Rebooting EPICS IOC-s

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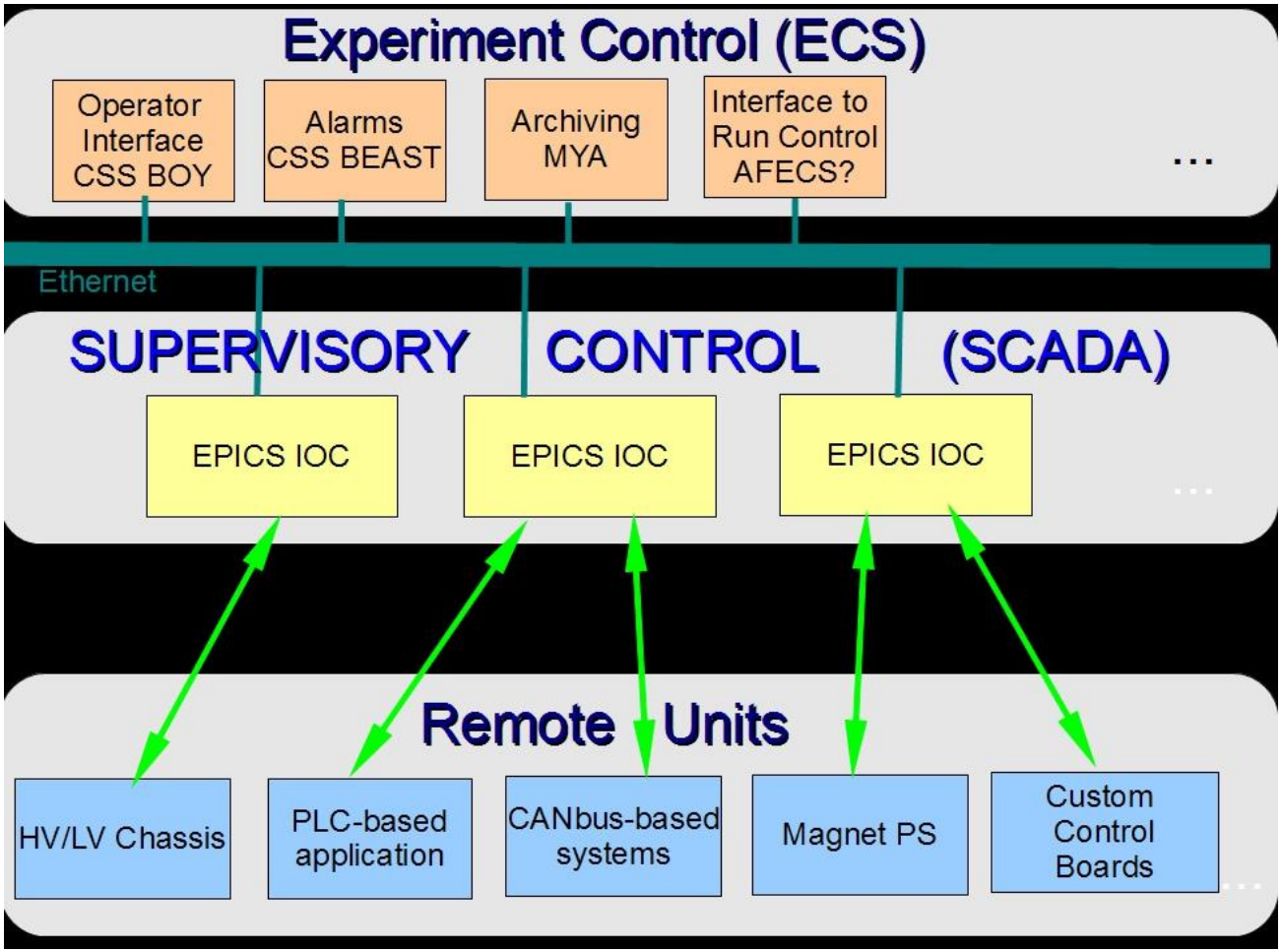
Input/Output Controller (IOC)

