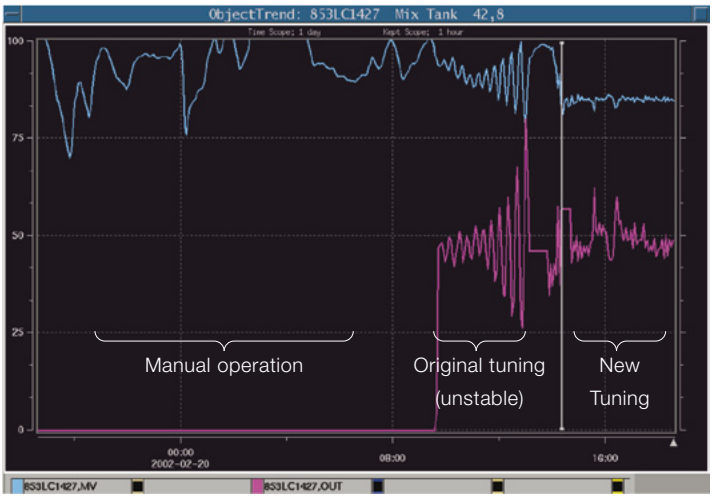
Process Automation Advanced Services

ABB Loop Optimization Services
Services that benchmark, correct and sustain system performance improvements

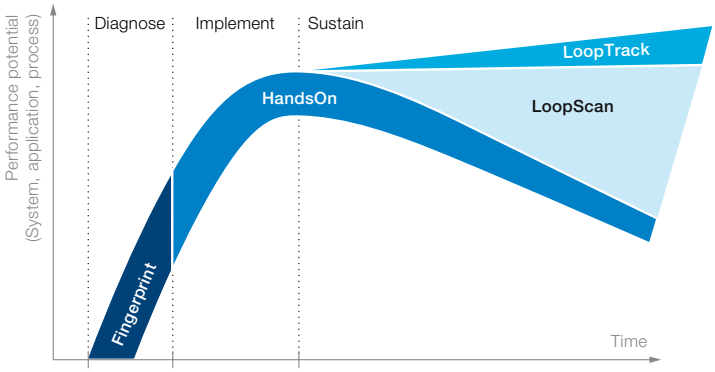
ABB Loop Optimization services identify and correct loop performance issues.



ABB's Loop Optimization Services help process industries get the most value from their automation assets.

Benefits
- Reduce energy cost
- Improve product quality and operating range
- Increase capacity
- Eliminate manual operation
- Improve reliability and safety
- Reduce process upsets

Features
- Plant-wide assessment of control loops
- Benchmark support data and calculations
- Detailed implementation plan
- Remote-enabled maintenance support
- Periodic or continuous monitoring with ABB's LoopScan™ and LoopTrack™ products



Process control performance
When first installed, automation equipment provides substantial benefits. However, sustaining peak benefits can be elusive. Engineers must review hundreds of signals to detect possible problems, and only expert engineers perform successful control loop tuning.

In many cases, after a few months, gains are lost due to process changes. Even slight process control degradation can result in millions of dollars in lost profitability.

Optimization methodology
ABB Loop Optimization Services include a series of platform-independent, non-invasive services that can be applied to any automated process.

A three step methodology—*diagnose*, *implement*, and *sustain*—is applied to the task of control system auditing and tuning. The diagnostic phase includes benchmarking existing performance to provide a basis for evaluating and identifying improvement opportunities. The resulting implementation plan identifies corrective activities for performance improvement, and associated financial benefits. Once improvements have been achieved, sustaining services, delivered on-site or remotely, provide the means to maintain and continue process improvements.

Commercial PID control block algorithms from ABB and other control system vendors are supported, with configuration options available for PID algorithms. Proprietary, state-of-the-art software tools simplify complex loop data analysis. Troublesome loops are identified through combined data collection, model identification, feedback tuning, feedforward tuning and controller simulation.

