

Fermilab Site Report Fall 2014 HEPiX Workshop

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Fermilab

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Acknowledgements

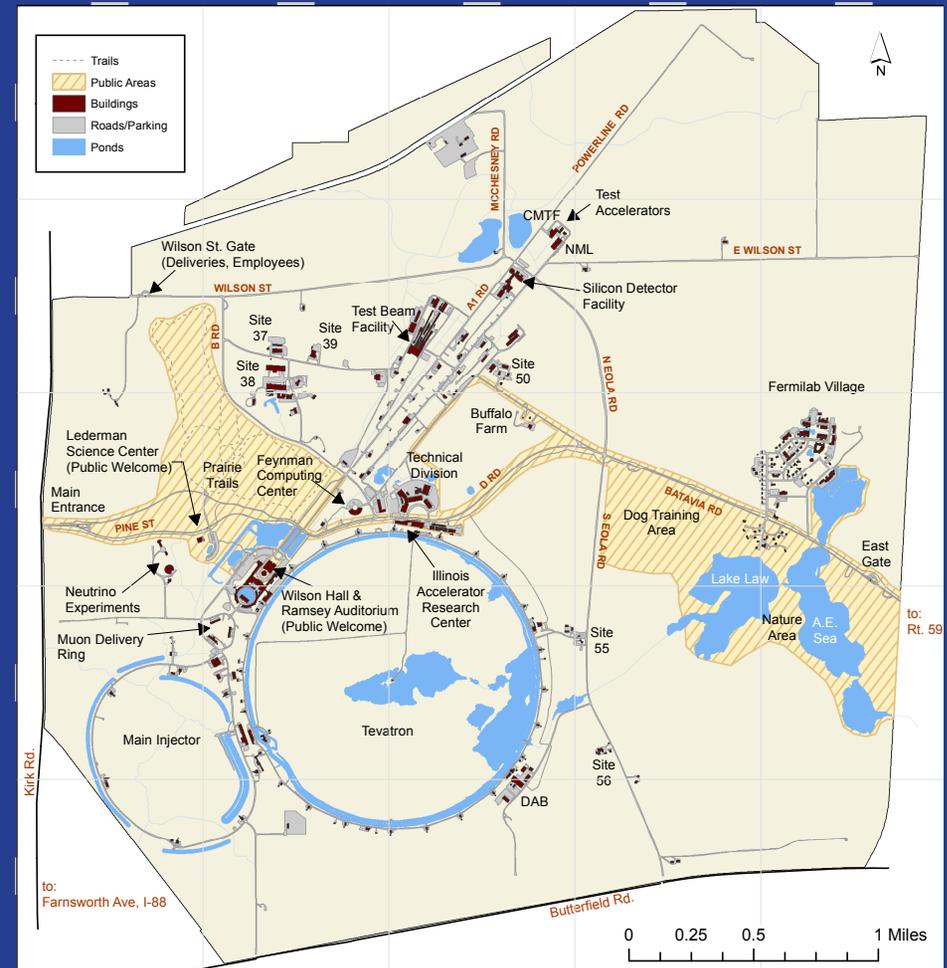
I am reporting on the accomplishments of the many individuals and organizations of the Fermilab Computing Sector,

Please credit them with all the accomplishments and assign to me any misunderstandings.

Fermilab

Some quick facts about Fermilab:

- We are located in Batavia, IL (~45 miles/~60 km west of Chicago).
- Is the premier US based HEP lab,
- Provides services to the US HEP program,
- Hosts experiments in the Energy, Intensity and Cosmic frontiers,
- Is a strong collaborator with the Open Science Grid (OSG) and the World-wide LHC Computing Grid (WLCG),
- Hosts the US Tier 1 facility for the CMS collaboration,
- Is the home of Scientific Linux.



Selected Organizational Changes since May 2014

Rob Roser confirmed as CIO.

Panagiotis Spentzouris was appointed head of the Scientific Computing Division on 2-Sep-2014.

- Panagiotis has appointed three area coordinators:
 - Jim Kowalkowski (R&D and Architecture),
 - Burt Holzman (Facilities),
 - Oliver Gutsche (Science Workflows and Operations)
- Adam Lyon has been appointed as the new head of the Systems for Scientific Applications quadrant

Computing Facilities

FCC:

- The FCC3 computer rooms continue to operate without any disruptions since commissioning in December 2010,

GCC:

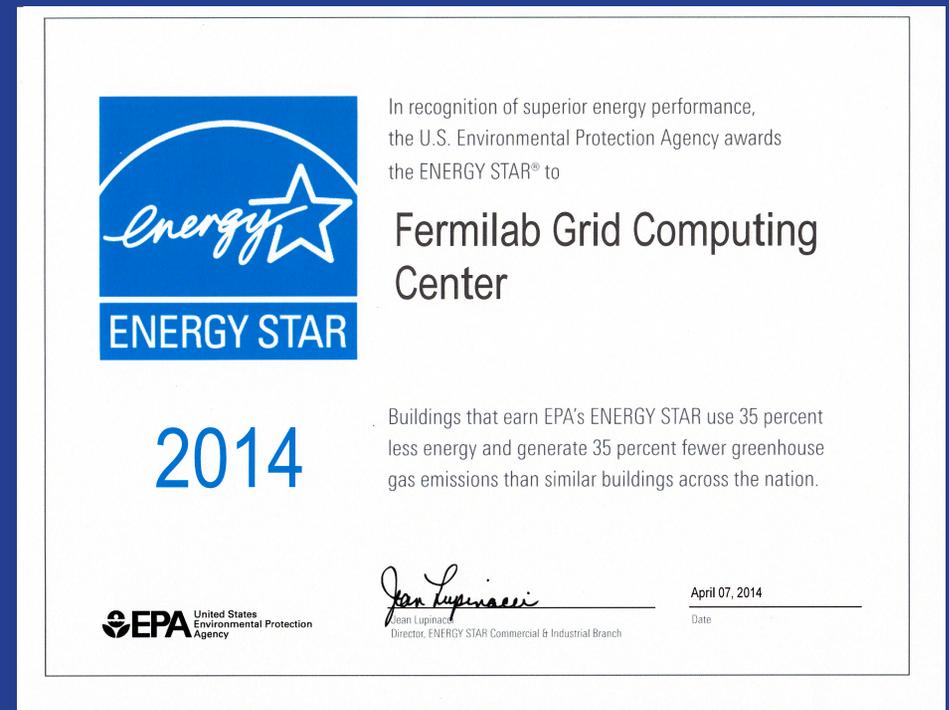
- No further issues with cooling now that the condensers are located on the roof of the building (also helped by a very "mild" summer).

