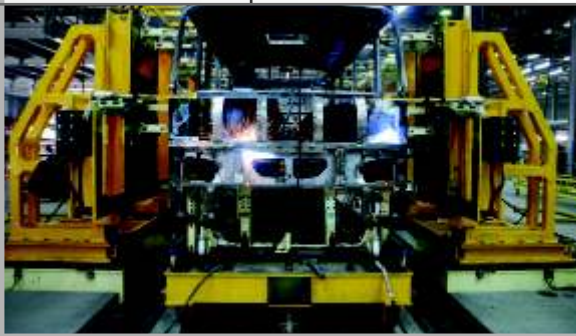




csense[®]

process performance enhancement



In today's competitive manufacturing and mining environments, there is a constant drive to enhance process performance through reducing production costs while also increasing asset capacity. This is not achieved, in part, because the causes for production problems in complex processes are difficult to identify, isolate and prevent. Furthermore, current process control does not allow for optimal asset usage. Control of critical process units generally requires more advanced techniques than simple control loops to reach optimal throughput.

CSense provides the tools to identify **causes** for production problems **faster** and **easier** than before and the technology base to help **prevent** these problems from recurring. The CSense technology base also helps process and control engineers to first **understand** and then **solve** their process control needs.

Discover how CSense can enhance your process performance.



Process Performance Enhancement

The CSense Process Performance Enhancement offering allows a user to follow an incremental approach to unlocking the true value of information. An incremental approach helps the user absorb the technology at low risk and implement solutions when and where appropriate. The comprehensive and integrated Process Performance Enhancement offering consists of Rapid Process Troubleshooting, Smart Process Monitoring and Advanced Process Solutions.

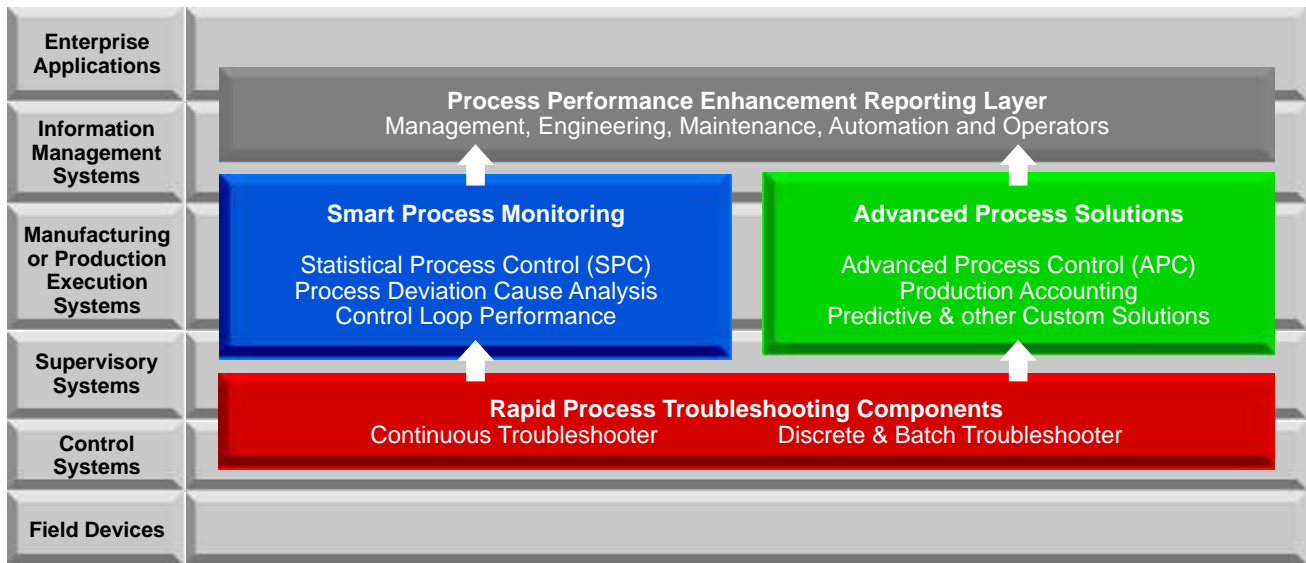


Figure 1 CSense Process Performance Enhancement offering in the industrial application layer context

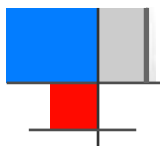
Rapid Process Troubleshooting

CSense Troubleshooters are powerful analytical tools that utilize multivariate statistical and empirical techniques to extract knowledge from existing historical data. These tools can be used to identify causes for production problems and identify the opportunity for preventing these problems in the future.

