

## activplant ActivEssentials™



### ActivEssentials—the Business Intelligence for 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.

ActivEssentials provides:

- ✓ **Real-time operational visibility**  
With a measurable ROI of three to six months, 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. Built on the



Microsoft .NET Framework, ActivEssentials uses a services oriented architectural model (SOA) to take advantage of powerful web services. Whether you are seeking to extend the use of your current technology or are just looking for a platform that freely communicates with 99% of all other systems, ActivEssentials is your answer.



## 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 what is going on.

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 govern the operation of the individual machines, but also record 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. Within this framework, it is possible to define data items that reflect the values observed in your PLCs, and to derive a deep understanding of how your products flow through your production lines. Activplant defines data in the following way:

#### ❖ 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. In a typical plant, asset states would be conditions such as running, faulted, blocked, and starved. As it might be possible for more than one condition to exist at any one time, each state is assigned a priority level, so ActivEssentials recognizes only the condition having the most impact.

#### ❖ 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. Incidents, therefore, are the elapsed periods of time during which an asset condition exists, and since asset states carry priority levels, ActivEssentials records only

### Finding your course

*Manufacturing is a complex undertaking, so it is important to take the right course. Without a real understanding of the intricate interactions between each of the machines on your plant floor, you compound your difficulties. You need clarity.*

ActivEssentials is Business Intelligence for Manufacturing Operations—there is no other software like it. Activplant uses patented methodologies to accurately model almost any kind of manufacturing facility.

It doesn't matter if you manufacture complex assemblies, or if you run a very high-speed line with few manufacturing steps. Manufacturing in almost any form has fundamental similarities that ActivEssentials can model to give you precise, contextualized, manufacturing data.

the incidents having the greatest impact.

#### ❖ 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. This information could come from your PLCs, or it could come from the ActivEssentials database.

#### ❖ 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. With this information, it is possible to observe counters and timers in relationship with defined periods during normal production. Examples of counters are production counts, scrapped and rejected parts, total good parts, etc. Timers include total time, blocked time, starved time, etc.

#### ❖ 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); when a monitored value changes causing the capture of the value at a second data point (a Value Change event); or when triggered by a separate change in state that causes sampling to begin and run for a defined period (a Triggered Sample event). Event-based measurements could include cycle times, maximum weight, minimum temperature, torque, and pressure.

Using these definitions, it is possible to delve deeply into the interactions between each of the machines and processes on production lines. Furthermore, from the collected data it is possible to derive additional understanding by using calculations that define production units, process variables, etc., and give context to the data using, for example, shift and shift period information.

## 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. In a new installation, the ActivEssentials database includes numerous user roles, with appropriate rules for controlling which users have access to the various configuration and production interfaces. These system-defined roles are sufficient for most ActivEssentials installations, but system administrators can amend or expand the security model to suit their needs.

Security for the ActivEssentials database and its operation within SQL Server are strictly governed by several layers of protection. The system of roles being assigned privileges, and of users being assigned to roles, creates a system where users can be restricted to accessing just the aspects of ActivEssentials



### Meeting your goals

*You do your marketing research to assess the size of your market; you look at your production capacity to determine if you can meet the demands of customers; and you hope that you can deliver on time with the expected quality.*

This seems complicated, but with ActivEssentials you gain a real insight into your manufacturing operations. You get the ability to examine every nuance of machine operation, so you can find your weaknesses before they materially affect production.

There are plenty of other pieces of software that can collect data, but none that give you the contextual understanding that ActivEssentials provides.

Meeting your goals is important, so using the right tools is just as important. ActivEssentials is the right tool for you.



required by their job functions, including what kind of action and where in the structure of the plant hierarchy these actions take place.

## ✓ 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.

With the Application Template functionality included with ActivEssentials, you can define assets with “model” configuration, and then easily distribute their configuration across Plant Hierarchy.

## ✓ Data Management

ActivEssentials includes a robust data management system for archiving your production data. In a typical production facility, production data builds up quickly, but as it ages it is not as important.

The ActivEssentials data management functions provide many options for archiving and/or purging production data, plus the ability to restore data as needed. The archive, purge and restore tasks can place a heavy demand on database servers, so you can schedule this activity for less demanding times. You can also define the scope of any activity, to control just what data is archived and/or purged. The data management functions are wizard driven to ensure proper configuration.

Optionally, with the Activplant Integration Toolkit (ITK), you can extend your data management capabilities by integrating aggregated data into a data warehousing application.

## ✓ Shift Scheduling

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

Shift scheduling and shift editing are possible through the ActivEssentials administration interface, where you can assign shift schedules to your assets, with different schedules to meet varying levels of demand. As it is always possible that production scheduling can change, the Shift Editor makes it easy to make changes to forthcoming shifts and to amend the historical records when necessary.

