

# Alarm System

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# Basic Idea

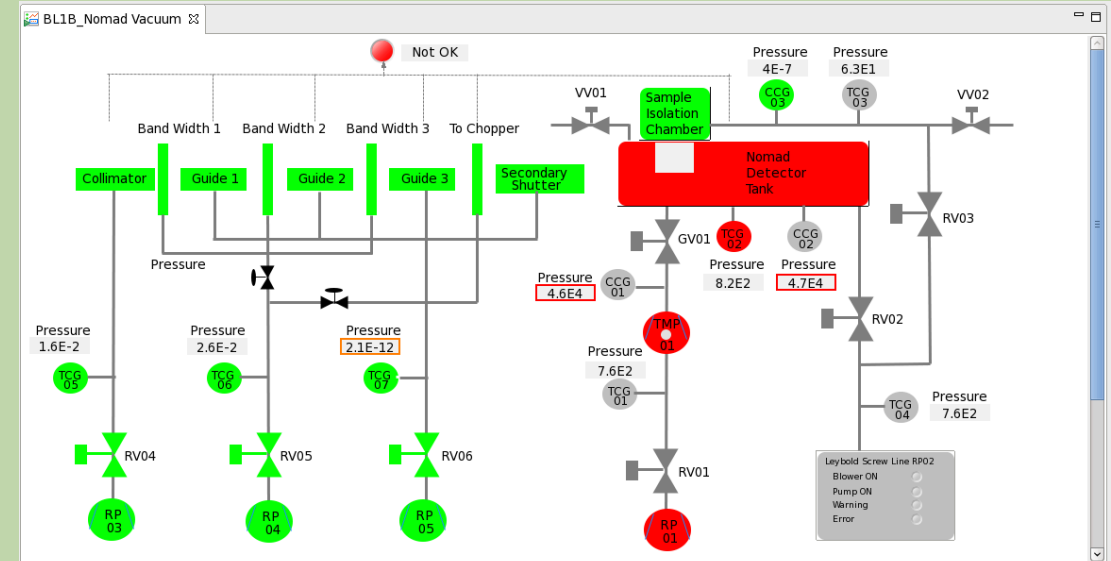
## Alarm System

- 1) Indicate alarms
- 2) Detail: Which PV? When? What value?..
- 3) Guidance
- 4) Related Displays
- 5) Keep alarms until acknowledged & cleared

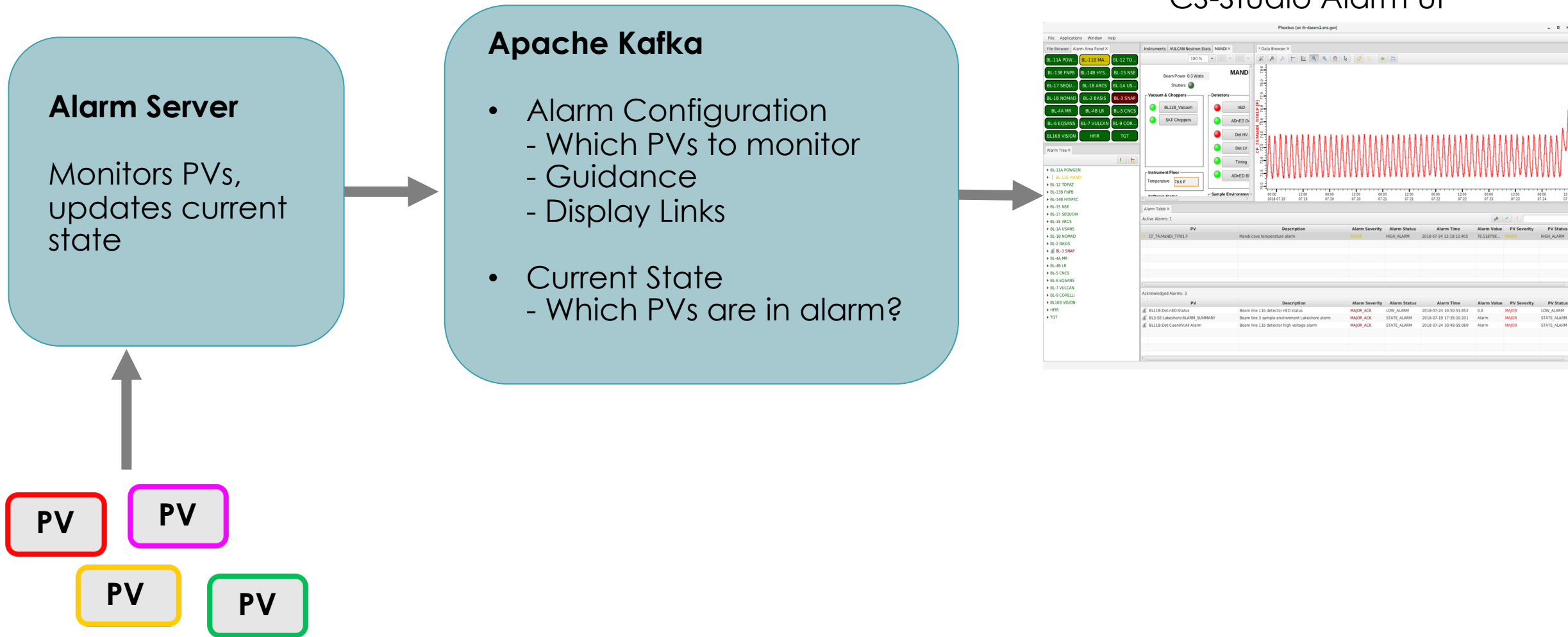
“Check XYZ.  
Try opening ABC.  
Call Fred.”

