AMS – Alarm Management System

and

CSS – Control System Studio Update

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Overview

- Requirements of the alarm system
- Structure of alarm system
- Technical overview
- Interconnection server and persistent store
- Filter configuration in the alarm management system
- CSS Alarm Applications
- CSS Update
Requirements

- Several sources for alarm/log messages (EPICS, D3, CSS, …)
- Dedicated alarm messages should be forwarded to different destinations (SMS, e-mail, voice mail, …)
- Rules and actions to configure special behavior for alarm messages
- Persistent store holds current status of all process variables
- Archive all alarm/log messages
- Operating system independent applications to view messages and configure alarm system
Structure of alarm system

Alarm / Log message Sources
- EPICS IOC
- D3 PCM
- CSS Instance

JMS Server
- Archive DB
- Persistent Store (LDAP)

Alarm Management System

CSS Alarm Tools (Views, Configuration, ...)
- Message Table
- Message Archive
- AMS Configuration
- Alarm Tree
Technical Overview

• Implementation in Java → Operating System independent
• Alarm applications with UI part are integrated in Control System Studio (CSS)
• Common APIs for JMS -, LDAP – Server and Database → no special implementation is required
• JMS Messages (Key, Value) for all communication between components → alarm messages are just a special kind of message
• Redundancy for JMS communication and Alarm Management System
Message sources

- EPICS IOC
  - Alarm Sender
  - Text Message

- Interconnection Server

- D3 PCM
  - Alarm Files

- D3 Alarms

- CSS Instance

- sendMessage (Test Tool)

- JMS Messages

- JMS Server

Other Sources

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Message sources II

- EPICS IOC and D3 PCM send alarm messages in a special format
- Interconnection Server (EPICS) and D3 Alarms (D3) translates alarm messages in JMS format
- Interconnection Server and D3 Alarms are headless CSS applications (XMPP management)
- CSS uses log4j and sends log messages in JMS format
- JMS Server at DESY is Apache ActiveMQ
Persistent store and archive

Interconnection Server

D3 Alarms

JMS Server

Persistent Store (LDAP)

jms2Ora

Update

Update (not yet implemented)

Archive DB

Update
Persistent store and archive II

- Persistent Store (LDAP) holds structured list of all records
- Records are ordered by facility name, component and controller
- Alarm status of a record:
  - epicsAlarmAcknTimeStamp
  - epicsAlarmSeverity
  - epicsAlarmStatus
  - epicsAlarmTimeStamp
- Jms2Ora is a CSS headless applications
- JDBC for DB connection → Jms2Ora can use any DB implementation
Alarm Management System (AMS)

Filter Manager

Alarm Message (JMS)

CSS Alarm Configurator

write configuration

Read configuration

DB

SMS Connector

Voice Mail Connector

Mail Connector

Action

Filter

JMS

JMS

JMS

SMS

Mail

Voice Mail
Logical elements of AMS

Operators:
• Receives alarm messages via mail, sms, ...
• PIN Code to acknowledge alarm messages

Groups:
• Operators responsible for specific facilities
• Defines priority who should be informed first, second, ...
• Maximum delay for acknowledgment

Action:
• What should be happen with an alarm message?
Logical elements of AMS

Filter:
- Checks if the filter matches
- Creates a new message with the relevant information of the alarm message
- Forwards the message to an action

Filter condition:
- A Filter is a combination of filter conditions
- Filter conditions can be connected with AND and OR
- Available condition types are: Compare strings, Check current PV, Time based condition, ...
AMS Configurator in CSS

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CSS alarm applications (Alarm Treeview)

- Shows the current status of the persistent store (LDAP)
- Delete and create records and subcomponents by context menu
- Changes are stored in the LDAP server
- Alarm status is propagated to root component
- Property view to view and edit tree items
CSS alarm applications (Alarm Table)

Message properties, color and text for severities are configurable

Log View
- Shows all types of messages in a chronological

Alarm View
- Shows alarm messages
- Ordered by: 1. severity and 2. time

Archive View
- Shows messages stored in archive DB
- Time period and search criteria
Summary

The Alarm System has run through a major refactoring stage.
The new Filter Manager provides an extendible set of filters; including
time based filters and condition based filters with online data through
the control system independent Data Access Layer.
The modular design is key to run major components redundantly
(JMS server and InterconnectionServer run on a Sun Cluster)
The message based communication only specifies a limited set of
mandatory Tags. Other Tag/Value pairs may be added on demand.
There’s no EPICS specific application besides the alarmSender on the
IOC.

The Alarm System is ready to be shared.
CA Snooper
- Monitors the Channel Access traffic
- CA Snooper Server is a CSS headless application
- CA Snooper UI gets information via XMPP protocol from the server

Record Property
- Shows all fields of a record
- Field value for configuration DB, RMI server and IOC
CSS Update II

SDS
- New Strip Chart -, Thumb wheel -, 16 binary bit widget
- Connection Overview for status of all PVs
- Previous display name is displayed as a link on current display

Save Value
- Store current settings of control system via RMI service from any CSS instance
Current State

The Alarm System is in operation since one year

The new version is in test and will run in production this month

A new CSS-Beta is now available.

After collecting final feedback on this version CSS-1.1 will be released.

The CSS-Synoptic Display will go into production this autumn during commissioning of a cryogenic plant which has been converted from a commercial system (D/3) into EPICS.

CSS will slowly replace all of the dm2k screens and take over
Thank You