



Scientific Computing Division

James Amundson

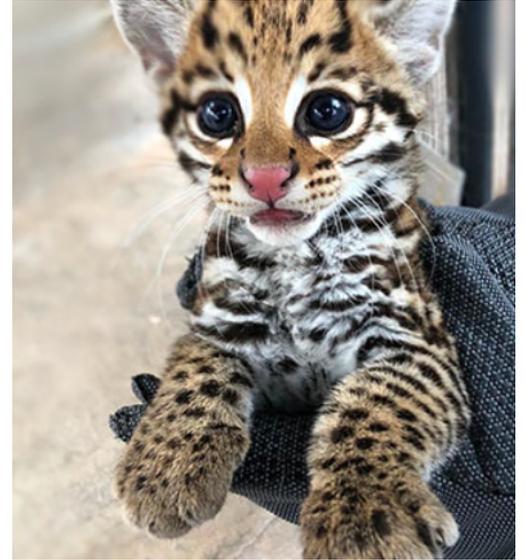
Joint CIO/CRO All-hands Meeting

2019-04-30

Focus: Where we are and where we are going

- Oversight committees
 - SCPMT
 - ICAC
- Strategic directions: responding to recommendations
- One strategic change: Scientific Linux

... also: safety and diversity are not only integral to our mission, they are also integral to this presentation



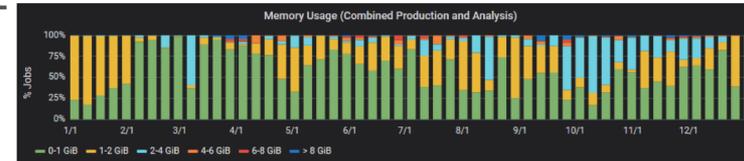
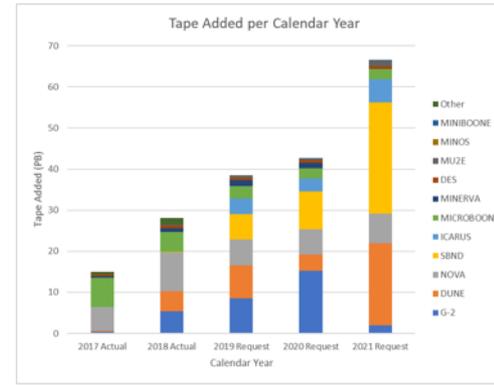
Baby ocelots are more visually interesting than oversight committees

Nigel's Top 5

- Stay focused on upping performance to the highest level
 - Safety, Projects, Operations and Business systems
- PIP-II to be baselined late summer
 - Technical progress is impressive and partnering is going well
- LBNF/US-DUNE to be baselined late this year
 - Work in South Dakota has started in earnest
 - DUNE is proceeding well and ProtoDUNE a huge success
- CMS Detector Hi-Lumi upgrades: Goal is CD-1 in October
 - Congratulations on CD-2 for AUP
- Mu2e Project team must stay focused
 - Production solenoid winding is underway

2019 SCPMT Review February 25-56

- Scientific Computing Portfolio Management Team
- Committee: Lothar Bauerdick, Pushpa Bhat (Chair), Brian Bockelman, Taylor Childers, Ian Fisk, Kate Scholberg
- <https://indico.fnal.gov/event/18685/>
- Division Presentations:
 - Conventional Resources and Requests
 - HPC Resources
 - Service Requests
- Liquid Argon Experiments: DUNE, MicroBooNE, ICARUS, SBND
- Other Neutrino and Muon: NOvA, Muon g-2, mu2e, “everybody else”
- Externally funded experiments: CMS, DES, LSST



SCPMT Charge

- Scope: Computing and Detector Operations funded activities
 - not Cosmic, not CMS, not SciDAC, etc.
- Priorities
 - We ask the committee for comments on priorities of support
 1. Are the lab / P5 priorities satisfied?
 2. Are the needs of the major experiments met?
 3. Are there low priority efforts that should be discontinued?
 4. We have expressed the effects of our plan in terms of risks; are the risk mitigations appropriate?
 - In an era where funding is diminishing at the same time needs are growing, we need to have a clear set of priorities
 - We ask for the committee's guidance on support for
 - The current experimental program
 - The future experimental program
 - ... and the balance between the two

