



Computing Division General Run 2 Support

CD Mission:

FNAL-CD provides computing resources and services to help accomplish the laboratory's scientific mission.

It supports networking, shared facilities, personal computers and other specialized facilities which not only directly support the scientific program, but also provide support for many of the engineering, technical and administrative needs of the lab.

CD support for Run 2 needs to plan for > 3-5 years.



Computing Division Support for Run 2 Computing includes Services:

- Safety and Security
- Infrastructure for Data Collection, Handling and Access: (Mass) Storage, Data Processing, Databases, Data Handling, Central Analysis Facilities, Maintenance and repair,
- Infrastructure for Applications - reconstruction, analysis, online, development - compilers, build tools, debuggers, profilers, analysis tools, database application infrastructure, simulation tools and event generators
- User Services - helpdesk, documentation, data center services support, licenses
- Collaborative tools - video conferencing, web pages and services
- Online Components



Services in Support of Run 2

- High Availability Core Services. Central on-call and system monitoring facilities.
- Ongoing maintenance, replacement and upgrade of the infrastructure - hardware and software
- Support for performant data taking and maintaining throughput of offline processing and analysis. Networks, LAN and WAN connectivity
- Test and development systems.
- Tracking, evaluation and deployment of new technologies, new computing models in collaboration with experiment evolving requirements.
- Experienced and expert help for troubleshooting, fire-fighting any system or application



Other Support for Data Processing and Analysis in collaboration with the Experiments:

- Persistence in knowledge of critical components to handle turnover in experiment personnel - e.g. graduating students; postdocs.
- Provide programmatic and "on demand" training, documentation, software validation, trouble shooting
- Encourage documentation and hold reviews to maintain awareness of longevity of the Experiments and systems.
- Encourage dissemination and presentation of technologies with our peers, sponsor workshops e.g. root, SC.



Process: Run 2 Operations MOUs

- **Security & Safety**
- **Computing Services**
 - Email
 - Backup
 - Networks
 - Printing
 - Strong Authentication
 - Data Center Operations
 - User Support and Account Management
 - Hardware Installation and Maintenance Support
 - Maintenance Contracts and Licenses
 - OS Certification
- **Experiment Specific services**
 - Central Analysis System
 - Code Management
 - Data Handling Operations
 - Databases
 - Offline Desktop Systems
 - Event Data Model
 - Production Farms
 - Application Frameworks
 - Analysis Frameworks
 - ProductionExe Program
 - Online & Monitoring and Control Systems

MOU first pass completed in Jan 2001.
Will revisit within 2 years.
To date has adequately modeled the needs.



Definitions and Standards to aid in Support Process

- ***Standards and Recommendation***
 - Service and Support Levels
 - Communicating Computing Issues to the Users
 - Linux Support Policy
 - Certified UNIX Operating Systems
 - Computing Division UNIX Environment Standards
 - UNIX Operating System Releases Certification Process
- ***Service Levels***
 - Very High Availability > 99.5%
 - High Availability 99-99.5%
 - Managed Service 95-99%
 - Best Effort
 - None
- ***Support Levels***
 - 24x7: 365 days a year 4 hour response
 - 8x7: 8:30-17:00 7 days a week 4 hour response
 - Workday: 4 hour response during normal workdays
 - Consulting: no response guarantee, but best effort assistance
 - User-supported: no commitment

Provide baseline to work from when any new issues or mismatch between expectations arises.



Some thoughts - from Matthias - part of Computing Division mission/vision

- Computing for HEP experiments is costly
 - In \$\$'s, people and time
 - Need R&D, prototyping and test-beds to develop solutions and validate choices

need to do a better job here
- Improving the engineering aspect of computing for HEP experiments is essential
 - Treat computing and software as a project (see www.pmi.org):
 - Project lifecycles, milestones, resource estimates, reviews
- Documenting conditions and work performed is essential for success
 - Track detector building for 20 years
 - Log data taking and processing conditions
 - Analysis steps, algorithms, cuts

} As transparent
and automatic
as possible



Approx Support profile - per experiment

- Safety and Security .5
- Infrastructure for
 - Networks 2
 - (Mass) Storage, 2
 - Data Processing (Farms) 4
 - Databases 2
 - Data Handling 3
 - Central Analysis Facilities 2
 - Maintenance and repair .25
 - Software Products 4
- Infrastructure for Applications
 - compilers, build tools, debuggers, profilers, 3
 - analysis tools 2
 - database application infrastructure 3
- Simulation tools and event generators 1
- User Services
 - Helpdesk & documentation .5
 - Data center services support 2
 - Licenses .25
- Collaborative tools
 - video conferencing .25
 - web pages and services
- Online Components - 1

(33)



Effort in Support of Run 2 Offline

- Current level of effort in CD (non-science)

	From MOU	Additional needs identified in mou
CDF	36	6.75
DO	33.5	6.5

- Effort capped by availability of manpower.
- Possible areas of "effort" risk:
 - Performance and stability of central analysis facilities both hardware and software
 - C++ compiler issues - gcc not yet successfully validated
 - To support level effort clear that additional administration and support for Farms must be offset by savings elsewhere...
- Performance of Experiment algorithms with luminosity profile will be monitored to see if injection of effort at any time might give payback.



Common Efforts and Joint Projects

- All agree that the effort required has been minimized through the commitment to Joint Projects and Efforts.
- For CD to be able to maintain this level of effort requires that continued attention be paid to align Run 2 needs well with other parts of the Computing Divisions program.
- It is a goal to promote Joint Projects for future developments and extensions.



- All Experience (Run 1) and analysis of the needs indicates Level of Effort needed will be constant to within ability to predict:
 - Ongoing need for upgrades and replacements.
 - Lifetimes of the technologies is shorter than the lifetime of the experiments data analysis needs.
 - Experiments will continue to increase the scope and sophistication of analyses to extract the most physics from the delivered data.
 - If Grid s/w is adopted it must be accepted that this is an immature technology which will require effort to turn into production services. It will also invite new ideas for all and additional coordination efforts with especially the European Data Grid and the LHC.

ie. CD needs to continue commitment of ~35 FTEs per experiment



The Computing Division's support for Run 2 is matched to its mission.

Run 2 Support is a significant effort that we plan to continue at the current level throughout the run.

There is close and ongoing collaboration with the Experiments to ensure the appropriateness and prioritization of the support as well as working on new development areas as needed.