LCC:

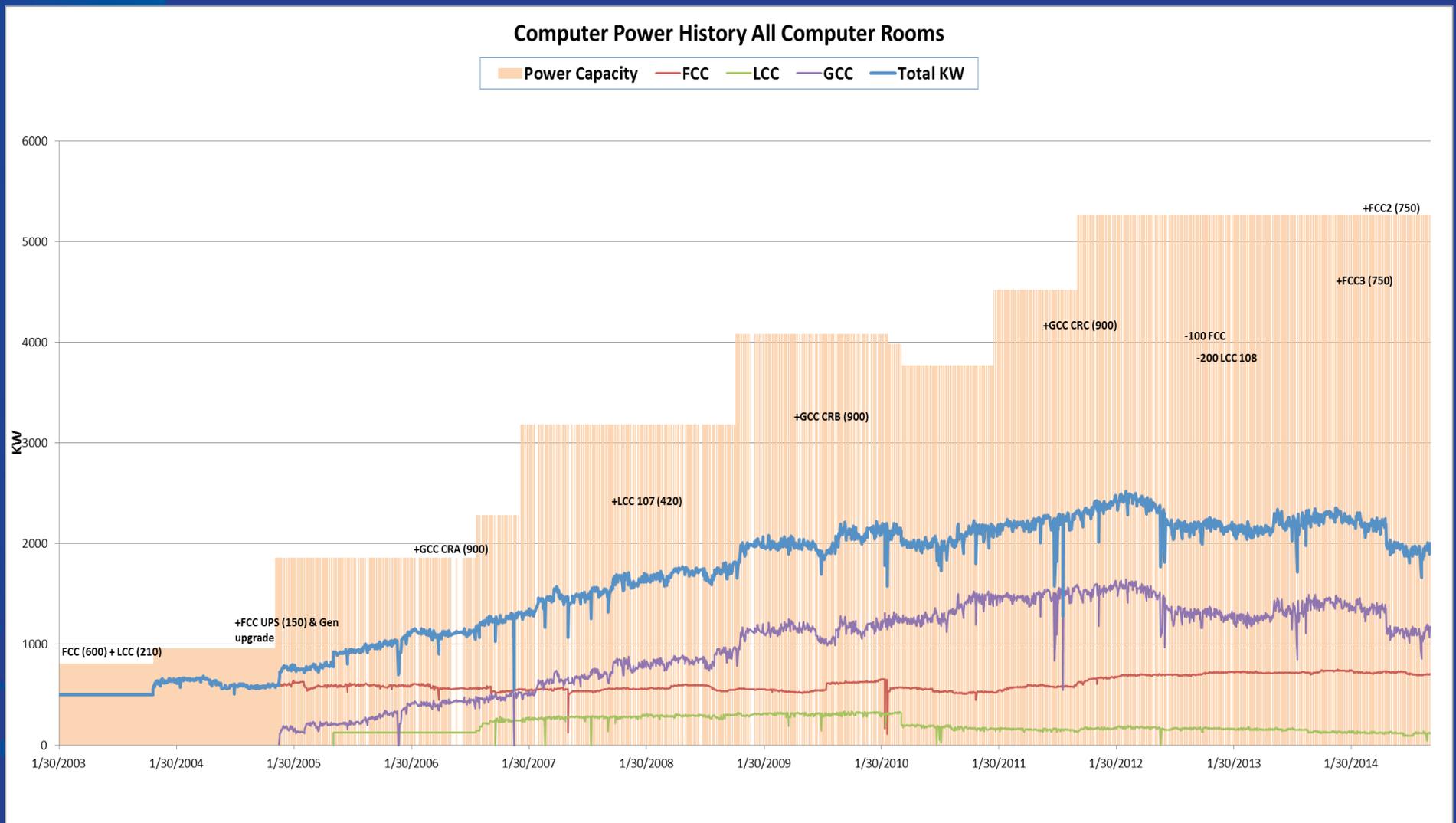
- LCC had >99.9% uptime.

The GCC computer center received an energy star certificate for 2014.

- This is the fourth year in a row that this building has received the award.



Computing Center (Power) Capacity and Utilization



GCC Cooling Upgrade has been Completed



ISO 20K / ITIL Service Management

Our current focus are the preparations for our Formal ISO20K Audit later this year,

- Performing self audits across the various ITIL roles,
- Will be performing a disaster “table top” exercise next week,
- Reviewing and updating our procedures & documentation.

Three new service areas are in the process of being fully onboarded to ISO20K:

- Facilities,
- Scientific Collaboration Tools,
- Scientific Computing Systems.

All other service areas are being onboarded to “ITIL-lite”:

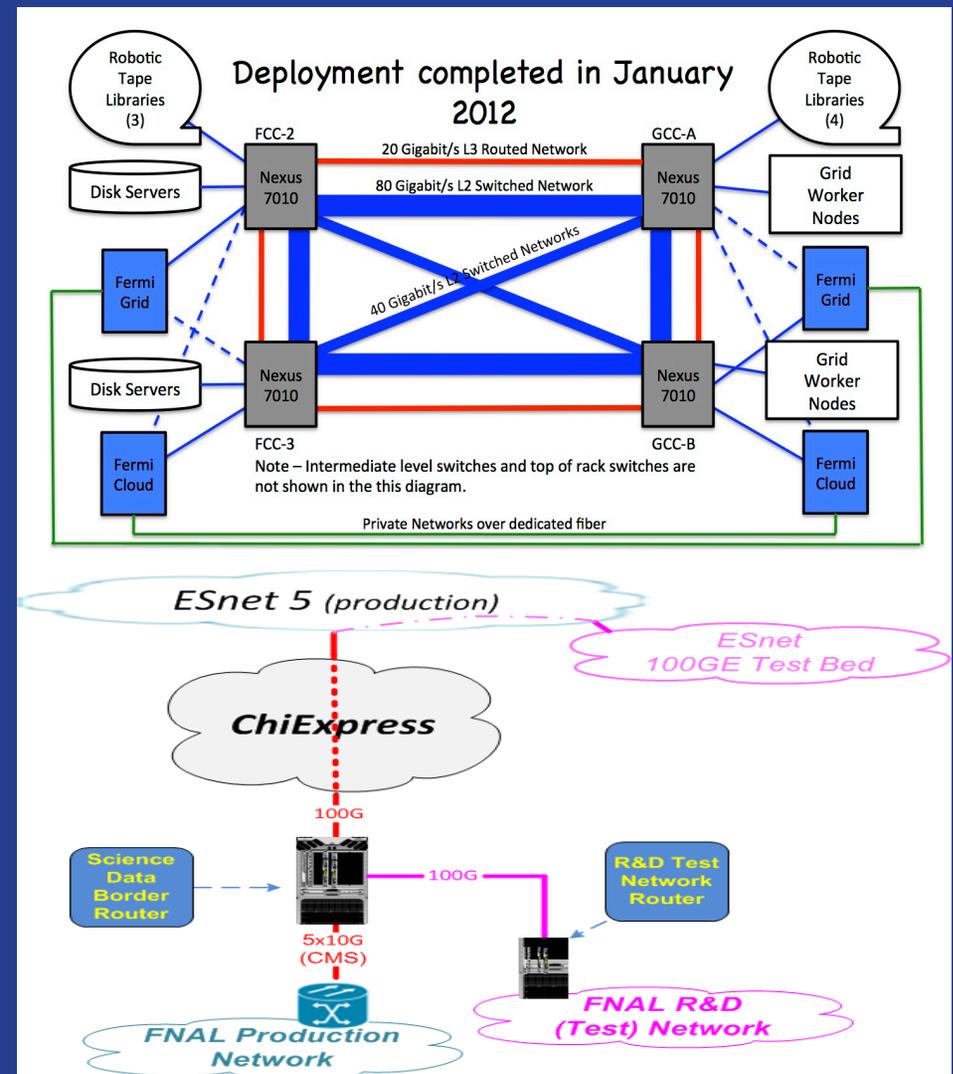
- Incident, Problem, Change, Foundation SLA.

Network

The offsite network links were moved from the ESnet CHIMAN 10GE network to the new ESnet ChiExpress 100GE infrastructure on Friday 9-May-2014.

The reorganization of the IPv6 and the 100 Gb/s testbed continues,

- Slow progress since enhancements and maintenance of the production network takes priority.



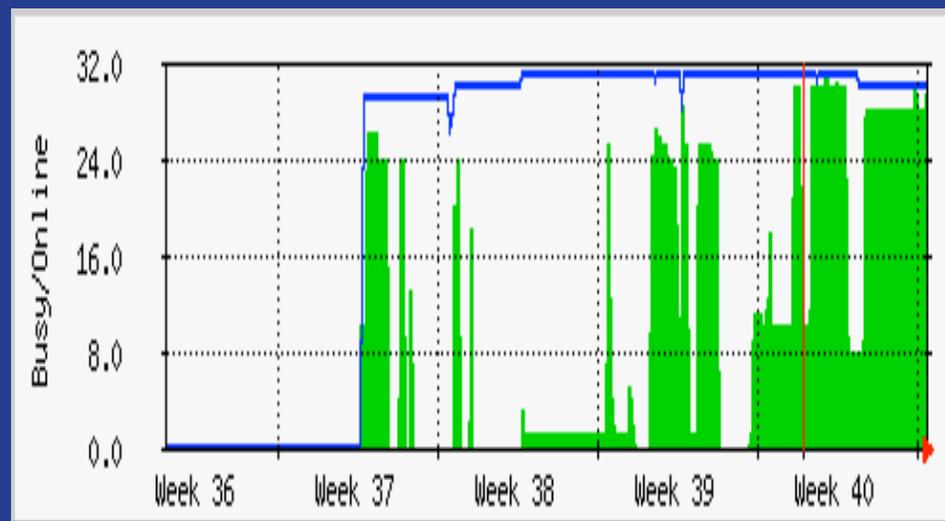
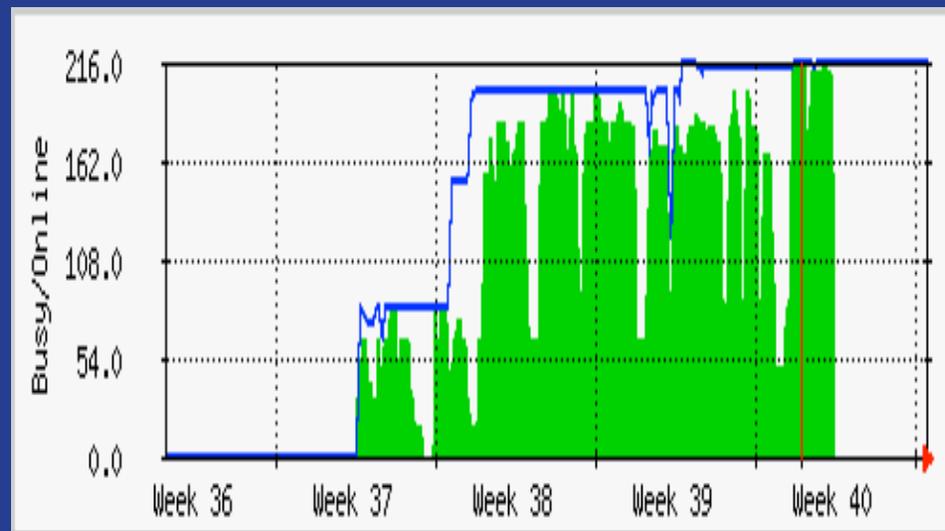
HPC & Lattice QCD

“Hybrid” HPC Cluster Acquisition:

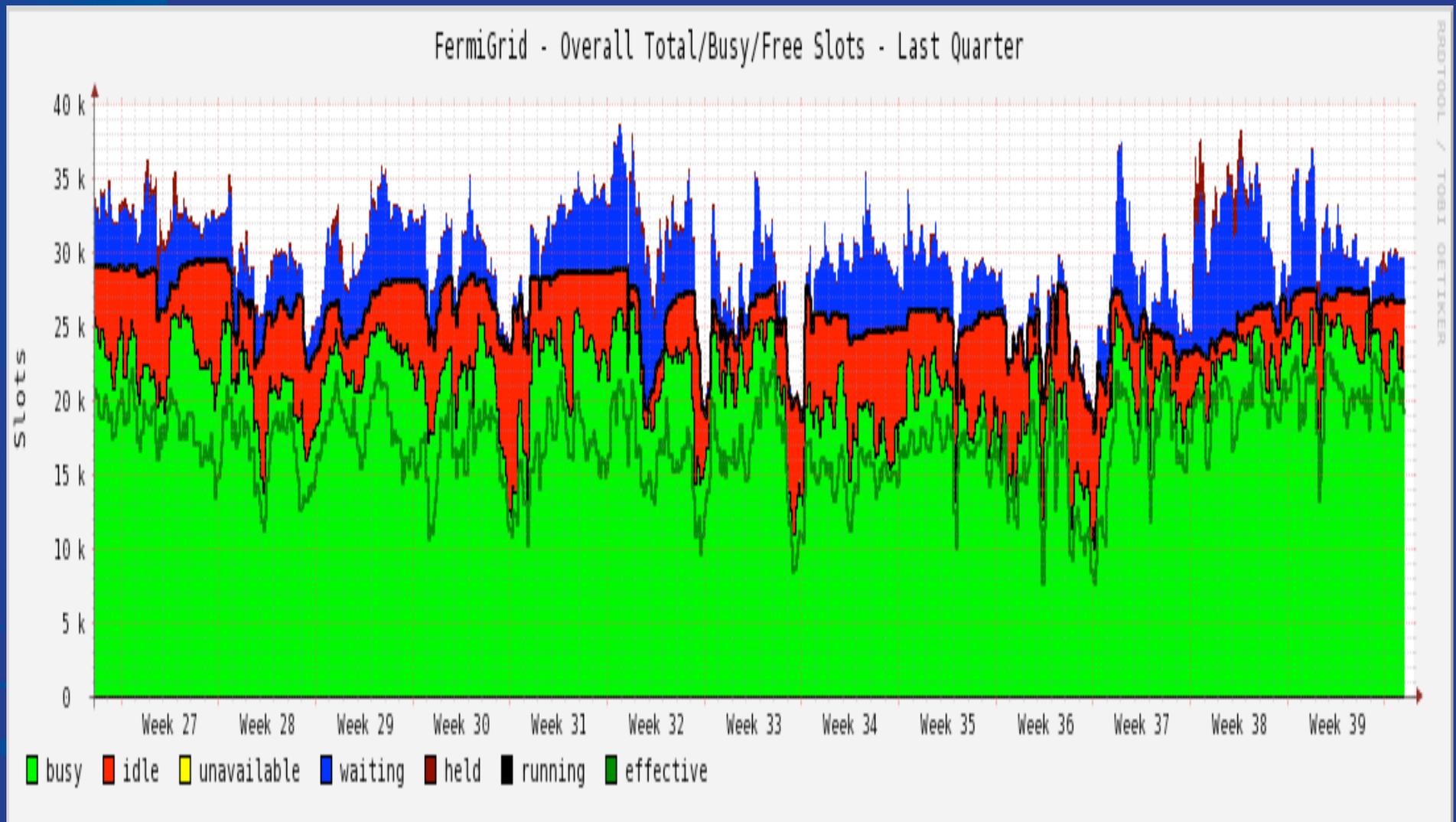
- ≥ 10 TF sustained performance Conventional,
- ≥ 29 TF sustained performance GPU,

Acquisition completed and hardware delivered,

- **Conventional – 212 systems**
 - Dual Intel E5-2650v2 2.6GHz 8-core processors with 128 GB of system memory,
- GPU – 32 nVidia K40,
- Underwent “friendly” user testing for ~1 month,
- Conventional portion released to production on 10-Oct-2014.



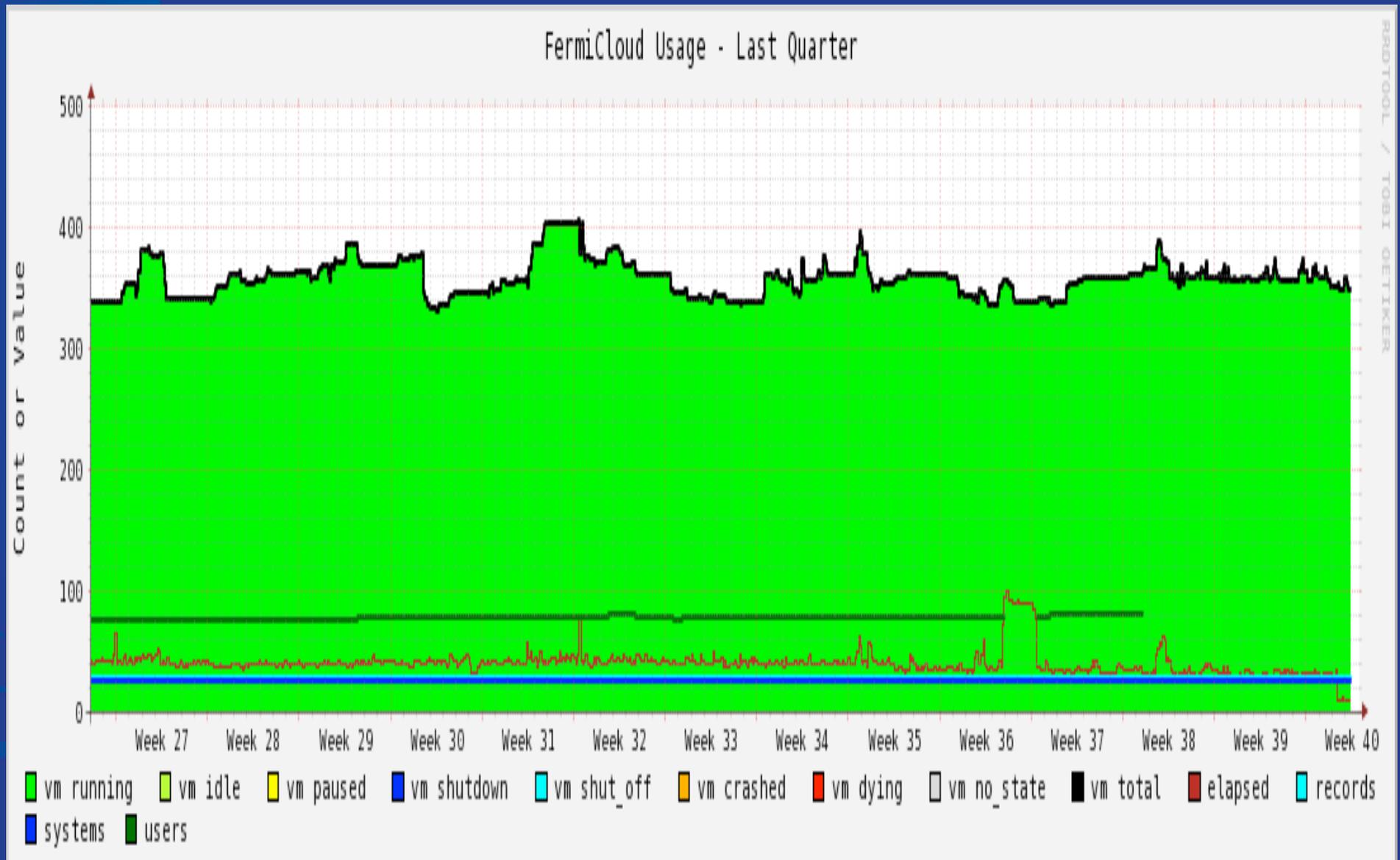
Fermilab Campus Grid Utilization



Current Fermilab Campus Grid Statistics (as of Oct 2014)

