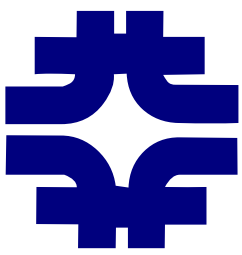


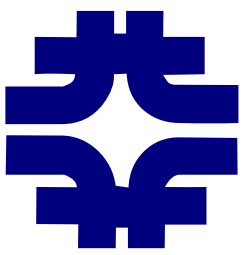
Overview of Run II Computing

Vicky White,
Head, Computing Division



Run II Computing: A collaborative endeavor

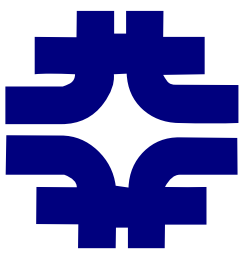
- Run II Computing and Software is, of course, an endeavor that involves many parties
 - CDF collaboration and its Computing Operations plus Offline Analysis organizations
 - D0 collaboration and its Computing and Core Software plus Analysis Software organizations
 - Computing Division - CDF department, D0 department and 3 large departments
 - CEPA (Computing and Engineering for Physics Analysis)
 - CCF (Computation and Communications Fabric)
 - CSS (Core Support Services)
 - Grid Projects efforts in US and Europe
 - CERN support for some software (e.g. GEANT, ROOT)
 - Increasingly - Computing Centers and institutions with significant computing resources outside Fermilab



Run II Computing: A collaborative endeavor

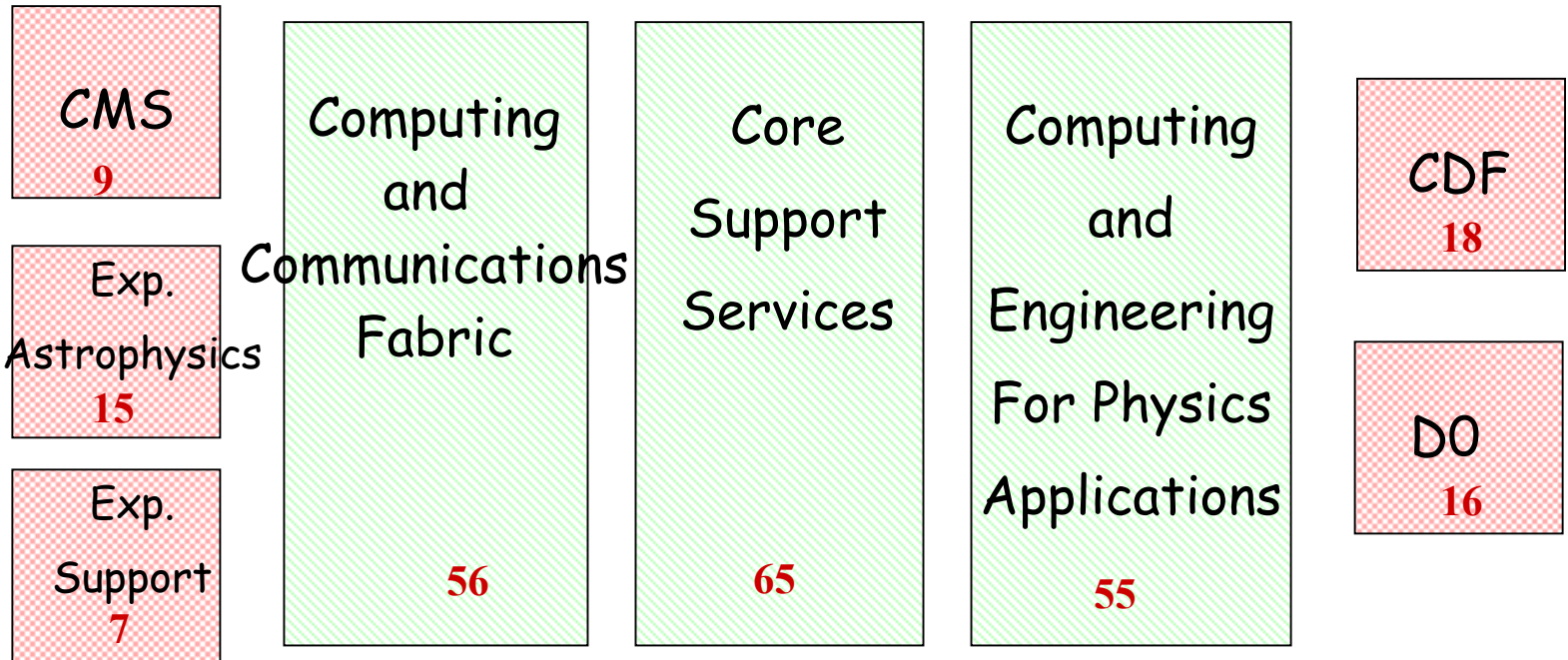
Provides
Leadership
for

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New Computing Division Organization

Division Infrastructure
26

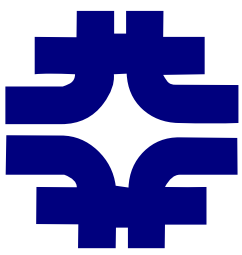


Scientists of all sorts, Engineers, Technical, Computing, Admin = 267



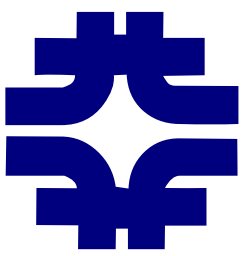
Success! But we are not done - yet

- We have come a long way over the past 6 years and both experiments are able to
 - Record, reconstruct and analyze their data in a fairly reliable and timely way
 - Create and store MC data
 - Make new releases of their software
 - Make use of computing resources outside of Fermilab (to some extent)
 - Get physics results out and published
- Although we are officially in the "Operations and Upgrade phase" there is much to do still in the next 3 years and there is going to be a continuing large manpower investment in Run II Computing and Software as well as Computing hardware.



