

Mastering the assets

Asset Master software improves productivity
Eric Olson

Every year, heavy industries spend billions of dollars on maintenance; yet, equipment failure is the principal cause of production losses. There is now a wide appreciation that the development of new monitoring technologies is critical to reducing downtime and containing cost. Most importantly for industrial work practice, employing asset management will impel a shift in work culture, from routine and reactive maintenance to proactive maintenance.

As ships were to seafarers in the 15th century, the computer was to information processing in the 20th century. From number crunching to problem solving, it has become an indispensable tool in the ever-increasing complexity of today's work environments.

The history of computing is peopled with the most picturesque characters: Charles Babbage and his "Analytical Engine"; Ada Byron, who anticipated

computer programming by more than a century; John von Neumann, who proposed storing a program as electronic data; and Alan Turing, who believed that an algorithm could be developed for almost any problem.

Today, large organizations expect to examine and monitor the status of even the most remote outpost at the push of a button. Networks make this possible. It was in the 1970s that ARPANET was set up to connect

research organizations throughout the US. In time, this evolved into a worldwide network – the Internet. Taking advantage of networking technologies, it is now possible to create richer and more powerful applications that enable organizations to achieve higher operational efficiency.

Each progression in the evolution of information technology has been the result of a timely idea. The focus today is on integrating disparate tech-

Operational profitability

nologies and systems to achieve the next level in industrial automation.

Creating Asset Master –

a complete asset management tool
Every year, heavy industries spend billions of dollars on maintenance; yet, equipment failure is the principal cause of production losses. There is now a wide appreciation that the development of new monitoring technologies is critical to reducing downtime and containing cost. Most importantly for industrial work practice, employing asset management will impel a shift in work culture, from routine and reactive maintenance to proactive maintenance. Complete asset management in industrial plants is an emerging opportunity and a present challenge, as changing customer needs tend to raise the bar in innovation.

The first step in defining Asset Master or “must have” features was to identify specific industry needs: The application needed to be capable of managing all areas of field instrument engineering, commissioning, and maintenance. It had to support ABB and third party devices. It needed to provide easy access for online and offline device configuration, parameter setting, online monitoring and

tuning, diagnostic alerts, asset monitoring, calibration management and integral work order processing. Finally, it needed to be scalable. The application had to focus on specific instrumentation needs for device management, while supporting direct integration into large scale process automation systems such as 800xA. Thus instrumentation and automation users alike could benefit from a common set of engineering resources and components.

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Most of these desired features for Asset Master were already present in ABB’s 800xA System and thus, it provided the perfect platform for creating Asset Master. By concentrating on providing a scaled down version of this functionality the precise needs of instrumentation users could be achieved. A six-tiered strategy was under taken for supporting a number of use cases **Factbox**.

The tiers provide extensive scope, from an “electronic screwdriver” at one extreme to a full device management tool installed on the common network using a central database at the other. Customers can start with a small maintenance based application and grow it into a larger control system using the same configuration data and navigation methods for both.