Cluster(s)	Batch System	Job Slots	Raw Occupancy	Effective Utilization
CDF	HTCondor	3,562	83.0%	65.5%
CMS T1	HTCondor	12,179	96.8%	92.7%
D0 (Merged)	PBS	4,400	61.8%	39.8%
GP Grid	HTCondor	7,595	84.3%	65.9%
_____		_____	_____	_____
Overall-Today		27,712	84.1%	71.1%
Spring 2014 HEPiX		30,257	79.1%	59.4%

FermiCloud Utilization



FermiCloud

Has successfully tested VM launching on Google Compute and Microsoft Azure Clouds,

- Have specific “recipes” for each.

Is being used to support “custom” Grid worker nodes for specific VOs,

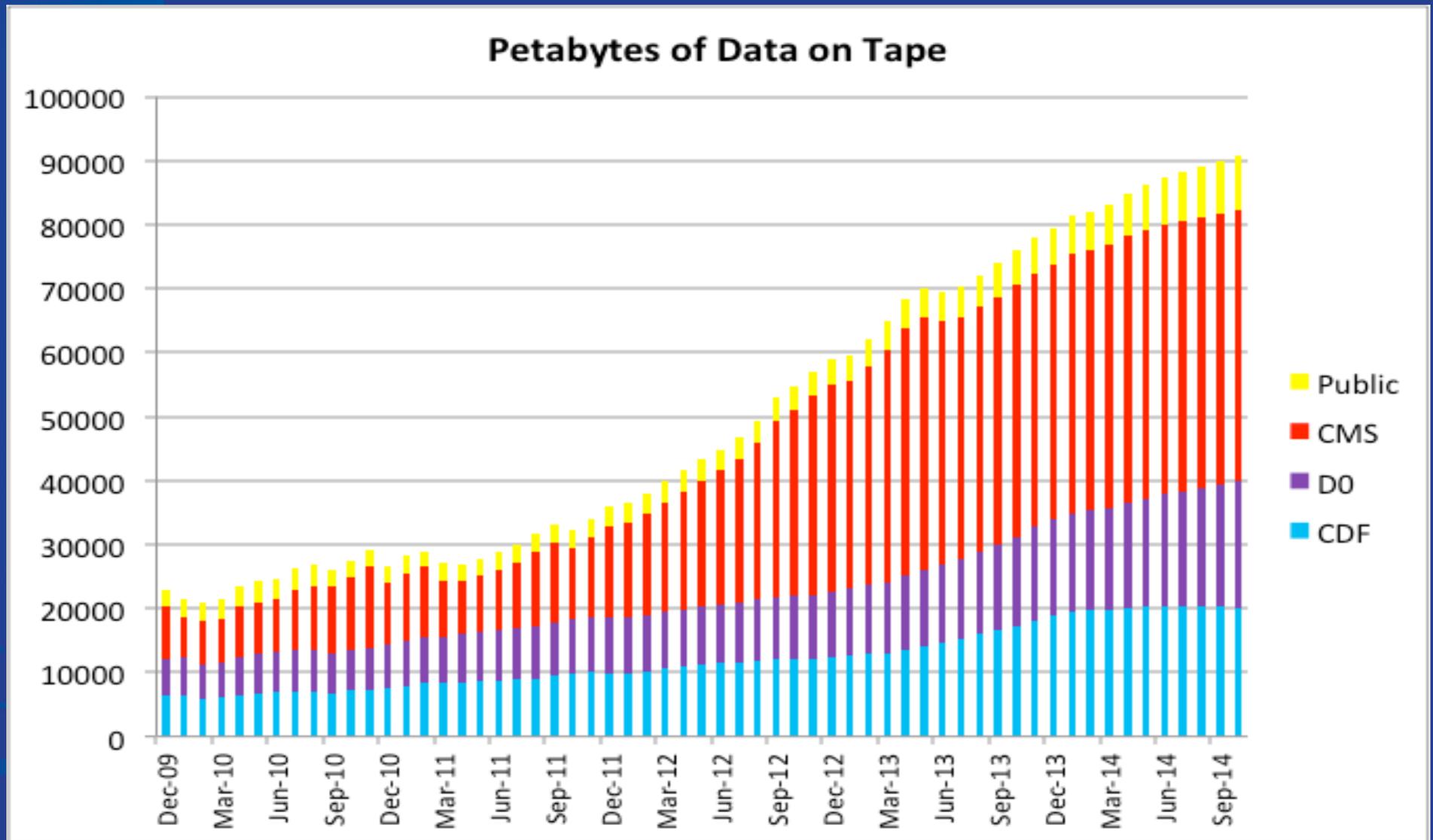
- Typically larger memory allocations, disk partitions, or multi-core jobs.