Step 1: Diagnose with Loop Performance Fingerprint

The Loop Performance Fingerprint compares existing controls to optimized standards to discern expected capabilities. It uses comprehensive data mining techniques, proven loop performance indicators, and standard service methodology, and is supported by years of loop tuning experience to access and diagnose:

- Control loop and process assessments
- Root cause and interaction analysis
- Controller setup and tuning cluster measures

ABB optimization engineers, equipped with the LoopScan Analyzer built on patented ABB technology, analyze the control loop response of automation equipment.

Overnight plant-wide data collection allows each loop to be classified and prioritized related to control, signal conditioning, and process interactions. Disturbance sources, such as dead time, inverse response and under-damped behavior in the process models, are identified. Loops are ranked to classify Key Performance Indicator area relationship, severity and priority. Problem areas are isolated and disturbance sources are quickly identified.

Process evaluation

Each performance index is a function of specifically designed ABB indicators. The resulting indices are used to evaluate performance levels and to provide:

- Assurance that solutions are applied to process disturbance rather than process symptoms
- A determination between tuning problems and physical hardware issues
- Qualifying problems related to signal conditioning setup on actual instrumentation short comings

Reporting

Findings are presented at the end of the evaluation period. Executive and Technical Reports describe Fingerprint findings, supporting data, recommendations, financial impact of recommendations, and an actionable improvement plan.

