

Efficiency Through Automation

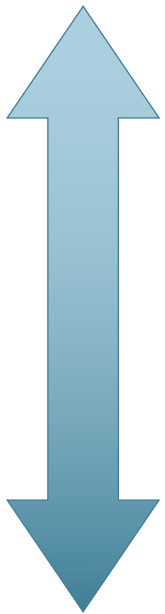


A. García-Tabarés on behalf of the
Controls Group

Automation at EuXFEL: introduction

Developers

Users



- Karabo is a distributed control system that has been designed, developed and used at European XFEL.
- Automation is performed at multiple levels within the control group, and here are a few examples:
 - Karabo automated deployment via ansible playbooks: This involves rolling out and deploying new versions of both the control framework and equipment/device updates.
 - Beckhoff Assistance: Devices controlled using Beckhoff can be automatically started with this assistance. It can be used for a single device or multiple devices.
 - Karabo Scan Tool: This tool helps in data acquisition while synchronously moving several actuators and motors.
 - Gain Curve Scan: device that is used to scan the undulator cell gap.
 - Beamline alignment (R&D project, in progress)

Automation at EuXFEL: a successfully story

- When a topic is restarted, many devices need to be manually started (instantiated).
- Recently, a broker incident occurred at the MID instrument, requiring the broker to be restarted. This shared broker with the HED instrument caused two topics to be restarted using deployment scripts and the recovery portal.