A Process Troubleshooting and Improvement program supports and compliments current continuous improvement initiatives through facilitating rapid process troubleshooting. The program also addresses the establishment of a troubleshooting capacity amongst process engineers through supplying the technology, training and coaching required to solve current process problems, while continuously monitoring the operational and business effectiveness of deployed solutions.

Smart Process Monitoring

The value of information decays over time. Hence online proactive troubleshooting enhances process performance through enabling quicker fault and cause diagnosis. CSense has a variety of smart process monitoring solutions that can be customized for optimal use with the CSense Troubleshooting tools. These solutions include real-time display and automated reporting and can incorporate both univariate and multivariate statistical and modeling techniques to accommodate process complexity.



Advanced Process Solutions

The CSense technology platform also provides the infrastructure to develop custom solutions to meet more advanced process control (APC), monitoring, or predictive requirements. CSense has extensive tool boxes that can be used for the development of advanced process solutions in an environment that is designed for ease of use and configuration.

The results of the CSense Process Performance Enhancement solution modules are conveyed to users through role-based reports (see Process Performance Enhancement Reporting layer in Figure 1). The reports and real-time screens provide users with specific corrective actions to take based upon the source or cause of deviation. Each role-based report provides the appropriate level of detail for that specific group. Process Performance Enhancement reports are designed for management, process engineers, maintenance, automation, and operator personnel.

