Exaquantum Alarm Reporting and Analysis

Exaquantum/ARA
The Problem
Key Problems

Sub-optimal Alarm Configuration
- Incorrectly configured alarm levels result in frequent alarm floods and nuisance alarms
- Alarm management policies do not conform to industry standards and best practices

Operator Overload
- Large numbers of alarms may result in operator stress
- Operators develop a low regard for integrity of alarms

Alarm Rationalization Process is Cumbersome
- Significant time spent in gathering information and creating reports

Safety and Environmental Incidents
- Important alarms drowned out by nuisance alarms, causing operators to miss important incidents
The Solution
The Solution

Based on EEMUA 191, ISA-18.2-2009 and IEC-62682

- 38 reports covering plant management, performance, operations and maintenance

Reports from Summary Level to Individual Alarm Occurrence

- Summary reports can be drilled down and filtered to focus on alarms of interest

Rapid Identification of Areas of Concern

- Reports highlight most frequently occurring alarms and recurring alarm problems

Assistance in Implementing Effective Alarm Management Policies

- Reports raise awareness of improvements that can be made to alarm configurations
Key Benefits
Key Benefits

- Reduces the Number of Distracting and Nuisance Alarms
  - Allows operators to focus on and react faster to abnormal situations with the proper corrective action

- Reduced Operator Stress
  - Improves reaction times for incident resolution

- Improved Plant Safety
  - Reduced risk of serious environmental incidents

- Identification of Improvement Opportunities Through Focused KPIs
The Architecture
Architectural Overview

User Displays

- Dashboard
- Operator KPIs
- Area Performance
- Alarm Frequency
- Calibration Mode
- Custom Reports

Reports

- Excel
- Word
- PDF
- Email

Drill Down To Raw Events

User Displays

- Rationalization
- Chattering
- Active
- Rate
- Peaks
- Averages
- Top Alarms

- Frequency
- KPIs
- Floods
- Standing
- Bad Actors
- Operator KPIs
- Responsiveness

- Consequential
- EEMUA 191 Performance
- Shelving
- Suppression
- Detection
- Counts

Data Historian / PIMS

Exaquantum

Experion
DeltaV
OPC Foundation

CENTUM VP
Fast/Tools
ProSafe RS

vigilantplant
The clear path to operational excellence

PR NTPC00201-01EN ARA R3.01
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1st April 2016

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YOKOGAWA
Key Features
Key Features

- 38 reports based on EEMUA 191, ISA-18.2-2009 and IEC-62682
- Dashboard displaying key KPI information, highlighting areas and patterns of concern
- Consolidated alarm and process information through custom reporting
Features

- Drill down to the individual alarms and events
- Tag descriptions for all reports that display tag information
- Detailed filtering options
  Exposes hidden problem areas.
- Intuitive Web User Interface
  - Web User Interface eliminates need for client software
  - Integrated Windows Security
  - Localization options
  - Japanese language support
  - Convenient navigation links to other Exaquantum products
### Alarm and Event Data Collection

- From Yokogawa CENTUM DCSs and FAST/TOOLS SCADA
- From Exaopc R3.73 to collect OPC A&E and CAMS for HIS data
- From with non-Yokogawa systems via OPC A&E 1.1
- Recovery of missing Yokogawa DCS alarm and event messages
  - History catch-up (recovery on start-up)
  - OPC data recovery (following network or connection issues)
- Ability to process pre-existing historical A&E data held within Exaquantum
- ARA Configurator enables setting of daily alarm target for each plant unit
- Direct interfaces with Yokogawa ‘CAMS for HIS’
Features

‘CAMS for HIS’ Integration

→ **Alarm Detection/Disable Status**

Detection disabled alarms are excluded from reports that are designed to reflect alarm loading from the operator’s perspective.

→ **Group Suppressed Alarms**

Alarms that are subject to CAMS group suppression can be filtered from reports designed to reflect alarm loading from the operator’s perspective.

→ **Shelved Alarms**

Alarms that are subject to CAMS shelving (one-shot or continuous) can be filtered within those ARA reports that contain alarm loading from the operator’s perspective.

→ **Alarm Priority Overrides**

If present, ARA processes new alarms using the CAMS priority; otherwise the DCS alarm level is used.
Plant Hierarchy Creation

- **Automatically**
  Automatic plant hierarchy creation via the CENTUM and FAST/TOOLS plant hierarchies.