1000 VMs “en mass launch” test under OpenNebula 4.8,

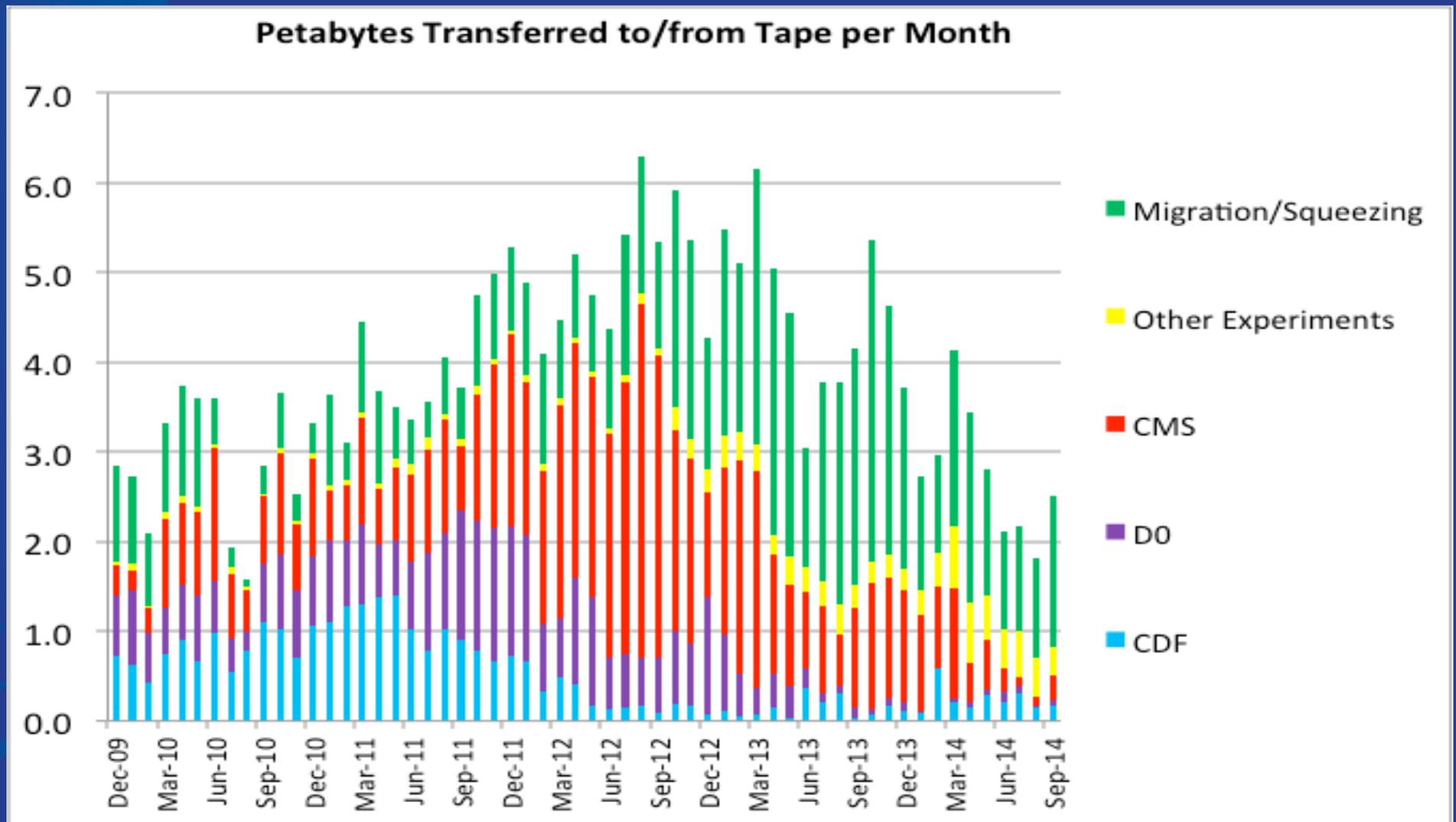
- 1000 VMs deployed sequentially with a sleep 1 between each launch,
- 998 VMs successfully deployed,
- 2 VMs went to FAIL state for a libvirt error.

Currently setting up for a “1000 VM” hybrid cloud test with VMs deployed on FermiCloud and Amazon EC2.

Enstore - Data on Tape



Petabytes to/from Tape per Month



Other Storage News

D0 is looking at moving to dCache,

- A test dCache instance has been deployed for D0.

LTO4 Migration:

- CDF has been migrated off of LTO4,
- D0 is 80% migrated.

CNAF is copying ~5PB of CDF data to their storage system as part of Run II data preservation activities.

FY2014 purchases that will soon be deployed

1920 cores (30 nodes) for the GP Grid cluster:

- Quad core AMD Opteron 6376 – 64 cores per system,
- 128 GBytes of DDR3-1600 ECC Registered memory per system,
- Storage per system:
 - 2 TByte, 7200 RPM “system” disk (Hitachi),
 - 4 TByte, 7200 RPM “data” disk (Hitachi).
- 5 year warranty.

2 PB public dCache:

- 7 x Nexsan E60VT with 60x6TB disks

6 PB CMS (split across dCache and EOS) disk:

- 21 x Nexsan E60VT with 60x6TB disks

Some amount of >5 year old disk being retired.

Notable Security Events

Shellshock vulnerability:

- `env X="() { :; } ; echo vulnerable" /bin/bash -c "echo completed"`
- Patches for SL(F) [5,6,7] and MacOS X distributed.

Apple OS X Yosemite removed DES encryption:

- Fermilab Kerberos update deployed on 11-Oct-2014,
- Cryptocards have been retired and replaced with RSA SecureId Tokens,
- Will shortly be upgrading the Fermilab KCA to support SHA2.

We have had a couple of occurrences of Norton Internet Security (home/personal version) blocking access to the FNAL.GOV domain,

- The FNAL Web Team pushed out an 'attribution' file to validate ownership of the domain.

P5 Report

The Particle Physics Project Prioritization Panel (P5) report was issued in late May 2014:

- http://science.energy.gov/~media/hep/hepap/pdf/May%202014/FINAL_P5_Report_Interactive_060214.pdf

Fermilab is taking the necessary steps to implement the recommendations for Fermilab and the community in the report.

In particular, the Long Baseline Neutrino Experiment (LBNE) is seeking international involvement and collaboration. If you or your institution is interested in participation, please contact Fermilab!

