Asset by Asset vs. Plant Wide Analytics Software

PROMETHEUS GROUP

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Considering Industrial Performance & Reliability Software?

In this whitepaper, we're going to explore taking a plant-wide vs. asset-by-asset approach using real-time monitoring and offline exploration.

The plant-wide approach focuses on broad coverage of plant assets, using real-time data analytics. Data analysts and engineers leverage AI-generated math models to virtually monitor assets across your plant or entire fleet to predict equipment failures and identify asset efficiency issues to improve overall plant performance.

The asset-by-asset approach focuses on specific assets using offline data analytics. Data scientists build specific math models to explore historical asset data with the hope of identifying something that could potentially improve an asset or process.

The real difference is coverage time:

- The asset-by-asset approach starts from a clean sheet and users build asset specific models based on a specific area of interest. This allows for a very concentrated focus to improve an asset's performance.

- The plant-wide approach leverages automation, preconfigured asset model templates, and machine learning to create models quickly and accurately. The automated Plant approach generates 100s, if not 1,000s, of ML models that yields ~80% plant

coverage. The Asset approach is then used for the remaining percentage for full plant coverage.

Chart 1 above compares the time to plant coverage with an asset-by-asset approach (bottom line) and a plant-wide approach (top line).

Starting Up or Scaling Up?

For those just starting out, historical data via a data Historian, or other data sources, is the base dataset needed for offline asset exploration to create your math models. The data is used to explore historical events, trends, and other areas of interest. Access to the data is

often via offline batch or timed access during low data transfer hours.

Real-time plant analysis also leverages historical data for developing generated baseline asset behaviors and models from historical norms of assets and processes. The Plant approach also uses the historian as a continuous real-time data feed which is used to evaluate and learn from data changes in real-time as part of the prediction and performance evaluation process.

For those looking to scale and get widespread coverage, model volume often becomes the biggest hurdle to overcome. If you take the asset-by asset approach, managing ten, or even a hundred assets models is manageable. However, as that model count continues to grow and more assets come online, models can grow exponentially which can lead to model chaos.

With a plant-wide approach you immediately start working with 100s or 1000s of models and therefore requires a good model management environment or it can be a real headache, and seriously impede the success of the program.

Another important consideration when scaling is use and reuse. When scaling a program it's important to reduce redundancy by encouraging model sharing and learning from what others have done to solve a similar problem. This includes templating and attributes, building a hierarchical representation of assets, and tag mapping. This can be daunting, and is rarely considered when starting out or planning to scale within an organization. Whether Asset-by-asset/offline or Plant-wide/real-time, model management and model reuse is key to scaling any performance & reliability program using software.

Speed To Getting Results

Both plant-wide and asset-by-asset processes get results. Your desired pace and coverage are the biggest differences. Asset-by-asset takes more of an ad-hoc approach, where models are created for trying to solve a problem. Over time you can create 100s, or even 1,000 to provide full plant coverage.
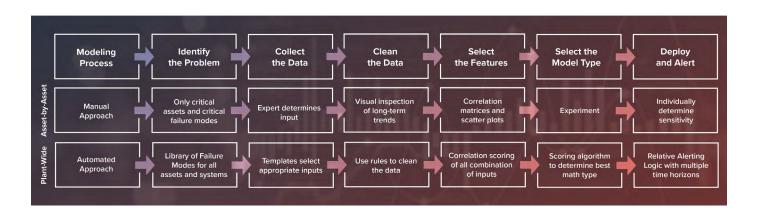
Something to consider, though, when building models manually, one by one:

> "
> *Algorithmia released an independent survey data showing that 40% of companies say it takes more than a month to deploy a single Machine Learning model into production.*

Real-time plant-wide coverage takes an automated approach and casts a wide net by producing 100-1000s of models to cover the majority of plant assets. This is accomplished using detailed asset libraries of asset classes, types and functions, AI/ML automation, and precision and accuracy scoring to determine the best algorithms and models for an individual asset x 1,000 assets. It's rare that this process will cover 100% of a plant, however >80% coverage is not uncommon, and it can be accomplished in weeks - not years.

The table below represents the process used to create models using the plant-wide vs. asset-by-asset approach.

Modeling Process	Identify the Problem	Collect the Data	Clean the Data	Select the Features	Select the Model Type	Deploy and Alert
Asset-by-Asset Manual Approach	Only critical assets and critical failure modes	Expert determines input	Visual inspection of long-term trends	Correlation matrices and scatter plots	Experiment	Individually determine sensitivity
Plant-Wide Automated Approach	Library of Failure Modes for all assets and systems	Templates select appropriate inputs	Use rules to clean the data	Correlation scoring of all combination of inputs	Scoring algorithm to determine best math type	Relative Alerting Logic with multiple time horizons

Summary

Both approaches have their benefits:

- The real-time plant-wide approach clearly offers an advantage to get coverage quickly with existing staff, data analyst, and engineers who focus on plant uptime, reliability, and overall performance

- Offline asset by asset approach allows for highly focused exploration using mathematical expertise of data scientists to identify issues and opportunities.

Which is best, or right for you? Perhaps both.

Fast results win favor with any initiative, but focus around unique assets with unique operating parameters can't be ignored.
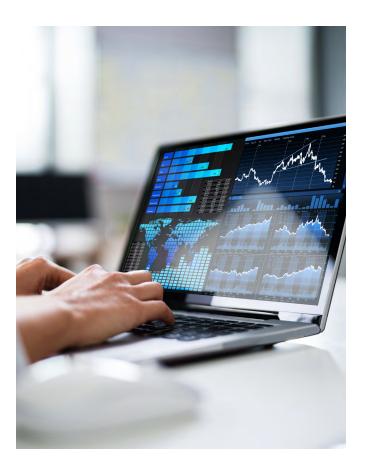
The Bottom Line:

Don't reinvent the wheel by asking your math experts to solve problems that have already been solved 1000s of times before. Focus their attention on unique asset problems.

Similarly, don't distract your data analysts and engineers with data scientist problems at the cost of ignoring plant operations to prevent unplanned downtime and loss of efficiency.

With the right foresight and planning you can achieve fast results, 100% coverage without software management fatigue, all while preventing unplanned chaos.

You can have the best of both worlds. It just helps to understand which tools will help you get there.

Contact us to learn more about how Prometheus APM can enhance your performance and reliability program today.

LEARN MORE

About Prometheus Group

Prometheus Group is a leading global provider of comprehensive and intuitive enterprise asset management software solutions that work within ERP systems and span the full work management life cycle for both maintenance and operations. Developed jointly with end users, Prometheus software enhances the customer experience for planning, scheduling, and executing work for both routine maintenance and shutdowns and turnarounds, all while protecting the workforce with safety solutions and electronic permit to work. Our straight-forward functionality, graphical visualization, and simple processes enable customers to increase productivity, reduce costs, and improve reporting. For more information, please visit www.prometheusgroup.com.