

Controls and Monitoring Status

MICE CM47

Ajit Kurup

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**Imperial College
London**

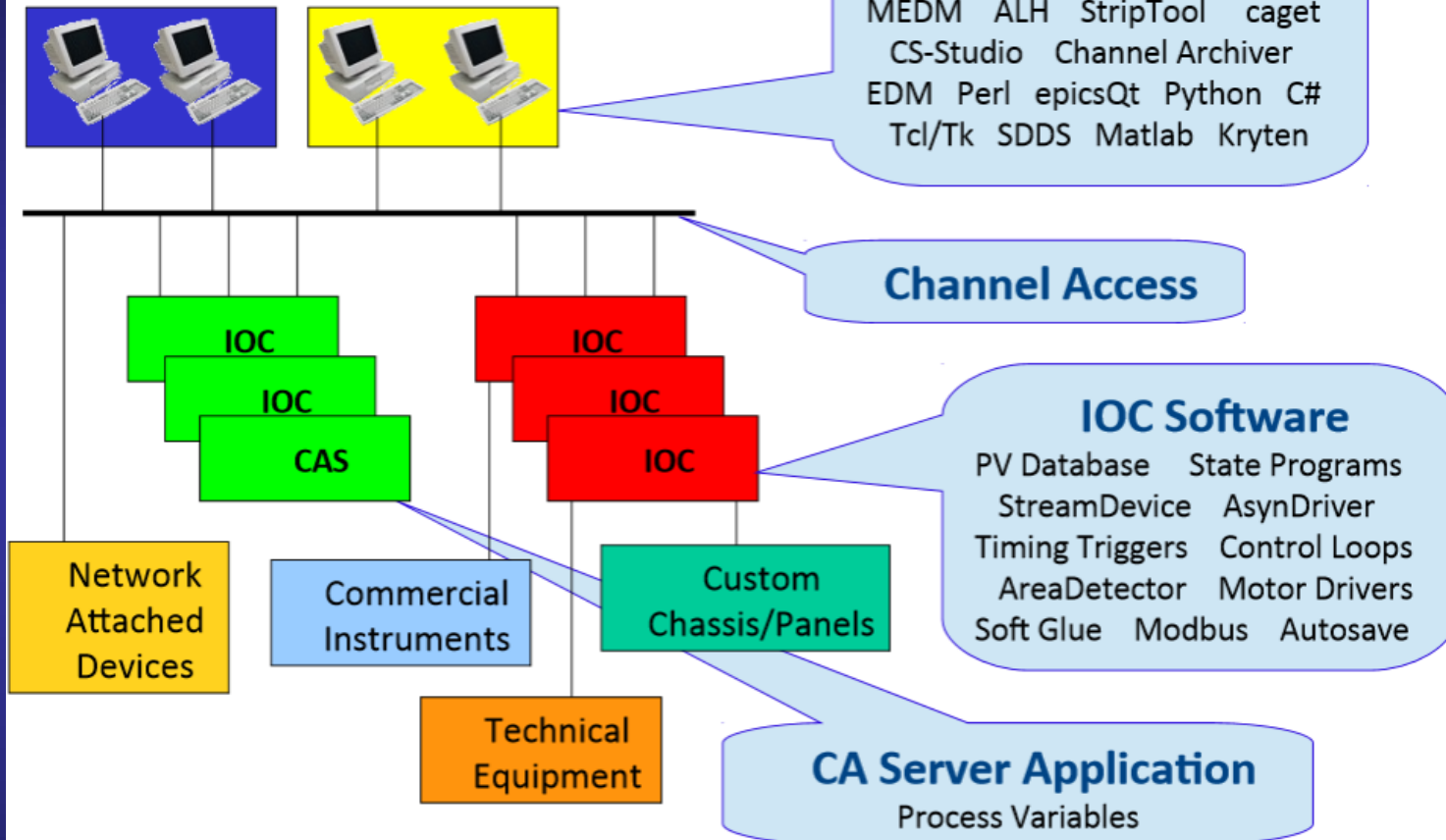
Introduction

- Change in personnel.
 - Pierrick has moved on.
 - Officially took over responsibility for Controls and monitoring (not magnet hardware!) on Friday 13th Jan.
- C&M updates.
 - New features and improvements to the functionality.
- Current status.
- Summary and plans.

