



SOFTWARE & COMPUTING

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MICE PROJECT BOARD

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OVERVIEW

- Software & Computing Project
 - Goals
 - Workflow
 - Organization
- Computing Infrastructure
 - Configuration tools, GRID, Web services
 - WBS, Status, Schedule
- Summary

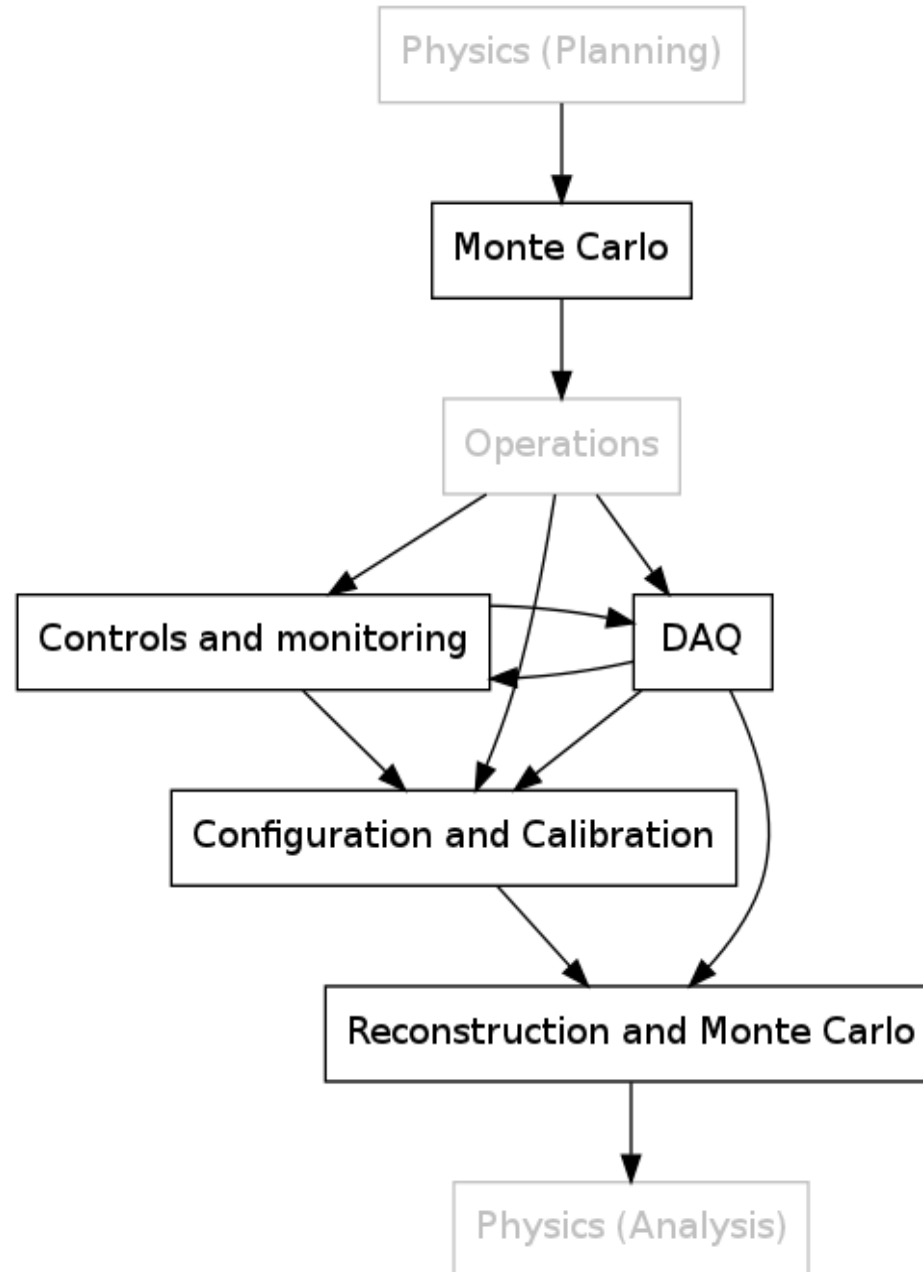


PROJECT OVERVIEW

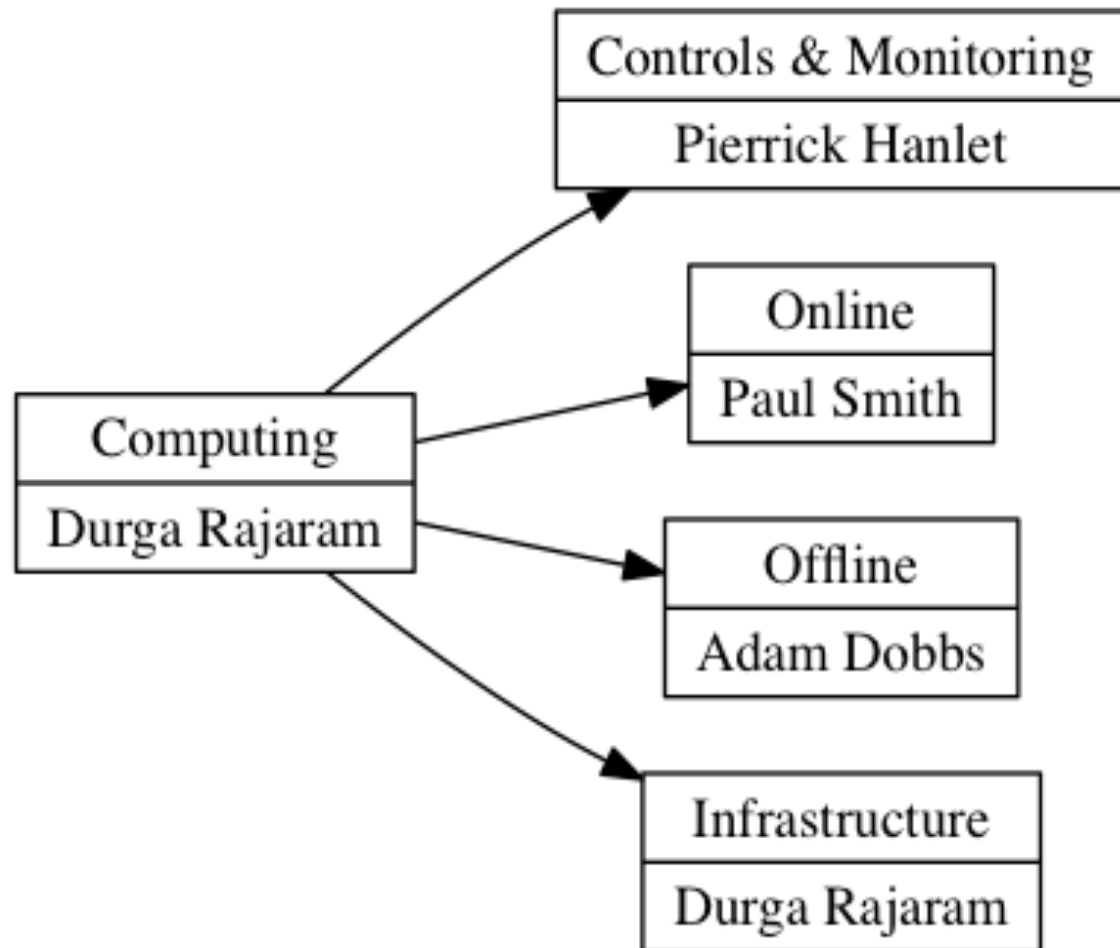
- Wide range of tasks
 - Read out detectors – DAQ
 - Provide hardware controls & monitoring
 - Manage and maintain Control Room servers
 - Reconstruct data
 - Provide online monitoring & reconstruction
 - Describe geometry, fields
 - Provide Monte Carlo simulation of the experiment
 - Manage data storage
 - Provide database tools to manage configurations
 - Web services
- Aim to turn around reconstructed data within 24 hours of data taking



WORKFLOW



ORGANIZATION



- Personnel changes since MICE CM 40
 - Chris Rogers has taken over the Physics group
 - Rajaram who was the Offline manager, has taken over Computing from Rogers
 - Also interim manager for Infrastructure until Warwick postdoc takes over in Jan 2015
 - Adam Dobbs who was coordinating tracker reconstruction is now head of Offline



