OAK RIDGE National Laboratory

Alarm System

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Kay Kasemir

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U.S. DEPARTMENT OF ENERGY

Basic Idea

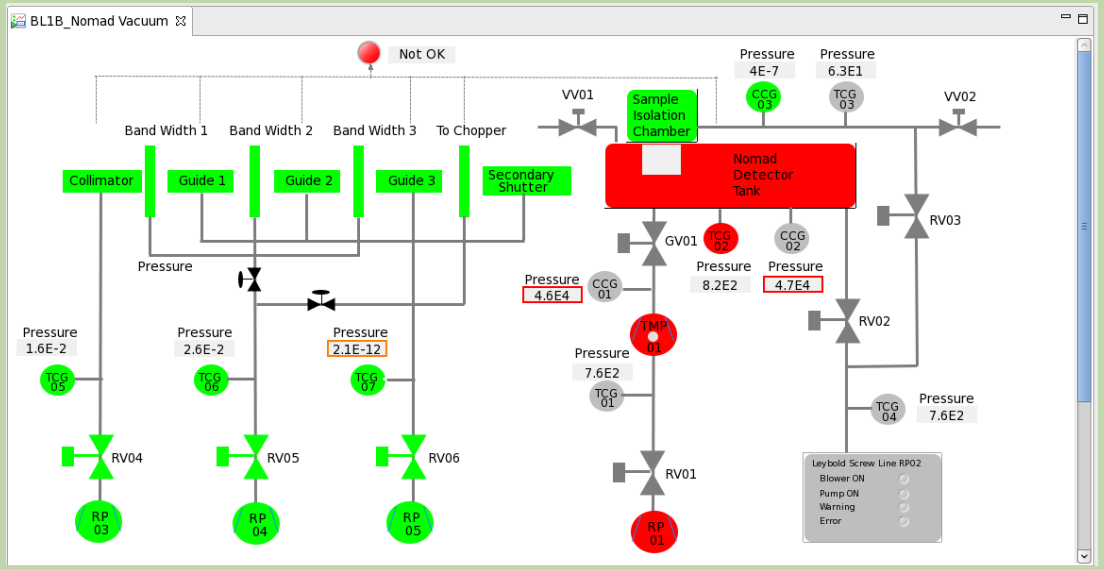
Alarm System

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

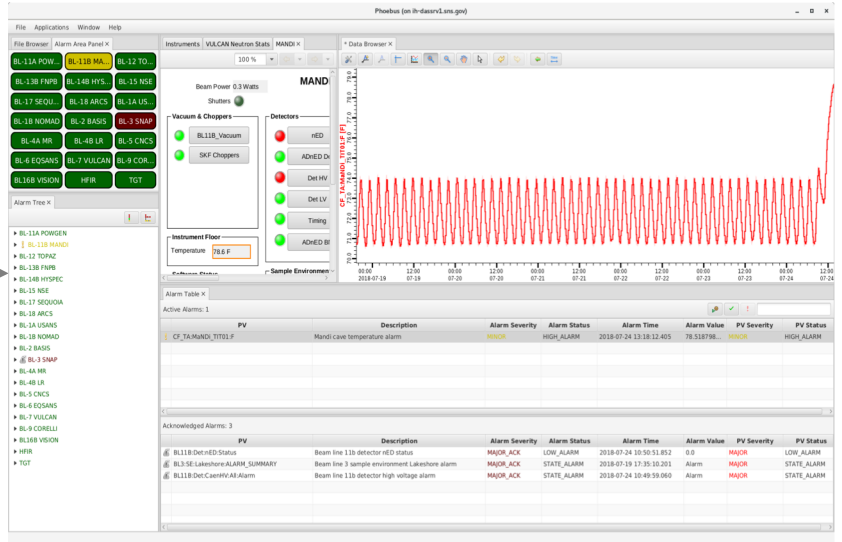
Alarm Server

Monitors PVs, updates current state

Apache Kafka

- Alarm Configuration
  - Which PVs to monitor
  - Guidance
  - Display Links
- Current State
  - Which PVs are in alarm?