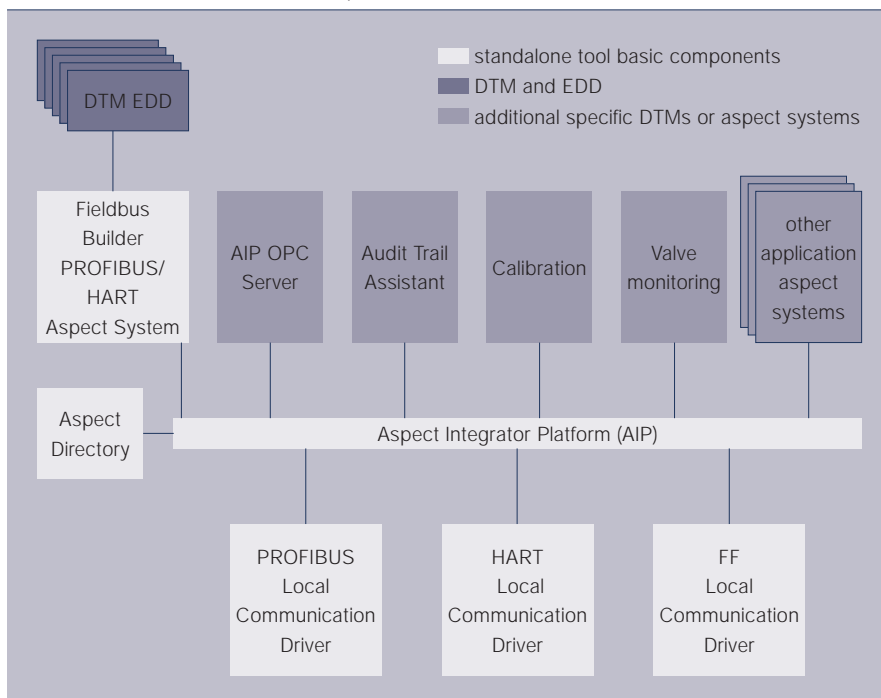
Named Asset Master, the software application for Tiers 3 through 5 is a single tool for all instruments, independent of the manufacturer of the device or the communication protocol (eg. HART, PROFIBUS, or Foundation Fieldbus).

Asset Master Architecture

Asset Master is based on the 800xA System and makes use of common features and components. It can be upgraded by using existing 800xA components such as audit trail, calibration management, maintenance trigger, etc. **1** shows the 800xA System architectural concept. The goal is to reuse as many components as possible.

The functionality of Asset Master will be synchronized and expanded with each release of 800xA. The initial release of Asset Master, scheduled for early 2007 will run on a stand-alone