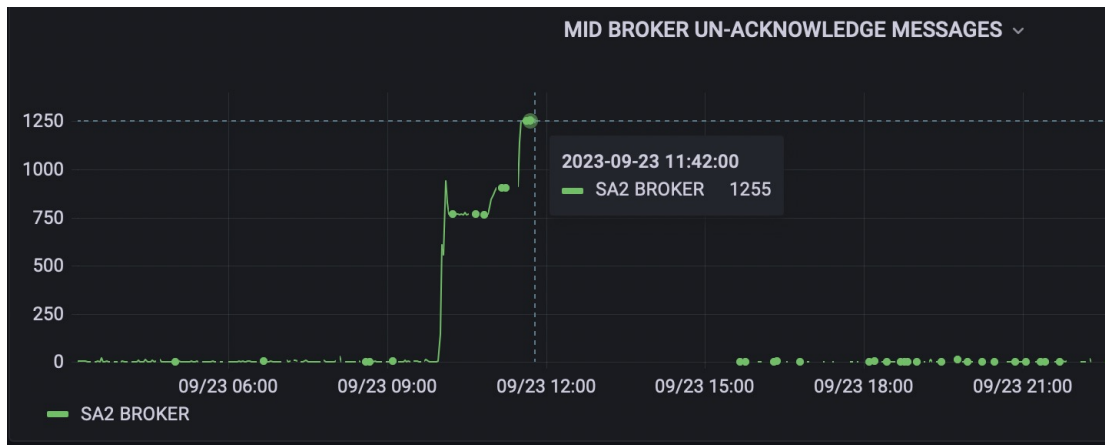


Automation at EuXFEL: a successfully story

Issue

Stop and restart topics

Start remaining devices



Automation at EuXFEL: a successfully story

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MID BROKER UN-ACKNOWLEDGE MESSAGES ▾

```

4 karabo_tag: 2.17.0
5 karabo_gui_tag: 2.18.0
6 karabo_dataloggers_tag: 2.17.2
7 karabo_broker: "{{ hed_broker }}"
8 karabo_broker_topic: HED
9 karabo_gui_host: hed-rr-sys-con-gui1
10 karabo_gui_port: 44444
11 karabo_project_db_host: exflkardb
12 karabo_config_db: configDatabaseHED
13 timeserver_name: HED_RR_UTC/TSYS/TIMESERVE
14 server_bound_opt: "Logger.priority=INFO ti
15 server_md1_opt: "timeServerId={{ timeserve
16 webservice_opt: "--port=8080 --webservice_ag
17 adqDigitizer_tag: 4.5.9-2.17.0
18 agipd2Control_tag: 1.1.3-2.13.7
19 agipd2Timing_tag: 1.0.0-2.16.0
20 agipdMiddleLayer_tag: 2.6.1-2.16.5
21 apitechAttenuator_tag: 1.0.4-2.17.0
22 aravisCameras_tag: 1.9.11-2.17.0
23 beamImagingUnit_tag: 1.3.11-2.16.2
24 beamQualityAssignment_tag: 1.0.2-2.13.7
25 Beckhoff_tag: 4.14.5-2.17.0
26 BeckhoffAssistant_tag: 1.4.0-2.13.6
27 BeckhoffInterlock_tag: 1.0.1-2.10.0
28 ccmom_tag: 1.3.1-2.17.0
29 cLockAndControlML_tag: 3.0.1-2.13.7
30 ComponentManager_tag: 0.4.4-2.11.0
31 CompoundRefractiveLens_tag: 1.3.6-2.16.0
32 deviceClone_tag: 0.3.0-2.16.2
33 doocsDevices_tag: 1.11.3-2.17.0
34 doocsML_tag: 1.1.4-2.16.6
35 epicsDevices_tag: 0.9.2-2.13.2
36 ePixControl_tag: 1.1.3-2.16.5
37 ePixReceiver_tag: 1.3.1-2.16.5
38 fastAdc_tag: 3.0.6-2.17.0
39 functionGenerator_tag: 1.0.4-2.16.2
40 genicamCameras_tag: 3.11.12-2.17.0
26 - name: cppServer/hed_loop_2
27 prefix: cpp
28 options: >
29   autoStart[0]={BeckhoffCom.deviceId=HED_RR_SYS/PLC/2 BeckhoffCom.serverUri=tcp://hed-rr-sys-plc-2:1234 BeckhoffCom.createGenericDevices=tru
30
31 - name: middlelayerServer/hed_hex_7
32 prefix: middlelayer
33 options: "{{ server_md1_opt }}"
34
35 - name: middlelayerServer/hed_hex_9
36 prefix: middlelayer
37 options: "{{ server_md1_opt }}"
38
39 - name: middlelayerServer/hed_loop_1
40 prefix: middlelayer
41 options: "{{ server_md1_opt }}"
42
43 - name: middlelayerServer/hed_attn_1
44 prefix: middlelayer
45 options: "deviceClasses=ApitechAttenuator {{ server_md1_opt }}"
46
47 device_packages:
48 - name: Beckhoff
49   tag: "{{ Beckhoff_tag }}"
50 - name: BeckhoffInterlock
51   tag: "{{ BeckhoffInterlock_tag }}"
52 - name: beamImagingUnit
53   tag: "{{ beamImagingUnit_tag }}"
54 - name: vacuumSection
55   tag: "{{ vacuumSection_tag }}"
56 - name: SlitSystem
57   tag: "{{ SlitSystem_tag }}"
58 - name: jjAttenuator

```

- hosts: all
- environment:
- KARABO: "{{ install_dir }}/karabo"
- PATH: "{{ install_dir }}/karabo/bin:{{ ins
- tasks:
- include: retrieve_facts.yml
- name: start all device servers
- include: daemontools.yml
- vars:
- state: started

Automation at EuXFEL: a successfully story

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```

1250 -----
1000 -----
750 -----
500 -----
250 -----
0 -----
SA2 BROKER

MID BROKER UN-ACKNO

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13 timeserver_name: HED_RR_UTC/TSYS/TIMESERVE
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40 genicamCameras_tag: 3.11.12-2.17.0

- name: cppServer/hed
  prefix: cpp
  options: >
    autoStart[0]={Beckhoff}

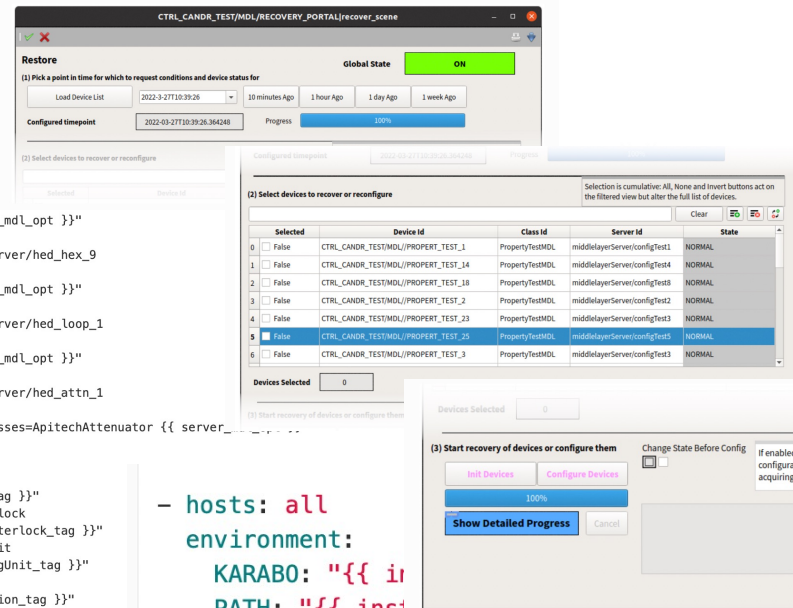
- name: middlelayerServer/hed_hex_9
  prefix: middlelayer
  options: "{{ server_md_l_opt }}"

- name: middlelayerServer/hed_loop_1
  prefix: middlelayer
  options: "{{ server_md_l_opt }}"

- name: middlelayerServer/hed_attn_1
  prefix: middlelayer
  options: "deviceClasses=ApitechAttenuator {{ server_md_l_opt }}"

device_packages:
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- name: BeckhoffInterlock
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  KARABO: "{{ karabo_tag }}"
  PATH: "{{ path }}"
tasks:
- include: retrieve_facts.yml
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  include: daemontools.yml
vars:
  state: started

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