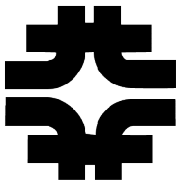


DAQ Support And Developmment
(Software)
Project Status Update for 4/03/2007

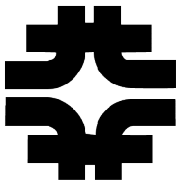
Gerald Guglielmo
(CD/ILC/DAC)

CD-doc-2073



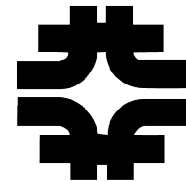
General Project Categories

- Experiment Software Development and Support and External Reporting
 - Run II (CDF & D0)
 - Nova DAQ
 - Other Experiments
- Infrastructure Software and Management
 - Applications and Drivers
 - VxWorks
 - Testbeams
 - Kernels
 - Design and Review
- Beam Position Monitor Systems
 - MIBPM & TBPM
- SDSS II DAQ Upgrade



Project Deliverables Status for CDF

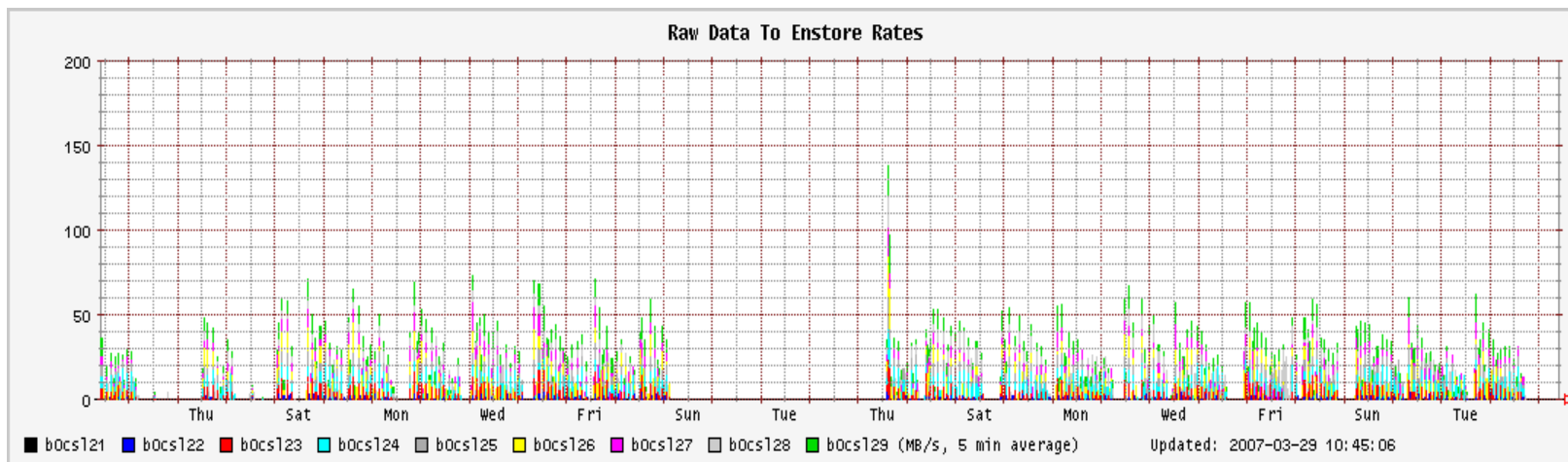
- SEVB and Merlin front line support transitioned to experiment
 - Consultation basis and guidance being given (~February 2006)
- Kernel and L3 DAQ related external reporting
 - After October this was moved to Kernel support
- CDFRDL
 - Development and testing phase complete
 - No direct support expected (*SCP/REX/OPS provides support*)
 - Integration testing mid-September complete
 - Migration to Production ~ November 3, 2006
 - Completed development and testing basically on schedule.
 - CDFRDL in place and ready ahead of rest of CSL
 - Configuration and tuning by SCP/REX/OPS first few months for performance
 - CDFRDL has been stable since deployment to production

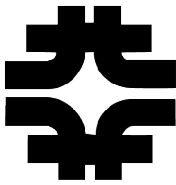


Project Deliverables Status for CDF (Cont.)