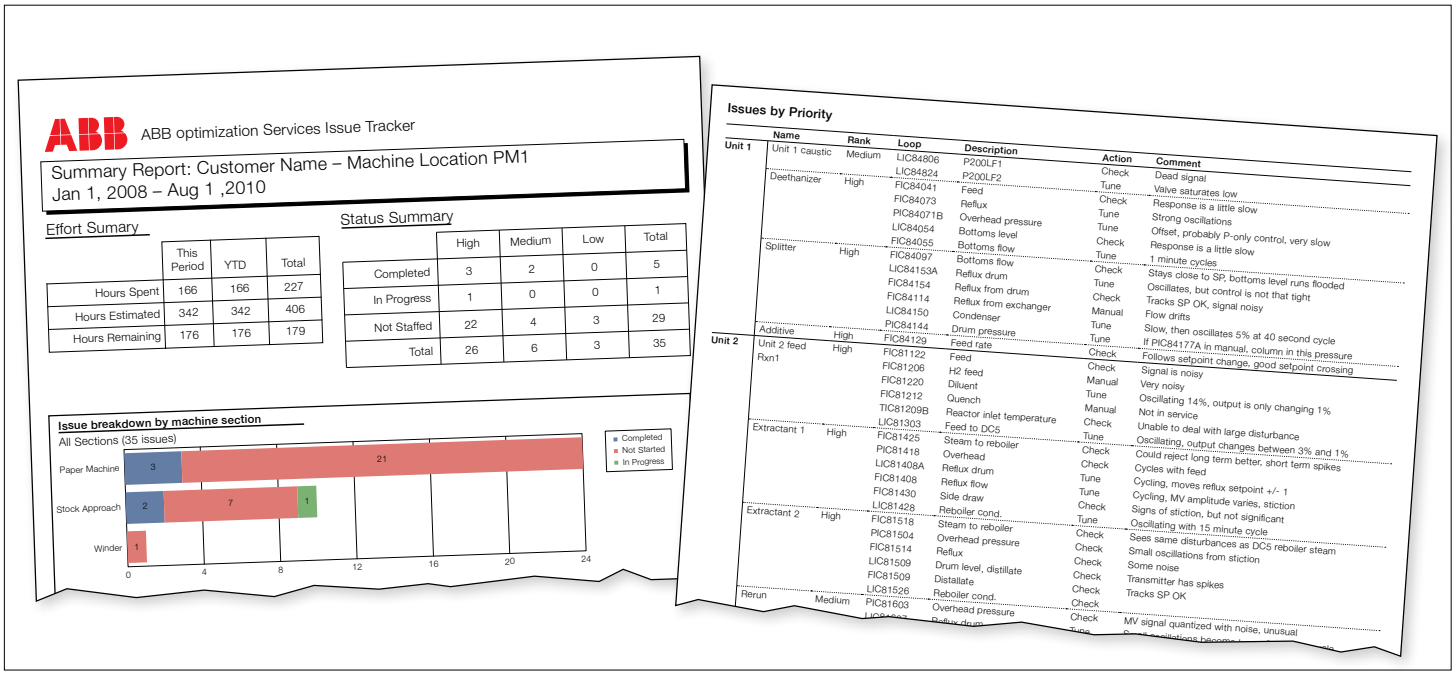
Improvement plan

Improvement plan lists prioritized improvement activities that will achieve maximum performance benefits quickly. Based on the findings, improvement recommendations may include: valve replacement, correcting the sources of cyclic process problems, cleaning up signal conditioning problems, optimizing or adding control logic, revising tuning techniques, updating standard operating procedures, or re-tuning controls.

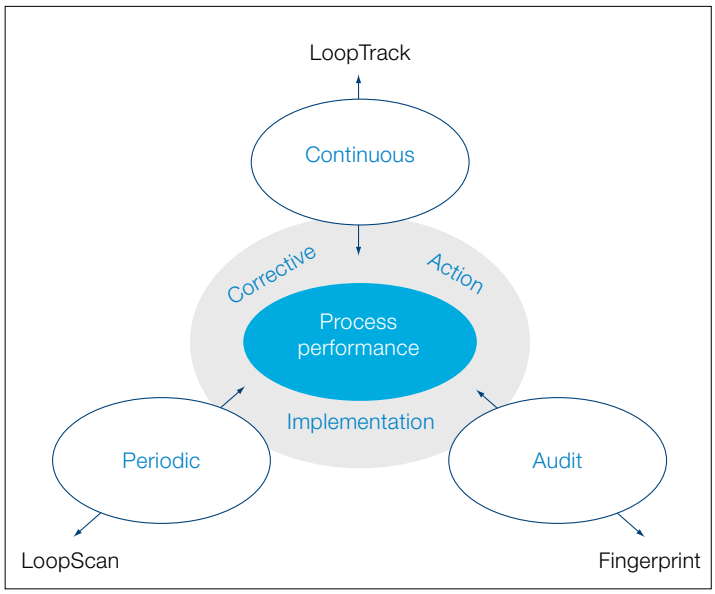
Step 2: Implement

An improvement implementation plan is developed by ABB and site representatives, through a collaborative review of the Fingerprint findings and recommendations.

Once the plan has been set, improvements can be delivered incrementally or all at once for immediate improvement. Phased implementation ensures that process and equipment changes



Sample Implementation Plan



Loop Optimization Services can be delivered as a single Fingerprint audit, by module periodically with LoopScan, or continuously as LoopTrack.

can be made and maintained throughout the year with steady progress toward the performance goal.