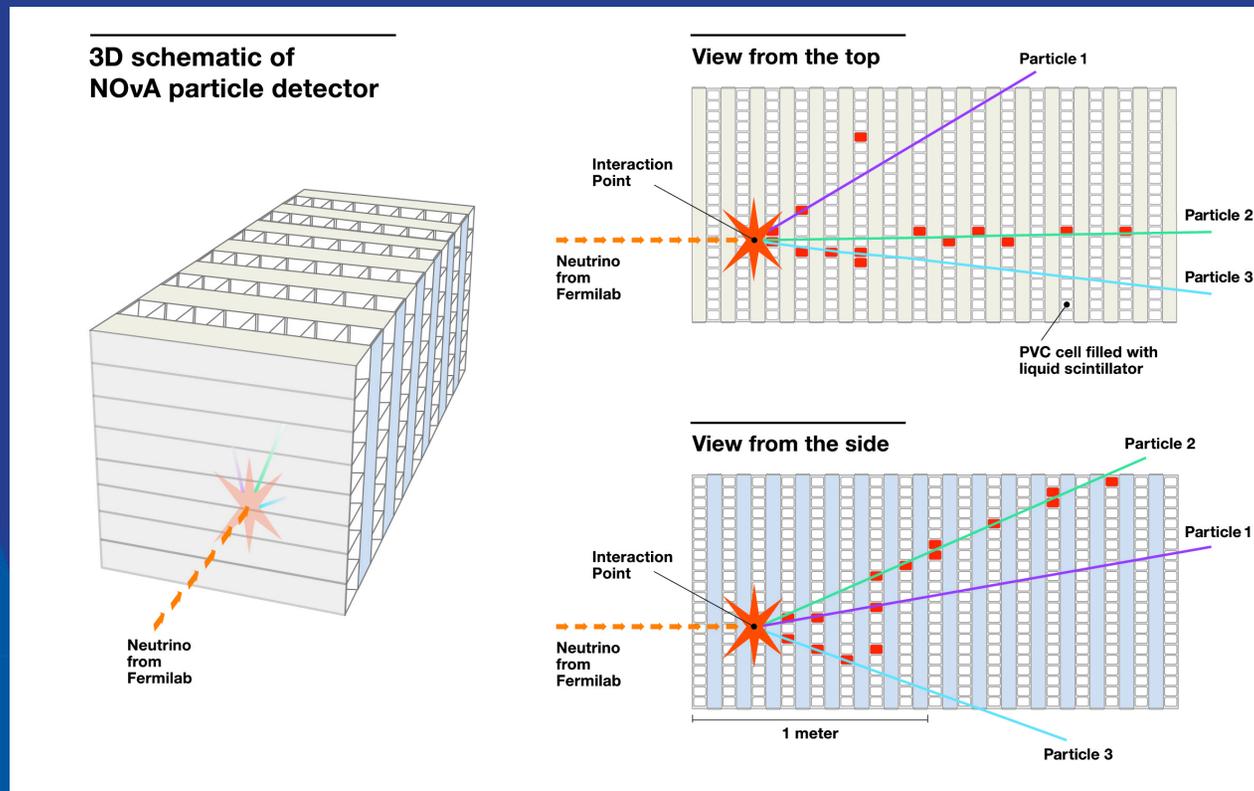
New ROC West



NOvA

Running as of 6-Oct-2014!

- http://www.fnal.gov/pub/presspass/press_releases/2014/NOvA-Running-20141006.html