ORGANIZATION: CONTROLS

- Controls & Monitoring responsible for:
 - Hardware controls
 - Interfaces for controlling & monitoring subsystems
 - Monitoring the MICE environment
 - Run control
 - Storage of hardware and run parameters
- MPB 10: Have a prioritized plan & milestones for Step IV
- Pierrick Hanlet will cover C&M tomorrow

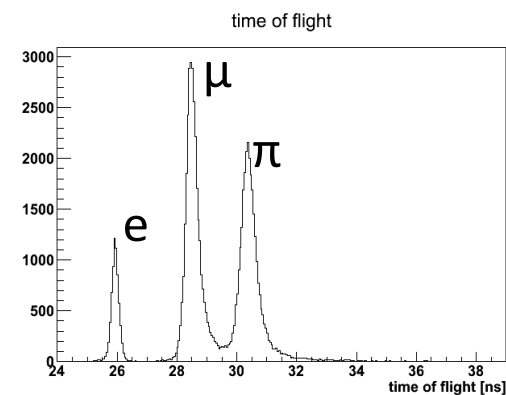
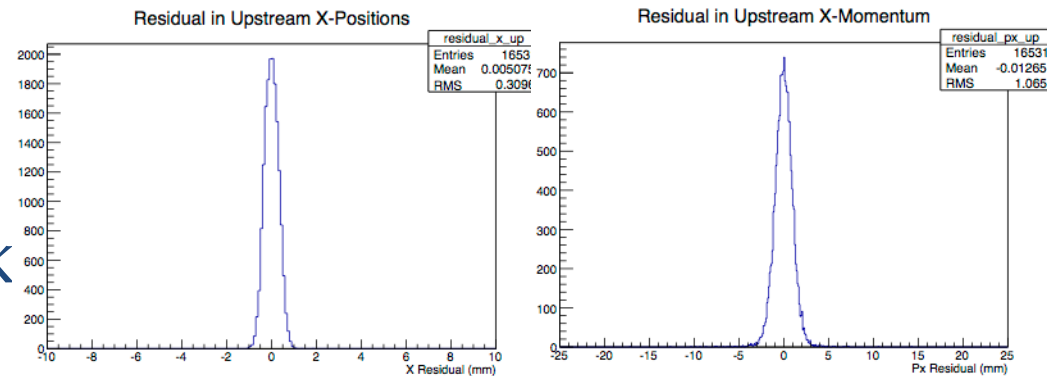
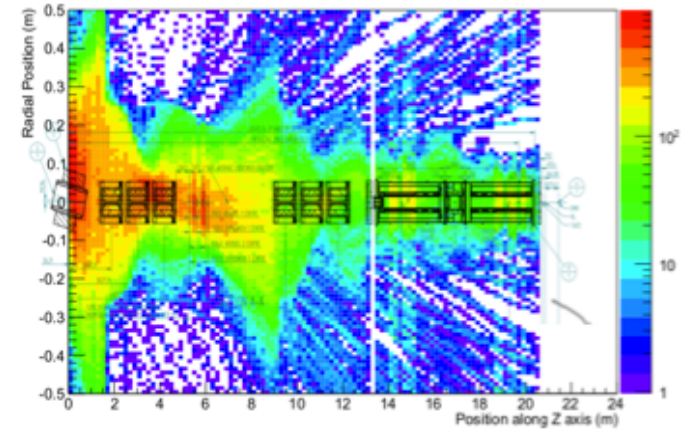


ORGANIZATION: ONLINE

- Online group responsible for MLCR systems:
 - Network switch
 - Servers & operator interface machines
 - DAQ
 - Online monitoring of DAQ
- Have a working system, continuing to make improvements
- MPB 12: Have a plan for on-call support during Step IV
- Paul Smith will cover Online

ORGANIZATION: OFFLINE

- Offline group responsible for:
 - Detector reconstruction
 - Geometry
 - Simulation
- Can reconstruct all detectors
- MPB 14: MICE-Note on track reconstruction completed. MAUS paper in preparation.
- Adam Dobbs will cover Offline