- CDFRDL in Production as part of new CSL
*We are now taking real data with the New CSL
Congratulations!!!! on getting to this point.*
--- F. Chlebana 11/07/06
- No requests for consultation or support since initial commissioning in November

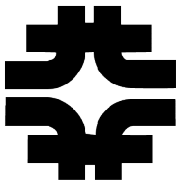
Recent CDFRDL network activity to MSS





Project Deliverables Status for D0

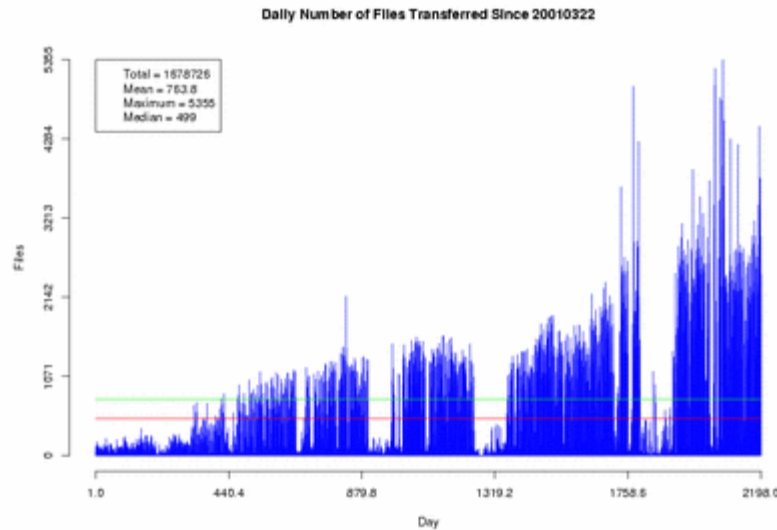
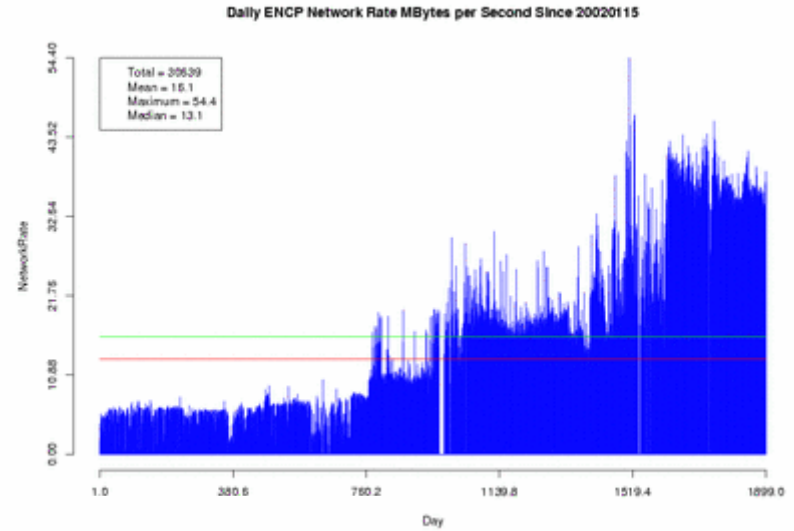
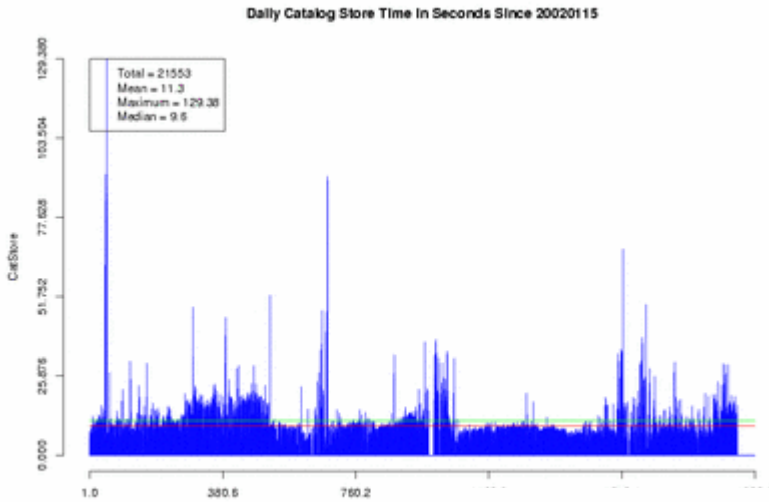
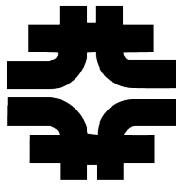
- Monitoring and Support Transitioning
 - Draft Document (CD-doc-2064)
 - Monitoring and issue intervention transition period
 - March until start of shutdown
 - Continue monitoring but restrict response
 - Nuisance issue: Watch but do nothing
 - Serious: Report and see if experiment can resolve
 - Crisis: Act and report later on how it was seen, diagnosed, resolved
 - SCP/REX/OPS may be more active
 - Suspend active monitoring once shutdown starts
 - No agreement with experiment yet, but actions indicate they are following through

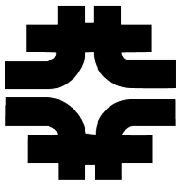


Project Deliverables Status for D0 (Cont.)