**PV**  
VAL: 20  
HIHI: 20  
HHSV: MAJOR

**PV**  
VAL: 10  
HIGH: 5  
HSV: MINOR



# Implementation



# Initial Setup

1. Install Kafka (typically as Linux service)
2. Check that “Accelerator” config exists

```
cd ~/epics-train/tools  
./list_topics.sh  
./monitor_topics.sh Accelerator
```

If nothing shown:

```
./create_alarm_topics.sh Accelerator
```

3. Start alarm server (typically also as Linux service)  
`alarm_server`

<https://github.com/shroffk/phoebus/blob/master/app/alarm/Readme.md>

# Configuration

- Open CS-Studio Applications, Alarm, Alarm Tree
- Right-click, Add Component
  - Node “Fishtank”
  - Add Guidance and Display link

The screenshot shows the CS-Studio configuration interface. On the left, the 'Accelerator Alarm Tree' is visible with the 'Fishtank' component selected. The main window, titled 'Configure /Accelerator/Fishtank', displays configuration options for the selected component.

**Guidance:**

Title	Detail
Fish Care	Feed the fish

**Displays:**

Title	Detail
Display	/home/training/epics-train/examples/Display Builder/fishtank/heater.bob

**Commands:**

At the bottom of the configuration window, there are 'Cancel' and 'OK' buttons.

# Configuration ...

- Right-click on new “Fishtank”, Add Component

- PV** “training:heat\_V”

- Description**

  - Anything’s better than the PV name

- Specific **Guidance** and Displays

  - Should have guidance. Otherwise, why is this an alarm?

- Enabled? Latch? Annunciate?