CS-Studio Alarm UI



PV PV PV PV

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
```

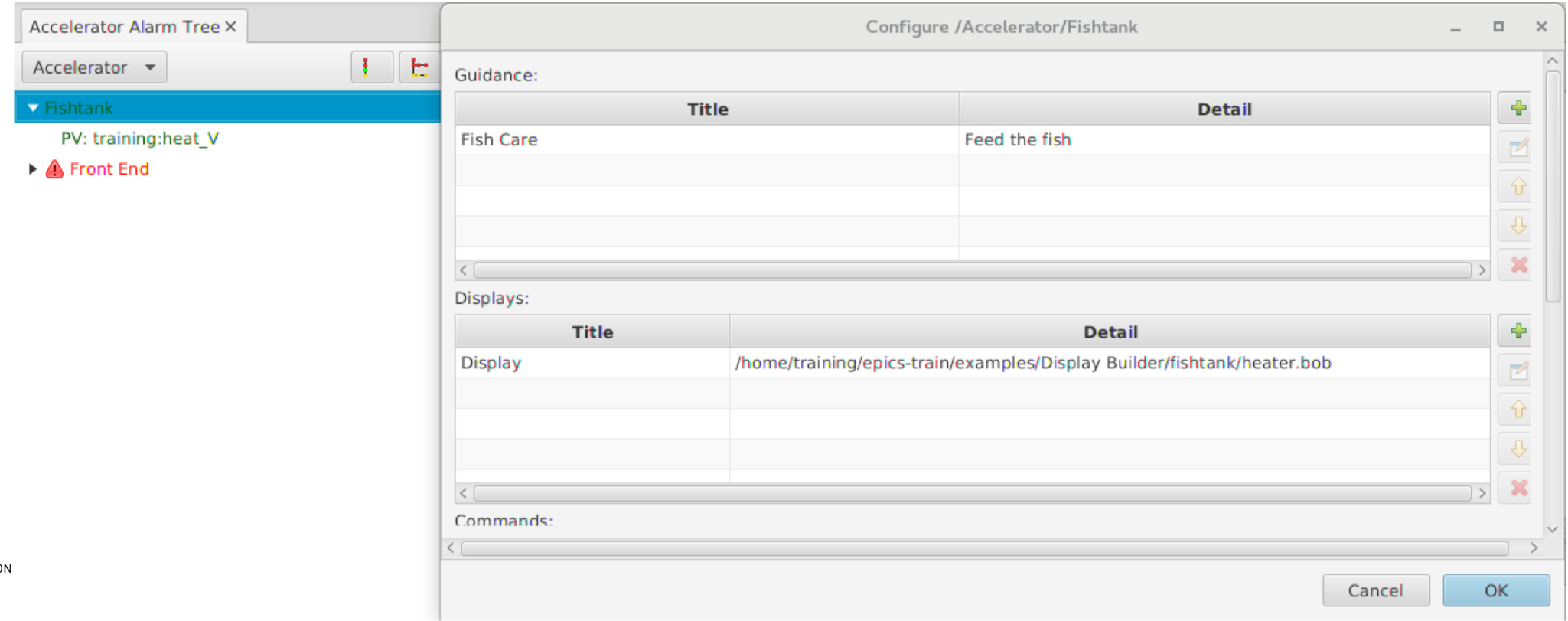
3. Start alarm server (typically also as Linux service)