- Event Catalog storing turned off on February 6, 2007
 - DLSAM/DLCAT ready ahead of time (only needed to set switch in configuration file)
 - Disk corruption occurred 2 hours after change (a small bump)
 - Not told about recover from backup
 - Lost initial changes to configuration file
 - Observed and fixed 7:30 am next morning
- Unofficially advise on L3 resource leveling impact and constraints (*e.g. luminosity block related requirements*)
 - Status on experiment side not clear
 - May or may not involve significant effort request down the road
 - Thought to have little impact on our software in near term
 - More elaborate proposals still violate fundamental rules in data scheme (luminosity block event grouping, etc.)

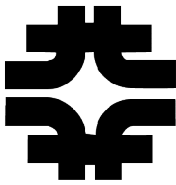
Project Deliverables Status for D0 (Cont. 2)





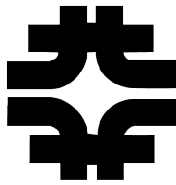
Risks from Run II

- CDF/CDFRDL
 - Proliferation to other experiments or aspects of experiment may require refactoring and moving away from forked code model.
 - Higher luminosity may provoke new issues
 - Operationally stable and new hardware so risks mainly due to new OS versions (low)
- D0
 - Most of the technical experts have been lost to attrition over several years
 - New hardware or library dependencies could require significant effort
 - Higher luminosity may provoke new issues
 - Resource leveling in L3 potentially large impact
 - Problems now rare (great!)
 - Insufficient experiment side monitoring may create a crisis



Project Deliverables Status for Nova

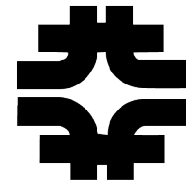
- WBS Management
 - DAQ Software (large)
 - Databases (for historical reasons this is under DAQ Software)
- Director's CD-2/3A
 - June 4, 5, 6 (Monday-Wednesday)
- DOE Lehman CD-2 / 3a Review
 - July 17, 18, 19 (Tuesday - Thursday)
- Current Activity Focus
 - Message Passing System
 - EPICS underneath
 - Reliable messaging issues (work around good enough for IPND)
 - Java API ~85%
 - C++ API started recently ~30%



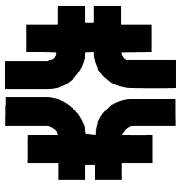
Project Deliverables Status for Nova (Cont.)

- Current Activity Focus (Cont.)
 - DCM bootloader
 - Partial success but still issues with networking on board for download
 - Event Builder
 - Buffer manager code roughly ready
 - Connection manager next
 - Run Control
 - Requirements document being written (3rd draft)
 - Global Trigger
 - University of Minnesota at Duluth volunteered
 - Will start on requirements document soon
 - Reuse Minos code where possible

Project Deliverables Status for Nova (Cont. 2)



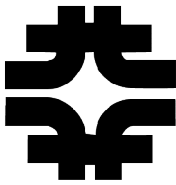
- Current Activity Focus (Cont. 2)
 - Nova Teststand
 - FCC 369
 - ~6 nodes installed
 - DHCP exemption (for DCM booting)
 - Job Posting
 - Reading resumes and starting phone screening



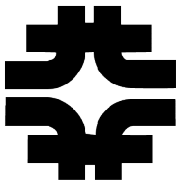
Risks from Nova

- Schedule for IPND remains a risk
 - Will evaluate in May and make corrections if necessary
 - Manpower situation should be improving
- ILC and Accelerator projects sudden requests drain effort unexpectedly
 - Hard to plan in advance, must react and readjust each time
- EPICS reliable messaging and potentially performance
 - Should be good enough for IPND but may need to rethink for far detector
 - Couldn't find anything better the first time around
- Database struggle between online and offline perspectives
 - Need to continue to work for support of both models
 - Include appropriate management when/if necessary
 - Waters have settled considerably as of late
 - Can Postgres really scale for far detector operations?

