ACTIVPLANT ESSENTIALS

The toolkit to build your custom MES solution.

DATA SHEET

ACTIVESSENTIALS — THE MANUFACTURING OPERATIONS PLATFORM

ActivEssentials lies at the heart of the Activplant solution, where it provides a mature and robust platform from which to derive the Business Intelligence you need to run your manufacturing enterprise.

ActivEssentials excels at collecting data from the automation level of your plant floor. The standardized data modeling used in ActivEssentials is able to capture accurately the complex interactions between all of the machines and processes on your line. Businesses in as diverse a range of manufacturing as automotive (both supplier and OEM), consumer packaged goods, forestry, bottling, food processing, and pharmaceuticals, have all been able to see how well ActivEssentials captures the essence of their operations.

With ActivEssentials being able to capture and contextualize manufacturing so well, it is not surprising that so many manufacturers have turned to Activplant to provide them with this world-class, Business Intelligence for Manufacturing Operations solution.

Real-time operational visibility. ActivEssentials gathers equipment, product, and process data directly from the automation level of your plant floor. It then transforms this data into actionable and configurable views, reports and user-defined key performance indicators, all of which are available through a web interface.

Lowest total cost of ownership. ActivEssentials has the lowest total cost of ownership of any Business Intelligence for Manufacturing Operations solution because of the patented Activplant Universal Factory Data Model (UFDM)—an instant data warehouse for the factory floor. The UFDM requires no coding to install, implement, or maintain.

Unmatched scalability. ActivEssentials has unparalleled scalability to cost-effectively handle small plants with as few as a dozen assets, or large operations with thousands of assets, hundreds of users, and millions of data points.

Consolidated plant monitoring and reporting systems. ActivEssentials replaces multiple, disparate monitoring and data collection systems in your operation. The net result is considerable cost savings in ongoing management, maintenance, and training. You also gain a consistent view of all your plant data.

Openness and Interoperability. With ActivEssentials, you get a platform that uses industry standard software components to ensure all the interoperability you need, and open web standards to ensure compatibility with other systems.

The ActivEssentials Data Model

To understand the complex interrelationships between the many machines and processes on a production line, it is important to categorize the information from the automation layer in a way that leads to an intelligent understanding of the various events occurring through the entire process.

Behind the operation of ActivEssentials is the very powerful, patented Activplant Universal Factory Data Model (UFDM). Activplant took a close look at manufacturing, and realized that you could categorize manufacturing data into a simple yet extremely effective data model; one that made it possible to accurately model nearly all manufacturing operations.

Nearly all manufacturers build units of output that each go through a series of operations that could include steps such as some assembly, a reshaping, or possibly a treatment process. Each of these steps is likely controlled through an automation layer in the plant (the PLCs) that not only governs the operation of the individual machines, but also records their current status. The information in the PLCs is all you need.

What does the UFDM measure?
Activplant created a simple series of data collection categories that encapsulate all of what takes place within the automation layer.

Asset states. Drawn directly from the PLCs, the asset states are the real-time conditions that could exist on each of the pieces of equipment on a production line.

Incidents. Derived from the asset states, incident data items reflect the duration of asset conditions that lead to production delays at the asset, from which it is possible to capture historical data about each occurrence of an incident.

Identifiers. These data items reflect the durations of expected events during normal production, such as when particular batches are in production, lot numbers, or serial numbers, and also during the terms of system variables such as the shifts and shift periods.

Accumulators. Taken from the PLCs or calculated within ActivEssentials, accumulators record any counters and timers, and are particularly useful when associated with an identifier, such as lot numbers and batch number, or with shifts or shift periods.

Events. Observed from the PLCs, events are snapshots of values held at particular data points. ActivEssentials allows users to view these values at predetermined intervals (a Sample Time event).

ActivEssentials Administration
ActivEssentials includes an extensive administration module from which administrators can control all aspects of the data collection configuration. The administration of ActivEssentials occurs through a web interface, with all aspects of the administration being controlled by the security model built-in to ActivEssentials. Major aspects of the configuration model are as follows:

Security. Your data is important, so ActivEssentials includes privileges- and roles-based security to ensure data integrity.

Plant Hierarchy. An intrinsic component of ActivEssentials is the Plant Hierarchy, which is a virtual representation of the hierarchical structure of your plant. Within this you can define your organizational structure right down to the individual assets.

Data Management. ActivEssentials includes a robust data management system for archiving your production data.

Shift Scheduling. ActivEssentials includes a powerful shift configuration module for those users who need to relate production shifts to their production data.

Application Templates. ActivEssentials includes highly effective application template functionality that allows users to distribute the configuration applied to a particular asset to as many other assets as are needed.

Calculations. To assist in being able to convert raw production data into contextualized data, ActivEssentials includes a calculation engine where users can define formulas, calculations templates, and calculations.

Production Data Viewer
The ActivEssentials platform includes a comprehensive production data viewer (VPWeb), which allows for both realtime and historical views of the plant. Users can create graphical representations of the plant, departments, lines, etc., with accompanying KPIs; create graphs and charts; view real-time and trended production data; and generate reports, all with the ability to focus on any part of the production facility.