```
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



Configuration …

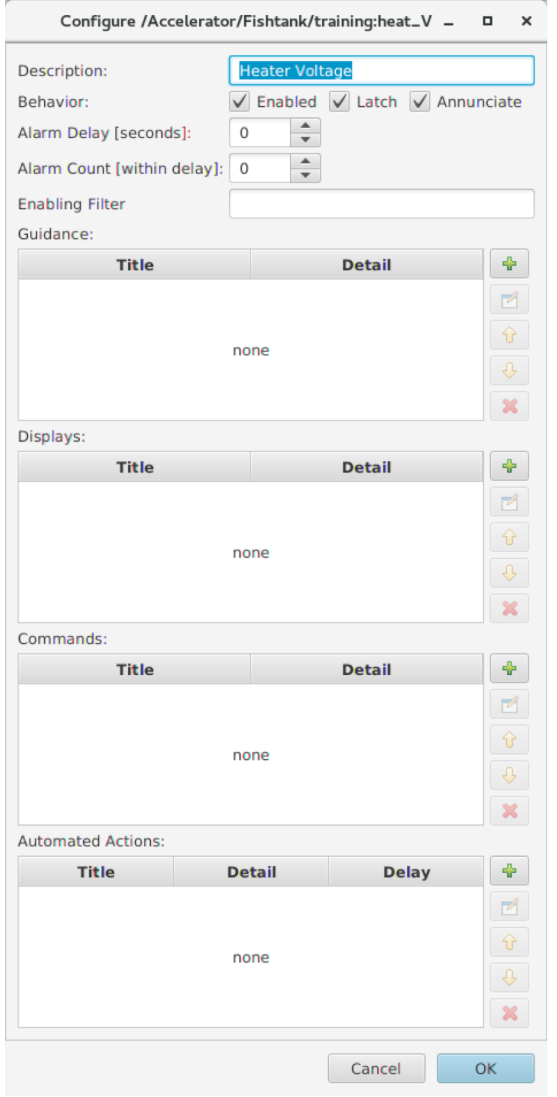
- Right-click on new “Fishtank”, Add Component
  - ❑ **PV** “training:heat_V”
  - ❑ **Description**

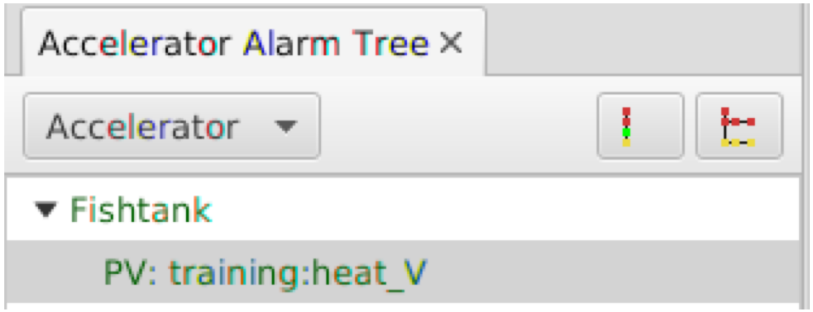
    Anything’s better than the PV name
  - ❑ Specific **Guidance** and Displays