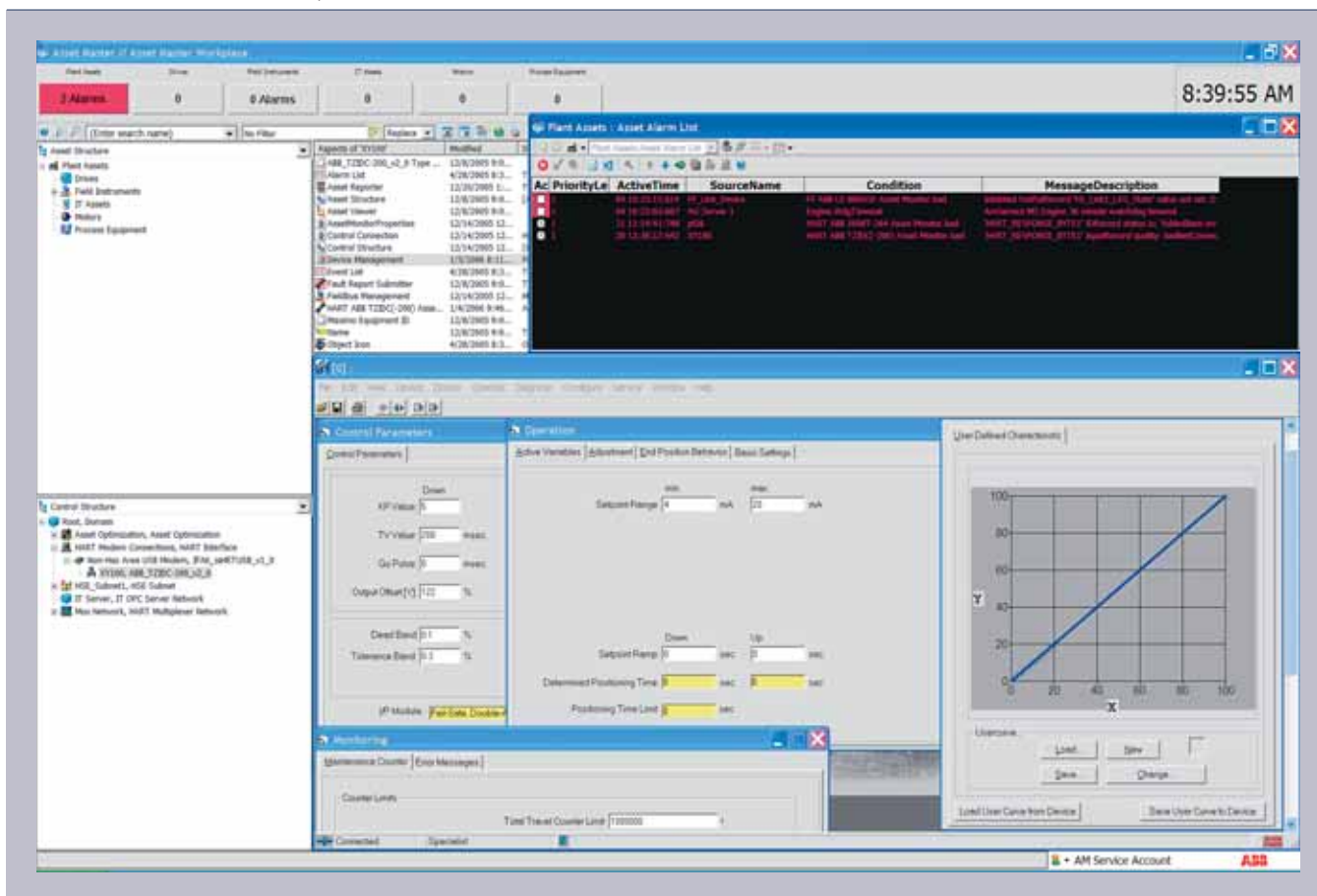
1 800xA software architecture concept



Factbox Six-tiered approach to asset management use cases

- **Tier 1:** Device configuration – PC – based setup tool, factory configured devices, and local device Human-Machine Interface (HMIs)
- **Tier 2:** Device configuration – Hand-held configuration of ABB and third-party devices and hand-held calibrator
- **Tier 3:** Configuration and visualization – 800xA based stand-alone PC configuration and visualization tool (base offering)
- **Tier 4:** Calibration – Device management calibration software (option to base offering)
- **Tier 5:** Asset optimization – Asset monitoring and reporting (option to base offering)
- **Tier 6:** 800xA – automation system (upgrade from base offering + options in Tiers 4 & 5)

2 Asset Master maintenance workplace



PC. It will employ a new Asset Master workplace derived from the existing maintenance workplace.

Instrument connections with Asset Master will be made in support of two primary use applications:

- point-to-point access for bench work configuration (HART via modems, PROFIBUS via adapters, and Foundation Fieldbus via ABB's LD800HSE)
- multiplexer access for online network configuration.

The Mobility hand-held calibrator for integrated calibration is an optional extra. In support of asset optimization, interfaces to asset condition monitoring and Computerized Maintenance Management System (CMMS) are also available as optional offerings.

Considering the rise in transfer of digital information over cellular networks, an option for SMS messaging

to cell phones and pagers will also be supported. The 800xA includes all of these optional features and provides them unaltered for use by Asset Master.

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Asset master functionality

Asset Master runs on Windows XP from a single PC workstation, and provides concurrent connections with HART, PROFIBUS, and FOUNDATION Fieldbus devices. Software installation is straightforward, usually taking less than 2 hours. Support for HART modems and PROFIBUS adapters goes beyond earlier online 800xA capabilities to provide offline bench configu-

ration of the connected fieldbus devices. A search function simplifies efforts in identifying all fieldbus devices connected to the modem, adapter, or linking device.

The Asset Master Workplace display environment focuses on maintenance needs and is comprised of an alarm band that identifies asset condition events organized by asset type (pressure, flow, etc.), a browser for organizing and selecting assets and their displays or data functions, and a viewing area to see the selected display or data **2**.