## ✓ 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. There are no limitations to the configuration scope, so the configuration in a template can include all of the data model information, any defined reports, and shift configuration.

ActivEssentials provides the means for the creation of templates that support either asset configuration, report configuration, or shift configuration, but you can bundle these together into applications. This means that you can develop a complete application around a “template” asset, and use this to apply the same configuration to as many other assets as is needed. As you can package this configuration, it becomes portable, meaning that you can take the configuration at one plant and apply it across each of your manufacturing facilities, which then gives you the same data collection, calculations, and reporting at each.

## ✓ 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.

You can use the calculations and formulas to give context to the data presented in ActivEssentials. For example, you can designate the numerical information held at an OPC data item as a temperature or pressure reading, or take a reading and then apply a calculation to change the unit of measurement. You can also derive, in real-time, new values from the values of two or more historical data items, to extend your understanding of the collected data.

**Success!**



## Production Data Viewer

The ActivEssentials platform includes a comprehensive production data viewer (VPWeb), which allows for both real-time 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.

*Much rests on your manufacturing operations; you need the quality and price the market wants, in the quantities the market demands. Being able to satisfy the market in the shorter and longer terms is how you measure your success.*

VPWeb includes several interfaces (views) that allow users to focus on the production data in a variety of different ways. Each view has a specific set of properties that enhance its ability to display data, and each has the ability to focus on different aspects of your production. The views are simple to create using drag and drop methods, and with the Application Template functionality are just as simple to distribute across your plant.

ActivEssentials is flexible enough to handle almost any manufacturing operation. You get contextualized data in a form that is actionable, pertinent to your needs, and accessible to all that need it. ActivEssentials is the right tool to help your organization to get to where it needs to go.

- ❖ **Layout View.** This view allows you to create graphical representations of your plant, lines, and assets, or to create controls that reveal KPIs related to any of these. The controls can reveal historical and real-time data.
- ❖ **Production View.** This view provides tabular data, where the columns relate to periods of time in the plant. You can choose from a variety of time definitions, including hours, days, etc., but you can also use definitions such as shifts and shift periods, or definitions that relate to production, such as batch numbers and serial numbers. You can relate the columns to any other data item, such as production counts, process variables, and incidents. There are also charting and graphing options.
- ❖ **Detailed View.** This view lists incidents and other data items by their occurrence, with each listed against a variety of production parameters, such as date stamps, in their respective columns. It is possible to filter the data in each column using Boolean expressions to create focused listings. Detailed View also includes charting options, including Pareto charts.
- ❖ **Trend View.** This view provides charting for event-based data such as process variables, as well as other kinds of data. You can view real-time or historical data, and you can also view several different variables simultaneously.

Each of the views is sensitive to where in your plant structure your users are working, so the views relate directly to the various areas, departments, lines, and assets. 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. These controls come with appropriate security to ensure that only qualified users have access.



- ❖ **Filtering.** VPWeb comes with a number of ways to filter the data in the various views. Data is primarily filtered in a time-based way, where users can define a time span, or use a shift or some other identifiable span of time. At a macro level, VPWeb offers options to further define the scope of what is displayed based on include/exclude rules, and a rules-based option to manage overlapping data. Users are also able to use Boolean expressions to filter column data in some views.
- ❖ **Reporting.** In an out-of-the-box ActivEssentials installation, VPWeb includes many configurable reporting options, a scheduling system, configurable delivery methods, and a report viewer interface. Reports administrators can control who is able to create reports, who should receive scheduled reports and the method of their delivery, and the reports to which a user can subscribe.

## Activplant Reporting System

No Business Intelligence application is complete without an integrated reporting system. ActivEssentials ships with a fully featured reporting system and a set of out-of-the-box reports.

The Activplant Reporting System (APRS) provides a comprehensive reports administration module and a report viewer in the VPWeb production data viewer. All of the ActivEssentials reports are wizard driven, so users are able to select from a list of report types and to clearly define the scope of any reports they might require. Users can initiate reports from the Report Viewer interface.

Report administrators can define reports for users and schedule these as needed through SQL Server. Report configurations include the report scope, but can include configurable elements that users must set at run times.

Optionally, with the Activplant Integration Toolkit, you can significantly extend the capability of the APRS, as you can introduce custom reporting through SQL Server Reporting Services (SSRS), or export the ActivEssentials data to the third-party applications you use to manage your business.

## Extending the power of ActivEssentials

The ActivEssentials platform, if extended, enables manufacturers to do so much more with the data they can collect. While ActivEssentials is powerful within itself, an extended implementation opens up new avenues to intelligently increase your understanding of manufacturing operations.

