

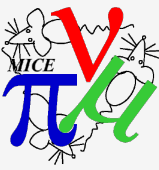


# COMPUTING & SOFTWARE

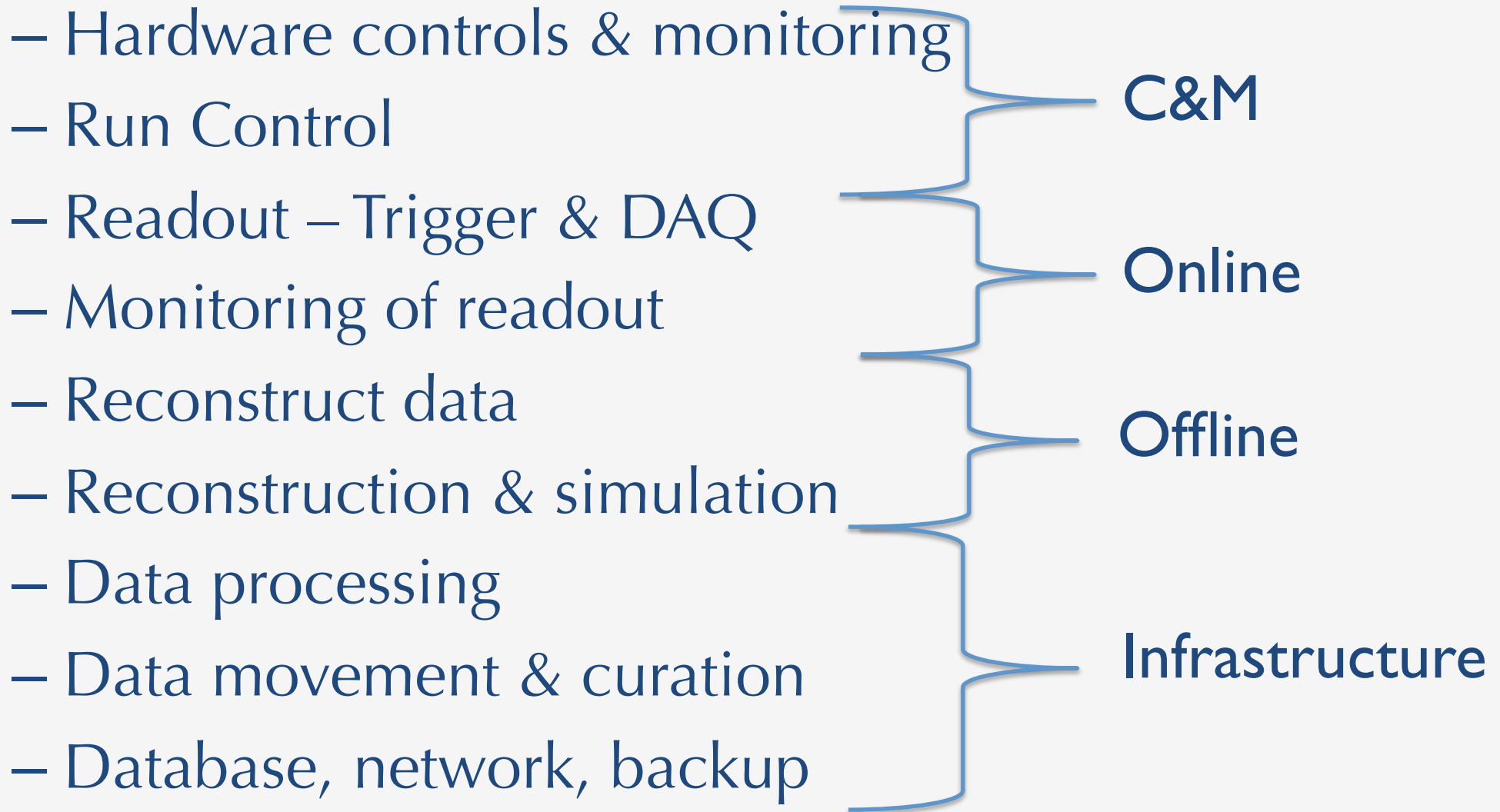
Durga Rajaram

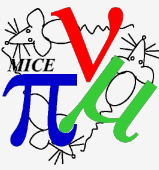
CM 43

October 30, 2015



# OVERVIEW





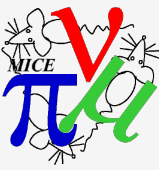
# C&M

- Channel (SSU/FCU/SSD) State Machines complete
- Run Control stability issue identified and resolved
  - Python-EPICS CDB interface incompatibility identified, replaced with C-API
  - integrating new C-API for CDB interface
- PRY Movement monitor implemented
- Hall probes (internal & external) implemented – needs integration
- Expert layer GUIs being implemented on Channel PSUs, Target, DS
- Issues:
  - dropouts with some(?) serial devices
  - implement & start writing out currents to CDB
  - implement & write out absorber settings
- More from Pierrick...



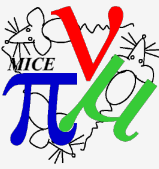
# ONLINE

- DAQ readout & software:
  - Stable
  - Tracker DAQ code revamped & integrated with main DAQ
- Trigger
  - Stable. Old NIM-trigger removed.
- Improvements
  - checks to trap potential data corruption (done)
  - versioning/rollback being implemented
  - Automated tests of DAQ & FEE (during shutdown periods) in development (ongoing)
- Online Monitoring
  - Catch unpacking/event building errors and send a signal to EPICS (Run Control)
  - Need: reactions to signals from monitoring
- More from Yordan...



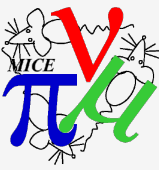
# OFFLINE

- Framework
  - Significant revamp to speedup MAUS ~60-75
  - Data processed faster than it can be taken
    - Implications for fast-reconstruction
  - Book-keeping improvements: all maps & calibrations now in DB
- Reconstruction
  - TOF, Ckov, KL, EMR stable
  - Tracker – several improvements to Kalman
  - Issue with  $p_z$  reconstruction
  - Global track matching progressing; issues related to geometry
- Simulation
  - Batch MC currently blocked by not having a final geometry
- Geometry
  - Various bugs found & fixed.
  - One too many iterations, need to move up feedback mechanism
- More from Adam...