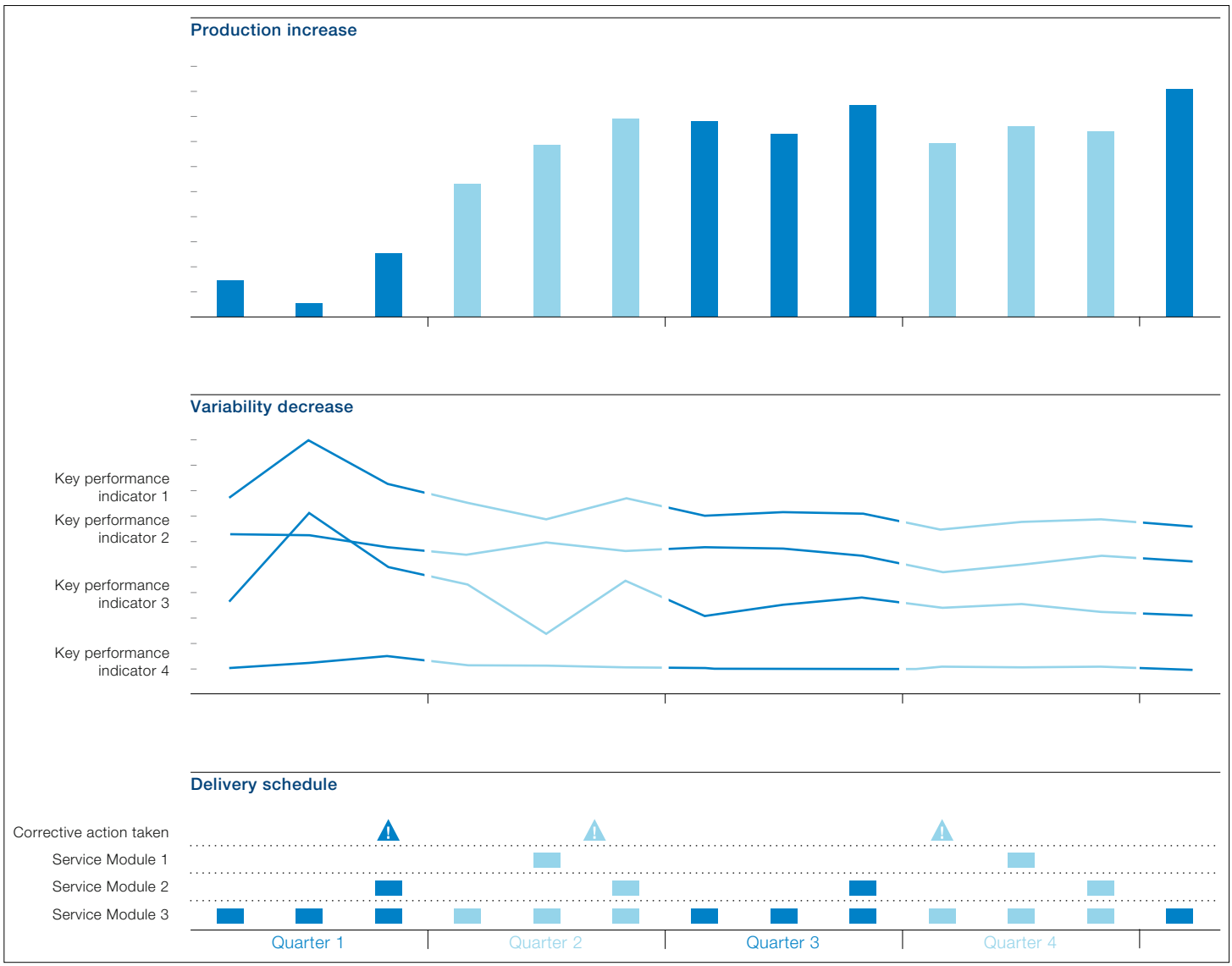
Implementation examples include:

- Prioritized control tuning loop
- Instrumentation requiring calibration or repair
- Control loop configuration enhancements
- Valve and positioner repair priorities
- Level 1 tuning prior to advanced process control projects
- Implementation of advanced control algorithms
- Advanced composition control
- Investigation of root cause disturbances

ABB Engineers are equipped with advanced control loop tuning tools such as LoopTune which allows process response modeling and efficient and accurate tuning of PID loops.

Step 3: Sustain performance with LoopScan and LoopTrack

The Sustain step ensures improved performance does not degrade. ABB LoopScan and LoopTrack software ensure



The diagram above shows the benefits of LoopScan over the course of a year. Production increases and variability decreases resulting from diagnostic and corrective action over time are shown.