    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





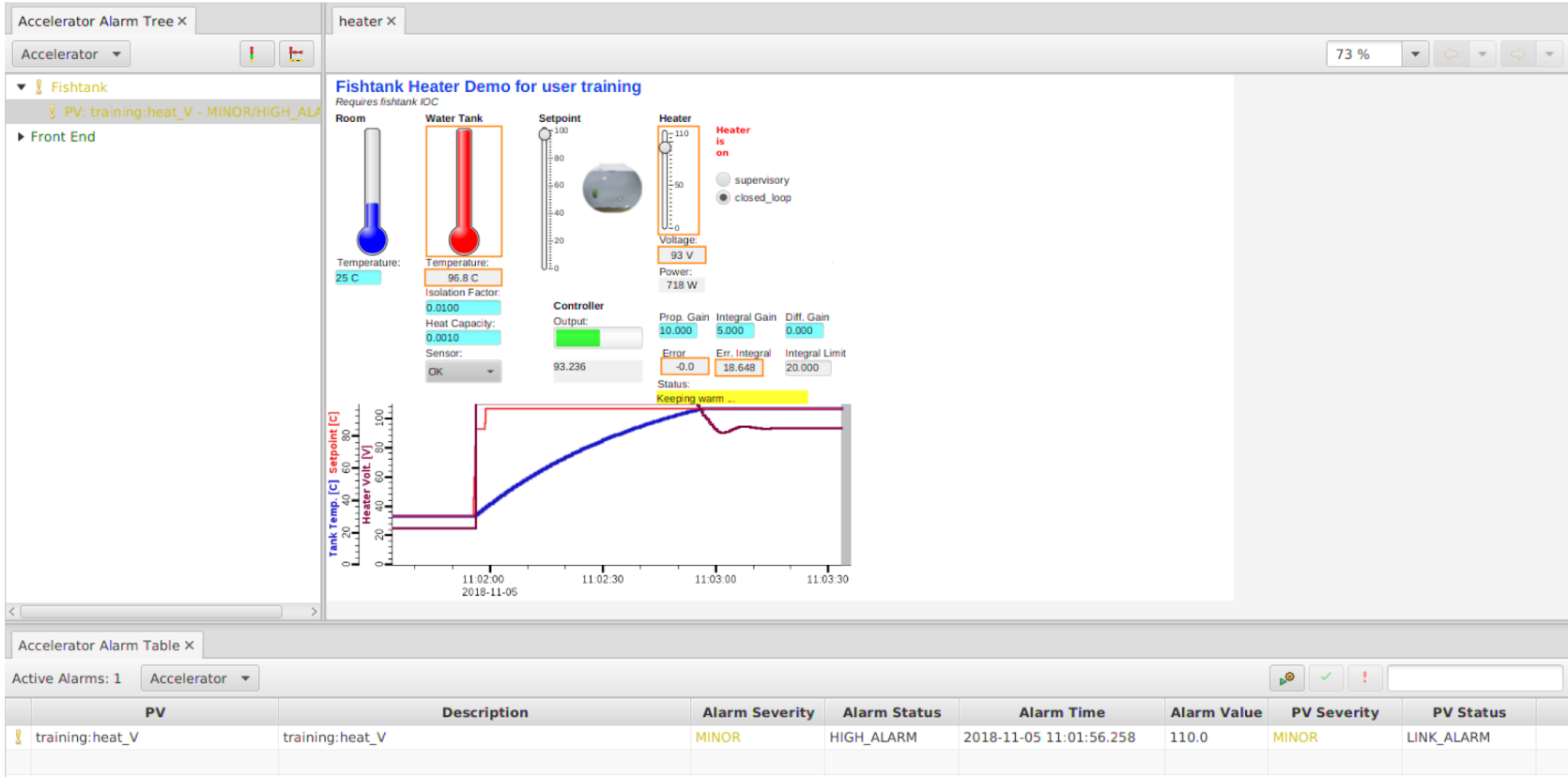
Example Alarm Workflow

- Cause an alarm

```
caput training:setpoint 60