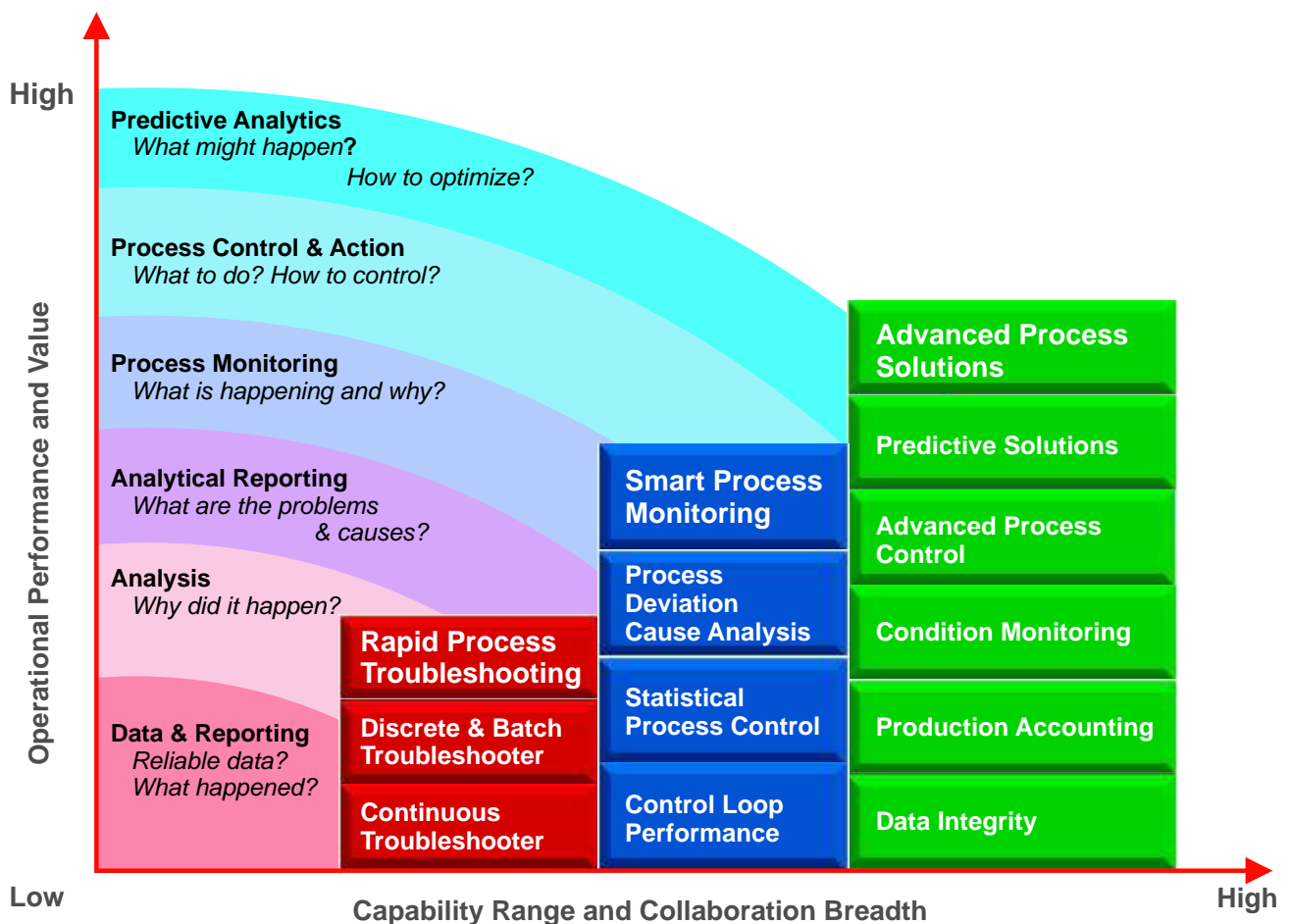


Figure 2 CSense solutions modules offering with regards to Analysis, Analytical Reporting, Monitoring, Control and Predictive Analytics

Figure 2 illustrates the CSense Process Performance Enhancement solution modules with regards to Analysis, Analytical Reporting, Monitoring, Process Control and Predictive Analytics in the context of increasing business value, capability range and collaboration breadth. The Rapid Process Troubleshooting products provide the basis for Analysis and Solutions Development and addresses questions such as “Why did it happen?”, whereas the Smart Process Monitoring solutions provide solutions on a Analytical Reporting and Monitoring level and addresses questions such as “What are the problems and causes?” and “What is happening and why?”. At the Process Control and Predictive Analytics level, CSense helps to address questions such as “How to control?”, “What might happen?” and “How to optimize?” with its predictive, control and optimization solutions.

Rapid Process Troubleshooting

The CSense Troubleshooters provide wizard environments that facilitate the off-line troubleshooting of continuous, batch and discrete processes and a solutions simulation and development environment called CSense Architect. They provide the user with the capability to visualize process problems and their causes through modeling and simulating the process on historical data.

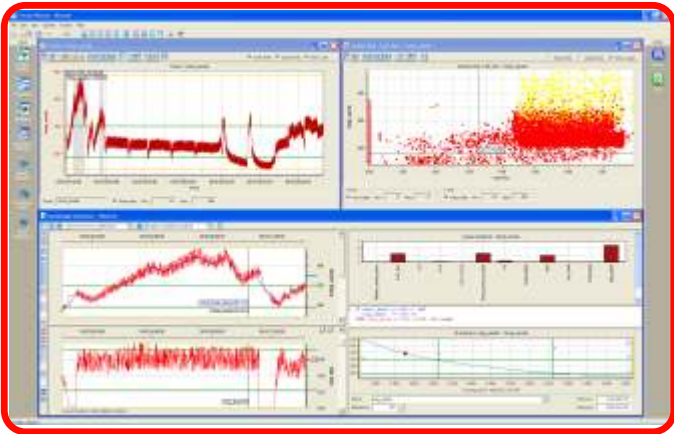


Figure 3 Continuous Troubleshooter

The CSense Troubleshooting Wizards allow for:

- Guided troubleshooting steps captured in underlying solutions action object.
- Visual and automated data preparation.
- Visual analysis of historical data.
- The use of powerful but intuitive models and statistical charts to identify the causes of process problems using continuous/batch/discrete data.
- Configuring smart process monitoring solutions from a single and unified environment.
- Identifying the opportunity and quantifying the benefit for developing and implementing an online solution.

Smart Process Monitoring

The smart process monitoring solutions provide for the identification and visualization of:

The causes of process variation in real-time – The automated causal analysis report helps production management and process engineers to determine causes of variations over the last shift, day, week, month, etc. The real-time action object displays realtime causes for operators and process engineers as well as operator actions or messages.

Abnormal process variation through the Statistical Process Control (SPC) portal – This identifies Key Performance Indicators (KPIs) that are not meeting specification on historical data and combines off-line SPC with multivariate troubleshooting drill-down for finding causes of process deviations in KPIs. This also allows for the importing of SPC into the web-based automated SPC reporting facility with KPI driver trees.

Poorly performing control assets through web reports – This is done through Web- and e-mail-based control loop performance summary reports (ranking worst performing control loops), loop-based detailed reports and custom reports with user-based configuration, scheduling and administration criteria.

