

Configuration Management at ISIS

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ISIS

Configuration Management

- Configuration here refers to experiment / beamline / instrument configuration
- More specifically to the software controlling devices currently present on the instrument
- We want to load:
 - The correct drivers for the available devices
 - Appropriate settings for these devices
- This process could be initiated manually or automatically (e.g. on boot)



EPICS Autosave

- Normally used for IOC boot time restore
 - Restores key PV settings
 - Does not usually cause record processing
- Also contains a utility called configMenu
 - Creates “manual save sets”
 - Can later restore a set of PV values (with record processing)
 - Similar to BURT tool



ISIS Configurations

- A configuration provides:
 - Which IOCs to start
 - Plus macros, and additional PV values to set
 - “Blocks” and “block groups”
 - Aliases for relevant experiment PVs
 - Also logging, run control limits
 - A default synoptic view
- Stored as XML files in folders on disk
 - Managed and served by “blockserver” process
 - Versioned in git



IBEX
Configuration
Synoptic
IOC
Run-Control
Help

LARMOR is SETUP

Run: 00007197 Shutter: CLOSED

Title: MetalsTa_W - Bin1
Users: Team

Good / Raw Frames: 0 / 0 Inst. Time: 09/02/2016 15:38:58
Current / Total: 0 / 0 Run Time: 24 min 1 s
Monitor Counts: 2147483647 Period: Unknown

JAW GAPS	BENCH	Sample	Detector	Optics	Choppers	Sample Environment
A1HGap: -0.053 S1VGap: -0.034 C1HGap: 0.811 C1VGap: 0.106 S2VGap: 0.000 S1HGap: 0.006 A1VGap: 0.014 S2HGap: 1.424	M4Trans: 206.95444 BSZ: 0.00050 BenchLift: LOWER BenchStatus: LOWERED Bench_Rot: 40.001 Mon4InOut: 0.000 BSY: 200.00475	FineHeight: -0.00100 mm SamplePos: 0.00500 mm Phi: -0.00149 deg SampleX: disconnected CoarseHeight: 0.00100 XL0Lim: 0.00000 mm XH0Lim: 40.00000 mm	DetectorPack2: Off DetectorPack3: Off DetectorPack1: Off DetectorPack4: Off	BlockhouseVacuum: 9900.000 Pol_Arc: -1.30330 mm Pol_Trans: 100.00075 An_Zarc: 4.19590 mm An_InOut: -0.00213 mm An_Deg: 0.667 degree	T0Phase: 49200 TargetDiskPhase: 0 InstrumentDiskPhase: 0 IncidentVacuum: 0.015	J1SetTemp: disco J1ExtTemp: disco J1Temp: disco J2SetTemp: disco Euro1_A01: disco Euro1_A02: disco Euro1_A03: disco

Bump strip is TRIPPED Current user: NONE Motors are STATIONARY **Stop All**

Alarms (53)
Beam Status
DAE
Experiment Details
IOC Log
Log Plotter
Motors
Scripting
Synoptic
Web Links

Synoptic Selection
Refresh Synoptic
Synoptic Navigation

Pressure A2
Unknown

Pressure B1
Unknown

Vacuum 1

Vacuum 2

Sample Stack

Moving Bench

Chopper
Frequency Unknown
Phase Unknown
Error Unknown

Coarse Jaws
HGap Unknown
0.811
VGap Unknown
0.106

Polariser
In/Out Unknown
Angle Unknown

Aperture 1
HGap Unknown
-0.053
VGap Unknown
0.014

Slit 1
HGap Unknown
0.006
VGap Unknown
-0.034

Monitor 3
Counts Unknown
M3Height Unknown
0.00003

Sample Changer
Sample Unknown
In Position Unknown

Sample Stack
X Unknown
-0.025
Y Unknown
0.005
PHI Unknown
-0.001
Fine Height Unknown
-0.001

Slit 2
HGap Unknown
1.423
VGap Unknown
0.000

Monitor 4
Counts Unknown
M4Trans Unknown
206.95444

Bench Rotation
Target angle Unknown
Current angle Unknown
Status Unknown

Analyser
In/Out Unknown
Angle Unknown

Moving Beamstop
Counts Unknown
Z Unknown
0.00050
Y Unknown
200.00475

Current configuration: larmor_base



Components

- A configuration can include “components”
 - These are like mini-configurations
- An instrument’s equipment is composed of:
 - Fixed beamline devices (e.g. slits)
 - Variable experiment devices (e.g. cryostat)
- A particular configuration would contain:
 - A base fixed devices component
 - Additional movable equipment components



Implementation

- Each IOC has a config.xml file in its build area
 - Describes available macros and PV sets
 - All collated at build time, served to clients by blockserver process
- Clients create and edit configurations
 - Via interaction with blockserver process
- On boot all IOCs call a common “init.cmd”
 - Processes configuration, sets macros etc.