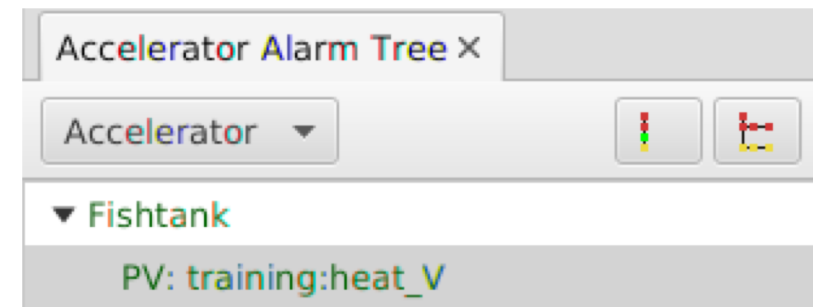
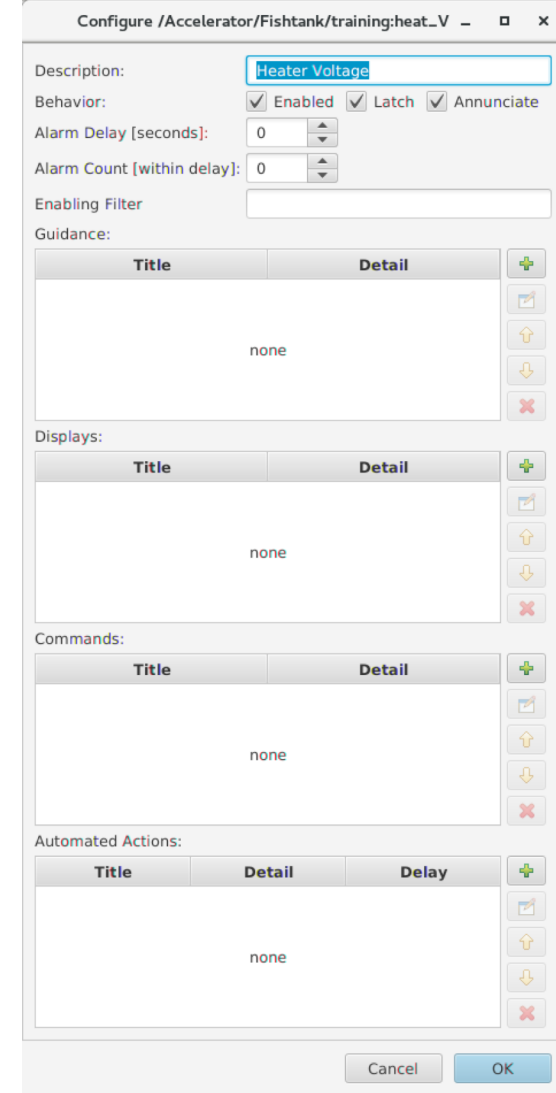
  - Usually: Yes, otherwise: Why bother?

- Delay?