- **Layout View.** Create graphical representations of your plant, lines, and assets.

- **Production View.** Tabular data, where the columns relate to periods of time in the plant.

- **Detailed View.** List of incidents.

- **Trend View.** Charting for event-based data such as process variables.

As each of the views has specialized viewing capability, administrators can tailor each to your production needs. Some features of the views are as follows:

- **Tracking incidents.** VPWeb includes several tools for tracking incidents, such as downtime, blocked and starved, and includes a module for viewing incidents in real-time.

- **HMI Controls.** ActivEssentials includes an option to use a series of HMI controls, which through an OPC server can write data to your PLCs.

- **Filtering.** VPWeb comes with a number of ways to filter the data in the various views.

- **Reporting.** In an out-of-the-box ActivEssentials installation, VPWeb includes many configurable reporting options.

REAL-TIME LOGIC ENGINE— YOUR DATA IN THE CONTEXT YOU NEED

ActivEssentials provides the means to retrieve as much raw data as you could possibly want from the automation level of your production facility. At its most basic, ActivEssentials is a remarkable tool for gathering data, but when combined with the power of the Real-Time Logic Engine (RTLE), you get an immediate conversion of your raw data into data that truly helps you manage your business.

So what does RTLE do?

RTLE is a bidirectional high-performance Boolean logic engine that is designed to function as a bridge between an OPC DA compliant data source and ActivEssentials. In this role, an RTLE instance appears as if it were the OPC DA source. Furthermore, you can use an RTLE instance to consolidate data from many OPC DA sources, such that they appear as just one.

At the heart of RTLE is its extraordinary ability to process extremely high volumes of raw OPC data and derive from it the data you really need. You can aggregate data from a multiplicity of sources, apply calculations, and use Boolean logic to trigger predefined actions.

While RTLE is extremely efficient at handling data from OPC DA compliant data sources, it is also able to write-back to these sources.

An instance of RTLE acts as a bidirectional bridge or gateway between the automation layer of your facility (PLC to OPC) and the ActivEssentials system.

RTLE is able to consolidate the data from many OPC servers, including other RTLE instances and other applications that can provide OPC DA compliant data. Included in the ActivEssentials suite is a specialized OPC server that is designed to retrieve additional configuration data that you can use to give context to the data collected from the plant floor.

Understanding Data

The Real-Time Logic Engine is a highly efficient tool for managing data from multiple OPC DA sources. You can take data from many sources to derive an aggregated insight into manufacturing

performance, add further understanding to your data by relating shift and other information to the collected data, or use the Boolean logic engine to initiate tasks through a trigger and action model. While ActivEssentials is remarkable in its ability to collect manufacturing data, the RTLE opens your data to higher levels of interpretation.

ROOT CAUSE ASSIGNMENT— FINDING THE CAUSE

ActivEssentials excels at monitoring and recording production incidents, but this information alone might not be enough to properly identify cause. You might well be able to identify machines or processes whose performances are marred by production incidents, but sometimes it really helps to have someone there to record just what happened. With Root Cause Assignment (RCA), you are able to place in the hands of those who are on the plant floor a tool that lets them give direct feedback about the cause of production slow-downs.

So what does RCA do?

RCA promotes two of the tenets of the Toyota Production System; it requires that operators and supervisors "go and see" what the problem is, and it depends deeply upon the principle of repeatedly asking the question "why?" Together these tenets facilitate the goal of finding the root cause. Definitions of production incidents rely on PLCs to return machine states, but in many instances the machine state does not identify cause. In a broad sense, a PLC that recognizes that a machine is down is reporting only that the machine is unable to continue. If operators quickly rectify the situation, they may feel that they have done their job, but without an effective feedback system management misses an opportunity to determine and address the root cause of recurring problems.

Broadening the understanding of root cause

As the feedback through the decision tree process is always driven by the interpretive abilities of the operator, RCA includes further tools to reinforce the decision path. When the operator assigns the "reason code," there is also an opportunity for the operator to write a comment that can legitimize the decision process or add further understanding.

Security. Because the reason code assignment functions are designed for plant floor operation, RCA extends the security provided by ActivEssentials down to the individual task level.

Incident editing. Through the standard RCA entry view, you can edit the historical record of the production incidents. The editing options include the ability to close and reopen incidents, create new incidents, assign cause to an incident on another machine.

Filtering. Root Cause Assignment is an investigative tool, so RCA allows your operators to focus on just the incident data you need. To do this, RCA has powerful filtering options to ensure that only the incidents that are of concern are subject to the assignment of reason codes.

Reporting. RCA includes predefined reporting options, which supervisors and administrators can access through the standard reason code assignment interface. The configurable reports provide a Top 10 listing of assigned reason codes, based on the duration of the related production incidents.