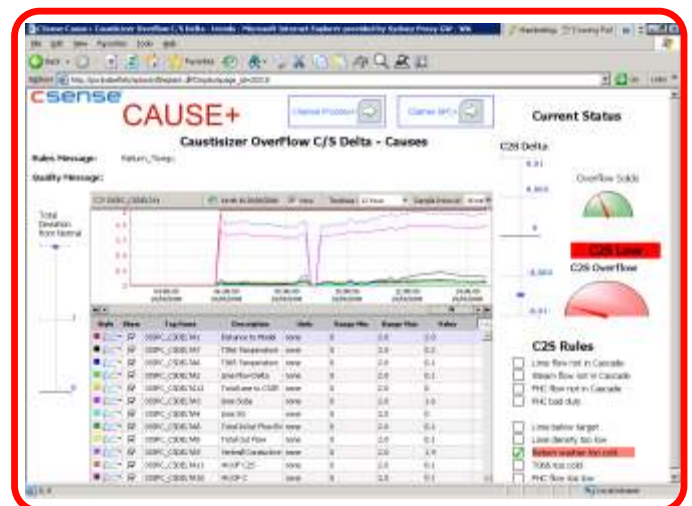


Figure 4 Smart Process Monitoring identifying causes of process deviation

Advanced Process Solutions

The advanced CSense solutions development and deployment environment provides users with the capability to:

- Analyze and quantify the opportunity for improvement using the CSense Troubleshooting Wizards and customizing generated solutions action objects.
- Develop an optimal advanced process control, decision support or expert systems solution by combining knowledge mined from both data and process personnel using the CSense solution development platform.
- Integrate the solution with the existing information infrastructure and execute continuously in real-time using the CSense Action Object Server and web-based reporting infrastructure.

What CSense Process Performance Enhancement means to the people that matter

Business and production management can look forward to:

- Enhanced production performance and the global competitiveness of the business
- High-level reporting on process performance (linking in with operational dashboard where possible) and ad-hoc drill-down capability
- Addressing questions such as “Why did it happen?”, “What might happen?” and “How to optimize?”
- An effective and scalable program for the rolling out of process performance enhancement solutions
- Establishing an empowering process troubleshooting and improvement capability within the workforce
- Fast-tracking of continuous improvement and Six Sigma project cycles

Process engineers and process specialists get a comprehensive and professional toolset that allows:

- More processes to be in control through preventative, real-time actions
- Rapid process troubleshooting and fast-tracking of Six Sigma continuous improvement project cycles
- Automated SPC with KPI driver tree solution for identifying KPIs that are not meeting specifications
- Automated and real-time drill-down capability to pinpoint the causes of badly performing KPIs
- Automated control loop performance management
- Development and deployment of advanced process control, decision-support, and predictive solutions

Maintenance staff gets more optimal or improved use of assets and less downtime of equipment through:

- Automated SPC that helps spot trends and maintenance-related KPIs that are not in control
- Automated and real-time drill-down capability to pinpoint the causes of equipment malfunctions
- Automated control loop performance management (e.g. identify control element-related problems, etc.)
- Comprehensive tools to develop asset health and maintenance solutions

Automation and instrumentation personnel get better insight into diagnosing and fixing system problems with:

- Comprehensive tools for rapid system diagnosis
- Automated SPC with KPI driver tree solution for identifying deviations in automation and instrument-related KPIs
- Automated and real-time drill-down capability to pinpoint the causes of automation and instrumentation problems
- Automated control loop performance management
- Tools to develop and deploy custom data integrity solutions for checking instrument-related problems

Operators are more in control of complex processes with:

- Real-time cause indicators and associated actions and messages when process deviations occur in KPIs
- The ability to do control loop adjustments according to feedback from the automated control loop performance management solution
- Operator interaction with advanced process solutions



The CSense Process Performance Enhancement solutions offering and integrated product range provide production personnel, process specialists, and industrial automation professionals with the tools they need to identify and eliminate problems before they become mission-threatening and to get the most from their wealth-creating processes. The Process Troubleshooting and Improvement program addresses sustained skills transfer, engineering assistance, training and on-going assessment of the business value of the improvement.



About CSense Systems

CSense Systems was established in 1997 and is a rapidly growing company with a global partner network of highly professional industrial software distribution and engineering companies with deep domain skills. Apart from software products, it also offers Process Performance Enhancement services and global solution support. CSense software facilitates a troubleshooting methodology which makes it easy to determine causes of process problems rapidly and fast-tracking process improvement actions leading to operational excellence and growth.

CSense. Enhancing Process Performance.



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