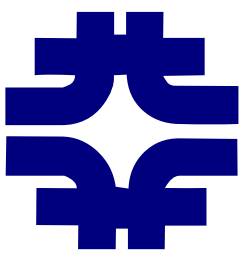
Tiny bit of History

- Beginnings of forming a Joint Run II Computing Project - 1996
- Data Management Needs Assessment for Run II - June 1997
 - Funding profile (stretched 2 years) for a total of \$18M of capital equipment expenses
- Software Needs Assessment - October 1997
- Working Groups to develop Joint Projects from early 1996 onwards
 - Initiated several joint projects - many successful
- Ongoing efforts to converge on common tools, storage systems, database approaches, data handling and caching systems
 - Getting more commonality in leaps and bounds each year



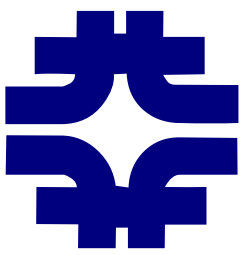
Common Stuff

- Data Handling and Storage now converged to same model
 - Enstore, dcache, SAM-Grid => Grid standards
 - Reconstruction Farm tools
- Oracle Databases + approaches to applications converging on similar approach
- Core Software tools - compilers, debuggers, code management systems
- C++ libraries (ZOOM and CLHEP)
- GEANT, ROOT
- Linux Analysis Farms and file servers (evolving)



Differences you will see

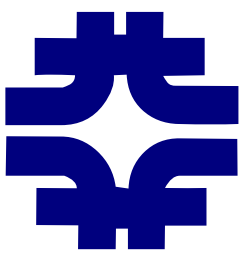
- Differences in data formats and sizes, reconstruction code efficiency and sociology of how analysis is done create big differences in the way CDF and D0 plan to spend money on computing hardware.
- Differences in approach to global distributed computing, different stage of readiness for Grid computing create big differences in projected cost of computing at Fermilab for the two experiments.
- Different plan for data recording now proposed by CDF creates significant additional cost of computing over previous estimates.



Effort vs. Equipment

- ~\$3M of capital equipment for Run II in FY03
- ~ 60 FTEs of Run II effort in our WPAS budget plan (> \$6M)
- August 2003 effort reporting (heavy vacations) shows
 - CDF direct 18.5
 - D0 direct 16.5
 - Distributed Computing and Storage etc. 19
 - Physics Applications, libraries, projects 13
 - CCF Operations (storage, networking) 17
 - Databases 6
 - + helpdesk, security, facility operations and more

**Large
Fraction
For
Run II**



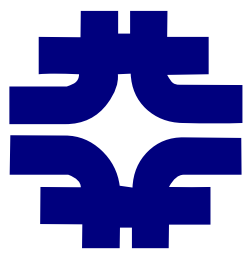
Work to be done

- There is much work to do still to
 - Improve the robustness and scalability of the data handling and storage systems that need to serve to 2009
 - Improve the efficiency of the code
 - Make it easier for physics to be done and students and physicists to contribute
 - Make use of global distributed resources and align CDF and D0 with the evolving Grid infrastructure in the US and Europe (driven by the LHC and grid projects)
 - Remove some of the costly manual operations activities
- This is not all "Run II" work - it is facility and core software infrastructure work that our field needs to do for both Run II and the future.



How much of this is Fermilab Computing Division work?

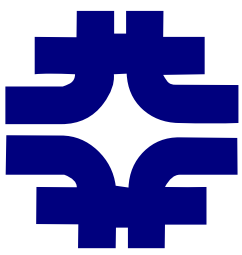
- CD cannot do all of this - some of the effort must come from the collaborations
- We will do our best to help where we can.
- To do this we need to be efficient and
 - Not duplicate effort
 - Turn off the costly SGIs this year
 - Use cost effective tapes and disk solutions
 - Continue to take ever more common approaches
 - Consolidate operations even more - where we can
 - Leverage effort and do joint work with CMS/LHC where possible



Areas we would like to direct more CD effort to

- Common Fileserver and Linux Analysis Farm procurements
 - Working Group to be formed
 - Run II + CMS + SDSS and possibly others
- Shared, dispersed Central Enstore Storage System
- Dcache further development of features and robustness
- SAM-GRID and evolution towards system to run on US Open Science Grid and European Grids
- Database infrastructure - scalability and reliability issues
- Security and Virtual Organizations
- Analysis systems and tools to help people get physics done
- Help to improve performance of code

How quickly we can do all this will depend on how much we can further consolidate efforts and reduce our operational load



Status and Planning

- Today you will hear many details about how things are working (very well mostly)
- You will hear about the ongoing work and the manpower currently allocated (and assumed in most cases to remain allocated)
- You will hear the assumptions for input parameters (event rate, size, cpu, etc) and the measured parameters from the current running systems on which plans for future computing needs are based
- We hope you will be pleased with the progress we have made - but also incisive and critical of our plans and assumptions and we thank you in advance for your time and help.