Touch screen operation

While it is possible to respond to incidents using a conventional keyboard and mouse, RCA offers a simple, easy-to-use, touch screen application. This allows plant floor operators to assign reason codes with just a few touches of the screen and also allows for the entry of comments through a touch screen keyboard. The application also makes it simple to edit the reason code assignments and any comments.

MANUAL DATA ENTRY

Activplant supports automatic data collection from Open Platform Communication (OPC) servers and generates shifts according to the shift schedules. However, sometimes automatic data collection is not available: for example, an operator might reject parts manually and discard the rejected parts to a downstream machine. The Manual Data Entry module of Activplant allows manual collection of data in such instances. The data collected through the Manual Data Entry module can be used by quality engineers to monitor quality trends.

THROUGHPUT ANALYZER - CLEARING THE WAY TO DRAMATIC INCREASES IN PRODUCTIVITY

All manufacturers seek greater productivity, but until now, the way to achieving this goal has been complex and fraught with difficulties. The Activplant Throughput Analyzer allows you to see through the clutter, the endless and confusing data, to find what truly hinders you from producing more.

Throughput Analyzer is as equally at home in an automotive facility, where takt time rules the flow of product, as it is in highspeed production environments where management is more concerned with the rate of flow.

Throughput Analyzer users have experienced increases in throughput of 10% to 25%

Since its introduction, Throughput Analyzer has enabled many of our customers to achieve substantial increases in their production throughput.

As you start to use Throughput Analyzer, it quickly builds an historical record of the performance of every piece of equipment you use, which it then uses to calculate statistical averages that over a relatively short period of time, two to three weeks, will expose your chronic constraints.

Because Throughput Analyzer requires minimal configuration to identify constraints, users start seeing results just a few weeks after implementing the solution. Most of our customers see a return on their investment in a matter of a few months. In today's business environment, these are the results you need from your CI projects.

Striving for the ideal, applying proven theory

Throughput Analyzer starts with an ideal vision of the manufacturing enterprise; plants running continuously at their designed takt time or at their ideal rate to achieve 100% throughput for maximum productivity. To bring that vision as close to reality as possible, we apply established theories as well as advanced technology and years of relevant experience.

When associated with manufacturing, the Theory of Constraints (The Goldratt Institute) suggests that the throughput of a manufacturing facility is constrained by its slowest contributor. The challenge is to isolate and then elevate that constraint.

To do this, Activplant borrows from the tenets of lean manufacturing as espoused in the Toyota Production System, including the measurement of every asset in the operation against one-piece flow to takt time or against the ideal rate.

The result is the identification of constraints through our patented Throughput Capability Metric. The movement of parts/material through each piece of equipment in the plant is tracked automatically, and the Activplant logic engine processes the data to reveal the true and chronic constraints of the operation.

Visual presentation of data promotes focus

The Activplant Throughput Analyzer produces views and reports that can direct your continuous improvement projects. These views and reports can unambiguously direct you to your constraints through the use of real-time information and trended historical data. With this information, plant teams can focus on where you can make real productivity gains.

Quick and easy to apply

The patented Activplant Universal Factory Data Model (UFDM) allows Throughput Analyzer to emulate the subtle, almost unseen interactions that occur on your line. For almost any manufacturing process, the UFDM can model it and Throughput Analyzer can measure it. Custom built, proprietary software can take many months if not years to apply, whereas it is possible to have Throughput Analyzer up and running within weeks, which means a swifter implementation with rapid, more meaningful results.

Lightweight and focused

Throughput Analyzer uses a lightweight approach to collecting the data you need to identify constraints, as it requires as few as three data items for cycle-based and five for rate-based production environments.

Get clarity on constraints, get the right tools

Whether you measure your output in terms of hours, minutes, or seconds, you need accurate, appropriate, and timely information about your production facility. Today's production lines are complex, with intricate interrelationships between each machine and/or process. With each piece of equipment potentially having numerous internal functions, and each running according to a programmed set of instructions, it is very difficult for you to observe just where delays occur. It can be a frustrating puzzle, where an educated guess is often the best option. You need the right tools—Activplant Throughput Analyzer.

INSIGHT FOR EXCEL

Insight for Excel is an easy to use tool with direct access to the ActivPlant database from within Excel, providing highly flexible reporting in a familiar environment.

Insight for Excel is an Add-in module to Microsoft® Excel that provides ad hoc reporting capability using Activplant data without the high costs of customized programming services. In addition, it is easy for plant personnel to learn and use because it resides within the familiar, widely used Excel interface.

For enterprise management, Insight for Excel simplifies cross-plant comparisons by allowing you to create multi-plant performance dashboards that provide deep inspection and broad visibility. For example, you can access multiple Activplant servers to populate spreadsheets showing monthly summaries for several plants with detailed data by hour, shift, product, etc.

APTEAN

Aptean is a leading provider of mission critical enterprise software solutions. We build and acquire industry-focused solutions to support the evolving operational needs of our customers. Our solutions help nearly 5,000 organizations stay at the forefront of their industries by enabling them to operate more efficiently, thereby ensuring higher customer satisfaction.

For more information, visit **www.aptean.com**.