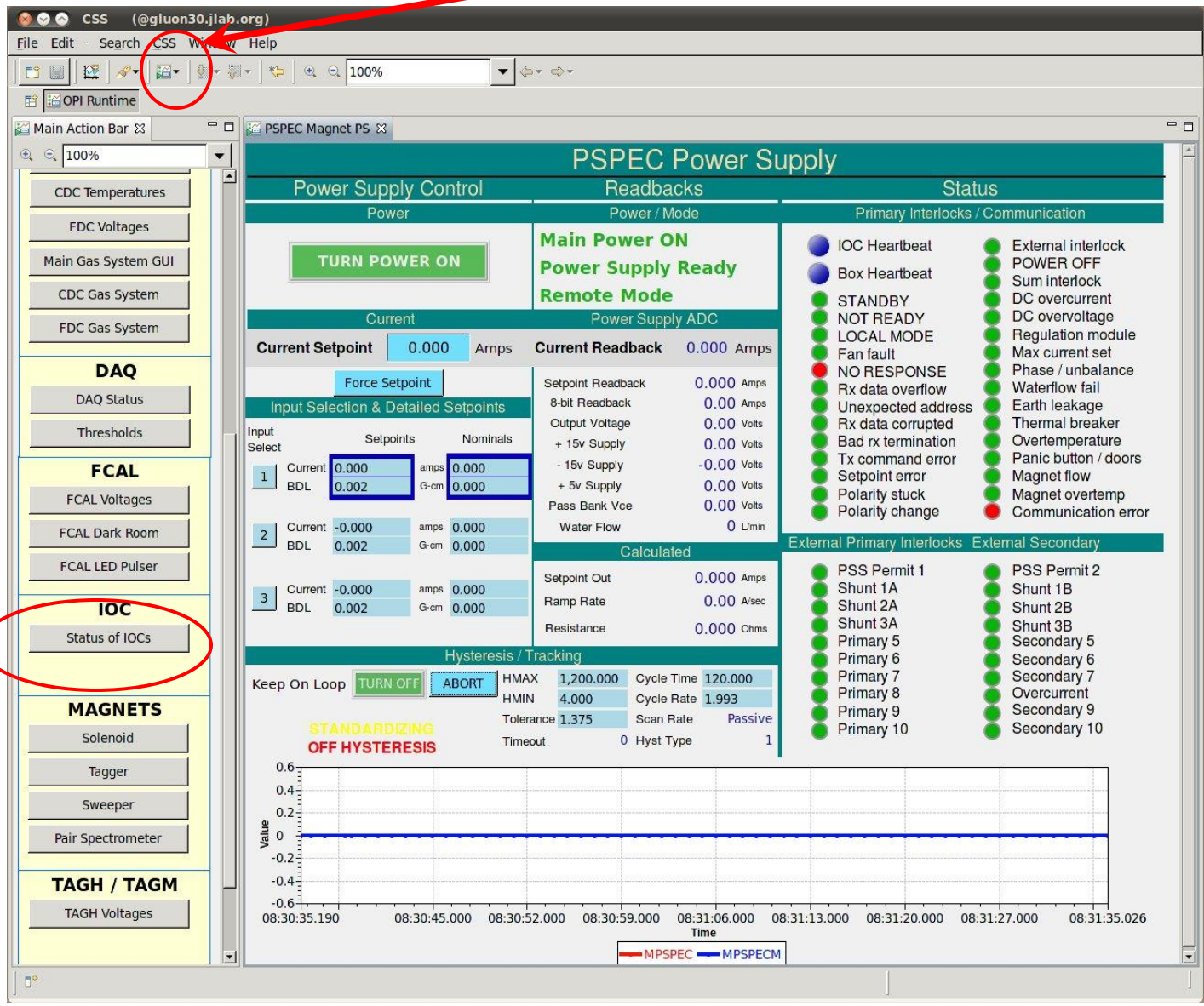
- In EPICS the process variables (PVs) can be accessed over the network.
  - Servers provide (serve) PVs while clients consume them.
- Almost all EPICS variables in Hall D are provided by specialized programs called IOC.
  - Exception is solenoid PXI server which is not technically an IOC.
  - Each EPICS process variable (PV) belongs to one IOC.
  - When an IOC dies or is stopped all its EPICS variables will disappear.
  - IOC may need to be rebooted when a problem is identified that cannot be resolved while keeping IOC online.
    - Need buttons and other widgets to simplify rebooting process
- IOC-s talk to the hardware and serve various quantities as variables over the network.
  - Can talk to COTS hardware that we buy or to custom made systems like PLC or PXI.
- Hall D IOC-s are programs compiled and executed on Linux hosts
  - We us ***procServ*** Linux utility as a host program for executing EPICS IOC in the background.
    - Requires an TCP port assignment.
    - Killing container ***procServ*** will kill the corresponding IOC as well.
      - ✓ ***procServ*** should not be killed.
  - IOC can be executed directly from a command line as well.
- Official Hall D IOC-s are running on ***gluonioc1*** Linux server.
  - ***gluonioc1*** is currently an alias to ***gluon29***.
  - ***gluonioc2*** is currently an alias to ***gluon30*** and is used for EPICS development purposes.
- Hall D will be running about a dozen of IOC-s at a time for various subsystems.

