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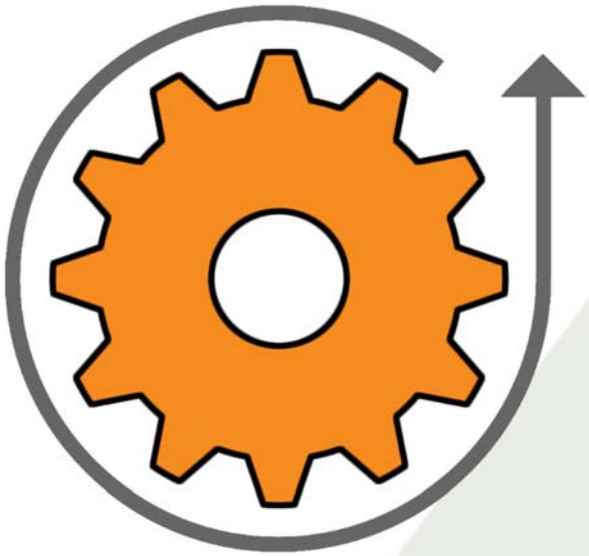
# Continual Improvement with Status

*Using Your Process Data to Increase Efficiency and Productivity*



This document outlines some of the ways in which B-Scada's Status software can be used to implement a program of continual improvement for your controlled processes.

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"He who stops being better stops being good." – Oliver Cromwell

# Introduction

One of the most profound advantages to automation is the extent to which it facilitates the implementation of a Continual Improvement Process (CIP). Automation is not essential to continual improvement, but it allows for much greater control of the process and more immediate feedback.

A Status system provides ideal tools for continual improvement in continuous, discrete, and batch production environments. However, continual improvement techniques are not limited to production processes. Status can help users implement improvement strategies in all business processes.

> *NOTE: A distinction is sometimes made between "continuous" and "continual" improvement – whereas "continuous" improvement implies a literal continuum in the mathematical sense of the word and "continual" improvement more accurately implies an incremental improvement that occurs in steps. In this paper, the term "continual" is preferred for accuracy and compliance with ISO standards as defined in ISO 9000 and ISO 14000. For the purposes of this paper the two terms can be considered to be interchangeable versions of the same concept.*

# What is Continual Improvement?

To get an understanding of continual improvement and what it means to an organization, we should consider the definition. Conceptually, a CIP is a meta-process that encompasses another process or other processes.

A CIP is a system in which feedback from business processes and customers are evaluated against organizational goals in order to find ways to make incremental improvements over time. This evaluation process and the incremental optimizations are never-ending.

There are different techniques employed by proponents of continual improvement – differing depending on industry niches and organizational goals. The overall intent and methods employed, however, are based on the same fundamental goal: to improve processes for greater efficiency, quality and/or safety.

## Kaizen and Related Philosophies

One of the mostly well-known and widely used philosophies of continual improvement originated in Japan. It is known by the name, kaizen, which translates approximately to "good change". Kaizen has been employed in a wide range of industries – healthcare, banking, psychotherapy, government, and many others. In business, kaizen typically refers to activities that continually improve all business

functions and involve all employees.

Kaizen is frequently used to optimize purchasing, logistics, and supply chain processes, and has been employed in lean manufacturing processes to help eliminate waste. Kaizen was first used by Japanese businesses following World War II, and has since spread throughout the world and been implemented in environments outside of business and productivity.

Kaizen places a strong emphasis on employee feedback, encouraging employees at every level to apply the scientific method in learning how to spot and eliminate waste in business processes. Kaizen can be applied in a very small, personalized way, or it can apply to larger processes that involve groups of employees. In a very general way, the Kaizen methodology can be understood as:

1. Discovering opportunities for small adjustments based on process data and customer feedback
2. Implementing these small changes incrementally
3. Monitoring the results of each individual adjustment for a certain period of time
4. Using the new data to make adjustments
5. Defining the results of successful adjustments as standards, and using these standards as baselines for additional improvements
6. Repeating this cycle indefinitely

The kaizen philosophy aims to improve process efficiency, quality, and safety by making it easier for employees to do their jobs well and with confidence – rather than expecting them to work harder through incentives or fear of replacement.

Improvements made using the kaizen philosophy are typically on a much smaller scale than those found in the “command and control” improvement programs popularized in the mid-twentieth century.

This system of incrementally improving operations is also known the Shewhart Cycle, Deming Cycle, or PDCA (Plan-Do-Check-Act).


