

RIZING

RIZING CONDITION-BASED MAINTENANCE

**Combining the powers of SAP
MII and SAP EAM to improve the
asset health of your enterprise**



Author:
Terry Wireman

This paper discusses how SAP Manufacturing Integration & Intelligence (MII) and Rizing CBM can help your company implement a condition-based maintenance strategy.

Improved asset health through condition-based maintenance

A CBM Strategy

To implement a Condition Based Maintenance (CBM) strategy to improve asset health needs the following process steps:

- Use real time visibility to operational characteristics for evaluating against standards or limits.
- Identify problems or potential degradations of performance from any standards violations.
- Provide alerts or directives to guide the maintenance planning and execution process to the asset.

A CBM strategy helps a maintenance organization to add efficiencies to their operations by detecting problems before they severely impact performance and directing the performance of preventative / corrective maintenance tasks to the most appropriate times for the operations.

Some of the Business Benefits of CBM are:

- Improved asset availability through reduced downtime and fewer unplanned outages
- Increased asset reliability through improved detection of failure modes before they happen
- Reduced maintenance costs through better maintenance planning and less reactive repairs
- Reduced spare part inventories through component replacement decisions based on measured degradation of parts.

Rizing CBM

Rizing's Condition-Based Maintenance solution is a configurable application built to execute the steps needed for implementing a CBM strategy that's integrated to SAP Plant Maintenance by providing:

- Automated and manual acquisition of data from any industrial data sources and systems.
- Standard and customized processing rules for evaluating equipment conditions.
- Generation of asset and monitoring scenario-specific maintenance notifications, work orders or measurement documents based on the conditions of assets.
- A non-programming configuration environment to enable maintenance experts to define the monitoring scenarios.
- A business user directed dashboard for monitoring the health of assets and the status of the actions pending on those asset.

Rizing CBM focuses on capturing real time condition data using the standard capability provided by SAP MII.

Rizing CBM focuses on capturing real time condition data using the standard capability provided by SAP Manufacturing Integration and Intelligence (MII); evaluating that data against maintenance-related thresholds; and posting transactional alerts into SAP PM specifically related to the condition of the asset.

The foundation of Rizing CBM is SAP MII: a platform for application development. The solution provides the subject matter content into SAP MII for a condition-based maintenance application. By using MII, the data and processes provided in Rizing CBM can be extended for use in other value-added applications through MII to help clients address business requirements beyond a CBM strategy.

SAP MII

SAP Manufacturing Integration & Intelligence (MII) is designed to facilitate the rapid development of applications that use operational data from industrial systems for:

- Automating integration processes between operational systems and SAP ERP
- Creating analytical processes for calculating metrics & KPIs
- Providing visibility and alerts of analytic results to operations and management personnel through dashboards & messages
- Performing transactional exchanges with SAP ERP related to activities, events and conditions in operating environments.
- Providing a simplified end user environment for interaction with SAP ERP and operational systems.

MII provides visibility to operational systems data through its out-of-the box integration to the virtually all plant level systems including process data historians, SCADA, DCS, and advanced control systems software. MII can also acquire information from these systems through the use of:

- Standard-based protocols such as OPC-DA/HDA
- Product-specific protocols for systems such as OSI PI
- Database technologies through SQL-based queries
- Flat files & Spreadsheets
- Message-based systems

The SAP Plant Connectivity (PCO) product serves as a data acquisition agent to help normalize the integration layer between MII & industrial systems. SAP MII provides unparalleled capabilities for transactional integration into SAP ERP processes across all components. MII applications can be extended to provide value to client specific initiatives across a variety of application needs.



Application Components

The main components of the Rizing CBM solution are:

- [Asset Health Dashboard](#) – this dashboard provides the business user visibility to the alerting actions taken by the CBM application and the status of maintenance activities from those actions.
- [Process User Interface](#) – This interface, named CBM Configurator, is provided to simplify all configuration & setup activities and for tracking alerts & system problems. This interface also provides the ability to perform Manual Data Entries via desktop and tablet devices.
- [Data Acquisition](#) – this provides the connectivity, control and receipt of all equipment level data to be used in the monitoring scenarios.
- [Condition Assessment](#) – a set of rule-based processes (standard & custom) for evaluating equipment data with limits and thresholds to identify problem areas with assets.
- [Alerting Action Processes](#) – uses the MII integration with SAP ERP to create notifications, work orders and measurement documents based on the Condition Assessment processes.
- [Configuration](#) – set of processes and screens to simplify the creation and maintenance of the monitoring scenarios and master data.

