



Data Taking and Online

MICE Project Board

P J Smith on behalf of the
Online group

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Online Overview

The online group is responsible for the hardware/computing in the MICE Local Control Room (MLCR), Rack Room 1 (RR1) and to a lesser extent Rack Room 2 (RR2). This covers:

- Local Network Switch
- Providing and maintaining the hardware and OS for most of the servers and operator interface machines (OPI).
- DAQ – The online group is responsible for the trigger. (Responsibility for individual PID detector electronics rests with the individual detector groups.)
- Online Monitoring. Monitoring of the raw data coming from the detectors as it is written to the HDD. Checking that the data is good.

Hardware Servers

Infrastructure

Network Switch Stack (3+1)

UPS

KVM

Miceserv1 (1) - General Purpose
Micestore (1) - Data Cache
Micethins (6) - Operator CPU
Nagios Test(1) - System Monitoring

Online Monitoring / Reconstruction

Miceonrec (3) – Diag of detectors

Machine Type (Required + Backups)

C&M Servers

Miceecserv (1+1)

Miceiocpc (1+1)

Targetctl1 (1+1)

Cagateway (1)

Miceisigateway (1)

Micecss (1+1)

- EPICS Client Server
- Software derived EPICS
- Target Controller
- Gateway to external
- Gateway to ISIS values
- Loads VXWorks onto VME

DAQ

Detector readout boards

Trigger hardware (1+1)

Miceacq (5+2)

Miceraid (1+1)

- Hardware – CAEN, NIM
- Old (NIM), New FPGA
- Data Acquisition PC
- Combines Data to Files

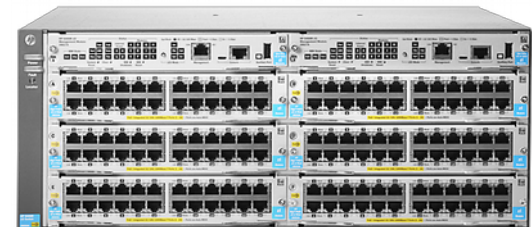
Hardware - Networking

MICE runs a secure virtual LAN, MICENet, managed by RAL Networking, of 254 IP addresses. Most of MICENet is contained within the MLCR and R9. There is also some access to the network from the offices in R1.

Externally MICENet is accessed through a gateway (mousehole) hosted by PPD. Security to MICENet is managed through the use of ssh key pairs.

The majority of MICENet traffic goes through a three switch stack in the MICE RR1. This stack is old, unsupported and has been giving us intermittent problems for about a year.

The entire stack is due to be replaced later this year with a modular system from Hewlett Packard.



Perspective

- 1) The online group have had a working system for many years. We have been looking after the machines for the MICE experiment since it's inception at Step I. We have a tried and tested set-up. Consequently a good proportion of the Online group's remit centres around maintenance, improvements and upgrades of our current system
- 2) With respect to HW have one critical task to do before running, which is the tracker commissioning. Note that a similar procedure has been done before for the single station test. The DAQ system for the tracker has been installed and its integration with the rest of the DAQ will be tested shortly.
- 3) We have a robust plan for the stability improvements we would like to make in the run up to Step IV.
- 4) We have a robust plan for how the online group will support commissioning and data taking, we now need to put this into action. (MPB-12)

Schedule

The main categories for the online schedule are:

- **MLCR Upgrade**
- **General Computing**
- **Documentation**
- **DAQ**
- **Network Switches**
- **On-Call Rotas**
- **Nagios and System Health**
- **Backups and Spares**
- **Online Monitoring**

I'll briefly talk about these categories which are applicable to the online schedule only. Note that the online schedule has been integrated into the full computing schedule.

Schedule

MLCR Upgrade

The MICE local control room has recently been upgraded so that it is suitably equipped for Step IV operations.

We have replaced the opi machines with dedicated thin clients. This has permitted more screen space in the MLCR. A new KVM system has been added to give access to all the machine in RR1.

There are a few tasks to be completed - awaiting some small minor works to be completed – Non critical.

General Computing

This is a catch all category for items that don't neatly fit anywhere, there are no critical items in this category.

Schedule

Documentation

The online group has a significant amount of documentation on MICEmine but it needs updating and reorganising. Two tasks – both of which are clearly critical:

- 1) Technical documentation – updating and making it accessible.
- 2) Training documentation – For online on-call experts.

Both of these tasks are in hand and scheduled.

DAQ

New DAQ machines have been installed (5 + 2 spare).