*The PDCA method exemplifies the modern perspective on continual improvement*

Similar ideas are investigated in the realms of Organizational Development (OD) or Business Process Improvement (BPI). The general intent of all of these philosophies is the same: to maximize the value of all available material, personal, and intellectual assets and to improve business processes by making use of resources that are already available.

Like the methods outlined above, other popular methods like Six Sigma, Lean, and Total Quality Management emphasize employee involvement and collaboration, standardizing processes, and reducing variations, defects and cycle times.

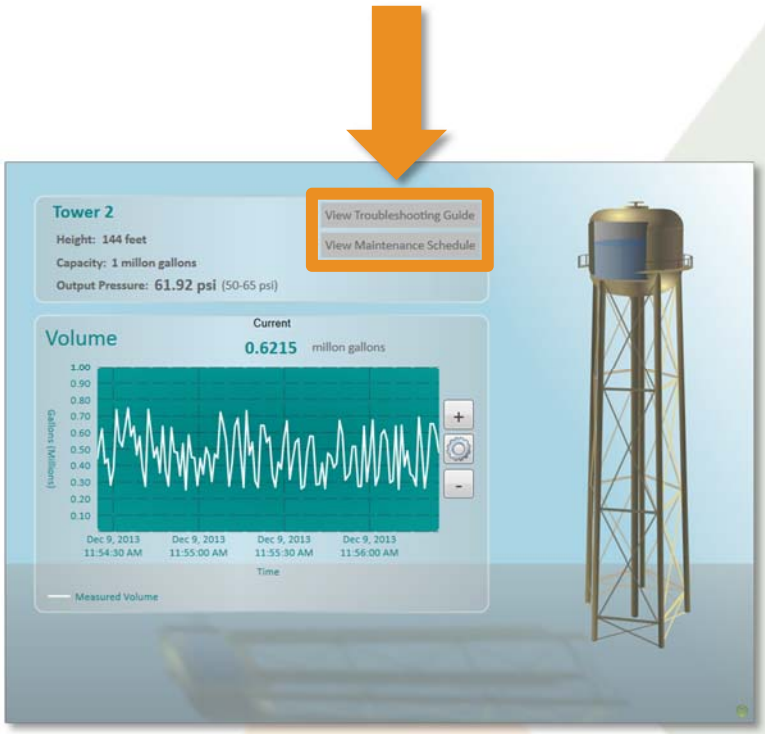
# How Can Information Modeling Help?

In Status, your assets and processes are part of an information model. This information model contains a virtual representation of your enterprise, and provides the organizational and relational structure of your enterprise's data. Data included in your information model can be drawn from nearly any source. Include data from PLCs, HART devices, databases, calculations, real-time user input, or data from other enterprise applications like ERP or MES systems.

By modeling your information in this way, you provide context to your real-time data. You can visualize your asset management data alongside your process control data, or your maintenance data alongside procurement data. Any data relevant to your business processes is now accessible to your visualization system, and opportunities for optimization become much more apparent when data is presented in context.

For instance, you can visualize how a particular motor's production throughput is affected by changes in the Overall Equipment Effectiveness (OEE). You can see how the OEE is affected by maintenance operations. The sort of real-time situational awareness enabled by information modeling reveals new opportunities to lower maintenance and operation costs by maximizing asset performance. By defining the relationships in your information model, the data that you visualize becomes much more understandable and actionable.

Another – and perhaps greater – benefit of information modeling is the ability to track the results of incremental changes in real-time across multiple channels.  This allows for faster analysis and greater collaboration. It also becomes much easier to establish new standards, as information entered into your information model is immediately accessible to all who use it. Also, additional media – like videos and manuals – can be included in your model to ensure that all personnel have immediate access to the latest standards and best practices.



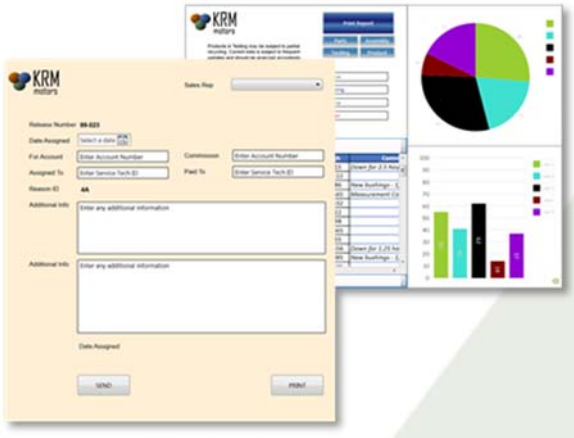

*Information Modeling allows standards and procedural updates to be distributed in real time to all personnel working with a particular asset or process.*