  - Hack for noisy alarm trigger PVs

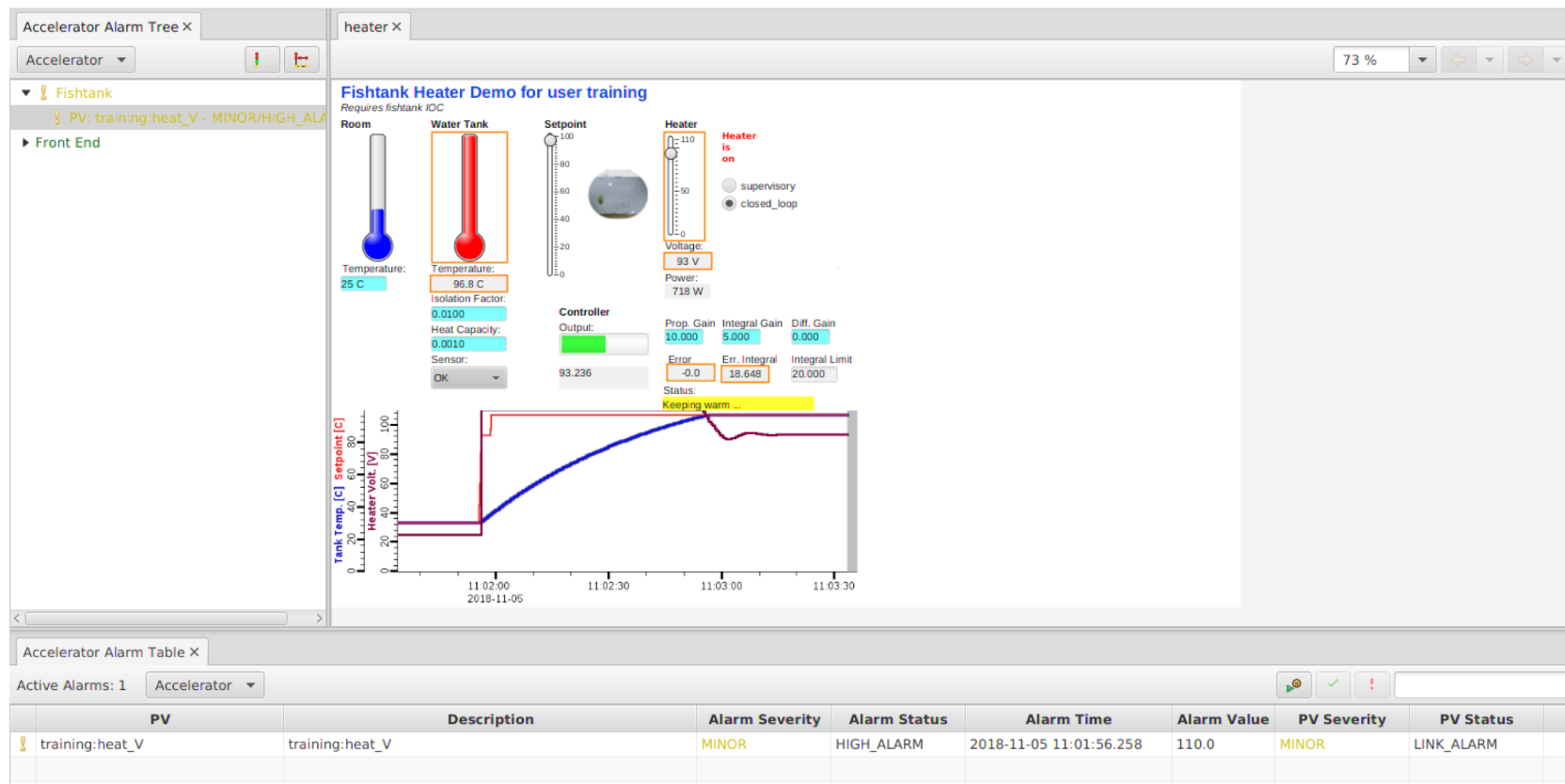
- Automated Actions

  - <mailto:fred@google.com>



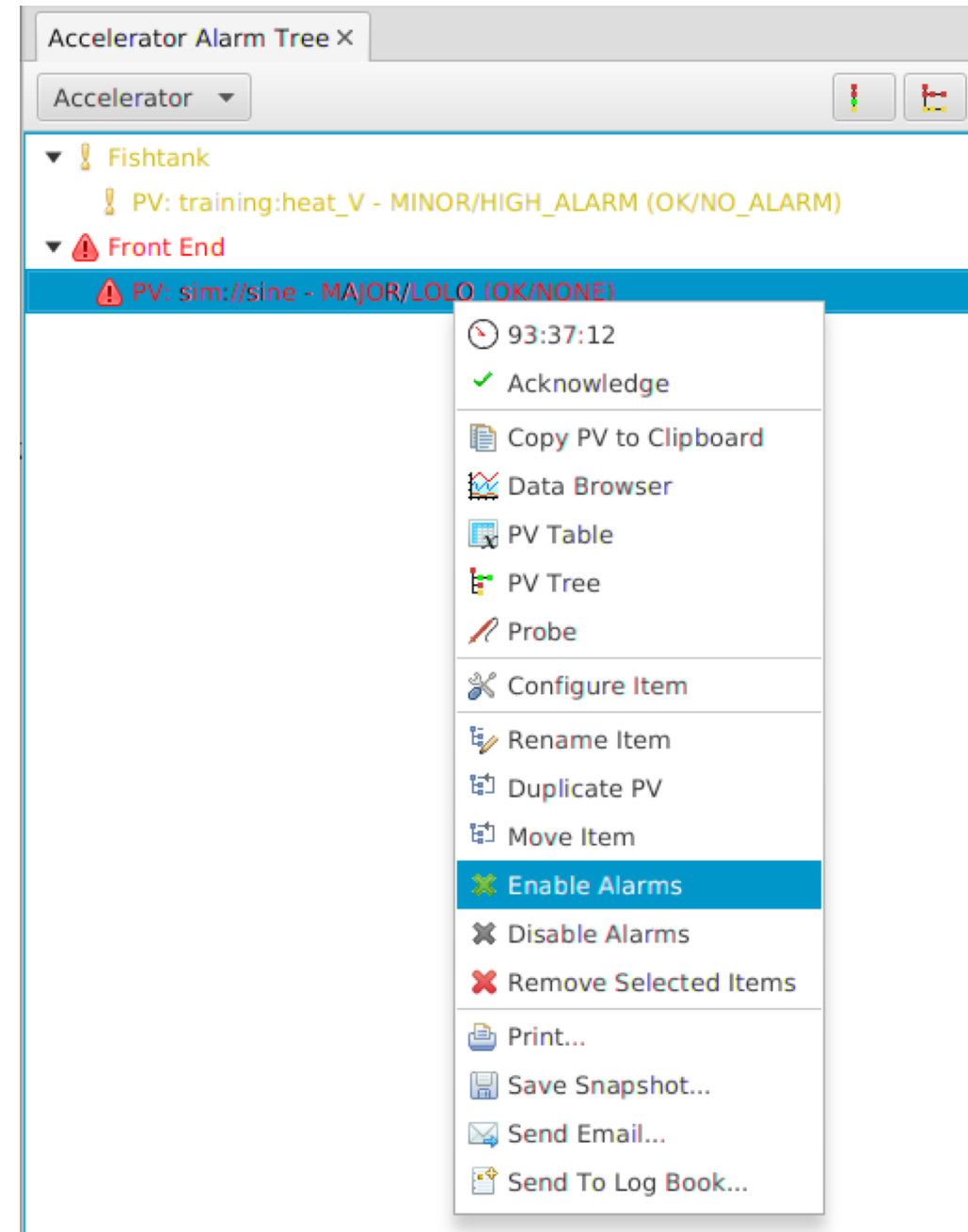
# Example Alarm Workflow

- Cause an alarm
  - caput training:setpoint 60
- Inspect Alarm
  - Watch as alarm is indicated
  - Open associated display
- Handle It
  - Acknowledge
  - Reduce setpoint
  - Clear



# Alarm Tree

- Primary configuration tool
- Hierarchical
  - Guidance, Displays apply to sub-nodes
- Operational useful to
  - Check if numerous alarms originate in the same area
  - Acknowledge or disable complete subtrees