ICAC

- Our new **I**nternational **C**omputing **A**dvisory **C**ommittee
- Ian Bird (**CERN**, chair), Peter Clarke (**University of Edinburgh**), Suchandra Dutta (**Saha Institute of Nuclear Physics**), Peter Elmer (**Princeton**), Eric Lancon (**Brookhaven National Laboratory**), Michel Jouvin (**LAL, Universite Paris-Sud and CNRS/IN2P3**), Margaret Votava (**FNAL**, secretary)

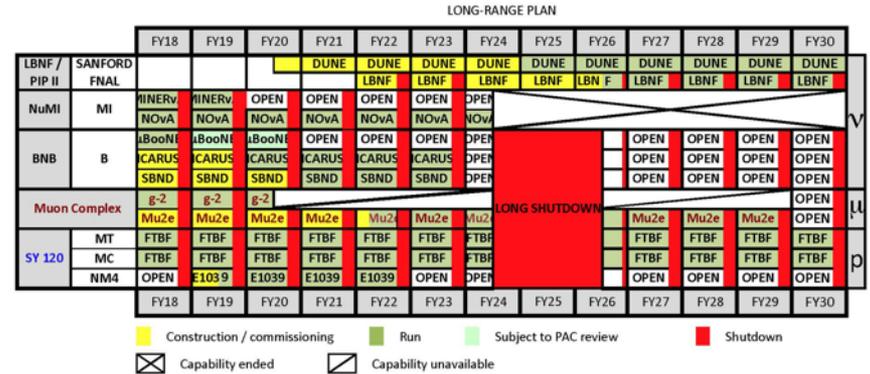


ICAC Review March 15-16

- Inaugural Meeting of the International Computing Advisory Committee
 - <https://indico.fnal.gov/event/20100>
- Charter: The ICAC
 - Reviews and Advises the laboratory on:
 - computing operations,
 - cyber security,
 - upgrade plans, and
 - software and computing R&D aimed towards
 - the development and exploitation of future facilities
 - as well as advancing scientific tools and methods in general
 - Monitors progress with respect to the established laboratory objectives, currently encompassing:
 - Software and Computing for the Intensity Frontier Experiments;
 - Fermilab's involvement in the HL-LHC Software and Computing Upgrades;
 - Progress toward common solutions for the above domains;
 - National and International cooperation and collaboration with partner institutions;
 - The ICAC is expected to address high-level strategic, programmatic, and planning issues, rather than specific implementation details.

ICAC Presentations

- Introductions
 - Computing Sector
 - Scientific Computing
- Strategy
 - HPC Strategy & US Exascale Program
 - International Cooperation Strategy
 - Cyber Security and Other DOE Mandates
 - Future Facility Plans
 - Local Operations Review (SCPMT)
 - Software and Computing R&D



SCPMT Recommendations

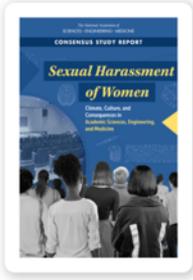
- 1. Improve the SCPMT template by reexamining the technical metrics.** Make the responses available in advance to provide more time for discussions with experiments and of SCD's action plan. Have larger projects outline their computing models and methods used to estimate the requested resources.
- 2. Improve efficiency of managing resources allocated to the experiments by developing well-defined policies for CPU performance and storage. Enforce policies via automated quotas and allocations. Develop tools to incentivize users who follow the policies.**
- 3. Facilitate onboarding of the experiments and reduce the long-term direct support.**
- 4. Storage resources and usage need a sustainable philosophy.** An example would be the NAS, which, as implemented, has led to dependence on expensive and old technology. The absence of high performance solutions has forced the experiments to use expensive storage systems in an inefficient way.
- 5. Continue efforts to develop and implement common tools across frontiers.**
- 6. In light of constrained budgets, no flexibility remains for identifying and updating current services and infrastructure. To be a sustainable enterprise, SCD should identify 5% of its budget that can be used for R&D activities toward future hardware/software advances.**

ICAC Recommendations

(Excerpts)