## Workflow, Reporting, and Condition-Based Maintenance

Assets included in your Status Information Model will have defined properties, and those properties can be assigned particular alarms, logging configurations, and conditions. The conditions of your properties are used to assign workflow tasks that can automate asset activity. Workflow tasks can be either time-based (scheduled to run at particular time intervals) or condition-based (triggered by particular conditions defined in your model). Condition-based workflow tasks can be useful for automating physical processes (i.e. close this valve once this tank is full), but they can also be useful for generating performance reports. You can assign a workflow task to certain plant floor conditions, and automatically generate a report when those conditions are met, providing you with a 'snapshot' of the current conditions. Because of information modeling, you can include data from multiple sources as part of the same report.

Workflow can also be useful for implementing a program of Condition-Based Maintenance (CBM). As opposed to Planned Maintenance (PM) operations, which are performed according to a predetermined schedule, many organizations are realizing significant savings in cost and increased asset reliability by performing maintenance according to certain indicators that suggest decreased performance or pending failure. Status Workflow can be used to monitor for certain conditions, and automatically generate a work order when those conditions are met. The work order can be assigned to a particular technician, who can then perform the exact maintenance with a full understanding of what needs to be done and why. This sort of condition-based maintenance can significantly reduce the frequency of visual inspections and scheduled tests.

CBM also ensures that maintenance tasks are performed as soon as conditions indicate they are required. This can often mean that preventive maintenance can be performed *before* an asset fails or forces unplanned downtime.




*Workflow Tasks can be used to generate condition-based reports or automate work order assignment for condition-based maintenance*

## Data Mining and Activity-Based Intelligence

The US Department of Defense employs a process known as Activity-Based Intelligence (ABI) to find useful details in large sets of data. The process involves creating an automated mechanism to sift through large sets of data in search of anomalies.

Today's industrial enterprises are finding ways to employ similar techniques. Huge amounts of data are being recorded and opportunities for improvement are known to exist, but how do we know what to look for and how do we find it? The same sort of ABI employed by the DoD is finding a place in the commercial world.

If we can review our historical process data to define the circumstances surrounding certain conditions (unplanned downtime, spikes in energy consumption, etc.), we may be able to recognize repeated patterns or anomalous activity related to these specific circumstances, thereby enabling us to take action to correct the situation before it happens again. By finding the data that stands out from the rest, detailing the characteristics of that data, and looking for those characteristics elsewhere, we may be able to pinpoint causal relationships that were previously obscure or misleading.

On the flipside, the same techniques can be employed to define the circumstances surrounding periods of extended productivity or energy efficiency. The same techniques used to discern the cause of deficiencies can be used to optimize asset performance and improve the quality and efficiency of our processes.

By creating analytic mechanisms aligned with the principles of ABI, we are able to create a safer, more efficient, more productive work environment.

### SQL Server

Data logged by the Status Server is stored in a relational SQL database. This allows users to take advantage of the advanced performance and many benefits provided by SQL Server, including data compression and encryption, redundancy, backup, disk partitioning, data mining tools, and additional security features. Data stored in a SQL Server database can be queried for advanced reporting or easily integrated into other applications.

Status also includes a database utility that allows users to easily test database integrity, renew databases, and configure backup and restoration options.

# Repeatable and Scalable

As you make the changes that will lead to a more efficient, more productive, and safer business, these changes become part of your information model.

Your Status Information Model not only helps you identify opportunities for improvement and publicize updated standards and procedures, but also gives you a means for endless repetition and growth. Your information model is progressive; it can always be modified or expanded. As you make successful optimizations, any changes made to your information model can be easily repeated for any other relevant processes. You also have the ability to expand your model by adding new locations, new assets, new process cells – whatever it is that you have optimized about your model can be repeated or extended indefinitely.

Status was engineered for more than process control. Status is a vehicle for business transformation, and one that will grow and evolve with your business as you reach new levels of success and strive for more.

*B-Scada provides software and hardware solutions for the monitoring and analysis of real time data in the SCADA (Supervisory Control and Data Acquisition), IoT (Internet of Things) and smart city domains. B-Scada systems are sold worldwide in various verticals including: building automation, transportation, smart grid, manufacturing, agriculture and commerce. B-Scada solutions are deployed onsite and as cloud-hosted solutions in a SaaS (Software as a Service) model. Learn more at http://scada.com.*

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