EPICS in a nut shell

- IOC= Input output controller
- PV= Process variable.
- EDM = Extensible Display Manager. Provides gui.
- ALH=Alarm handler.
- Database records are used to define PVs and their interactions.

3: EPICS Software Toolkit



APS EPICS Training • Andrew Johnson • 2014-09-18 • Introduction to EPICS

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MICE IOCs

- Hardware.
 - Low-level. Provided and supported by Daresbury.

Daresbury Lab IOCs		
IOC	Subsystem	PV names
CS1	Decay Solenoid	MICE-SOL-xxx
CS2	Target	MICE-TRG-xxx
CS4	Conventional Magnets	MICE-PC-xxx
CS7A	Channel: Analogue devices (serial)	MICE-SSU-xxx, MICE-SSD-xxx, MICE-FCy-xxx
CS7B	Channel: Digital devices (CanBus)	MICE-SSU-xxx, MICE-SSD-xxx, MICE-FCy-xxx
CS7C	Channel: Load Cells & SS PSUs	MICE-SSU-xxx, MICE-SSD-xxx, MICE-FCy-xxx
CS8A	R9 LH2 tests	
CS9A	Vacuum: Analogue devices	MICE-XXX-VAC-xxx (XXX=SSU/SSD/FCy)
CS9B	Vacuum: Digital devices (CanBus)	MICE-XXX-VAC-xxx (XXX=SSU/SSD/FCy)

- Higher-level. Integrates different pieces of hardware and provides the interface for shifters and system experts.
 - Beamline, Detectors, trench water, Hall probes, DAQ monitoring, run control, Channel, RackMon, Environment, HV for KL, Tracker and ISIS monitor.
- State machines.
 - Beam line, target, Decay solenoid, Detectors, TKU, TKD, SSU, SSD, FCD.
- Documentation on <http://micewww.pp.rl.ac.uk/projects/cm/wiki/locs>

State Machines

- State machines
 - Used to change alarm limits and what is archived as a function of state.
 - The state machines are passive, i.e only monitor.
 - Run as a separate IOC.
 - Monitors a particular system for all possible state transitions.
 - AutoSMS.
- Parameters used to define a state are defined in a spreadsheet.
 - Each system has a spreadsheet. See <http://micewww.pp.rl.ac.uk/projects/cm/wiki/SystemSpreadsheets>

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
BL	PV Name	Description	Measured		ALARM				Units	ARCHIVER			AutoSMS	Transition		Group		
			Low	High	LoLo	Low	High	HiHi		mode	frequency (s)	deadband		description	value	Name	Force PV	
Offline	MICE-BL-MQ-01:DT	Q1 temperature rise			-2	-1	1	2	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-02:DT	Q2 temperature rise			-2	-1	1	2	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-03:DT	Q3 temperature rise			-2	-1	1	2	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-04:DT	Q4 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-05:DT	Q5 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-06:DT	Q6 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-07:DT	Q7 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-08:DT	Q8 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MQ-09:DT	Q9 temperature rise			-2	-1	2	15.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MD-01:DT	D1 temperature rise			-2	-1	2	25.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
	MICE-BL-MD-02:DT	D2 temperature rise			-2	-1	2	10.00	K	monitor	10	0.5	0	N/A	0	ConvMagnets		
		MICE-BL-PABS-01:STA	Proton Absorber Status			0	0	2	2.00	-	monitor	10	1.0	0	N/A	0	ProtonAbs	
		MICE-BL-PABS-01:SEN	Proton Absorber Health			0	0	2	15.00	-	monitor	10	1.0	0	N/A	0	ProtonAbs	
	Offline	Ready	Setting	Set	Testing	Error												

Updates to C&M

- Pierrick's list, see http://micewww.pp.rl.ac.uk/projects/cm/wiki/Wiki#Pierrick_To_Do_List