Important Definitions

Condition Monitoring Point (CMP) - the central configuration record for the applications where the business user creates the monitoring scenario for the asset of interest

Alerting Action –the process executed when a condition violation is determined; configured in the CMP; Actions include: emails, text messages, alert table entries, notifications, work orders and measurement documents.

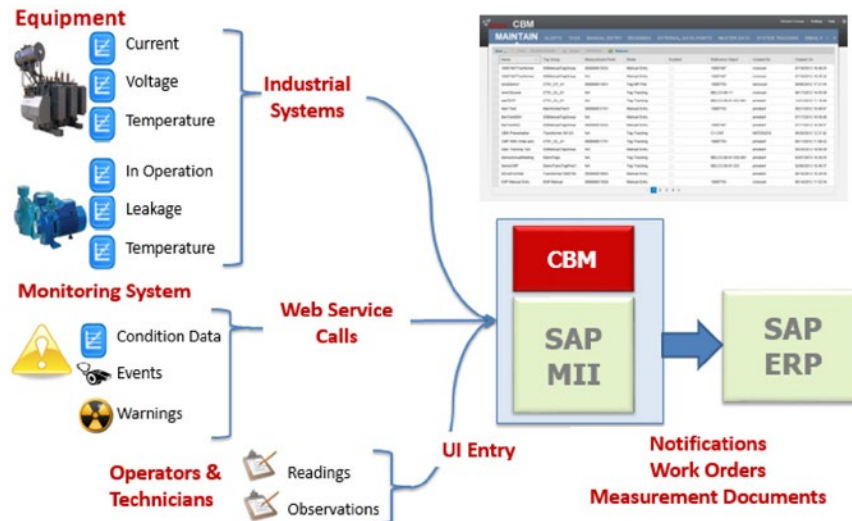
Summary

A roadblock in the past to implementing CBM strategies was suitable access to equipment data for use in the maintenance related monitoring processes. The extensive data access and integration capabilities of SAP Manufacturing Integration & Intelligence (MII) opens the door for maintenance organization to use the extensive industrial system information that already exist in a company's production environments to monitor and react to equipment conditions.

Rizing has used the features of SAP MII and its own subject matter expertise in SAP Plant Maintenance to create a non-programming environment to enable client maintenance personnel to author condition monitoring scenarios in support of an overall Condition Based Maintenance strategy. Contact Rizing to learn more about this exciting new solution.

Rizing has created a non-programming environment to enable client maintenance personnel to author condition monitoring scenarios in support of an overall CBM strategy.