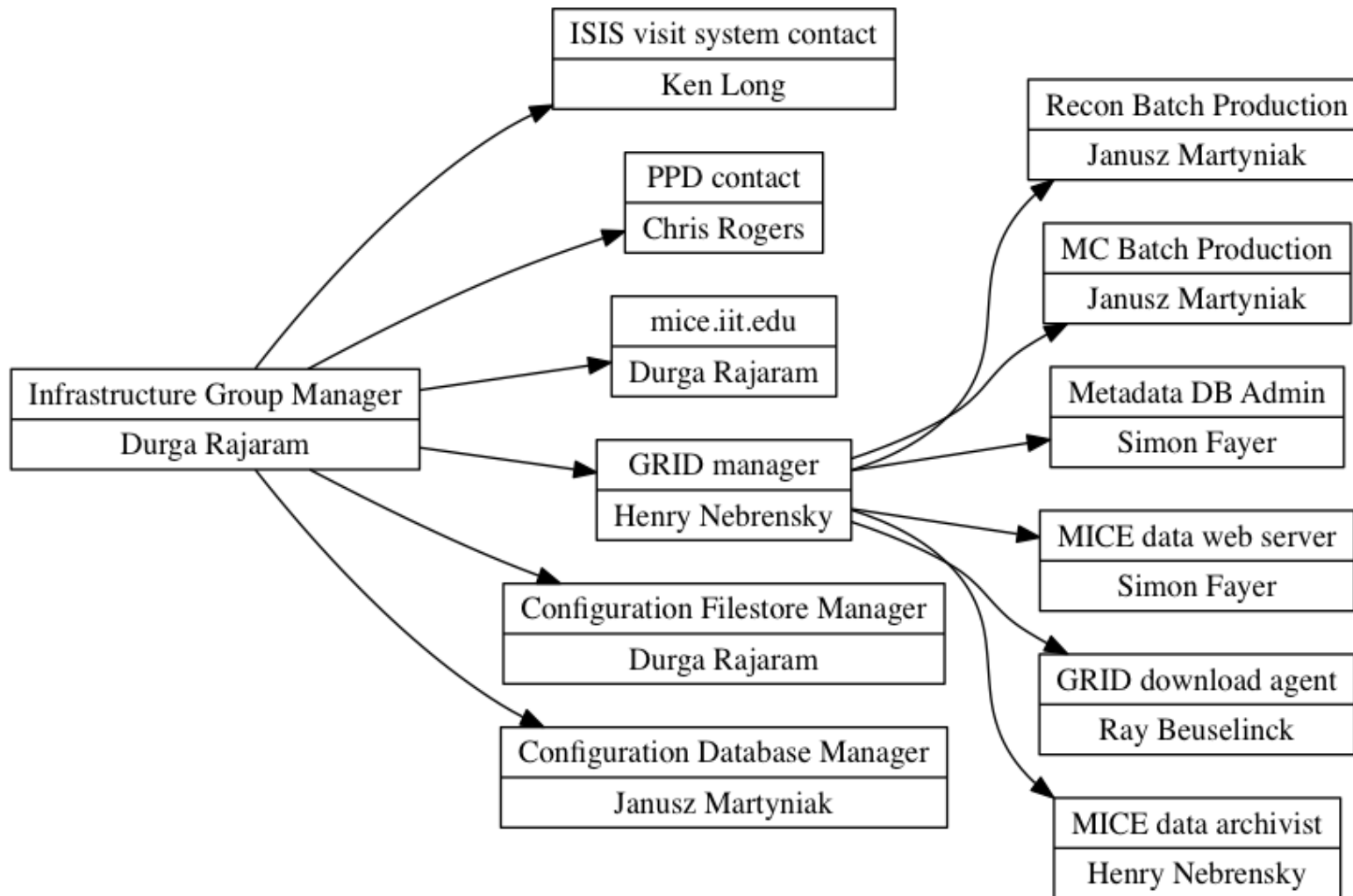




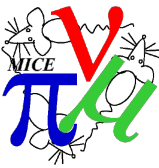
ORGANIZATION: INFRASTRUCTURE

- Infrastructure group responsible for:
 - Configuration & calibration management tools
 - GRID services
 - Data curation
 - Batch processing
 - Web services

