the target data model.
- **Extract, transform, and load (ETL):** This is a set of essentially physical processes by which the disparate source data is extracted from numerous databases, applications and systems, transformed as appropriate, and loaded into a centralized data warehouse.

2. THE ANALYSIS CHALLENGE: TURNING DATA INTO BUSINESS INTELLIGENCE

Once your data sources have been loaded into the data warehouse, they need to go through another important transformation so they can be mined for meaningful business intelligence. Historically, companies simply used SQL and other database mechanisms to perform queries, generate reports, etc., on the raw data. More recently, a powerful methodology – online analytical processing (OLAP) – has dramatically changed how many industries, including manufacturing, make sense of their data on multiple levels for the full spectrum of business purposes. By precompiling the raw data into calculations, averages, deviations, etc., OLAP enables faster analysis while eliminating the need for users to crunch their own numbers.

One of the main strengths of OLAP is how it permits multidimensional data views, allowing your employees – from a variety of departments and job functions – to understand how your business is performing at every level. However, with gigabytes if not terabytes of information to be searched and filtered, that cannot happen unless your data is properly validated, precompiled, labeled and indexed. This does not happen magically. It takes industry expertise and insight to know how to deploy and optimize OLAP for your company's purposes. You want to make sure your decision-makers get valid and valuable answers to their business queries, not reams of raw, lopsided or incomplete data.

A properly integrated, logically calibrated OLAP layer between your data warehouse and your end users translates the manufacturing data so your key decision-makers can find quick and reliable answers to questions such as:

Executive Level

- What is the current health of manufacturing operations, based on key performance indicators (KPIs)?
- Which of our contract manufacturers is the most productive?
- Which supplier provides the highest percentage of defective components?

Analyst Level

- Which component on our last bill of materials (BOM) revision impacted the yield the most?
- How is that measurement trending per test station?
- What test, station or operator caused the last work order to be delayed?

3. THE VISUALIZATION CHALLENGE: ENABLING INFORMED DECISION-MAKING

The final major element of an OLAP-based decision support system is two-fold: effective presentation and navigation methods. Components such as management-ready reports, robust and intuitive interfaces, and customizable user tools empower your employees to find, view and evaluate the information and data they need for problem-solving and decision-making. Various effective presentation and navigation components include:

Standard Manufacturing Reports

One of the common problems in many manufacturing environments is relying on homegrown or non-standard reports. Not only are they labor-intensive to develop, their use is often limited to a certain department or location. Company-wide standardized production reports allow you to visualize key metrics from all your manufacturing departments on an ongoing basis. Reports such as CPK Analysis, Cycle Times, Defects Pareto, WIP, and Yield should give you a clear snapshot of day-to-day operations, anywhere in the world. As well, they should support custom views and allow you to schedule them on a daily, weekly or monthly basis. These reports, along with threshold alarms, will highlight and identify trends and problems, letting you respond proactively to manufacturing issues.

Flexible Navigation Features

An ideal decision support system also comprises sophisticated filtering features and intuitive data navigation. Employees should be able to drill down from summary data to the details, and even further – right to the actual test stations, dates, operators, and product serial numbers – while also letting them see all related measurements and results. This allows them to view and evaluate crucial site, product, and test station performance data without having to collate information from disparate systems. By “slicing and dicing” these elements, employees can get another perspective on the data themselves, without needing programming expertise or assistance from another department. For example, they could quickly view monthly production rates per test station and then rearrange the data to view the monthly production rate per operator, and then compare these production rates by site, country, etc., all within the same interface.

Customizable Web Reporting Tools

Business needs change all the time, so users should be able to easily tailor their view of key business data to fit their specific requirements. Personalized Web-based dashboards and filters can allow them to manage and quickly view the data they need, in multiple formats such as tables, charts and/or graphs. For easy monitoring, KPIs can be mapped to desktop icons that light up green, yellow, or red depending on their current status. Detachable, floating windows can allow them to view multiple reports simultaneously, and they should be able to create customized reports on-the-fly (without programming knowledge) that can be output in convenient formats like PDF and Excel to share with others.

CONCLUSION

In today's global and highly competitive manufacturing environment, it's essential to be able to monitor key performance metrics, produce standardized reports, and give employees access to the latest business intelligence in order to make the best decisions. Which plant is most productive? What is the weakest link in the supply chain? Which test stations have the highest yields? Averna can help you answer these questions.

From our tight collaboration with hundreds of OEMs, product designers, and test engineers over 10-plus years, we have evolved our unique industry knowledge and best practices into Proligent Analytics, an off-the-shelf data management and business intelligence tool. Combined with our industry-leading professional services, Proligent Analytics can be tailored to improve and streamline your test, manufacturing, and supply-chain processes. Contact Averna to learn how you can implement our proven solutions to overcome your current manufacturing challenges.

Learn how Proligent Analytics can turn your manufacturing data into business intelligence.



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