

Features and Benefits

- **Asset Monitoring:**

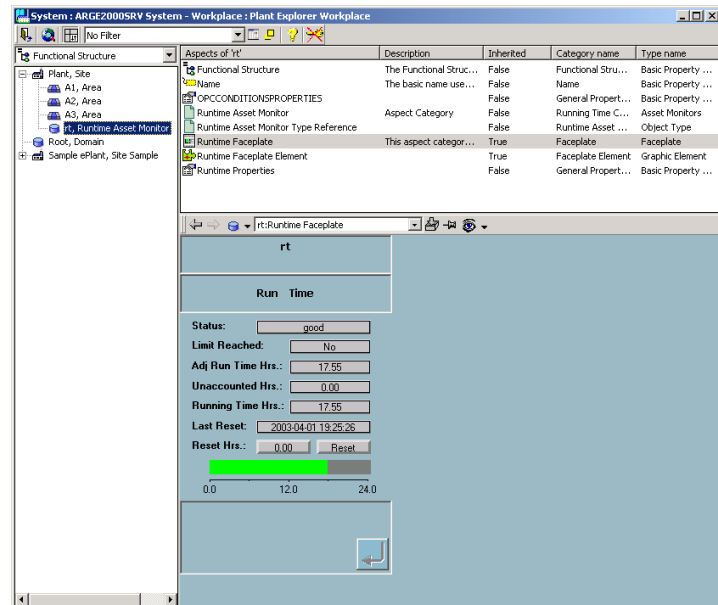
Provides consistent reporting method of plant asset health status: Asset Condition Tree provides visualization of current health conditions with the ability to drill down and determine root cause of problems.

Plant information used to determine asset performance: Asset Monitors track asset performance using real-time production and control data.
- **Complete asset optimization:** For automation devices, plant infrastructure, plant equipment, and production processes.
- **Automatic monitoring of maintenance conditions and automatic alarms:** Facilitate fast, reliable implementation of corrective measures.
- **Real-time integration:** Integrates CMMS systems, condition monitoring systems, and real-time asset information into a single application view.
- **Access flexibility:**

Thin client access: via web technology.

Process Portal A: via context menu.

Process Portal B: via context menu.
- **Alarm integration.** Seamless alarm integration with Process Portal systems.



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Asset Monitoring consists of the Asset Optimizer Server and Asset Monitor Environment with Basic Asset Monitor Library system extensions. It provides the infrastructure that acquires and analyzes asset status/condition information. Asset Monitoring notifies operators and maintenance personnel when an abnormal condition calls for a maintenance action.

An Asset Monitor is an application responsible for retrieving data from, and interacting with, multiple data servers (real-time data servers, OPC servers, etc.). It analyzes the data and when necessary, issues an Asset Condition Document (ACD) and notifies Process Portal of the detected condition. An Asset Condition Document contains all information necessary to describe an asset condition, that in turn may be used to generate a work order for maintenance purposes.

Asset Monitors can detect problems that may not affect the process variables, but do affect the maintenance status of an asset or process. They support the diagnosis of problems to identify and locate the problem source and to offer correction possibilities.

Asset Monitors can exist in any part of the plant hierarchy, such as the device, loop, equipment, area, process, plant, or enterprise. They can be written for higher level assets (parents) that are themselves composed of many subassets (children). Asset Monitors need not be associated with a single physical asset. They can acquire data from many sources to implement predictive maintenance functions. Therefore, Asset Monitors may require access to multiple data sources in the system.

Asset Monitoring interacts with third party CMMS applications to provide a system that is easily configured and operated. This optimizes the use of plant equipment and processes.

Asset Monitoring

Asset Monitoring consists of the following system extensions:

- **Asset Monitor Environment with Basic Asset Monitor Library.**
- **Asset Optimizer Server.**

Each system extension contains aspect systems. The aspect systems contain aspects that can be added to objects in the various structures. The aspect system are described in the remainder of this section.

Asset Monitor Environment with Basic Asset Monitor Library

The Asset Monitor Environment with Basic Asset Monitor Library system extension consists of the Asset Monitoring aspect system. It contains the following aspects:

- **Asset Monitor Data Source.**
- **Asset Monitoring Server.**
- **Basic Asset Monitor Library:**
 - Bad Quality Check.
 - Bool Check.
 - Flow Delta.
 - High Limit Check.
 - HighLow Limit Check.
 - Low Limit Check.
 - Running Time Check.
 - XY Profile Deviation.
- **Process Portal B Provider.**

Asset Monitor Data Source

The Asset Monitor Data Source identifies the data server type and its connection parameters. The defined data server is used by Asset Monitors to access the OPC item values that are needed to assess the current asset conditions. The Asset Monitor Data Source provides access to the configured data server.