```

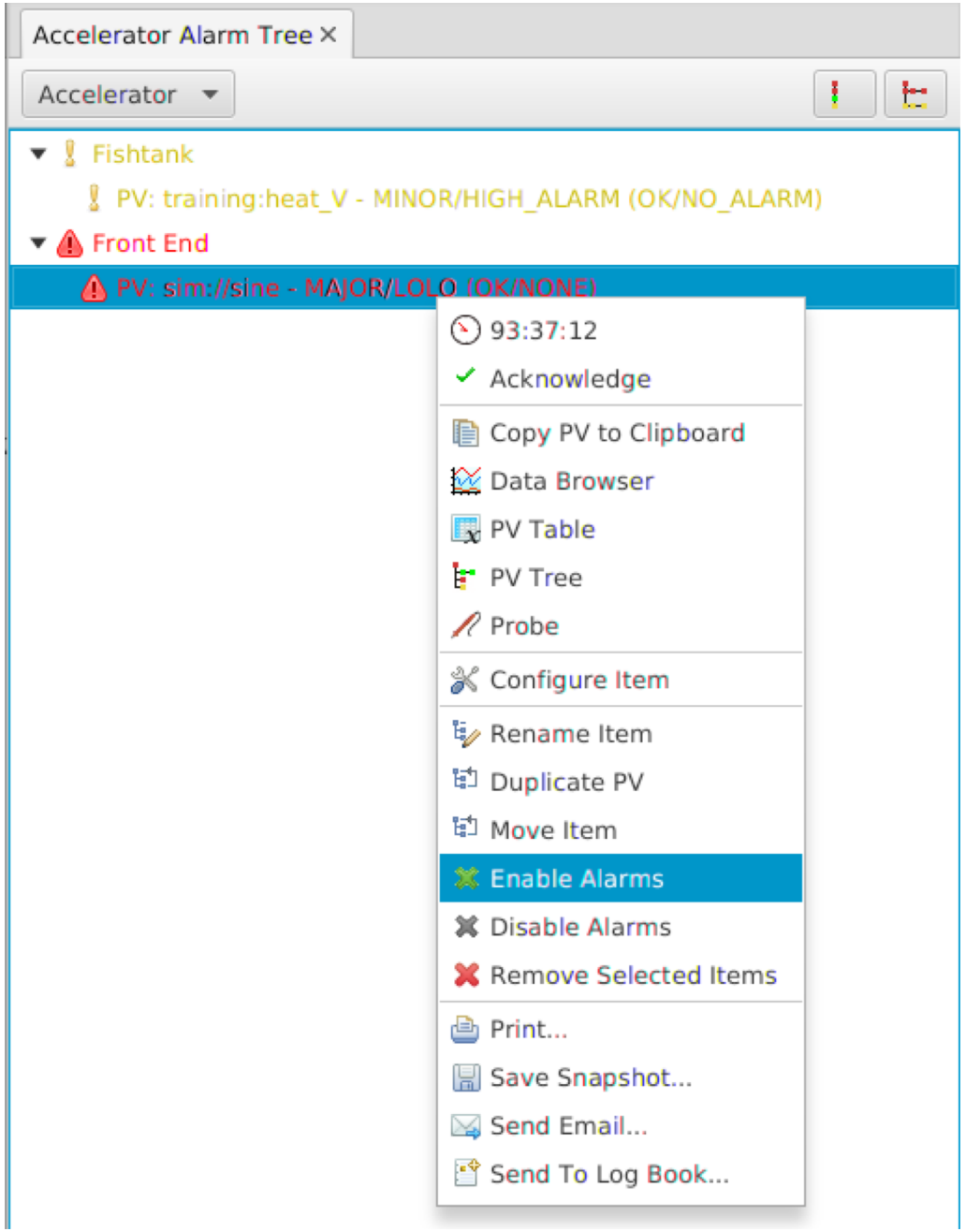
- Inspect Alarm
  - Watch as alarm is indicated
  - Open associated display
- Handle It
  - Acknowledge
  - Reduce setpoint