# Alarm Table


- Primary operations tool
- Ideally empty
- View/sort/acknowledge alarms
- Open guidance and displays

Accelerator Alarm Table x

Active Alarms: 1 Accelerator

PV	Description	Alarm Severity	Alarm Status	Alarm Time	Alarm Value	PV Severity	PV Status
 sim://sine	sim://sine	MAJOR	LOLO	2018-11-05 11:15:39.244	-4.7552825...	OK	NONE

Acknowledged Alarms: 1

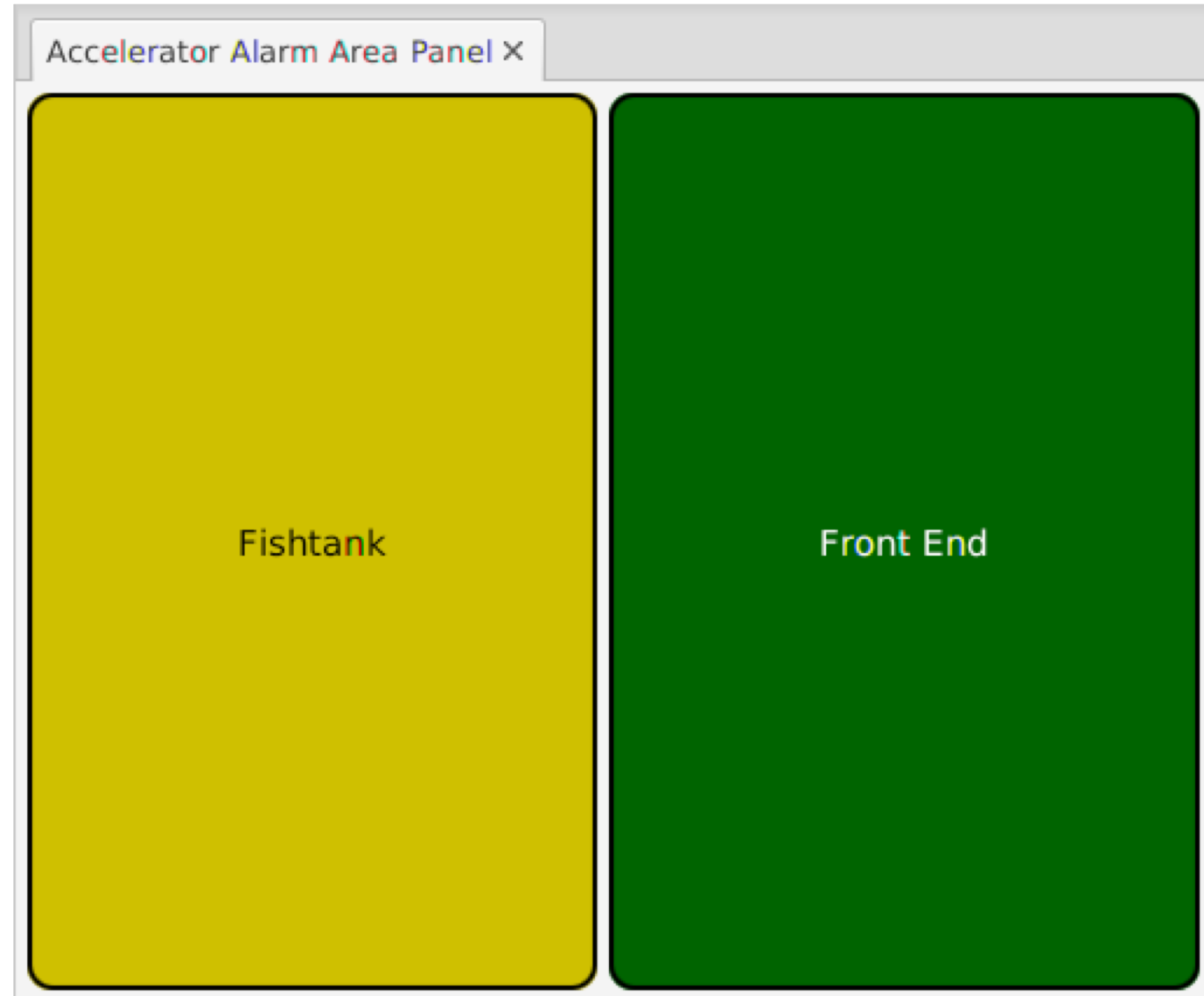
PV	Description	Alarm Severity	Alarm Status	Alarm Time	Alarm Value	PV Severity	PV Status
 training:heat_V	training:heat_V	MINOR_ACK	HIGH_ALARM	2018-11-05 11:15:42.257	110.0	MINOR	LINK_ALARM