Project Status Deliverables for Other Experiments



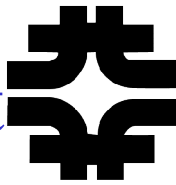
- Experiment development and support outside of Run II and Nova has been quiet generally
 - COUPP
 - Likely involvement down the road, could be on a consultation basis
 - DES
 - Nothing yet, but always a possibility
 - MIPP Upgrade
 - On hold as fall PAC deferred any decision
 - Minerva
 - Do not expect any requests at this time
 - SciBoone
 - Do not expect any requests at this time



Risks form Other Experiments

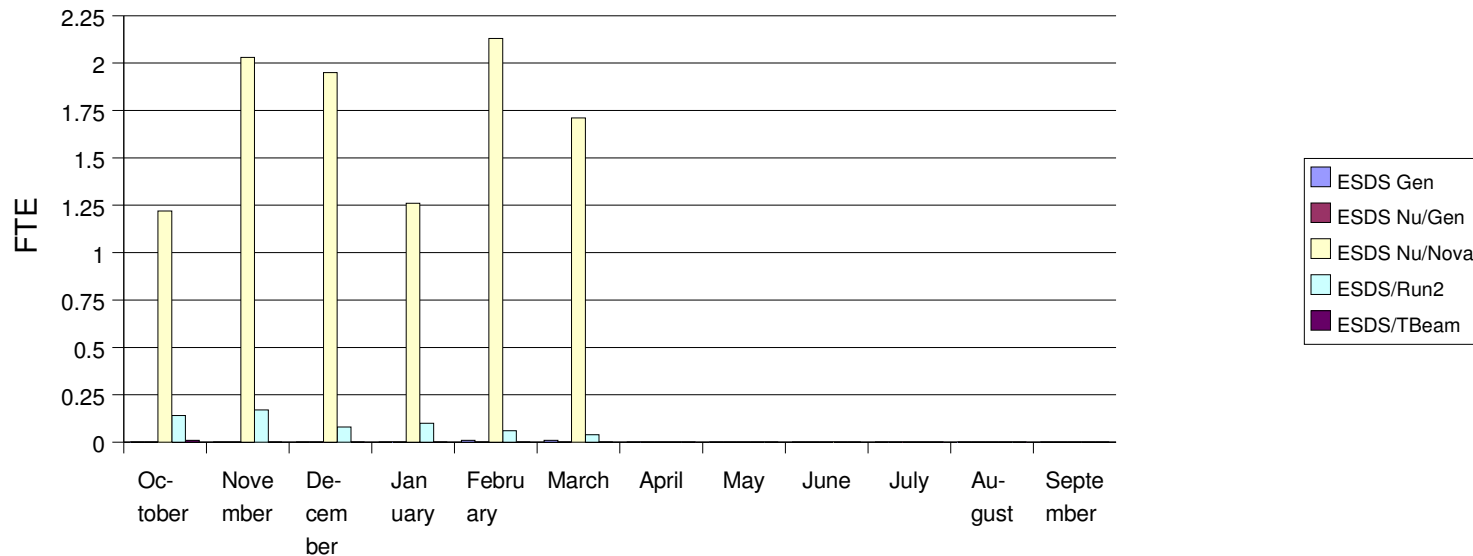
- COUPP may need help for lights out operations
 - Probably not in FY07
 - Possible Labview related requests
- DES
 - Could get approval from directorate for help (are they still asking?)
 - MIPP Upgrade
 - Could get PAC approval or could morph into ILC testbeam experiment
 - Minerva and SciBoone
 - Small possibility for a request, but likely only if they run into trouble
- All the experiments we haven't heard of yet
 - Requests could be for small to large efforts (hard to predict)

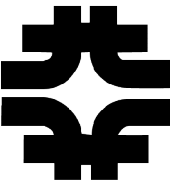
Effort for Experiment Software Development and Support



	Predicted FTE
ESDS/Gen	0
ESDS Nu/Gen	0.09
ESDS/Nu/Nova	2.09
ESDS/Run2	0.09
ESDS/TBeam	0.11