When you install ActivEssentials, you install a platform that gives you the ability to examine in minute detail the interactions between every piece of equipment on your production lines, but you can also get the following:

✓ **Real-Time Logic Engine**

RTLE is unique in the way it is able to simultaneously aggregate the raw data from up to thirty OPC sources, and allow you to add context to this data by applying any of numerous built-in functions and calculations (or build your own). You can use the functions and calculations to, in real-time, combine data items to create new data items that give the derived understanding you need.

✓ **Root Cause Assignment**

The RCA application is a plant floor application that allows operators to assign reason codes when they observe production incidents. RCA uses the principle of asking “Why?” numerous times to get to the root cause of an incident, by offering operators a decision tree to determine cause. Operators can also amend properties of reason codes to provide greater understanding and provide comments, and do this through either a web or touch screen interface.

✓ **Insight for Excel**

Insight for Excel is a Microsoft® Excel Add-in that enables users to develop reports that directly reference the ActivEssentials database. In addition to all of the usual functionality in Excel, users are able to access the database through the custom Activplant functions. Insight for Excel enabled cells within spreadsheets can auto-refresh, to give up-to-date reporting of plant floor data. Users can also combine ActivEssentials data with information from other sources to create enterprise level reports.

✓ **Activplant Integration Toolkit**

The Activplant Integration Toolkit (ITK) is a set of tools that allow for the use of aggregated ActivEssentials data, both within and outside ActivEssentials. The ITK can expose the proprietary structure of the ActivEssentials data to third-party applications as a means of integrating the data into the other business systems you use to manage your organization. You can also develop custom queries of the database that other ActivEssentials users can use as the basis for everyday reporting through SSRS. This functionality significantly extends the built-in reporting capabilities of ActivEssentials.

✓ **Marquee Manager®**

The Marquee Manager product enables the presentation of ActivEssentials data on Andon boards, LCD/ Plasma TVs, PCs, and Stacklights, and can also be used to issue audible alarms. Depending on the efficiency of local infrastructure, updates can be as quick as two seconds.

✓ **FirstPAGE®**

The FirstPAGE product enables decision makers and first responders to receive messages under specified conditions, through personal communication devices, including mobile phones, pagers, BlackBerry® devices, PDAs, and fixed data receivers. FirstPAGE is easy to use in a flexible or agile manufacturing setting with its full suite of flexible administration tools, all of which are accessible remotely. Depending on the efficiency of local infrastructure, updates can be as quick as two seconds.

✓ **Throughput Analyzer**

The Activplant Throughput Analyzer application is a truly unique application that can unambiguously find production constraints. The application benefits from the use of the patented Throughput Capability Metric, which uses current and historical data to determine how well each asset in a production facility performs, at only the times when it is expected to perform.

## Activplant Professional Services

Activplant's Professional Services team offers a complete family of services to rapidly and cost-effectively integrate ActivEssentials into your organization. These services should meet the integration requirements for all organizations—small and large, local or global, across diverse industries.

Activplant's global team of experienced specialists use proven methodologies and tools along with resources from our Development and Support teams to ensure that the most optimal resources are focused on your ActivEssentials integration project. With our innovative and flexible services delivery approach, you can leverage both on-site and online consulting professionals to maximize project efficiencies. These service capabilities let you rapidly realize the benefits of integrating ActivEssentials into your manufacturing environment.

Let Activplant's Professional Services Team manage a successful integration for your business—from planning the integration strategy to executing the installation. The following are included as part of the integration services:

- ✓ **Assessment**  
The development of an implementation plan for a project. This plan defines the tasks to be performed, how and when they will be performed, required skills, project duration, risks, and cost estimates for the implementation.
- ✓ **Migration**  
Once the planning is complete, a trained migration team will integrate your existing data collection operations into ActivEssentials and then support the initial start-up of the application.
- ✓ **Validation**  
Minimize the risk and let the Activplant Professional Services team validate that ActivEssentials is installed and running properly.
- ✓ **Training**  
Activplant's training specialists will help you reach your expected goals faster by empowering your staff with the knowledge and capability to do their job right the first time.

### ABOUT ACTIVPLANT

Activplant Corporation is a leader in Business Intelligence for Manufacturing Operations. Our software and expertise are setting the standard for operational excellence at some of the world's largest and most admired manufacturers. Our aim is to create world-class software that provides clarity to the management of medium- to large-scale, highly-automated, manufacturing facilities. Our software consolidates manufacturing data into relevant, real-time and historical information, which then enables manufacturers to successfully achieve productivity gains by optimizing product, people, equipment, and process. Activplant Corporation is a privately held company based in London, Ontario, Canada. For more information, please visit [www.activplant.com](http://www.activplant.com).



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