Configuring IOC Startup Options

The screenshot displays the IBEX configuration interface. The main window shows the status of the system, including the title 'NDXDEMO is SETUP', the run number 'Run: 00000127', and the shutter status 'Shutter: UNKNOWN'. The interface is divided into several sections: Monitors, JAWS, INCIDENT_SLITS, and Sample Stack. The Monitors section shows M2_Counts, M3_Counts, and M1_Counts, all at 0 count. The JAWS section shows HCENTRE, VCENTRE, HGAP, and VGAP, all disconnected. The INCIDENT_SLITS section shows SHGAP, SHVCENTRE, SHCENTRE, and SVGAP, all disconnected. The Sample Stack section shows ThetaUpper, PsiUpper, and ChiUpper, all disconnected.

The 'Edit Configuration' dialog box is open, showing the 'Editing the current configuration' window. The dialog has tabs for IOCs, Blocks, Groups, Components, IOC Macros, IOC PV Values, IOC PV Sets, and Summary. The 'IOCs' tab is selected, displaying a table of IOCs with columns for Name, Description, Sim. level, Auto-start?, and Auto-restart?.

Name	Description	Sim. level	Auto-start?	Auto-restart?
AG33220A_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
AG3631A_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
AG53220A_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
ARBLOCK		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
ARINST		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
BLOCKCACHE		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CHIPIRFP		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CHIPIR_COLLIMATOR	Unknown	NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CHIPIR_FILTER_SET	Unknown	NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CHIPIR_XYZ		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CHOPPERSIM		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CONEXAGP_01	Unknown	NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
CONTROLVCS_01	Unknown	NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTARDUSTEP_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTARDUSTEP_02		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTBPMAG_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTBPMAG_02		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTDCMAG_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DELFTDCMAG_02		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_01		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_02		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_03		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_04		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_05		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_06		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_07		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No
DFKPS_08		NONE	<input type="checkbox"/> No	<input type="checkbox"/> No

The dialog box has buttons for 'Save', 'Save as ...', and 'Cancel'. The current configuration is 'magn_workUp_01'.

Configuring Blocks

The screenshot displays the IBEX software interface. The main window shows 'NDXDEMO is SETUP' and 'Run: 00000127'. The 'Edit Configuration' dialog is open, showing a table of IOC components. The 'Block Configuration' dialog is also open, showing settings for the 'M1_Counts' block.

Main Window:

- IBEX Configuration Synoptic IOC Run-Control Help
- NDXDEMO is SETUP
- Run: 00000127 Shutter: UNKNOWN
- Title: (DAE SIMULATION MODE) a
- Users: Morrison, Cropper and Caruana
- Good / Raw Frames: 0 / 0
- Current / Total: 0 / 000
- Monitor Counts: 0
- Alarms
- Beam Status
- DAE
- Experiment Details
- IOC Log
- Log Plotter
- Motors
- Scripting
- Synoptic
- Web Links

Monitors:

- M2_Counts: 0 count
- M3_Counts: 0 count
- M1_Counts: 0 count

JAWS:

- HCENTRE: disconnected
- VCENTRE: disconnected
- HGAP: disconnected
- VGAP: disconnected

INCIDENT_SLITS:

- SHGAP: disconnected
- SHVCENTRE: disconnected
- SHCENTRE: disconnected
- SVGAP: disconnected

Sample Stack:

- ThetaUpper: disconnected
- PsiUpper: disconnected
- ChiUpper: disconnected

Edit Configuration:

IOC	Blocks	Groups	Components	IOC Macros	IOC PV Values	IOC PV Sets	Summary
Name							Visible?
DISCONNECTED							<input checked="" type="checkbox"/> Yes
NEW_BLOCK							<input checked="" type="checkbox"/> Yes
M5_COUNTS							<input checked="" type="checkbox"/> Yes
M1_Counts							<input checked="" type="checkbox"/> Yes
M2_Counts							<input checked="" type="checkbox"/> Yes
M3_Counts							<input checked="" type="checkbox"/> Yes
HGAP							<input checked="" type="checkbox"/> Yes
VGAP							<input checked="" type="checkbox"/> Yes

Block Configuration:

Configure Block

Selected block:

Name: M1_Counts ☒ Visible ☒ Local

PV address: IN:DEMO:DAE:MON:1:C

Run-Control Settings:

Low Limit: 0.0 High Limit: 0.0 ☐ Enabled

Logging Settings:

Mode: Monitor With Deadband Deadband: 0.0 ☒ Enabled

Configuring Groups

The screenshot displays the IBEX software interface. At the top, a status bar indicates "NDXDEMO is SETUP" and "Run: 00000127". Below this, a sidebar on the left contains navigation icons for Alarms, Beam Status, DAE, Experiment Details, IOC Log, Log Plotter, Motors, Scripting, Synoptic, and Web Links. The main window is divided into several panels. The top right panel shows status for Monitors, JAWS, INCIDENT_SLITS, and Sample Stack. The bottom right panel shows a list of IOC components. The central panel is titled "Edit Configuration" and shows the "Groups" tab. The "Selected group" is "INCIDENT_SLITS". The "Available" list includes LARMOR_SHTR, NORTH, SOUTH, WEST, EAST, MS_COUNTS, NEW_BLOCK, and DISCONNECTED. The "Selected" list includes SHGAP, SHVCENTRE, SHCENTRE, and SVGAP. The "Save" button is highlighted.

IBEX Configuration Synoptic IOC Run-Control Help

NDXDEMO is SETUP

Run: 00000127 Shutter: UNKNOWN

Title: (DAE SIMULATION MODE) a
Users: Morrison, Cropper and Caru

Good / Raw Frames: 0 / 0
Current / Total: 0 / 000
Monitor Counts: 0

Alarms
Beam Status
DAE
Experiment Details
IOC Log
Log Plotter
Motors
Scripting
Synoptic
Web Links

Monitors
M2_Counts: 0 count
M3_Counts: 0 count
M1_Counts: 0 count

JAWS
HCENTRE: disconnected
VCENTRE: disconnected
HGAP: disconnected
VGAP: disconnected

INCIDENT_SLITS
SHGAP: disconnected
SHVCENTRE: disconnected
SHCENTRE: disconnected
SVGAP: disconnected

Sample Stack
ThetaUpper: disconne
PsiUpper: disconne
ChiUpper: disconne

Edit Configuration
Editing the current configuration

IOCs Blocks Groups Components IOC Macros IOC PV Values IOC PV Sets Summary

Groups
Monitors
JAWS
INCIDENT_SLITS
Sample Stack
BEAM

Selected group
Name: INCIDENT_SLITS

Blocks

Available:
LARMOR_SHTR
NORTH
SOUTH
WEST
EAST
MS_COUNTS
NEW_BLOCK
DISCONNECTED

Selected:
SHGAP
SHVCENTRE
SHCENTRE
SVGAP

Add Remove

Save Save as ... Cancel

Stop All

Current configuration: main_workUp_01

Configuring IOC Macros

The screenshot shows the IBEX Configuration window with the 'Edit Configuration' dialog open. The dialog is titled 'Editing the current configuration' and shows the 'GALIL_01' IOC selected. The 'Selected Macro' is 'GALILADDR01' with a value of '192.168.1.201'. A table lists macros for Galil controllers 1 through 8, each with a value, description, and pattern.

IBEX Configuration

NDXDEMO is SETUP

Run: 00000127 Shutter: UNKNOWN

Title: (DAE SIMULATION MODE) a
Users: Morrison, Cropper and Caru

Good / Raw Frames: 0 / 0
Current / Total: 0 / 000
Monitor Counts: 0

Monitors

M2_Counts:	0 count
M3_Counts:	0 count <input checked="" type="checkbox"/>
M1_Counts:	0 count

JAWS

HCENTRE:	disconnected
VCENTRE:	disconnected
HGAP:	disconnected
VGAP:	disconnected

INCIDENT_SLITS

SHGAP:	disconnected
SHVCENTRE:	disconnected
SHCENTRE:	disconnected
SVGAP:	disconnected

Sample Stack

ThetaUpper:	disconnected
PsiUpper:	disconnected
ChiUpper:	disconnected

Edit Configuration

Editing the current configuration

IOCs: Blocks: Groups: Components: IOC Macros: IOC PV Values: IOC PV Sets: Summary

IOC: GALIL_01

Description: Galil number 1

Selected Macro

Name: GALILADDR01

Value: 192.168.1.201

Macro name	Value	Description	Pattern
GALILADDR01	192.168.1.201	IP address of Galil controller 1 (MTR01* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR02		IP address of Galil controller 2 (MTR02* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR03		IP address of Galil controller 3 (MTR03* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR04		IP address of Galil controller 4 (MTR04* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR05		IP address of Galil controller 5 (MTR05* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR06		IP address of Galil controller 6 (MTR06* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR07		IP address of Galil controller 7 (MTR07* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$
GALILADDR08		IP address of Galil controller 8 (MTR08* ...	^[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+\$

Future Work

- Make PVsets easier to use
 - Look into using configMenu functionality
- Move some autosave settings into components
 - e.g. motor record parameters
 - Particular use case for motor soft limits
- Configurations for ESS in-kind work

