

SVD slow control

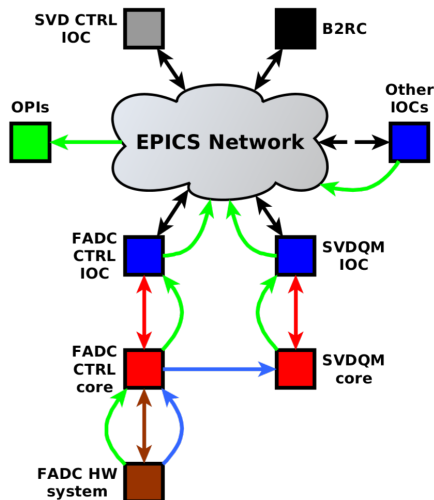
FADC CTRL and SVDQM

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Overview

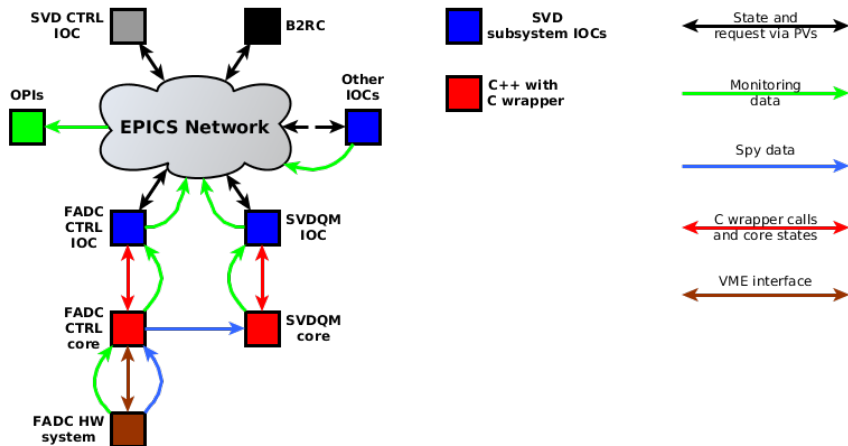
SVD slow control



- **OPI/CSS:** Presents data from the epics network to the user.
- **Epics Net.:** Contains data from all connected IOCs.
- **Epics IOC:**
Provides/broadcasts data for the epics network (PVs).
- **C++ Interfaces:** Provides IOCs with updates and processes the given request.

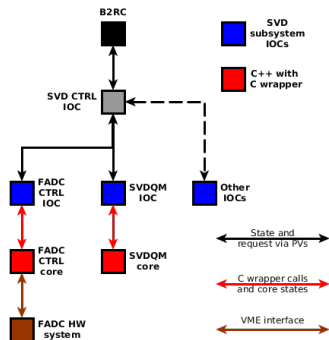
Overview

Data flow



Overview

Ctrl flow/hierarchy of FADC CTRL and SVDQM



Control flow/hierarchy:

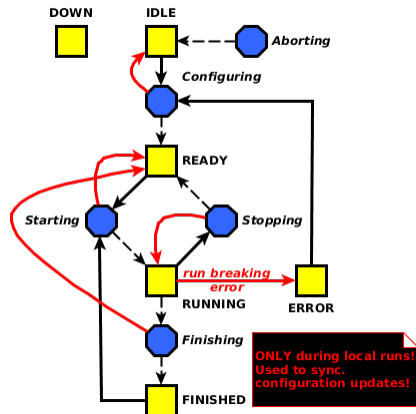
- Request propagation: top to bottom.
- Error/state propagation: bottom to top.

Internally, each subsystem IOC is driven by a finite state machine consisting of:

- **AcceptingRequest:** configure, start, stop, abort
- **WaitProcessed:** Waits until core has processed the request
- **Updating:** Copy the results from the core to the corresponding PVs. Remap core state to IOC state.

State machine

Stable states

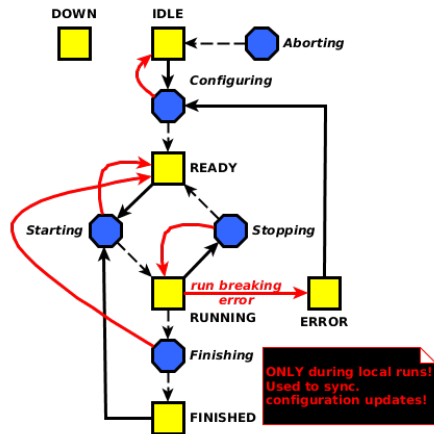


"Stable" states (accepting requests):

- **DOWN:**
Not all required PVs are connected during startup of the system.
- **IDLE:**
Configuration has to be fetched and (re)applied.
- **READY:**
The system is configured and ready to go.
- **RUNNING:**
The system is taking spy data.
- **ERROR:**
A run breaking error has occurred during RUNNING.

State machine

Intermediate states



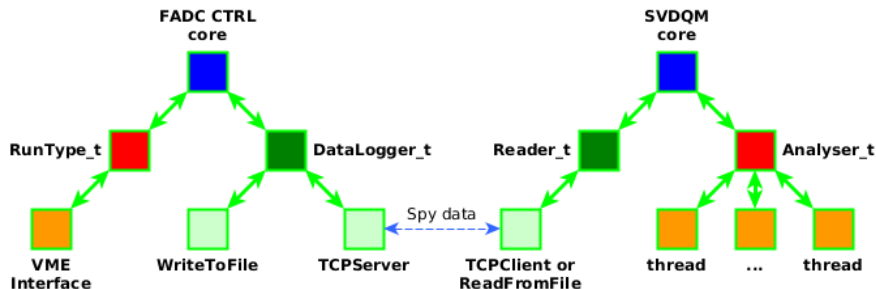
"Intermediate" states (busy performing request):

- **Configuring:**
Applying configurations.
- **Starting:**
Start acquisition/evaluation of spy data.
- **Stopping:**
Stopping acquisition/evaluation.
- **Aborting:**
Go from any stable state -except from DOWN- to IDLE.