# Alarm Area Panel

Useful for 'Overview Displays'

Indicates  
'across the room':

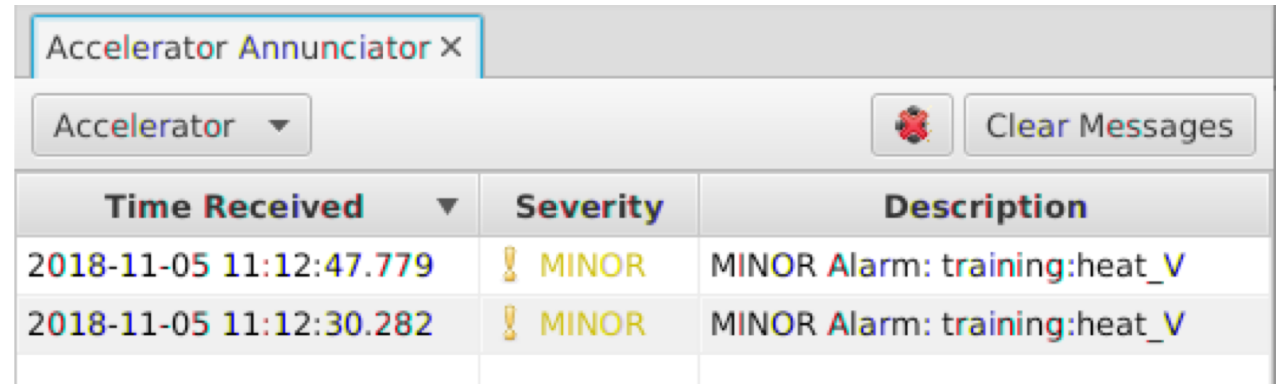
All OK?