Hardware Task List

Task	Personnel	Priority	Dependencies	Status
Shield SSU/SSD lead air flow sensors	Craig	2	Channel IOC	complete
TKD O2 monitor (moved to Tracker IOC)	Craig	1	Channel IOC	complete
SSU/SSD Vacuum gauge 6	Mark T.	1	Channel IOC	complete
SSD QPS filter on external trip	FNAL	1	Channel IOC	abandoned
TKD Lambda hardware limits		1	Channel IOC	complete
SSD lead blower swap sensor (bad cable)		1	Channel IOC	complete
SSD fill line temperature	DL	1	Channel IOC	
SSD QPS OS/SW update remove	Paolo	1	Channel IOC/Magnet operation	complete
Nikhef Hall Probes	Melissa	1	Channel IOC	
Tracker vacuum	Ed	3	Detector IOC/Tracker SM	
Tracker turbo pumps	Ed	3	Detector IOC/Tracker SM	
Luminosity Monitor sensor 3	Craig/Ed	3	Detector IOC	not bad sensor, but bad cable
Luminosity Monitor sensor 1	Craig/Ed	3	Detector IOC	new 17-01-23
miceecserv fail-over and sound	Paolo	1	Control room	

Updates to C&M

Software Task List

Task	Sub-task	Personnel	Priority	Status
IOCs	BeamLine update	Henry	2	
	TargetMon	Ed	1	in testing,awaiting water in synch
	Detector	Ed	2	in progress
	merge EMR to Detector	Ajit	2	in progress
Channel IOC	E5AC power		3	in progress
	removed unused SSD PSUs	DL	1	complete
	removed unused SSD PSUs		1	complete
	set parameters indicators		2	in testing
	Lakeshore 625 set PVs	DL	1	in progress
	Divergent ramp		1	requires magnet connections
	AMI420 dropouts	DL	1	in progress
	AMI430 — remove dynamic ALH limits	DL	1	in progress
	lead blowers/heaters to ALH & archiver		2	complete
	Channel control gui		1	in progress

Updates to C&M

	FC default values		2	in progress
State Machines	BL-SM updates	Henry	2	
	DET-SM updates	Ed	2	
	new TGT-SM	Ed	2	built
	DS-SM updates	Mike	2	in progress
	TKU-SM/TKD-SM review	Ed	2	in progress
	SSU-SM/SSD-SM review	Alan	2	
	FC-SM updates	Mike/Josef	2	
	complete MICEStates		1	in progress
	complete autoSMS	Ajit	1	in progress
Run Control	write SCAN field	Durga	2	in progress
	fix Channel sequence		2	complete
	write CC tag name to CDB	Durga/Janusz	1	complete
	write ABS tag name to CDB	Durga/Janusz	1	complete
	use MICEStates for Ready		2	in progress
	check end-of-run comment		2	
	remove write CCtag		3	complete
	fix State DATE sequence		2	in progress
	ssh lockout		1	in progress
	IOC access restriction		1	in progress

Updates to C&M

	Add LH2 absorber tags		2	complete
Tracker IOC	build as Support module	Ed	2	complete
move to epicsPRO		Ajit	1	
IOCmanager		Durga	3	in progress
add telnet to iocpe's			3	complete
micecss1 SW backup		Paolo	3	complete
simplify ALH startup			3	complete
vacuum gui updates			3	complete
fix SY527 - remove ToFs			3	
create BField IOC			1	
remove Channel compressor control from gui			2	

Preparations for data taking

- Move running version to production (PRO) repository and freeze.
 - Clear separation between version being developed and the version used to run the experiment.
- Development has been done on various machines (i.e the machine that the IOC runs on).
 - Only necessary for the KL HV crate.
 - Big job of merging and resolving conflicts.
- Bug fixing.
- Production version is ready!
 - Some IOCs already moved to PRO. Rest will be moved imminently.
- Static archiver configuration.
 - Ensures all data is archived regardless of what state we are in.
- Testing IOCs, alarm config.
 - Channel gui.
- Upload to CDB.

Summary

- A lot of work has gone into the controls to provide the functionality needed for MICE to take data.
 - Many thanks to Pierrick!
- Need to transition this to a stable state where development and running versions are separated.
- Complete version of the controls software in PRO.
 - Need to restart IOCs.
- Much bug fixing and testing has been done.
 - A bit more still to do!