Experiment Software Development and Support

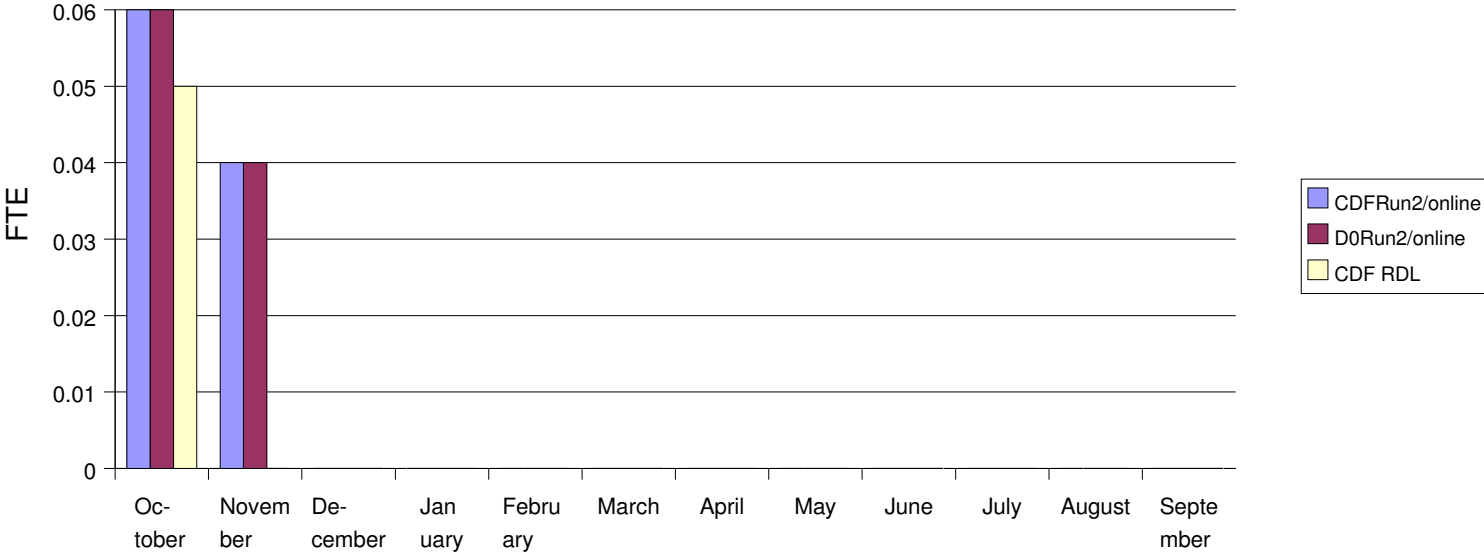




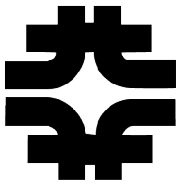
Effort for External Run II Reporting

	Predicted FTE
CDFRun2/online	0
D0Run2/online	0
CDF RDL	0.1

Run2 External Reporting

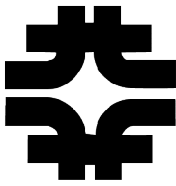


Project Deliverables Status for the Infrastructure Software and Management



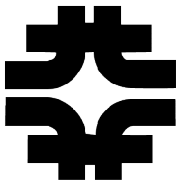
- Applications and Drivers
 - CAMAC Controller evaluation CAEN C111C (Ethernet)
 - Get out of business of supporting low level CAMAC drivers
 - **LUA scripting interface too slow**
 - **500usec of overhead for each 1usec CAMAC operation!**
 - **TCP socket interface still not working**
 - **Purchase Hytec ECC 1365 if budget allows**
- Design and Reviews
 - Various projects and experiments and SBIRs
 - SBIR proposal
 - ILC detector testbeam workshop (to understand future requests)

Project Deliverables Status for the Infrastructure Software and Management (Cont.)



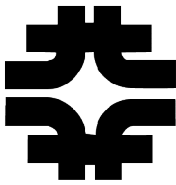
- Kernels
 - Linux kernel building
 - Add TRACE support in kernel
 - Boot script for loading kernels (used by D0 and CDF) updated
- VxWorks Support
 - Kernel builds for Run II and Accelerator Division users
 - Debugging and general support for VxWorks users
 - Investigating problem reports and finding resolution
 - Opening TSR with WindRiver when appropriate
 - License management and liaison activities with WindRiver (3 seats)
 - 1 CD
 - 1 AD
 - 1/2 D0 & 1/2 CDF

Project Deliverables Status for the Infrastructure Software and Management (Cont. 2)



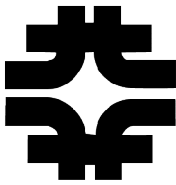
- MTBF
 - Use advanced CAMAC controllers to eliminate need for CAMAC drivers
 - Depends on finding controller that meets our requirements
 - Need to understand scope of facility to understand DAQ needs
 - Tied into understanding ILC detector test plans
 - Consider a unified DAQ system for the facility
 - Can we come up with a feasible design?
 - Can we come up with a way to integrate user systems?
 - What types of user systems can/should be integrated?
 - Provide near real time tracking code for improved user experience
 - Successful