# Alarm Annunciator



Annunciates the *description* of alarms

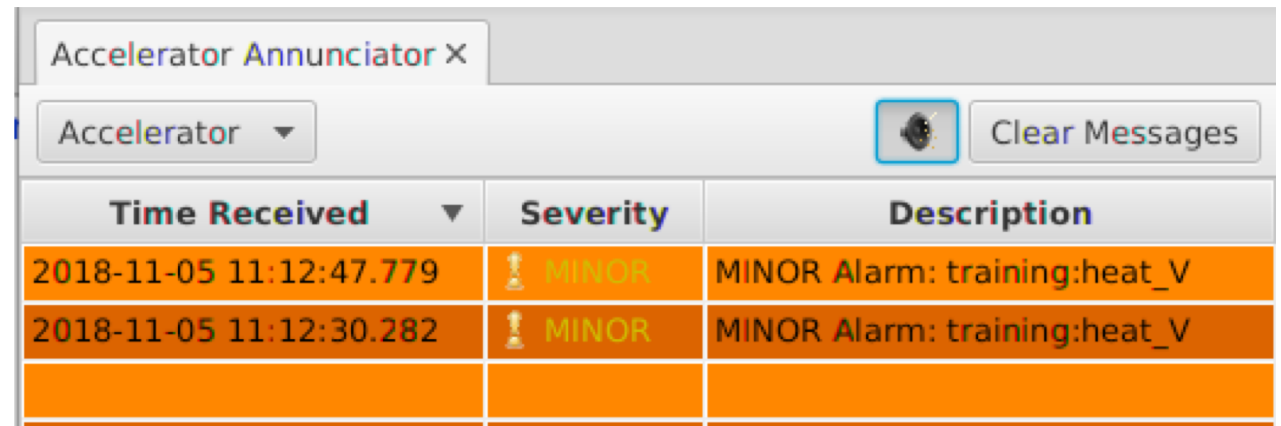
Basic “heads up” to check alarm table for details




Accelerator Annunciator X



Accelerator ▼  Clear Messages

Time Received ▼	Severity	Description
2018-11-05 11:12:47.779	 MINOR	MINOR Alarm: training:heat_V
2018-11-05 11:12:30.282	 MINOR	MINOR Alarm: training:heat_V



Accelerator Annunciator X

Accelerator ▼  Clear Messages

Time Received ▼	Severity	Description
2018-11-05 11:12:47.779	 MINOR	MINOR Alarm: training:heat_V
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# Alarm System

- Alarm Server monitors PVs, tracks alarms
- Alarm Tree to configure
  - PV?
  - Guidance?
  - Displays?
- Alarm Table, Area Panel, Annunciator to use
  - Acknowledge
  - Open Displays

The screenshot displays the IHC Alarm System interface. On the left is the 'IHC Alarm Tree' showing a hierarchical structure of beam lines (BL-11A to BL-16B) and detectors (HFIR, TGT). The main area shows a 'Summary Alarm' for 'LV 3V' with a status of 'ON'. Below this is a table of active alarms with columns for Sum, Status, Voltage, Prot. V, Current, Over Voltage, Over Current, Over Temp., and Details. The 'IHC Alarm Table' at the bottom shows 'Active Alarms: 0' and 'Acknowledged Alarms: 5'. The acknowledged alarms table includes entries for GlobalAlarm, Pulsed Magnet Coil Alarm, Lakeshore alarm, Chopper Problem, and AgilentAlarm.

Sum	Status	Voltage	Prot. V	Current	Over Voltage	Over Current	Over Temp.	Details
LV 3V	ON	3.38 V	15.00 V	2.552 A	OK	OK	OK	...
LV 4V	ON	4.43 V	15.00 V	33.247 A	OK	OK	OK	...
LV -4V	ON	- 4.42 V	15.00 V	14.589 A	OK	OK	OK	...
HV 13V	ON	13.31 V	24.00 V	1.985 A	OK	OK	OK	...

PV	Description	Alarm Severity	Alarm Status	Alarm Time	Alarm Value	PV Severity
BL9:SE:SS:GlobalAlarm	Beam Line 9 Slim Sam Magnet Ramp Failed	UNDEFINED_ACK	Disconnected	2018-10-30 22:28:27.334		UNDEFINED
BL9:PM:ILK:Alarm	Beam Line 9 Pulsed Magnet Coil Alarm	UNDEFINED_ACK	Disconnected	2018-10-30 22:28:27.334		UNDEFINED
BL3:SE:Lakeshore:ALARM_SUMMARY	Beam line 3 sample environment Lakeshore alarm	MAJOR_ACK	STATE_ALARM	2018-11-05 09:32:01.371	Alarm	MAJOR
BL7:CS:Stat:SkfChoppers	beam line 7 Chopper Problem	MAJOR_ACK	HIHI_ALARM	2018-11-04 20:41:03.774	1.0	MAJOR
BL16B:Det:PS:AgilentAlarm	Beam line 16b Detector Low Voltage Power Supply	MAJOR_ACK	STATE_ALARM	2018-11-04 13:41:18.259	Detector LV...	MAJOR