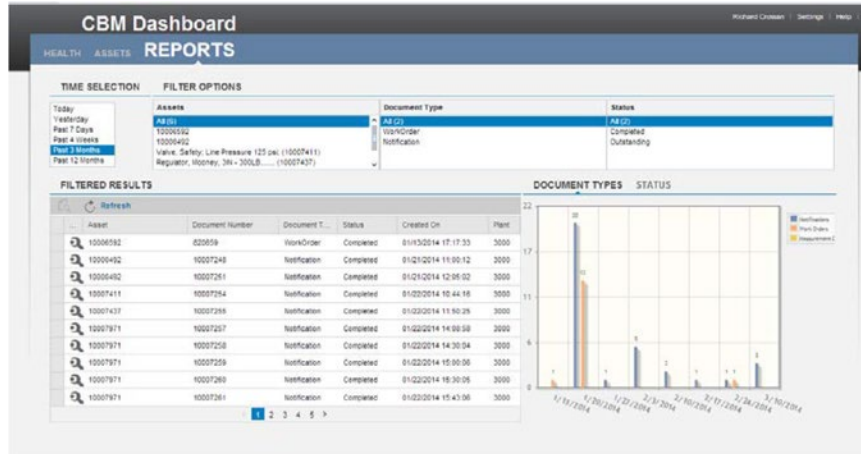
Rizing CBM Solution Details



Asset Health Dashboard

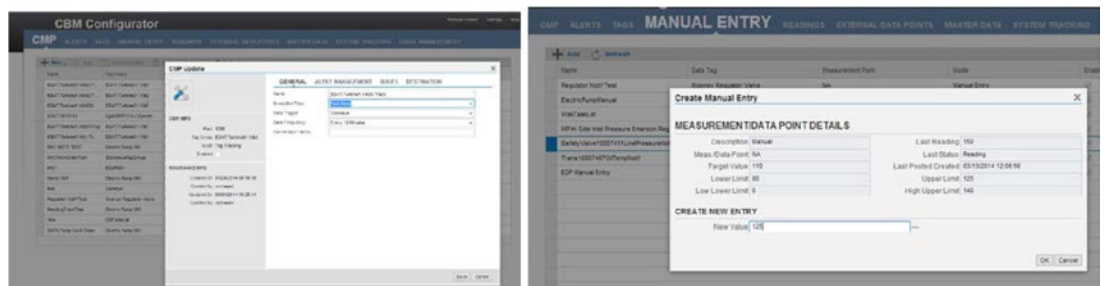
The Asset Health Dashboard provides visibility to the results of the monitoring processes configured in Rizing CBM. The Process User Interface focuses on viewing the monitoring points where this dashboard focuses on the affected assets. Reports are provided on:

- Total actions taken
- Drilldowns on the number of notification, work orders and measurement documents created
- Details on readings captured by asset
- Work Order, Notification details and Measurement Document details



Process User Interface

The Process User Interface is used to perform all Configuration tasks, any required Manual Data Entries and for viewing processing alerts and to track all system activities. Authorization controls are provided to customize the interface views for different roles. The Process User Interface is key to enabling a non-MII trained user to make use of both Rizing CBM and MII features.



Data Acquisition

The application exploits the built-in features of SAP MII that allow for non-intrusive, real time access to industrial system data. This is provided through out-of-the box connectivity using the SAP Plant Connectivity (PCO) agents, industry standard interfaces such as OPC, SOAP & SQL; and vendor specific interface techniques. Using the built-in access to data sources provided by MII, the data acquisition process for Rizing CBM consists of:

- Tag Management
- Acquisition Triggering and schedules
- Data Collection

Tag Management

In Tag Management, data points are identified and grouped together to address the information needs of a monitoring scenario by asset or an operational process. It is in the tag group where the thresholds can be assigned. The tag group represents the dataset that's used in the condition assessment and it is the support data that is delivered in the notification or work order to assist in the disposition of the problem by the maintenance organization.

Acquisition Triggering and Schedules

The acquisition of data can be based on a polling process initiated by SAP MII or on the delivery of data from an external system or from an SAP PCO agent. SAP MII can perform queries to read data from all connected data sources or allow the data to be delivered to it through inbound web services or asynchronous message services. This opens the data source opportunities that can be included in the CBM strategy.

The acquisition process can be driven from a schedule that is defined within the CMP for each monitoring scenario. The MII scheduler is used to initiate the polling processes to collect data. The scheduler is also used to verify that data is received as expected. This enables the CBM application to alert users when data readings are missed from the processing schedule.

The acquisition process can be driven from a schedule that is defined within the CMP for each monitoring scenario.

Data Collection

Tag Management and the Triggers & Schedule determine the what, how and when of data acquisition. Once acquired, the data is cached and packaged for use in the Condition Assessment process. Tag groups can contain multiple data points. When a collection is executed, all of the data points assigned to the group are captured for use; standard calculated values are determined and that data set is passed into the process rules for evaluation. This ensures that the data collected has consistent time stamps and opens up the use of all important data to the rules for processing and the dataset is available for inclusion in any alerting action that may follow.