- **Bulk Import / Export**
  - Export from CAMS for HIS and import
  - Exaquantum PIMS tag folder structure
  - Engineering tools, e.g. InTools

- **Manual Entry**
  Manual plant hierarchy creation via the ARA Configurator.
Features

Reports
38 reports based on EEMUA 191, ISA-18.2-2009 and IEC-62682.

→ Viewed on demand or scheduled and emailed
→ Use filters and drill-down to focus on areas of interest
Features

Reports
Grouped into four areas

- **Management**
  Providing a high-level overview of plant KPIs.

- **Performance**
  Covering specific EEMUA 191 performance guidelines to quickly highlight potential areas of concern.

- **Operations**
  Day-to-day operator reports covering alarm rates and trends.

- **Maintenance**
  Highlighting problem alarms and aiding in the alarm rationalization process.
### Reports
Grouped into four areas

<table>
<thead>
<tr>
<th>Management</th>
<th>Operations</th>
<th>Maintenance</th>
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<tbody>
<tr>
<td>Alarm Overview</td>
<td>Alarm by Condition</td>
<td>Active Alarms</td>
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<td>Alarm Rate KPIs</td>
<td>Alarm by Condition and Tag</td>
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<td>Area KPIs</td>
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<td>Alarm Rationalization Progress</td>
<td>Calibration Events</td>
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<td>Chattering Alarms</td>
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<td>Alarm Setting Change</td>
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<td>Area Alarm Counts</td>
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<td>Top Alarms</td>
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<td>Top Alarms by Operator</td>
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Features

Reports

Fully customizable

- Styles can be overridden to fit company branding
- Additional custom reports can be created in Excel and SQL Server Report Builder
Features

Data Export
Report data can be supplied

- **Microsoft Excel and CSV**
  Provide data to external applications for further analysis.

- **PDF**
  Standard format for storing and sharing reports with key stakeholders.

- **Microsoft Word**
  Consolidate weekly and monthly reports with customized introductions and comments.

- **Exaquantum/ARA API**
  The API can be accessed to provide KPIs to other applications.

- **Exaquantum/ARA OPC DA 2.05a Server**
  The optional OPC DA 2.05a server can be accessed to provide KPIs to other applications.
Solution Summary
Solution Summary

Derived from ANSI/ISA 18.2 – 2009

- Maintenance
- Operation
- Rationalization
- Monitoring and Assessment
- Philosophy
- Management of Change
- Audit
- Change Alarm
- Management of Change Loop
- Reports

AMS

ISO

EEMUA

Management
Overview of KPIs to ensure company targets are being met
Can be scheduled and emailed to managers in PDF format

Performance
Analyze EEMUA 191 performance guidelines to quickly highlight potential areas of concern

Operations
Monitor alarm rates and trends
Identify plant areas in flood
Identify consequential alarms
Drill down to raw events for detailed analysis
Export data to Excel for further analysis

Maintenance
Identify problem alarms such as:
  - Chattering Alarms
  - Long Standing Alarms
  - Bad Actors
Identify control loops with frequent adjustments
Identify alarms frequently in calibration

Exaquantum/ARA
Monitoring & Assessment
Assignment: ARA
Reference No: PR GMSCD06
Document Type: Presentation
Document Title: ARA Presentation
Author: Grant Hesse
Release Date: 28 November 2014
Application Manager: Grant Hesse

Documents Revision Record

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<tr>
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<tr>
<td>0.1</td>
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<tr>
<td>0.2-0.3</td>
<td>Revision and amendments to slide design/layout</td>
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<tr>
<td>0.4</td>
<td>Made corrections – PLEASE NOTE THAT SLIDES 25 &amp; 26 NEEDS TO BE REMOVED OR MODIFIED</td>
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<tr>
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<td>Amendments and updates to content from new design style and inc. Benefits, features and architecture (from overview)</td>
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<td>Altered End slide to read: <a href="mailto:info@ymx.yokogawa.com">info@ymx.yokogawa.com</a> and changed some of the divider headings slightly, to bring in-line for consistency</td>
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<td>Changed footer details (inc. release for 2.85 and date) Double-checked document and brought in line with new tabs...</td>
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<td>Slide 25 changed, approved for R3.01 release</td>
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Created or Modified By:
- Stephen Hughes
- Martin Farrell
- Bill Bambeck
- Martin Farrell
- Martin Farrell
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- Martin Farrell
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- Bill Bambeck
- Grant Hesse
- Bill Bambeck
- Nick Cross
- Nick Cross
### Documents Revision Record (continued)

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