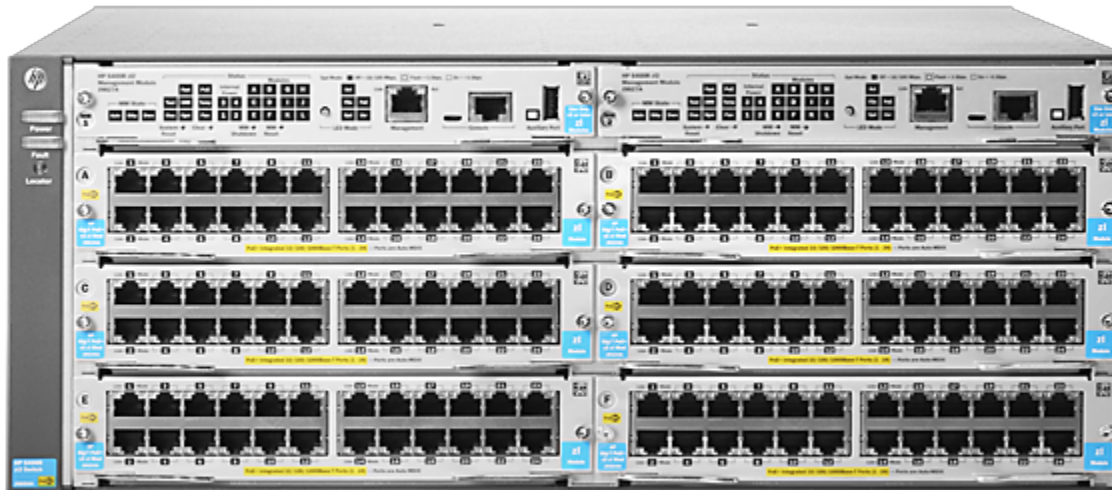
New FPGA based trigger system has been installed. We will switch over to the new trigger before step IV but is currently running in parallel with existing trigger system. Some DAQ spares to be purchased.

Currently going through the process of ensuring integration of DAQ with the tracker.

Schedule

Network Switches

As stated earlier the current stack is old and showing intermittent problems therefore it is being replaced. A new network stack is on order – we're awaiting delivery. Installation will be scheduled for later this year.



Schedule

On-Call Rota (MPB-12)

The online group will operate an on-call system during commissioning and data taking. To provide the necessary cover we will share this task with the offline and C&M groups. This is a reciprocal agreement where we will cover each others on-call duties.

A document has been produced with our plan for supporting MICE and has been included as part of the review.

1) Levels of Expertise 2) Areas of Expertise 3) On-Call Responsibilities,
4) On-Call Training 5) On-Call Staffing 6) Expert Staffing

Additionally we have identified and listed the required tasks that the online on-call person will be responsible for.

Recruiting individuals from these specified groups, writing the documentation and providing training are critical tasks that now need to be completed.

Schedule

Nagios and System Health

We have introduced a Nagios system onto MICE-Net to monitor the computers and give both warnings and alarms of either potential or real problems.

The system is installed but it will require some additional development in order to get the most from it. It also requires interfacing with EPICS. A member of staff has been identified who will take this task forward.

Nagios is a cumulative system – functionality can be added over time. We will have the necessary basic functionality for running Step IV but we will be able to add to the functionality as we see fit.

Schedule

Backups and Spares

MICE data is being looked after by the data group. The online group is responsible for ensuring that machines are functional and can be replaced/repared quickly.

Key machines have backup machines in place..

Most of the key machines are relatively new and in warranty, we aim to replace the machines or renew warranties on those critical machines that are not already covered by warranty.

Effort is required to establish that we have backup plan for all critical machines. We have identified the resources to ensure that this will happen.

We have an on-site backup system for machine configuration files:

This will be reviewed to ensure that it is both robust and that key backups are being made.

Schedule

Online Monitoring

The purpose of the Online Monitoring is to monitor the raw data that is being written to disk from the DAQ so that any potential problems with that data can be flagged. For example missing channels.

This system is functional however monitoring currently lacks any reference data which makes it difficult for the user(s) to know what they should be looking for.

Rhys Gardener is in the process of finding out exactly what needs monitoring and how it can be turned into something that gives timely and useful information to the individuals who are on shift when the software is running.

Conclusions

The online group is in good shape. The key schedule drivers are:

- 1) Continuing the scheduled improvements to ensure that the online systems are as robust as possible for commissioning and data taking.
- 2) Improving the documentation for the online group both as self reference and reference for MICE users.
- 3) Recruiting and training individuals to take on-call responsibilities for the online group.