Condition Assessment

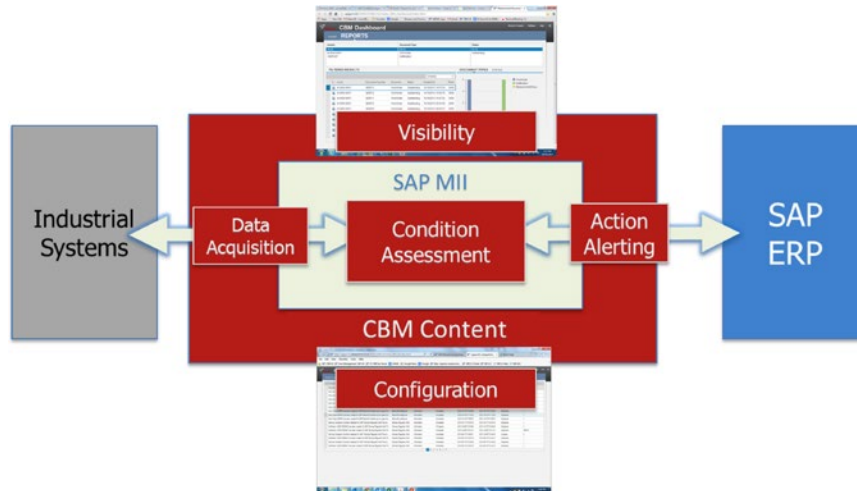
The condition assessment features are the decision making elements of the application. The data collected via the data acquisition processes is evaluated by the processing rule assigned to the condition monitoring point. Process users have the choice of selecting from a collection of standard rules or customer specific rules. The out-of-box rules are provided for current and time-based comparisons of the acquired data against the thresholds configured in the Tag Groups. In addition to the actual values, calculated values can be for evaluations as well.

Customer unique processing rules can be designed and easily incorporated into the rules library. Custom rules are built using the SAP MII workbench and can use of the full business logic capabilities of MII. Custom rules can include more complex analysis techniques along with additional data to go beyond standard checks and comparisons in standard rules. Custom rules can also include the use of historical data from the data source, results previously captured and ERP-based information related to the asset history or status.

Alerting Action Processes

The condition assessment function provides for the real time interpretation of the data. From this assessment an action or alert can be generated to notify the maintenance organization of the situation. When exceptions occur, the CMP designates what alerting action is to take place. In the case of measurement points, an exception is not required but rather the scheduled process is just gathering the data for posting via a measurement document.

SAP MII provides an unparalleled ability to transact with SAP ERP objects. In addition to the capability of creating notifications, work orders and measurement documents, MII can be used to map a variety of additional content into those objects including: Catalog Codes, Characteristics, Cause Codes, and Object Lists. These additional mappings will be included based on the customer requirements and availability of source data to determine the appropriate mappings. MII also allows for the use of customer developed function modules with SAP ERP. Therefore, if the notification or work orders have customized content, the needs of that content can be address as needed using standard capabilities in SAP MII.



Configuration

The configuration process involves three step:

- Master Data Maintenance
- Tag Group Creation
- Condition Monitoring Point Creation

Each of these processes are managed through the Process User Interface.

Master Data Management

The application provides a set of user views to control the identification and download of master data needed for identifying monitored assets and the required content for creating notifications, work orders and measurement documents. Selections Controls for the download of data from SAP ERP are provided ensure the efficiency of the download process and to limit the number of mass updates. Data downloaded from SAP ERP to support the application are:

- Functional Locations
- Measurement Points
- Equipment
- Work Centers
- Task Lists

Some of the master data is maintained manually: Plants, Emails & distribution Lists and Data servers.

Tag Group Creation

A Tag group is used for:

- Mapping data points needed for monitoring scenario
- Assigning & maintaining thresholds
- Packaging all support data for inclusion in notifications & work orders