- **Look at ways to speed up adoption of federated identity** use as a building block of collaborative services, particularly needed for DUNE.
- **DUNE should be encouraged to draft a computing model**, in order that Fermilab (and other sites) can plan their facilities.
- **Fermilab should have a plan for how it becomes an international laboratory for DUNE**, what collaborative tools will be provided, etc. The plan should clarify the responsibilities of Fermilab as a host lab, and as part of the computing model.
- **The future storage strategy requires particular attention.** In particular, a vision and a roadmap is needed to address the needs in the Public cluster and a plan should be elaborated to address concerns over the sustainability of Enstore, possibly by adopting a solution with greater support in the community.
- **Within SCD we recommend that CMS and other projects should be less stovepiped.** This is a source of duplication of effort and inefficiency. This must be avoided for DUNE. Facilities and services should be as far as possible common across supported experiments, focusing on function rather than specific requested solutions. We encourage the computing management to continue to re-evaluate the **organisational** structures in the light of constrained resources and with an eye to the evolving needs of the lab and the experiments.

Diversity is integral to our mission



Sexual Harassment of Women

Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine

<http://nap.edu/24994>



Two contributors discussed the report at Fermilab in March.

Report Findings and Conclusions

3. **Environments with organizational systems and structures that value and support diversity, inclusion, and respect are environments where sexual harassment behaviors are less likely to occur. Sexual harassment often takes place against a backdrop of incivility, or in other words, in an environment of generalized disrespect.** A culture that values respect and civility is one that can support policies and procedures to prevent and punish sexual harassment, while a culture that does not will counteract efforts to address sexual harassment.
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We need to interact with each other in a respectful and professional manner.

Tolerating incivility is not a virtue.

Safety is integral to our mission

- Office Enterprise Assessments Work Planning and Control Review February 11
- Review scope did not include SCD, however...

Error Precursors

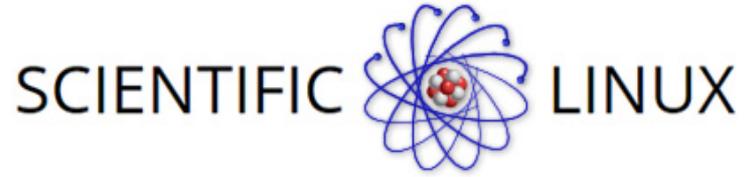
1. Time pressure
2. Assumptions
3. Unexpected equipment conditions
4. Complacency/overconfidence
5. Changes/departure from routine

Just because we do not have as many safety challenges as some at Fermilab does not mean we can become complacent.

SCD Response to Recommendations: Moving Forward

- We have to be able to change as circumstances change
- We have far more projects to do than people to do them
 - Some existing efforts will be scaled back in order to allow people to work on new projects
- Senior management is wrestling with ways to organize efforts to support new projects
 - Feedback from everyone involved will be necessary in the near future

Scientific Linux – Moving to a New Era



- Scientific Linux has been a tremendous success
- Circumstances have changed
 - CentOS now provides a viable free distribution similar to Scientific Linux
 - CERN was our partner on earlier versions of Scientific Linux, but has since switched to CentOS
- Scientific Linux 6 and 7 will continue to be maintained until their designated end of lives
- CentOS 8 will form the basis of our next computing platform 
 - SCD will maintain its extensive Linux expertise and collaborate with CERN and CentOS developers
- **Thank you to the Scientific Linux Team!**
 - Pat Riehecky, Bonnie King, Farhan Ahmed, Scott Reid, Rennie Scott, Glenn Cooper
 - Connie Sieh and Troy Dawson (emeritus)

SCD Response to Recommendations: Goals and Priorities

- Strategy (labeled, not ordered)
 1. Be the leader in data management and storage
 2. Be the leader in access to heterogeneous computing
 3. Be the center of core software development
 4. Be the center of HEP scientific software R&D
 5. Be the leader in HEP AI/ML R&D
 6. Be the leader in DAQ integration
 7. Provide the home for physics analysis
- Some high-priority projects (not ordered!)
 - GitHub (3)
 - Rucio (1)
 - New Framework (3,4)
 - LArSoft (4)
 - HEPCloud (2)
 - Storage Systems (1)
 - Institutional Cluster (2)
 - Spack infrastructure (3)
 - SpackDev (3)
 - GeantV (4)
 - AI/ML (5)
 - Container management (2,3)
 - Monitoring (1,2)
 - Root (1,4,7)

Thank you!
Questions?