Risks from Infrastructure Software and Management



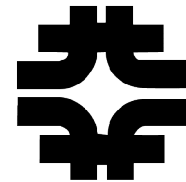
- Applications and Drivers
 - CAEN C111C module very likely does not meet needs
 - Wrong model (user calls CAMAC over network, not from onboard)
 - Evaluate Hytec ECC 1365 (more expensive, licensing, starting over)
 - Also may be wrong model (Hytec willing to change for a price?)
 - Continued requests for CAMAC driver support with lack of expertise
- Design and Reviews
 - Low risk due to any one project for a review
 - short term spike in effort
 - Not very frequent so far
 - Moderate risk if asked to help design
 - More pronounced bump in effort (generally not just a spike)
 - Not very frequent so far

Risks from Infrastructure Software and Management (Cont.)



- Kernels
 - Effort seems to be low and stable (no quick changes lately)
- VxWorks
 - New versions or boards pose temporary effort load
 - Special requests from users and extra work
 - Licensing changes could create fiscal issues
- MTBF
 - New pixel system integration (DAQ may be university standalone)
 - Expanded scope of facility could require significant effort (ILC driven)
 - Design and implementation
 - Large number of interested potential users based on ILC Detector Testbeam workshop
 - Individual experiment help may be requested
 - General DAQ system help may be requested

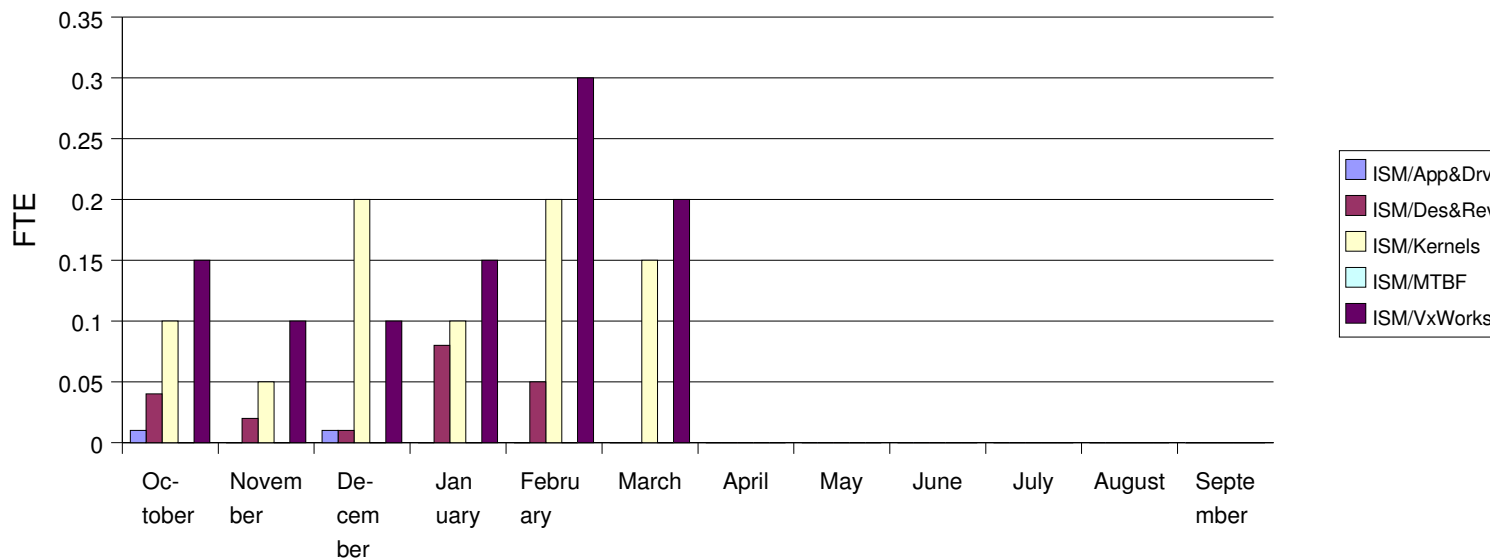
Effort for Infrastructure Software and Management