INFRASTRUCTURE: WBS



- Rajaram taken over from Rogers as interim manager
 - Warwick postdoc will take over in Jan 2015



INFRASTRUCTURE: DATABASE

- Variety of configurations & calibrations in MICE
 - Run conditions, magnet currents
 - Hardware state machines, alarms
 - Geometry, field maps
 - Electronics cabling maps, detector calibrations
- Configurations & calibrations are handled by a PostgreSQL database (CDB)
 - CDB master is hosted in the MLCR
 - Slave and web interface service are hosted in RAL PPD
 - Updates to the master automatically propagate to slave
 - Write access to the DB is only from the MLCR
- Web service provides interface to DB
 - User-side APIs are mostly in Python
 - C API provided for certain tables
- Configuration Filestore provided for storing pre-calibration data & miscellaneous data such as field maps, surveys

INFRASTRUCTURE: CDB: STATUS &

PLANS



- Status
 - Production database has tables implemented for all subsystems:
 - beamline, cooling channel, state machine, alarm handler, cabling, calibrations, geometry
 - C API developed for C&M EPICS interface
 - Was necessary to accommodate multithreading in EPICS
 - Added new table to handle batch MC production on the GRID
 - Developed new APIs to set reconstruction & MC datacards
 - in user-testing, will be deployed in production DB after that
- Plans
 - We want to store data quality and reconstruction quality flags from data-taking and batch reconstruction
 - Analysis users will want to know if a data-set or run is “analyzable” – were currents normal? Did detectors operate ok? Did they reconstruct?
 - Database group will implement the table, but the flags themselves will have to be defined and filled by detector & reconstruction groups
 - Populate CDB with information from older “missing” runs



INFRASTRUCTURE: GRID

- Data movement
 - DataMover moves raw data from MLCR to permanent tape storage
 - Grid Download Agent downloads data to other other GRID sites
 - Imperial College makes all data available on the web
 - Book-keeping of stored data is via a Metadata Database
- Batch
 - Reconstruction of MICE data
 - Re-process data with for e.g. new software version, revised calibrations, etc
 - Monte Carlo production
 - *Configurations to simulate are dictated by physics group & simulation and reconstruction software come from offline group*



INFRASTRUCTURE: GRID: STATUS & PLANS

- Status
 - Datamover machine has been upgraded to SL6
 - Latest MAUS version installed on GRID nodes
 - All data taken so far have been batch-reconstructed with latest version of MAUS
 - Fixed issues which affected the previous batch reconstruction on the Grid: memory leak in MAUS, problems with certificates.
- Plans:
 - Automated data movement from MLCR to tape is in progress
 - Script to control Monte Carlo production is being developed
 - Quick offline reconstruction to be automated
 - Configuration Filestore server will migrate to a new machine