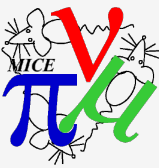
# DATA QUALITY

- Quality of data recorded
  - Readout, unpacking, event building
  - DAQ catches some, Online Monitoring catches others
  - Need to flag (done) & act (not done yet)
  - Need to record in a DB if errors, if detectors were off, etc
- Quality of reconstruction
  - Calibration, mapping, software
  - Should show up in online reconstruction
  - Need to add additional feedback
  - Need some reference for shifters to compare against
  - Need to flag & record in a DB for use in analysis



# INFRASTRUCTURE

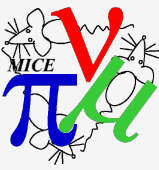
- Networking improvements
  - Network isolation test, dhcp failovers...
- Monitoring beefed up
- Failovers need to be tested
  - CDB, EPICS, targetctl....
  - In place, but never really tested
  - Need to schedule a day or two to do it & document
- More from Paolo...



# DATA PROCESSING

- Offline reconstruction has so far been on the GRID
  - During data-taking, use fast-response Tier-1 queue at RAL
  - Turns reconstructed data around within 24 hours (typically ~6 hours)
- With the speed improvements achieved with MAUS we can reconstruct data “live” in the MLCR.
  - Allows us to do the processing as we take data (or at worst just after a run ends)
  - Avoids queuing and submission issues (proxies, etc) on the GRID
  - Faster response reacting to patches & code fixes
- Tested in September: reconstruction happens ~parallel with data-taking
- A dedicated machine has now been installed
  - Automation of submission being implemented and book-keeping improvements being developed
- All Step IV data so far have been processed





# SUMMARY

- The Software & Computing project encompasses a broad spectrum of tasks
  - DAQ, controls, reconstruction, database
- Lots of progress and improvements
  - State machines complete, Run Control stability
  - Tracker DAQ commissioned, improved error trapping
  - MAUS speed up, track reconstruction improvements
  - Improved online reconstruction
  - Fast processing of data in MLCR