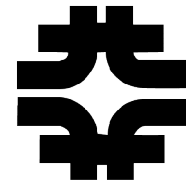
Predicted FTE

ISM/App&Drv	0.09
ISM/Des&Rev	0.16
ISM/Kernels	0.25
ISM/MTBF	0.12
ISM/VxWorks	0.17

Infrastructure Software and Management

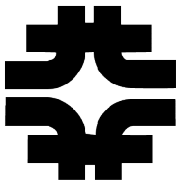


Project Deliverables Status for the Beam Position Monitor Systems



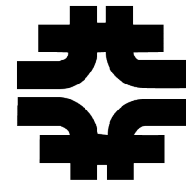
- TBPM
 - Maintenance mode
 - Motorola no longer manufacturing MVME2400
 - MVME2400 situation
 - 27 installed
 - 2 in teststand use
 - 1 broken (from F3 house)
 - 1 maybe broken (from D4 house)
 - Use MVME5500 (same as MIBPM) for replacements
 - Code base built and tested on MVME5500
 - Off-hours call to CD personnel late at night due to D4 house problems
 - Preparing for proton load, things went fine anyway
 - Need to work with Tevatron (and Main Injector) leader to clarify support

Project Deliverables Status for the Beam Position Monitor Systems (Cont.)



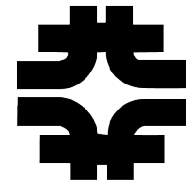
- TBPM (cont.)
 - Orbit corrections (not high CD priority)
 - Correct beam in real time using positions from BPMs at B0 and D0
 - Horizontal correction at D0 (tentative) and vertical at B0
 - Software changes completed and deployed at B0 and D0
 - VME DAC board is installed but not yet connected to correctors
 - Correction values are available as ACNET devices, these can be used to check if values are correct
 - Request to download offsets from database completed and in production
 - Request to pull some EchoTek boards from p-bar signals
 - Replace recycler boards being loaned to ILC damping ring BPM studies at KEK (ATF)
 - Request is for 10 to 15 boards (if all p-bar signals removed 54)
 - Time frame, effort, priority still to be worked out (Meeting April 4)

Project Deliverables Status for the Beam Position Monitor Systems (Cont. 2)



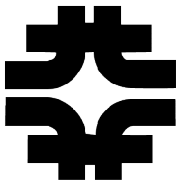
- EchoTek Boards ECDR-GC814/8FV2R(1/2)
 - Same model as in MIBPM, TBPM and elsewhere
 - 124 boards installed in TBPM system
 - 57 boards installed in MIBPM system
 - 16 boards installed in teststands
 - 49 boards installed elsewhere
 - 1 broken
 - 3 spares
 - Boards have proven to be very useful and found there way into multiple systems.
 - Good for spares as you do not need multiple pools
 - Leaves some systems vulnerable to scavenging

Project Deliverables Status for the Beam Position Monitor Systems (Cont. 3)

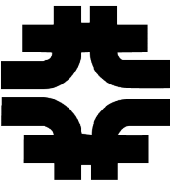


- MIBPM
 - Maintenance mode
 - Motorola still manufacturing MVME5500
 - MVME5500 situation
 - 7 installed
 - 2 allocated (teststand and Duane Voy) – SDSS owns teststand board
 - 3 in PREP
 - Need to work out support arrangements
 - Probably similar to Tevatron (work in progress)
 - Aided filter controller firmware upgrade installation before Stefano left