  → Clear



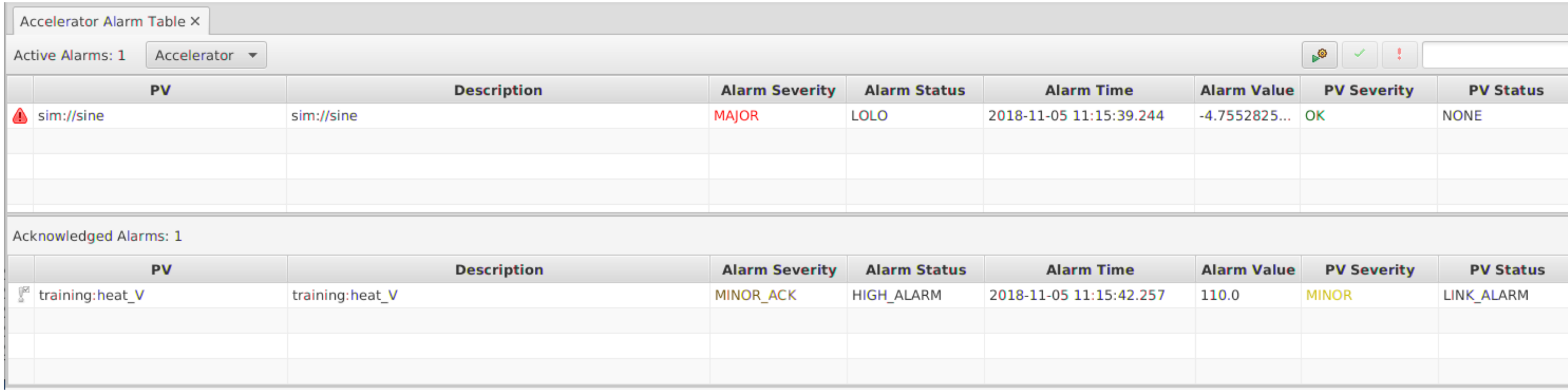
Alarm Tree

- 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

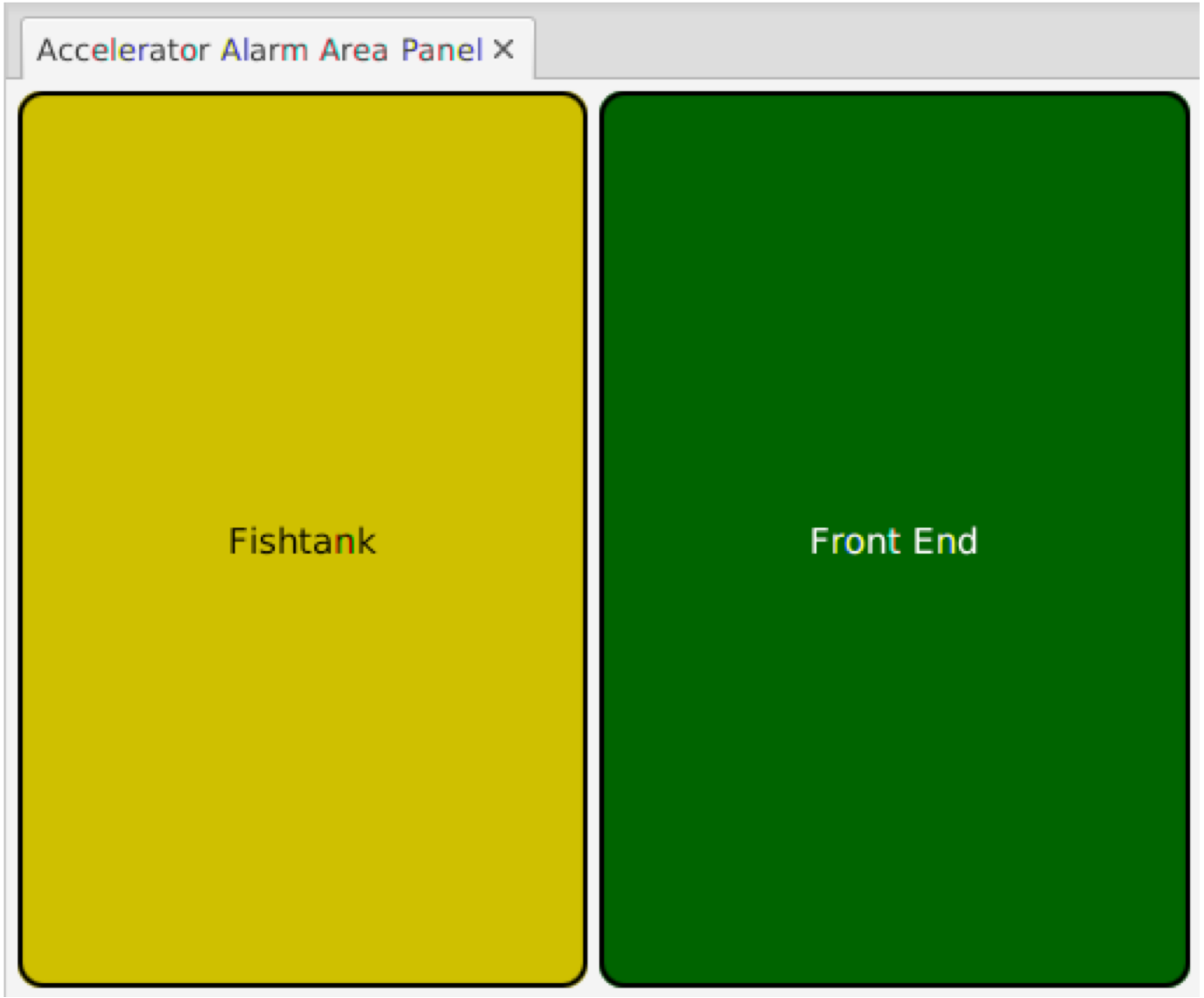


Alarm Area Panel

Useful for ‘Overview Displays’