This workplace reduces the time it takes to comprehend the state of all plant assets. Asset monitors are provided to identify not only the fault, but also the probable cause and the suggested corrective action. Asset conditions can trigger a cell phone message to designated personnel. Graphical based DTMs monitor and configure HART and PROFIBUS devices to

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improve plant operation and production. FOUNDATION Fieldbus device and network configuration is integrated with the LD800HSE linking device for setting up and monitoring the Link Active Scheduler and function block applications. Device calibration notices and asset conditions can be used to trigger a work order submittal to a Computerized Maintenance Management System (CMMS) such as MRO Maximo or SAP / PM that can then be tracked through completion from the Asset Master workplace.

Because Asset Master uses a streamlined version of 800xA, it can easily integrate into larger 800xA systems. This allows a site to start small with Asset Master and grow over time into a larger 800xA system.

Key benefits

In the area of Fieldbus Device Management, Asset Master provides significant benefits. Primarily, it offers a single tool to configure and diagnose multi-vendor devices, thus reducing capital expenditure on tools and training and removing the user's burden of selection.

The full value of intelligent field devices, that provide critical information on their own health and the health of processes and equipment around them, can be realized only when used in combination with asset optimization software. Asset Master offers improved productivity through choice of devices that best fit the application, independent of fieldbus-type.

Asset Master reduces configuration time by using pre-configured field device objects with extended functionality to access device data, asset information and documentation. It also enables faster commissioning through certified devices and approved field device libraries.

It is in the area of Asset Optimization that Asset Master provides tangible economic benefits by reducing maintenance costs over a plant's life cycle and thus boosting the bottom line.

Independent of asset type, Asset Master provides a single interface for engineering, notification of plant maintenance

and asset optimization information. Real-time monitoring and alarming of asset Key Performance Indicators (KPI) facilitate fast, reliable implementation of corrective actions. Asset Master collects, aggregates and analyzes real-time plant asset information to provide advanced warning of degrading performance and/or impending failure. Asset Master's reporting features provide visualization of current health conditions, while its analysis features provide the ability to drill down to the root cause of failure. Integration of disparate CMMS, DMS and Fieldbus engineering tools provides users with a single view, leading to quick and efficient assessment of maintenance needs.

Customers can start with a small maintenance based application and develop it into a larger control system using the same configuration data and navigation methods for both.

Included standard with ABB manufactured instrumentation are highly integrated and comprehensive asset monitors that enable Asset Master to not only identify faults but to show probable cause and suggested corrective actions. This can reduce the mean time to troubleshoot and / or repair the fault leading to improved productivity.

In his book on predictive maintenance, Keith Mobley [1] points out that in the US alone, every year, upwards of \$200 billion is spent on plant equipment and facilities maintenance. Every year, ineffective maintenance management results in a loss of more than \$60 billion. Thus, maintenance can represent 15 to 60 percent of the cost of goods produced, depending on the specific industry. In an oil refinery, for example, the failure of a single valve during peak hours can result in a loss of hundreds of thousands of dollars. A one percent decrease in productivity can reduce output by hundreds of barrels a

day. Therefore, implementing Asset Master creates a substantial savings potential.

Asset Master can provide another significant benefit by ensuring industry compliance. For instance, pharmaceutical units, subject to rigorous Food and Drug Administration (FDA) regulations, rely on the trustworthiness of electronic records generated/managed by critical systems. A recent FDA regulation, 21 CFR Part 11, covers electronic records and signatures that affect production, quality and distribution of drugs in pharmaceutical units. With integration of Mobility Device Management System (DMS), Asset Master can provide users with FDA regulation 21 CFR Part 11 – enabled calibration solutions. In an industry where data integrity is critical to product quality and/or public safety, systems must be overall compliant with FDA regulations. Integrating DMS in the control system offers versatile plant life cycle management and organization allowing the user to derive maximum value from plant assets.

Reusing several 800xA award-winning features resulted in reduced development time for Asset Master and an end-to-end Asset Management Tool that assures compliance with industry regulations. Even now, the combination of intelligent field devices and asset management software is setting new standards for what can be expected and accomplished from the control room. This growing trend in using Asset Optimization will most likely accelerate in the future, fueled by the need for output improvement and cost reduction.

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References

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