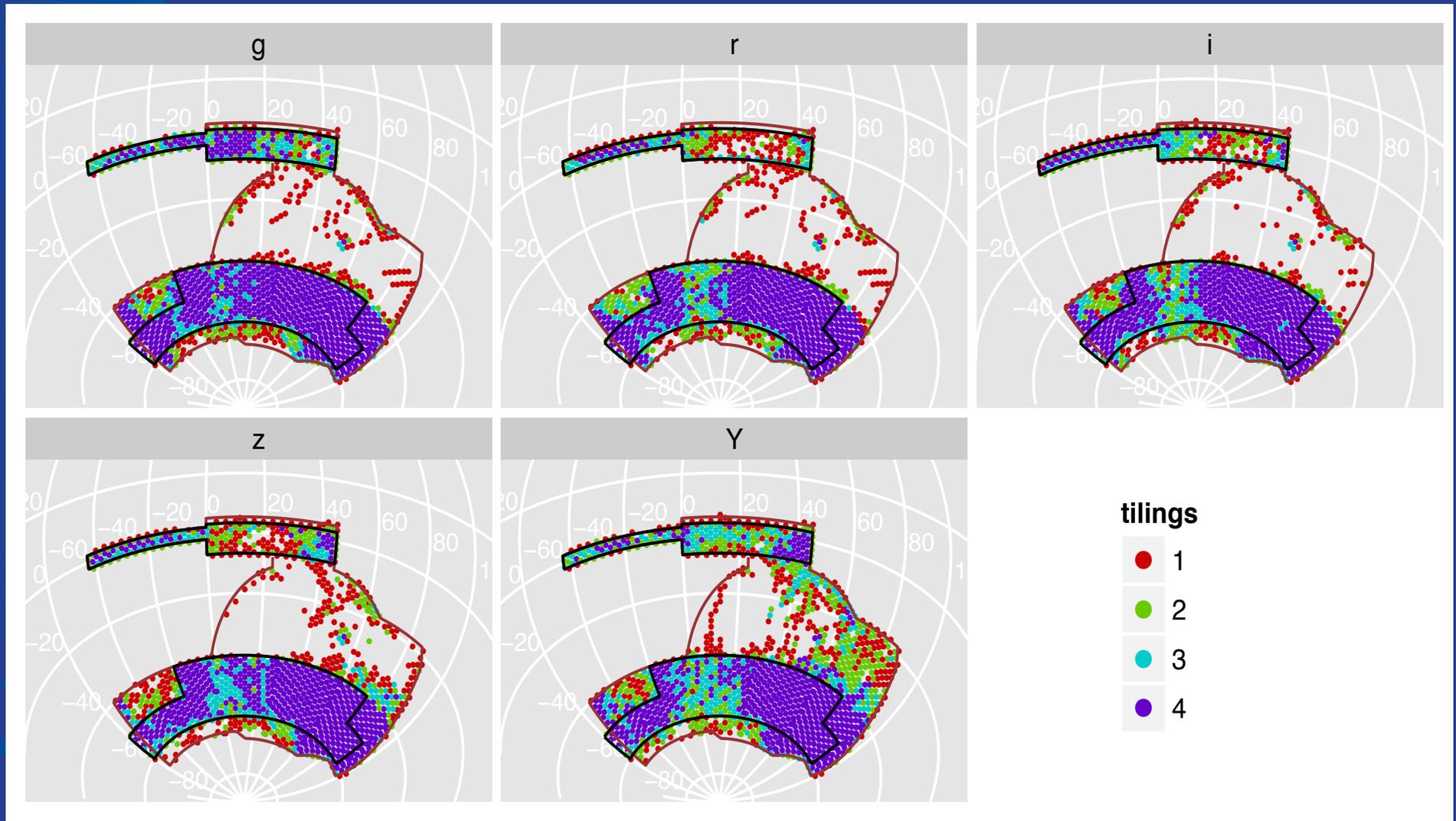


Muon g-2 Magnet has been installed in the new building

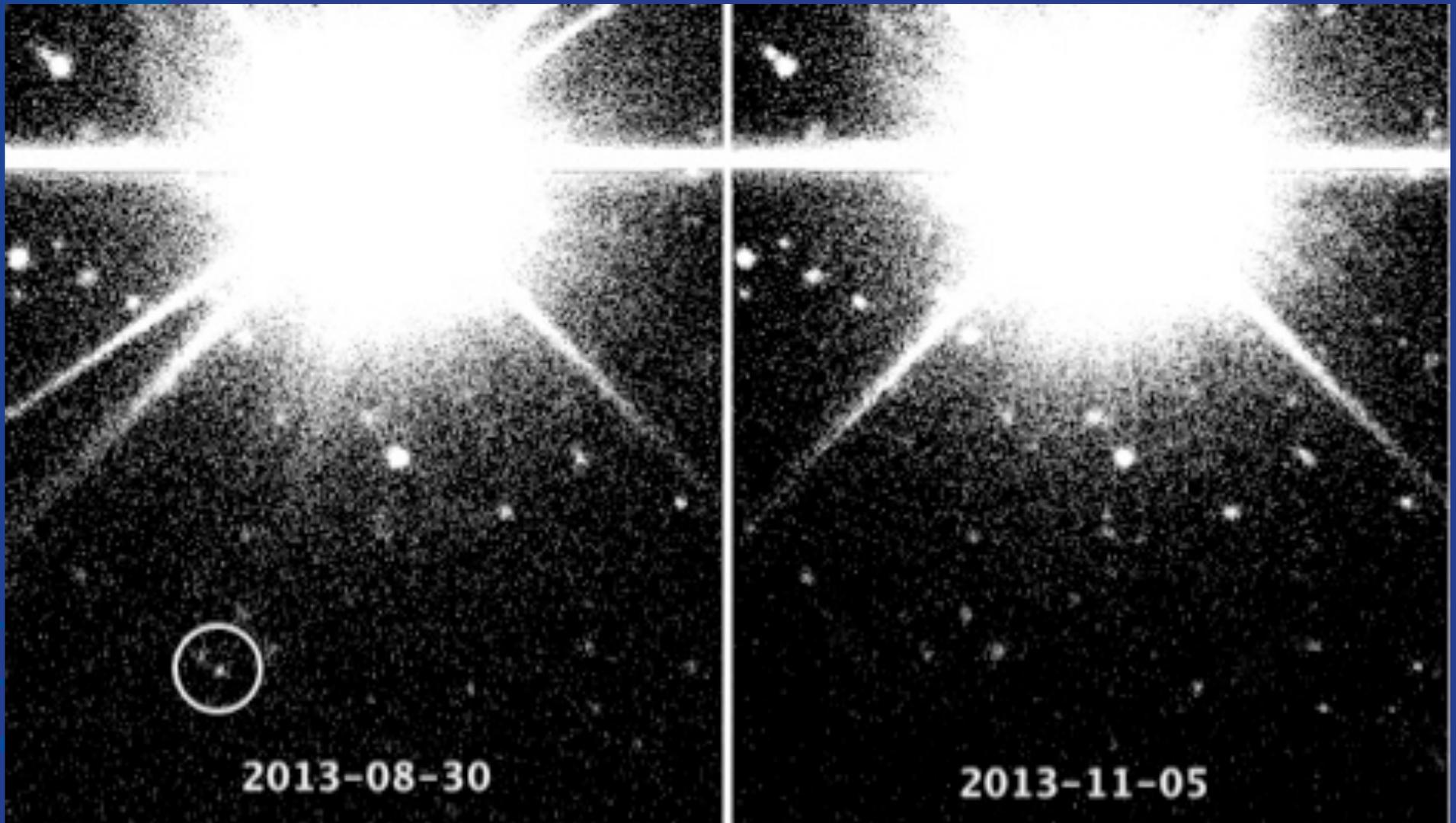


Data taking is scheduled to start in March 2017!

DES is making progress on the survey footprint...



DES discovers new trans-Neptunian objects



Other Notable Items - 1

Human Capital Management Upgrade -
Replaced various home grown solutions with
Workday Cloud Service,

- Lots of effort...
- Went live on 30-Jun-2014,
- Additional integrations (retirement, medical, dental, etc.) are in process.

Kronos (Time Reporting) Upgrade -> latest
release of Kronos.

Other Notable Items - 2

SharePoint 2010 -> SharePoint 2013 (aka "fermipoint.fnal.gov"),

- Mostly completed, but some site migrations are still pending,
- Original completion target was 30-Jun-2014,
- Small number of sharepoint sites waited for latest release of meeting workspace tool,
- New target date is 22-29 October, 2014.

DOE announced that they were ended funding for ReadyTalk teleconferencing on 30-Sep-2014:

- Fermilab has reviewed the potential options...
- Will purchase necessary ReadyTalk "licenses" for FY2015,
- Will not extend ECS VideoConferencing services,
- Actively investigating VOIP and other Unified Communications options.

Other Notable Items - 3

We are in the process of performing a "Software Quality (Risk) Assessment (SQA):

- Commercial Off-The-Shelf (COTS),
- Open Source,
- Custom

The assessment includes both business and scientific software,

Applications are being rated as [Low, Medium, High] risk based on various factors,

Factors that are going into the assessment include:

- Source code availability?,
- If the software is being tracked by a version control system (such as CVS, Subversion, Git, etc.)?,
- Are the software change and release processes being managed by the Computing Sector ITSM Change Management process, or other (typically experiment specific) Change Management process?

Other Talks from Fermilab

Scientific Linux current status update

- Pat Riehecky

Puppet at USCMS-T1 and FermiLab - Year 2

- Tim Skirvin

Fermilab Representative to the HEPiX Board

With this meeting, my tenure as the Fermilab representative to the HEPiX Board has come to an end.

Rennie Scott <rennie@fnal.gov> will be assuming this responsibility going forward.

Summary

It is an exciting time to be supporting science at Fermilab!

Science Drivers

- Higgs
 - Neutrinos
 - Dark Matter
 - Dark Energy
 - New Particles
-
- ```
graph LR; Higgs --> Energy; Neutrinos --> Energy; Neutrinos --> Intensity; Dark Matter --> Intensity; Dark Energy --> Intensity; Dark Energy --> Cosmic; New Particles --> Energy; New Particles --> Cosmic;
```

## Frontiers of Science

- Energy Frontier
- Intensity Frontier
- Cosmic Frontier

There is no danger of running out of work supporting and extending the computer systems and services that support science at Fermilab.

# Another Lunar Eclipse on 8-Oct-2014 *(photo courtesy of Marty Murphy, AD)*



Thank You!

Any Questions?