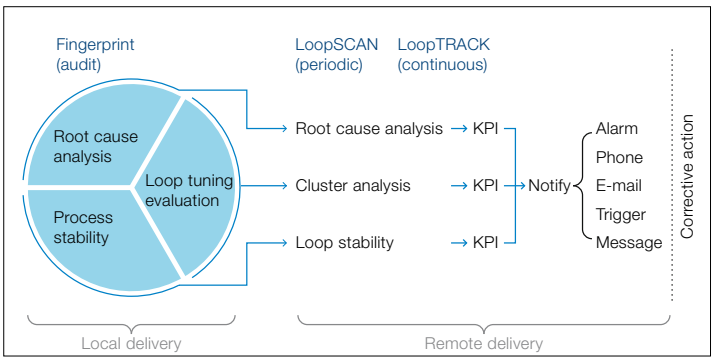


ABB Loop Performance modules can be delivered individually at a frequency that fits customer needs.

performance not only is maintained, but can be improved through continuous monitoring and corrective actions.

LoopScan provides periodic diagnostic monitoring of loop performance levels. Monitoring frequency and service modules are flexible, to match site requirements. Key Performance Indicators (KPIs) are accessed from a smart database, including configurable events such as: triggers, time stamps, execution periods, or operator request. LoopScan stored information is accessible on-demand to calculate KPIs for viewing and automated reporting.

LoopTrack provides continuous monitoring between LoopScan periodic reporting deliveries. It allows predefined KPIs to be used as notification triggers to ensure problems are not overlooked. The triggers are based on thresholds, persistence, windowed analysis or user-specified conditions. Triggers can be tied to notification options for specific conditions. Notification options include: alarms, phone calls, emails, triggered data storage, or text messages.

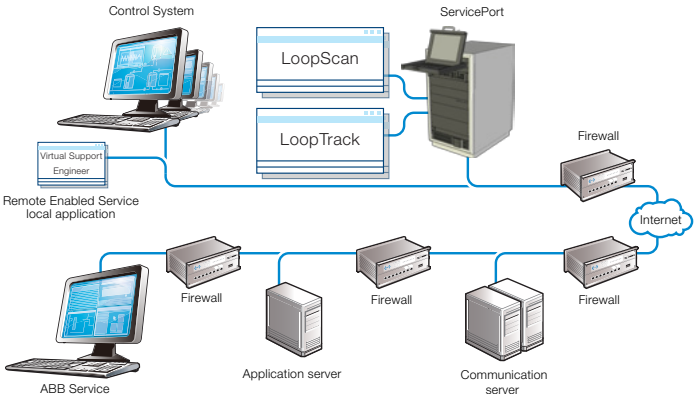
A database is configured to capture critical information to ensure that required data is available to enable continuous or remote troubleshooting.

ABB ServicePort

The key to sustaining benefits derived in implementation is to ensure that these tools are accessible to the people who maintain and manage the control system. To realize full advantage of the LoopScan and LoopTrack diagnostic and maintenance applications, the ABB ServicePort™ provides a robust node on-site on which these applications operate, and from which they can be accessed from anywhere on the plant network, or remotely.

The ABB ServicePort acts as an on-site service coordinator, and provides access and management for many services. When it is networked to the control system, the ABB ServicePort is the connection to facilitate ABB's remote-enabled optimization services. It also provides access to and interaction with the diagnostic and system maintenance features of the LoopTrack and LoopScan services.

The ABB ServicePort extends ABB's ability to serve customers. Current applications include the ability to monitor system operations remotely, and to send error or alarm warnings via email or text message to select managers' and engineers' computers and cell phones. The ABB ServicePort also facilitates access to extensive resources, such as other company employees, ABB's global network of experts, or other application and process professionals who increase and complement site engineering knowledge. The ABB ServicePort is provided as a subscription service.



Sustaining services include LoopScan, a periodic evaluation that helps prevent results erosion; and LoopTrack, a condition monitoring service that helps predict and prevent performance upsets. Both services can be delivered in person by an ABB Engineer, or through the ABB ServicePort, a secure connectivity device that gives customers fast access to the best ABB expertise no matter where it is in the world, to ensure increased process performance at the lowest possible cost.

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