Risks from the Beam Position Monitor Systems



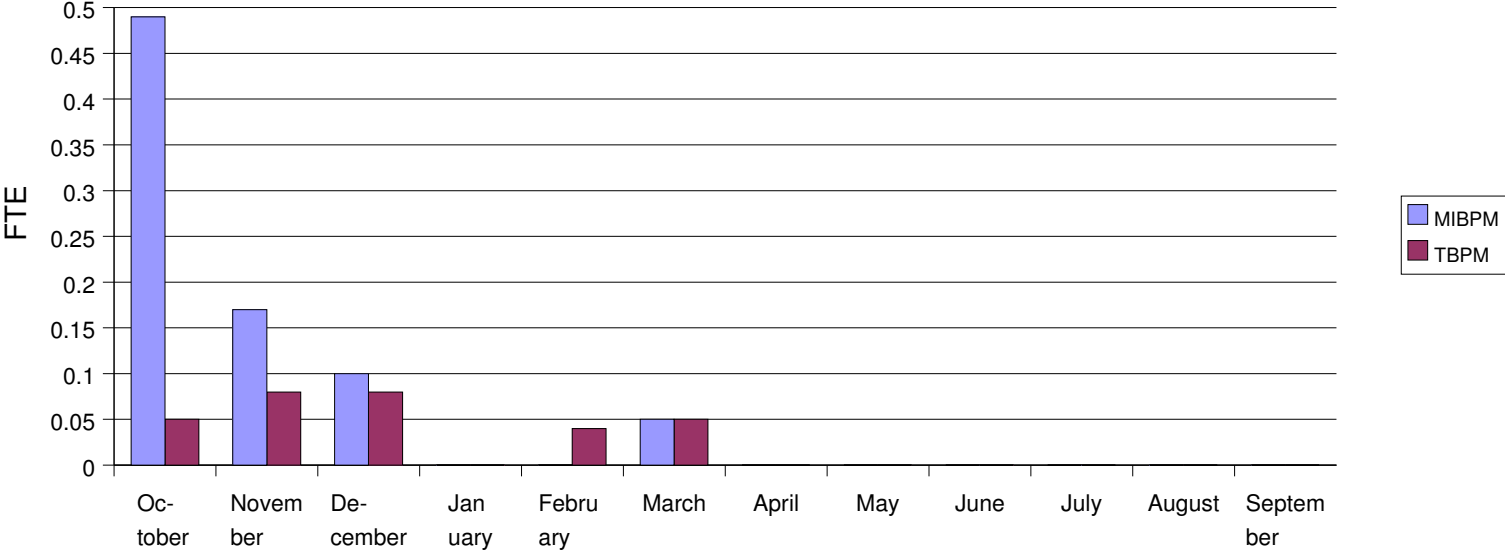
- TBPM
 - Operate through 2009 (maybe into 2010?)
 - MVME2400 no longer made (can use MVME5500)
 - Raiding system for components (e.g. EchoTek boards)
 - Support desired by AD may not be easily achievable
- MIBPM
 - Operational for less than a year (failure rate not yet understood)
 - Operate for many more years (2017+?)
 - Support desired by AD may not be easily achievable



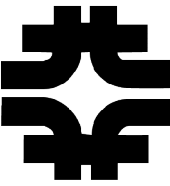
Effort for Beam Position Monitor Systems

	Predicted FTE
MIBPM	0.04
TBPM	0.04

Accelerator Support

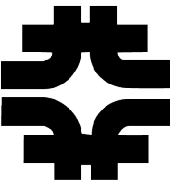


Project Deliverables Status for SDSS II DAQ Upgrade

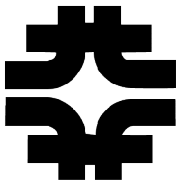


- Teststand
 - Moved to FCC 369 week of March 26 (off project)
 - Commissioned successfully, now operational
- NaN in spectro frame headers (issue pre-dated DAQ upgrade)
 - Telescope skewing before data readout complete, logic specifically cleared buffer of positions when telescope starts to move
 - Code changed to remove logic, cut and request for 24 hr shakeout
- Updated documentation
- Debugging problem reports (e.g.)
 - Watchdog process dead, process stack overflow (cause or symptom?)
 - Increase process stack size in astroda code for watchdog
 - Increased VxWorks stack size as a precautionary measure

Project Deliverables Status for SDSS II DAQ Upgrade (Cont.)

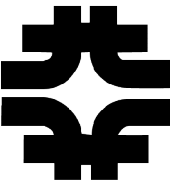


- Hand off of operational support to Apache Point personnel
 - Done (except maybe for the final sign-off)
 - Remaining issues with spare boards
 - Enough FOXI sender boards (or do we need to build more)?
 - Are VCI+ spares at APO good? APO will send to FNAL for tests
 - VCQ-M boards quote double cost of last years purchase
 - Reviewed MVME5500 inventory probably fine
 - Infrequent board hangs (< 1/month)
 - Handed off to APO staff
 - Next place to look is network and we do not have privileges to run network monitoring at APO
 - Able consult if needed
 - Hand off documentation generated



Risks form SDSS II DAQ Upgrade

- Insufficient spare boards of various kinds
 - Inventory and estimating of needs for next couple of years should help
- Code is fairly stable and few bug reports seen lately
- Teststand problems may inhibit ability to debug problem reports
 - Already had a few problems recently (all resolved)
- Requests for expanded functionality could arise
 - New features of scalability
 - **SDSS II or really for SDSS III?**



Effort for SDSS II DAQ Upgrade

Predicted FTE
SDSS Support 0.09

SDSS II Support