Indicates ‘across the room’:

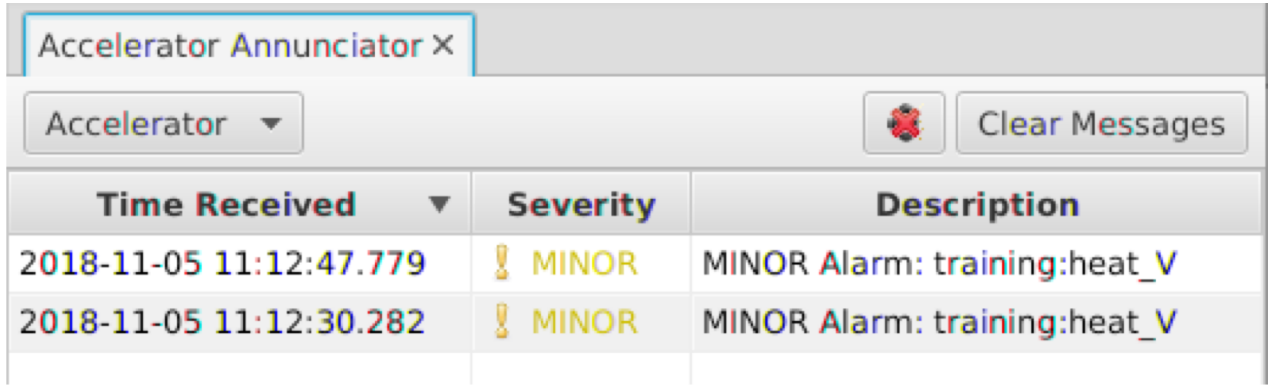
All OK?

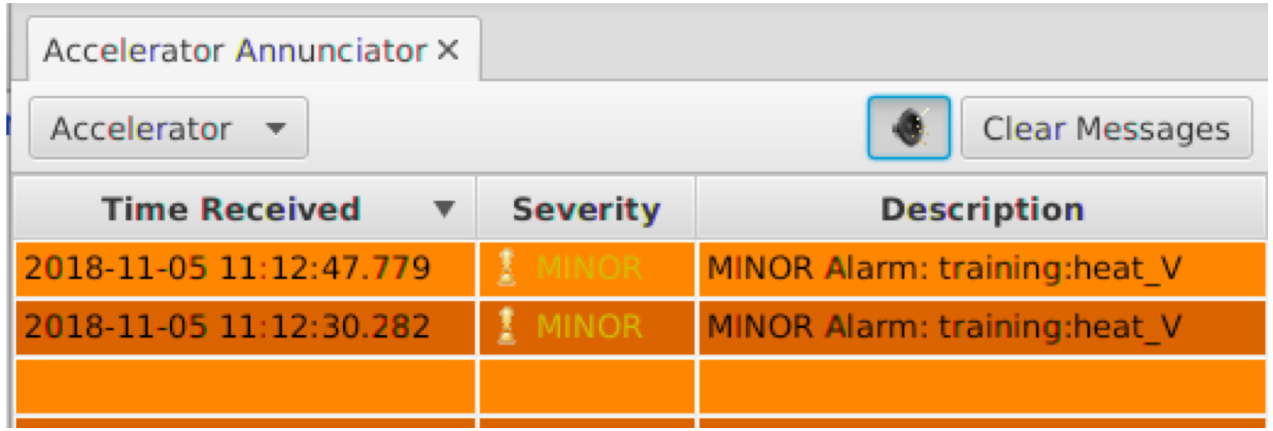


Alarm Annunciator

Annunciates the *description* of alarms

Basic “heads up” to check alarm table for details





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