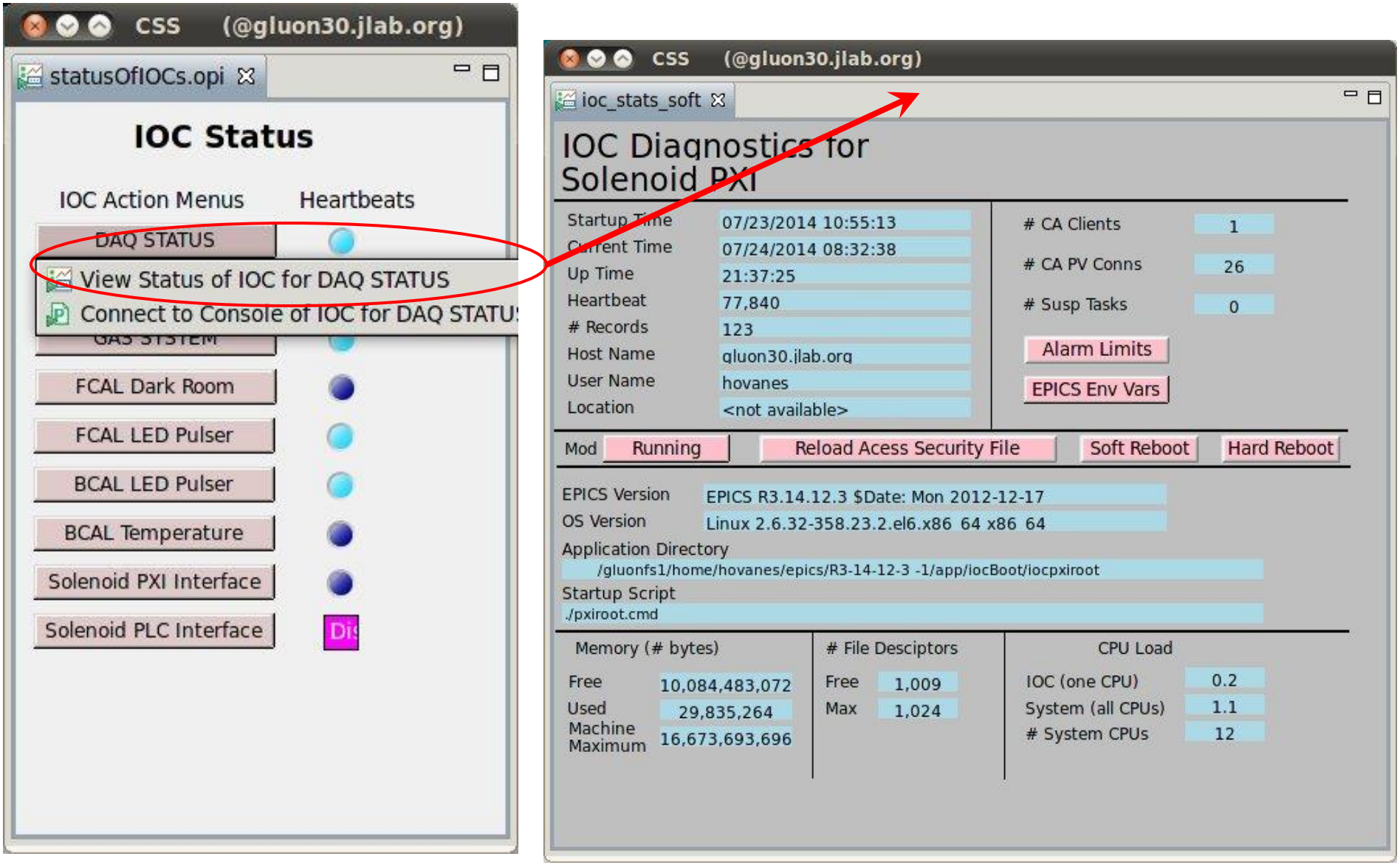
Framework

- Hall D slow controls are designed as a three layer system
- The top level Experiment Controls layer contains the applications that the shift personnel and other systems interfaces are.
- The intermediate level of the controls systems are the EPICS Input/Output Controllers (IOC) that talk to the hardware and make EPICS variables available on the network.
- The lowest level consists of the factory-made chasis, custom-made control boards etc.
- Hall D has a dedicated controls VLAN behind the firewall where all the slow controls components communicate.
- Ethernet ports are open between Hall D and accelerator network for sharing and archiving EPICS variables through the gateways.



- Login as hdops user to gluon machines, eg gluon02.
- Start Hall D EPICS GUIs by typing ***gluex_css***.
- Click on the TOP OPI icon on the toolbar and select "**Main Action Bar**".
- When **Main Action Bar** appears on the left side, find IOC sections and click on Status of IOCs.




CSS (@gluon30.jlab.org)
statusOfIOCs.opi
IOC Status
IOC Action Menus
Heartbeats
DAQ STATUS
View Status of IOC for DAQ STATUS
Connect to Console of IOC for DAQ STATU
FCAL Dark Room
FCAL LED Pulser
BCAL LED Pulser
BCAL Temperature
Solenoid PXI Interface
Solenoid PLC Interface
CSS (@gluon30.jlab.org)