Asset Monitoring Server

The Asset Monitoring Server defines the parameters used to identify the Asset Monitoring Server Engine that provides the execution environment for the Asset Monitors. Configuration consists of identifying the location of the Asset Monitoring Server Engine, location of the Asset Optimizer server, and the service account information entered during Process Portal A installation. An **Enable Auto Startup** check box is used to control whether or not the Asset Monitoring Server starts up when the system is started.

Basic Asset Monitor Library

Optimize IT Asset Optimizer provides the following library of Asset Monitors:

- **Bad Quality Check.** Reports the quality status (good, bad, uncertain) represented by the value of the monitored Input Record.
- **Bool Check.** Monitors a signal with two states: normal and alarm. Notifies if the signal is in alarm state.
- **Flow Delta.** Monitors the difference between two numeric values (e.g. steam flow and feedwater flow) and notifies if the difference exceeds a configured percentage of the first value.
- **High Limit Check.** Monitors a process value and notifies if it exceeds configured limit values that include the high limit value and the high limit value plus a negative offset value.
- **HighLow Limit Check.** Monitors a process value and notifies if it exceeds configured limit values that include the high limit value, the high limit value plus a negative offset value, the low limit value, and the low limit value plus a positive offset value.
- **Low Limit Check.** Monitors a process value and notifies if it exceeds configured limit values that include the low limit value and the low limit value plus a positive offset value.
- **Running Time Check.** Monitors the accumulated runtime hours of a device and notifies, for preventive maintenance, that the runtime has accumulated up to a configured limit.
- **XY Profile Deviation.** Compares a two-dimensional value against a baseline function and notifies if the deviation from the baseline is less than or greater than the configured limit.

Process Portal B Provider

The Process Portal B Provider provides seamless Asset Monitor condition reporting into Process Portal B Alarm and Event systems.

Note: The Process Portal B Provider is a Process Portal A aspect that sends asset condition events to a Process Portal B node. Process Portal B Connectivity must be installed on that Process Portal B node. With this software installed, the Process Portal B system will have both Asset Monitor alarm and Asset Optimizer view capability.

Asset Optimizer Server

The Asset Optimizer Server system extension consists of a base functionality that is common to more than one system extension (Messenger Service, CMMS Connectivity, Asset Monitor Environment).

The Asset Optimizer Server system extension consists of the Asset Tree aspect system, which consists of the following aspects:

- **ACTViewer (Asset Condition Tree Viewer).**
- **ACTReporter (Asset Condition Tree Reporter).**

The Asset Condition Tree shows the status of associated plant objects (assets) based on Plant Explorer hierarchies. Assets can be control system hardware components, control system networks, control system devices, fieldbus networks, fieldbus components, machines, pumps, motors, process equipment (boiler, reactor), etc.

Asset Condition Tree indicators propagate the most severe condition up the Asset Condition Tree. Asset Condition Tree indicators distinguish the level of severity using OPC and Asset Monitor severity range (1 to 1,000). Each Asset Condition Tree indicator represents composite severity of an object and all children beneath the object for the current structure.

In addition to displaying composite severity for each asset, the Asset Condition Tree displays, and propagates up the tree, the quality of the condition (or the Asset Monitor itself, i.e. bad configuration or not downloaded), as well as fault report availability. Fault report availability is indicated by bold text. Quality has three states:

- Good: Displays only Asset Condition Tree indicator.
- Bad: Displays Asset Condition Tree indicator plus X.
- Uncertain: Displays Asset Condition Tree indicator plus ?.

Table 1 shows and describes the Asset Condition Tree severity indicator icons.

Table 1. Asset Condition Tree Severity Indicator Icons









Icon	Description
	No ACTReporter or Asset Monitor associated with the asset.
	Normal subcondition.
	Non-normal subcondition with severity between 0 and 250.
	Non-normal subcondition with severity between 251 and 500.
	Non-normal subcondition with severity between 501 and 750.
	Non-normal subcondition with severity between 751 and 1,000.

