Exaquantum
Alarm Master Database
Exaquantum/AMD
The Problem
Key Problems

Poor Alarm Management is one of the Leading Causes of Downtime

- This has contributed to some of the worst recorded industrial accidents

Changes to Alarm Limits Through Lack of Alarm Management

- Potentially leading to safety failures, lost production and equipment damage

Lost Engineering Time

- Due to poor or incorrect record keeping
The Solution
Based On ISA-18.2, AMD Assists Managers and Supervisors in Monitoring, Assessing and Auditing the Behavior of Alarm Setpoints and Configuration as part of an Alarm Documentation and Rationalization Program
Key Benefits
Key Benefits

- **Standardizes Alarm Settings Configuration to Reduce Errors**
- **Improves Employee Efficiency**
  - Provides web access to information held in one central database
- **Confidence is Enhanced**
  - Ensures all changes are correct and consistent
- **Regulatory Compliance is supported by the availability of a Detailed Audit Trail**
- **Low Engineering Configuration Time Required**
  - The ability to import the configuration from files, DCS(s), CAMS for HIS(s) and other systems
The Architecture
Key Features
Key Features

- **Setpoint Management**
  Changes to DCS alarm setpoint values are monitored and can be:
  - Manually enforced
  - Automatically enforced
  - Ignored
  - Superseded

- **Mode Based Operation**
  Alarm setpoints can be assigned a ‘Mode’ to cater for varying plant operations and modes. The selected mode is then used in the AMD enforcement and setpoint monitoring process.

- **Deadbands**
  Each alarm setpoint can have a percentage deadband which is used during the monitoring process to determine whether an enforcement should be raised.

- **Monitoring**
  All changes to alarm setpoint values, whether made from the DCS or through AMD, are included in the Setpoint Auditing Report.
Key Features

- **Custom alarm attributes**
  Caters for numerous system configurations.

- **Dashboard**
  Key configuration and processes displayed for quick diagnosis of problem areas.

- **Operator Suppression**
  Lists of tags that have had operator suppression applied.

- **Web based interface**
  AMD utilizes a web based interface enabling easy access and maintenance by staff members throughout the organization globally.
Key Features

- **Notification of alarm setpoint changes**
  Ensures approved setpoint values are enforced.

- **Storage and version control of alarm design and philosophy documents**

- **Centralized repository to record all stakeholder requests and comments**
  An integral part of the Management of Change process.

- **Support for multiple distributed ICSSs**
  AMD has been designed to scale from a single facility to a physically distributed multi-facility multi-ICSS systems.

- **Security Model**
  The distributed architecture includes a security model that allows each user to have different security within the AMD hierarchy.
Key Features

- **Comparison Reports** to compare the current AMD configuration against the current ICSS and CAMS for HIS configurations

- **Web based viewing** with extensive Sorting and Filtering options, PDF Export and Printing capability

- **Administration Reports**
  - “Alarm Enforcement” contains the history of all Enforcement notifications and actions
  - “Audit” displays all alarm configuration changes
  - “Alarm Actions” displays all user actions and their associated comments
  - “Setpoint Audit” contains all changes made to a setpoint either via AMD or the ICSS

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![Enforcement Report](image1)

![Setpoint Audit Report](image2)
Scenarios

- Management of Change (MOC)
- Mode based alarm management
- Alarm rationalization
- Collaboration
- Greenfield deployment
- Brownfield deployment
Scenarios – Management of Change (MOC)

- All changes to the alarm configuration are recorded and reported
- Alarm version control allows for minor and major versions
- Alarms can be changed during the rationalization process but only signed off by dedicated alarm champion
- Role based security controls access to the; plant hierarchy, editing, saving and committing alarm changes
- Document management allowing checked-in and checked-out version control

Supporting AMD functionality
- Alarm minor and major version control
- Alarm Save and Commit
- Reporting; Audit, Enforcement and Setpoint Audit
- Document Management with minor and major version control
Scenarios – Mode based alarm management

- Assign AMD configured modes (states) to specific alarm setpoints allowing for different plant modes of operation
- ICSS alarm setpoint changes monitored and enforced against the currently applied AMD modes
- Current mode setpoints can be written to the ICSS
- Continuous monitoring and ad-hoc reporting of all changes to alarm setpoint values

Supporting AMD functionality
- Mode based Alarm setpoint management
- Manual and Automatic Enforcement
- Setpoint deadbands
- Reporting; Enforcement and Setpoint Audit
- Dashboard
- Enforcement Notifications; email and application notifications
Scenarios – Alarm rationalization

- Allows experts from across the globe to contribute to the alarm rationalization process

- Fully collaborative review process throughout the end users organization with the ability to add Alarm Actions and Comments

- Alarm review process requires a large degree of information from many distributed systems which can be held and accessed directly from AMD

- Process requires specialists from internal and 3rd party consultants such as Yokogawa VPS engineers

- Supporting AMD functionality
  - Alarm Actions and Comments
  - Remote and Local access via the web based browser
  - Reporting; Audit, Enforcement, Setpoint Audit, Cross Reference, Alarm Actions
  - Document management
  - Rationalization Statuses
  - Dashboard
Scenarios – Collaboration

- Collecting data from potentially multiple base systems having centralized access to the alarm configuration data is essential and cost effective

- Role based security allowing users to log in securely via their web browser

- Specialists, both internal and 3rd party consultants such as Yokogawa VPS engineers, can be provided access to the system

- Supporting AMD functionality
  - Connectivity to multiple different ICSS and CAMS systems often geographical separated
  - Reporting; Audit, Enforcement, Setpoint Audit, Cross Reference, Alarm Actions
  - Document management
  - Role based security
  - Remote and Local access via a web based browser
Scenarios – Greenfield Deployment

- Creation and rationalization of the base alarm configuration (attributes and setpoints) before the ICSS configuration and implementation

- Alarm configuration exported from AMD to the base systems

- Parallel operation saves time and reduces risk allowing the simultaneous ICSS implementation in conjunction with the alarm rationalization work between the customer and EPCs

- Supporting AMD functionality
  - Import/Export to; AMD CSV, CAMS for HIS, DCS via OPC DA
  - Alarm actions and report
  - Rationalization statuses and search
  - Function block templates – Tag Models
  - Audit trail
  - Document management
  - Remote and Local access via a web based browser
Scenarios – Brownfield Deployment

- Existing ICSS and CAMS for HIS systems already configured but poorly managed

- Import Alarm configuration from base ICSS and CAMS for HIS systems to AMD

- Perform Alarm Rationalization and enforce correct alarm settings to base ICSS and CAMS for HIS systems

- Systems are now rationalized and equalized

- Supporting AMD functionality
  - Connectivity to multiple different ICSS and CAMS systems often geographical separated
  - Import/Export to; AMD CSV, CAMS for HIS, DCS via OPC DA
  - Alarm actions and report
  - Rationalization statuses and search
  - Audit trail
  - Document management
Summary
Summary

**Consistency**
- Consistency – alarm setpoints and attributes are equalized across systems.

**Rationalization**
- Rationalization – caters for the process through alarm actions and comments, supporting documentation, reports, statuses and eventual enforcement.

**Enforcement**
- Enforcement – monitoring, assessing, notification and enforcing setpoint values.

**Centralization**
- Centralization – access from anywhere via web client. Connecting to multiple ICSS systems.

**Auditing**
- Auditing – traceability of all changes to alarms, setpoints and enforcements, viewable on the web pages or via reports.
Exaquantum/AMD and the Alarm Management Lifecycle (ISA 18.2)
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