INFRASTRUCTURE: WEB

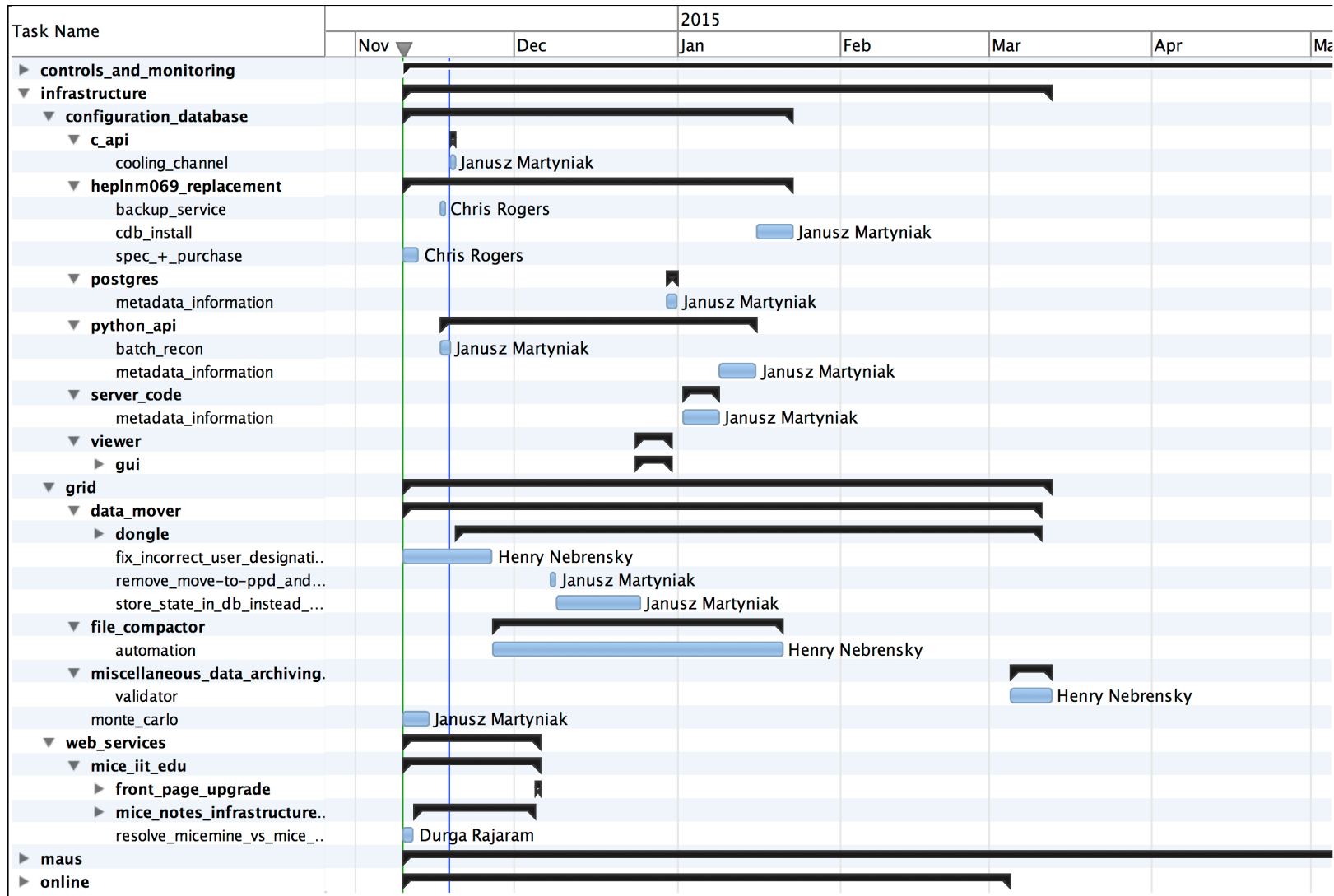
- mice.iit.edu: primary MICE website
- micewww.pp.rl.ac.uk: Wiki, working group pages
- SSH bastion: Gateway to access MLCR machines
- EPICS gateway: Remote read-only access for C&M
- cdb.mice.rl.ac.uk: Web interface to CDB
- test.mice.rl.ac.uk: CI test server for MAUS



INFRASTRUCTURE: WEB: STATUS & PLANS

- Status
 - <http://mice.iit.edu> has been redesigned for easier navigation and outreach
 - CDB web service experienced instability and ~ 2.5% downtime due to software memory issues
 - Implemented a fix to periodically poll and restart service if down
 - Other web services had downtimes < 0.5%

INFRASTRUCTURE: SCHEDULE



- No show stoppers
 - Automation of datamover is key item for Step IV data-taking
- MPB 13: Software & Computing schedule has been integrated into the overall MICE schedule



SUMMARY

- The Software & Computing project encompasses a broad spectrum of tasks
 - DAQ, controls, reconstruction, database
 - Precision requirements
 - Complex, changing configurations
- In good shape to be ready for Step IV
 - Have working online system, improvements ongoing
 - Have a prioritized plan for C&M
 - Offline software capable of identifying & reconstructing muons if we took data now