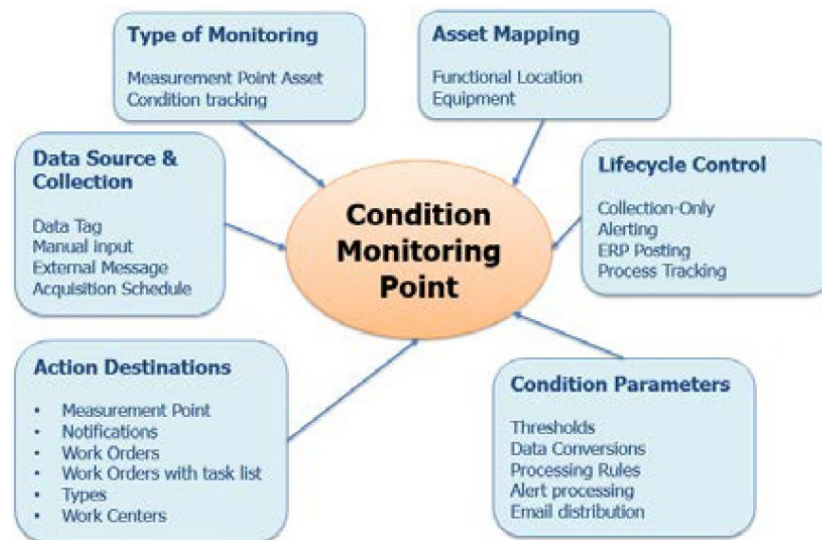
The Process user is provided a simplified interface to:

- Browse data sources for data points
- Maintaining thresholds
- Editing tag groups

Source data points can be used in more than one tag group and tag groups can have data points for more than one asset as may be the case with a functional location.

Condition Monitoring Point Creation

The creation of the CMP is the central configuration task in the application. The process user is the author of the monitoring scenario. The CMP contains all the critical information about that scenario. The process user interface is designed to provide a wizard-like set of tasks to simplify the creation task and to ensure the integrity of the CMP and its required elements.



Design Objectives

The Rizing CBM solution is based on the architecture of SAP MII. The design points used to improve the client experience:

Primary End Users: Non-MII developer

Exploit all capabilities of SAP MII

Address broadest range of data sources

Flexibility to include customer specific processing rules and alerting actions

Accelerate implementations and simplify client's ability to grow monitoring processes

Minimize system and administration requirements

User Roles

There are four different roles involved in the use of the solution:



Business User – asset focused; tracks results generated from the monitoring scenarios based on:

- Alert Actions Generated
- Condition Values or Readings values and trends
- Notification & work order content and status



Process User – configuration focused; role for business analysts, maintenance planners, or maintenance supervisors who have:

- Subject matter expertise about operational assets
- Knowledge of the data sources (historians, databases, external systems, etc.)
- Knowledge on notifications, work orders, measurement points, assets & master data used in the monitoring scenarios.
- No software development expertise.



Maintenance User – This user is responsible for making manual entries for data capture and tracking alerts issued on; user environment can be deployed through workstations and tablet devices.



Application Administrator – SAP MII developer and SAP ERP functional experience and usually filled by a person assigned to the plant or corporate IT organization. Their responsibilities will include:

- Installation/maintenance of the Rizing CBM application
- MII administration of connections, data servers, & credentials
- MII Workbench use for custom rule development

Implementation & Support

Rizing CBM is delivered as a supported software product from Rizing. Implementation services are provided from Rizing for:

Software installation
MII configuration
Requirements Discovery
User Training
Custom Rule and Process Development
Application Configuration (as needed)

Installation, MII configuration, Requirements Discovery and User Training can be completed in less than 2 weeks. The duration of the configuration process will be determined by:

- Number of Assets to monitor
- Custom Requirements for rules and Alerting Action
- Number, nature and quality of different data sources

The actual implementation timeline will be determined as part of the Requirements discovery process. Rizing can also provide implementation assistance with the installation of SAP Netweaver, SAP MII and SAP Plant Connectivity.

Hardware & Software

The primary software requirement for the Rizing CBM solution is SAP MII Release 12.2 or greater. No additional database or other software is required by the CBM application. SAP MII runs on the SAP Netweaver platform. SAP MII can be installed on an existing server that has Netweaver & the Java stack and it can co-exist with other Netweaver applications. However, there are specific Netweaver release and system Patch levels needed for the MII releases. The installation guides for the MII release contain all the Netweaver requirements for MII. Netweaver is supported to run on a virtual server so it does not have to be its own separate hardware server.

SAP MII and the Rizing solution do not have any specific requirements for the SAP ECC releases. The Plant Maintenance business APIs needed for work order and notification creation have been available since R/3 Release 4.7 so almost all SAP ERP landscapes are ready to use Rizing CBM.

For more information on improving your asset health through Rizing CBM, contact us today!