After finishing the task, the request PV is set to "PROCESSED" and the state goes depending on the success to the desired one.

C++ Interface

FADC CTRL and SVDQM core



OPI - Preliminary build!

Configuration

BELLE 2 SVD Configurations

Control SVD_CTRL

State: **Running**

Request: **Processed**

SVS_CTRL

FADC_CTRL

SYSDM

LV_PS

NTC

DIAMOND

Data: RAW

Run: Noise run

Run nr.: 0

TMP B2RC 0

SVD Configuration

General

Template xml file
/home/hao/_default_.xml

Data mode: RAW

Run mode: Noise run

Max. events: 0

IOConfig

☐ Save FADC output to:
/mnt/storage/fadc_test_data/css_tests

Prefix: CSS

ADCDelayScan

Samples: 50

NoiseRun

CM section size: 32

Noisy strip cut: 1.5

CalibrationRun

Peak cut: 0.1

FWHM cut: 0.1

Peak, time cut: 0.1

TriggerRun

Seed cut: 5

Neighbour cut: 3

Frame cut: 2

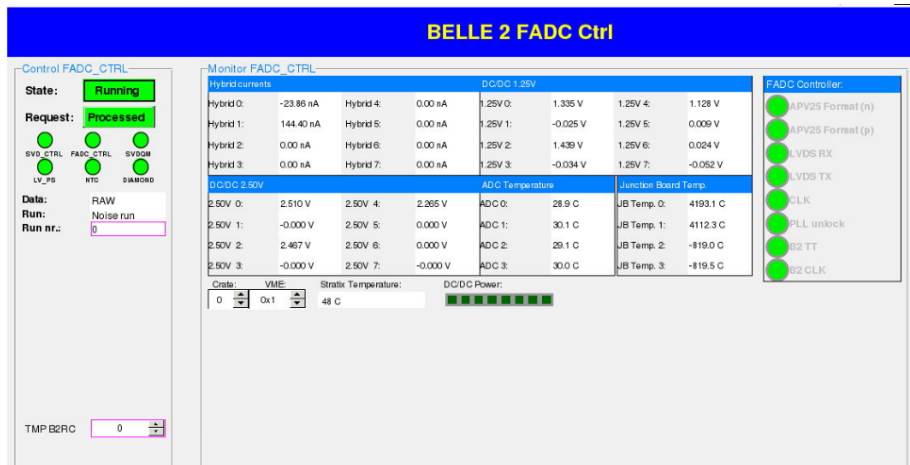
Cluster cut: 5

Min. hit length: 3

Parse template Save

OPI - Preliminary build!

FADC CTRL



OPI - Preliminary build!

SVDQM

BELLE 2 SVD QM

Control SVDQM

State: **Running**

Request: **Processed**

SV3_CTRL ☒ FADC_CTRL ☒ SVDQM ☒
LV_FS ☒ NTC ☒ DIAMOND ☒

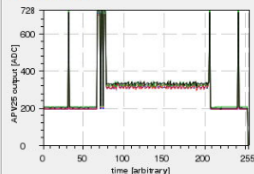
Data: RAW

Run: Noise run

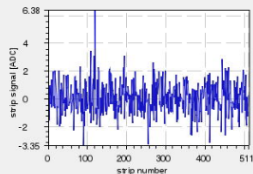
Run nr.: 0

TMP B2RC 0

Monitor SVDQM



- ☒ APV25 0
- ☒ APV25 1
- ☒ APV25 2
- ☒ APV25 3



☒ frame 0

Layer Ladder
0 0

Sensor Side Plot type
0 0 Raw Data

Sum of errors
Header errors: 0
Error bits: 0
FIFO full: 0
Frame errors: 0
Out of sync.: 0

Header errors: 0
Error bits: 0
FIFO full: 0
Frame errors: 0
Out of sync.: 0

Layer Ladder
0 0

Sensor Side Plot type
0 0 TRP Data

Header errors: 0
Error bits: 0
FIFO full: 0
Frame errors: 0
Out of sync.: 0

Sensor ID

Todos and time line

Last B2GM:

- Debugging the DESY build (**on going...**)
- Refactoring the DESY build (**end of August**)
 - ▶ Core implementation of SVD QM (80% finished, 1-2 week)
 - ▶ Core implementation of FADC CTRL
 - ▶ Adapting SNL codes.
- Updating / rewriting OPIs (**end of September, mid October**)
- Forwarding warning and error msg to Belle II RC. Internal interface is already implemented. (If there is an interface on Belle II RC side, few days...)
- Configuration databases (**unknown need discussion**)

Current state

- **Finished** debugging DESY build.
- **Finished** refectoring C++ implementations, few minor tweak left (configuration)...
- **Finished** msg logging to CSS, using the C++ implementation provided by M. Ritzert.
- Implementing BOY widget for specific tasks needed by SVDQM and FADC CTRL OPI (**ongoing, end of october**).
- Move local file bases configurations to database (**not started yet**).
- Implement alarm system, need responsibility definition between Slow Control and Belle II DAQ. (**not yet started**)

A discussion important point: What kinds of plots do you expect to see on SVDQM (shifter and/or expert interface)?