

Significant Event System

Use Cases

This document contains the use cases for the Significant Event System.

1 System Interaction

Interaction with the significant event system falls into categories:

- DAQ user
- DAQ application developer
- DAQ expert
- SE Server
- SE Application

Use cases for DAQ users, application developers, and experts serve two roles. They provide use cases and they aid in the definition of significant event system requirements. These use cases describe how people interact with the significant event system. Use cases for the SES servers and applications are the basis for designing the internals of the significant event system. The SES applications use cases use the DAQ application developer use cases and other specific use cases that users never see.

DAQ users are the shift operators. They view information on the Significant Event Display. When an alarm appears on the display the users can acknowledge the alarm and view the parameters associated with the alarm condition. The Heartbeat Display is only a display. The user is notified when heartbeats are lost and when they are found.

DAQ application developers integrate the significant event libraries into their applications. They connect their application to the server and send significant event messages. The events can be alarms or informational. All events are written to a log file.

DAQ experts resolve exceptional situations that develop in the significant event system. Through expert interfaces they are able to fix problems during system operation and access statistical data in the parts of the system.

The SES servers are the significant event server and the heartbeat server. These are the central points in the significant event system. All event messages are seen by the servers.

SES applications are the software tools that provide:

- alarm display
- significant event message logging
- off-line significant event event viewing
- communication with run control
- heartbeat monitor display

2 SE Server

Accept Connection

Wait for connection requests from clients and the expert interface. When a connection request is received, associate the dispatcher with the new server connection. The dispatcher directs incoming messages to the callback associated with the message class.

Register Sender

Add the message source connection to the list of significant event senders. This list is needed by the server to send command messages to the senders.

Close Sender

Remove the message source connection from the list of significant event senders and close the connection.

Register Receiver

Add the message source connection to the list of significant event receivers. These are the destinations of significant event messages passing the filters associated with the connection.

Close Receiver

Remove the message source connection from the list of significant event receivers and close the connection.

Receive Event

The dispatcher associated with the server connection calls the callback corresponding to the event message class. Callbacks are setup when the connection to the sender client is made.

Receive Instruction

3 SES Applications

3.1 Alarm Display

3.2 SE Logger

3.3 SE Offline Viewer

3.4 Alarm Watcher

Verbal alarm signal

Signal an alarm condition with a verbal statement on the voice box.

Verbal alarm cleared

Signal that an alarm condition has been cleared with a verbal statement on the voice box.

4 Actors

4.1 DAQ Users

The significant event display graphically represents the components of the DAQ system.

Alarm signaled

An alarm condition detected in a DAQ application causes the corresponding part of the display to flash an alarm color.

Alarm cleared

Once the user has resolved the alarm condition the display flashes the alarm-cleared color for a brief time. This gives the user a warm fuzzy feeling.

View parameters

Get detailed information on a signaled alarm. One example is for a value out of range. The parameters would include the current value, current range limits, and range limits from the hardware database. Sometimes this information is needed to diagnose the alarm condition.

Acknowledge event

An acknowledge informs the system that a user is looking into the cause of the alarm condition or that the alarm condition is not immediately repairable and can be temporarily ignored.

Start application

Some alarm conditions might require a special software application to resolve. From the interface the user can start the application. When the system is setup the applications are associated with the appropriate components.

4.2 DAQ Application Developers

4.2.1 Common Use Cases

Connect

Create a connection between your client application and the significant event server. Messages are sent across the connection.

Disconnect

Close the connection between your client application and the significant event server.

4.2.2 SE Sender Client Use Cases

Add sender

Tell the significant event server that you will be sending significant event messages.

Delete sender

Tell the significant event server that you will no longer be sending significant event messages.

Clear current alarms

Remove all alarm events that were received from this sender from the list in the significant event server.

Signal alarm

Indicates that the DAQ application has detected an alarm condition.

Clear alarm

Indicates that the cause of an alarm condition detected by a DAQ application has been repaired.

Send event

Send an event message to the significant event server. This covers all non-alarm events.

4.2.3 SE Receiver Client Use Cases

Add receiver

Tell the significant event server that you want to receive significant event messages.

Delete receiver

Tell the significant event server that you no longer want to receive significant event messages

Request event

Tell the significant event server to send all significant event messages corresponding to current alarms and to start sending significant event messages that pass your filters. This command is issued after filters have been added.

Request new event

Tell the significant event server to send all significant event messages that arrive after this request.

Cancel event request

Tell the significant event server to stop forwarding significant events.

Add filter

Add filter dimensions to the filter corresponding to your connection in the significant event server. Connections that specify no filters receive all significant event messages.

Delete filter

Remove filter dimensions from the filter corresponding to your connection in the significant event server. Might be too difficult to implement. Use clear filter then add filter.

Clear filter

Reset the filter corresponding to your connection in the significant event server to no filters specified.

4.3 DAQ Expert

Monitor and modify the internal state of the significant event and heartbeat servers. These applications communicate with the corresponding server through d0me.

Help

Generate a list of commands available to the expert.

Verbose

Make all report display extra information of various complexity.

Connect

Make a connection with the server.

Disconnect

Close the connection with the server.

Reconnect

Connect using stored parameters. The parameters are from the last connection. Useful if server crashes.

Connections

Get the servers' list of all connections to itself.

One connection

Get the servers' information on one connection to itself.

D0me connections

Get d0me information on all connections to the server.

D0me one connection

Get d0me information on one connection to the server.

Periodic statistics

Periodically display server statistics.

Report

Display server statistics, once.

Priority report

Display server statistics by using a mechanism that bypasses the event message queue. DØME does not currently support this.

Set statistics period

Specify how often the server statistics are sent to expert display.

Set retry period

Specify how often the server attempts to forward messages to broken connections.

Set retries

Specify how many times the server will attempt to send the same message before giving up and removing the connection.

Priority ping

Ping the server. Bypass the event message queue.

Ping

Ping the server. Process the request in the event message queue.

Close log

Close the server log file.

Abort connection

Forcibly abort a connection.

Shutdown

Shutdown the server.

Abort

Abort the server.

Activate

Receive and process incoming messages.

Inactive

Receive incoming messages but don't process them.

Exit

Exit expert program. If connected, disconnect first.

New events

Send all new events.

Alarms

Show alarms currently registered.

Acknowledge

Acknowledge an alarm.

Unacknowledge

Unacknowledge an alarm.

Heartbeats

Send all heartbeat alarms. Special application of the Filter command.

Filter

Show the filters for a connection.

Add filter

Add a filter dimension to a connection.

Delete filter

Remove a filter dimension from a connection.

Clear filter

Remove all filter dimensions from a connection.

Reset nodes

Reset alarm on front-end node(s). Spawn an application that communicates with the front ends and gives them instructions. Useful if the server fails.

Check connections

Force the server to ping all client connections and report results.

Close connection

Close a connection between the significant event server and a sender or receiver client.

Clear alarms

Remove the alarms for one connection from the list of alarms in the significant event server.

Reset alarms

Remove all alarms from the list of alarms in the significant event server.