ioc_stats_soft
IOC Diagnostics for
Solenoid PXI
Startup Time 07/23/2014 10:55:13
Current Time 07/24/2014 08:32:38
Up Time 21:37:25
Heartbeat 77,840
Records 123
Host Name gluon30.jlab.org
User Name hovanes
Location <not available>
CA Clients 1
CA PV Conns 26
Susp Tasks 0
Alarm Limits
EPICS Env Vars
Mod Running
Reload Acess Security File
Soft Reboot
Hard Reboot
EPICS Version EPICS R3.14.12.3 $Date: Mon 2012-12-17
OS Version Linux 2.6.32-358.23.2.el6.x86_64 x86_64
Application Directory
/gluonfs1/home/hovanes/epics/R3-14-12-3 -1/app/iocBoot/iocpxiroot
Startup Script
./pxiroot.cmd
Memory (# bytes)
Free 10,084,483,072
Used 29,835,264
Machine Maximum 16,673,693,696
File Desciptors
Free 1,009
Max 1,024
CPU Load
IOC (one CPU) 0.2
System (all CPUs) 1.1
System CPUs 12

Summary

- IOC-s are critical components of Hall D controls system.
- We need a system to monitor manage the IOCs.
- There is a preliminary version of such system.
  - Many IOC are already included.
  - Can be launch from the Hall D EPICS GUIs.
- Voltage control IOC-s are not included yet.
  - Soon to be added to the list.
- Care should be taken when rebooting IOC
  - May require coordination with people who might be currently using it
  - There might be a procedure that needs to be followed for rebooting an IOC.
    - Not easy to automate.