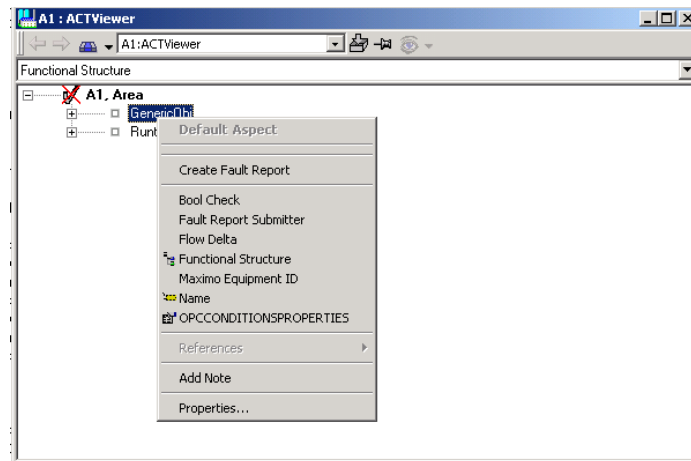
Table 2 shows and describes the quality indicator overlay icons that appear over the Asset Condition Tree severity indicator icons to represent quality.

Table 2. Quality Indicator Overlay Icons

Icon	Description
	Uncertain quality.
	Bad quality.

ACTViewer (Asset Condition Tree Viewer)

The ACTViewer (Figure 1), when added to an object, allows the Asset Condition Tree to be displayed. When displayed, the Asset Condition Tree shows the condition of that object and all its children. The Asset Condition Tree visually indicates the presence of a fault report by displaying items in bold text. Context menus permit fault report submission directly from within the ACTViewer. Right-clicking on the item of interest produces a context menu such as the one shown in Figure 1.



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Figure 1. ACTViewer

The ACTViewer is accessible within the Plant Explorer Workplace on the Asset Optimizer Server and rich client Asset Optimizer Workplaces. It is also accessible on thin client Asset Optimizer Workplaces. When the ACTViewer is active in the Plant Explorer Workplace in the rich clients, the status of the assets in the view update automatically when values change. Thin client views require a manual refresh to update the view.

ACTReporter (Asset Condition Tree Reporter)

The ACTReporter (Figure 2) is a detailed view of an asset condition.

Severity	AM Name	Condition	SubCondition	Description	TimeStamp	QualityStatus	Fault Report
1	Running Time Check	Runtime Limit Reached				badOutOfService	
1000	Flow Delta	FlowDelta	LimitExceeded	Flow delta exceeded allowable limit of 5.0%	2003-04-01 15:15:56	good	
1	HighLow Limit Check	HighLimit	Normal	Normal	2003-04-01 15:15:55	good	
500	HighLow Limit Check	LowLimit	LowOffset	Low offset limit reached	2003-04-01 15:15:55	good	
1	XY Profile Deviation	Reference Profile Deviation				badOutOfService	
1000	Bool Check	State	Alarm		2003-04-01 15:15:53	good	Available
1	Bad Qu Check			Asset Parameter 'ExecutionsRequiredForTrigger' must be an integer >= 1.	2003-04-01 15:15:54	badConfiguration Error	

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Figure 2. ACTReporter

It displays the severity indicator for an object itself. It displays information available to it from all Asset Monitors and their corresponding current subconditions. For each condition, the ACTReporter will provide information about current subconditions, severity, Asset Monitor status, fault report availability, and work order availability. Right-clicking on the item of interest produces a context menu such as the one shown in Figure 2.

Table 3 lists the color scheme that appears in the **Severity** column of the ACTReporter and how the colors relate to the subcondition severity levels.

Table 3. ACTReporter Color Scheme

Color	Subcondition Severity Level
Gray	Normal
White	1 to 250
Blue	251 to 500
Yellow	501 to 750
Red	751 to 1,000

The ACTReporter must be added to each object that needs to be propagated up the Asset Condition Tree in the ACTViewer.

The ACTReporter is accessible within the Plant Explorer Workplace on the Asset Optimizer Server and rich client Asset Optimizer Workplaces. It is also accessible on thin client Asset Optimizer Workplaces. When the ACTReporter is active in the Plant Explorer Workplace, the status of the assets in the view update automatically when values change. Thin client views require a manual refresh to update the view.

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