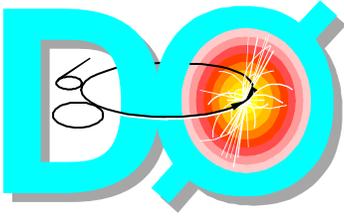


Online System WBS 1.5

Stu Fuess

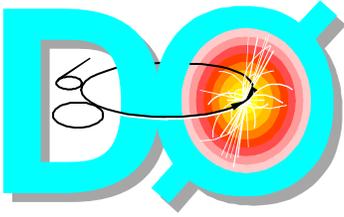
Outline

- One-page review
- Accomplishments
- System description
- Progress
- Status
- Goals



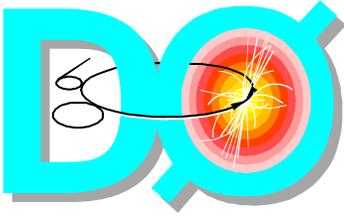
Online Review

- *Portion of the project which is responsible for providing:*
 - ◆ Control Room functions
 - ◆ Run and configuration control
 - ◆ Event data path from trigger system (Level 3) to data repository (Feynman Computing Center) at sustained rate of ~12.5 Mbytes/sec
 - ◆ Detector control, monitoring, and calibration
 - ◆ Data acquisition monitoring
 - ◆ Event data monitoring
 - ◆ Accelerator interface



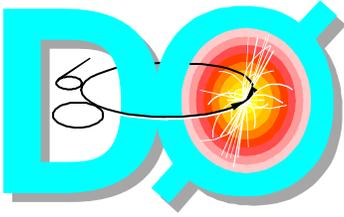
Outline

- *Accomplishments*
- *System architecture*
 - ◆ Hardware
 - ◆ Acquisitions and Issues
 - ◆ Software
 - ◆ Technical Design Report
- *Progress*
 - ◆ Milestones
 - ◆ Critical Paths
 - ◆ Schedule Integration
- *Sub-project status*
 - ◆ Cost estimate
 - ◆ Manpower
- *Goals*

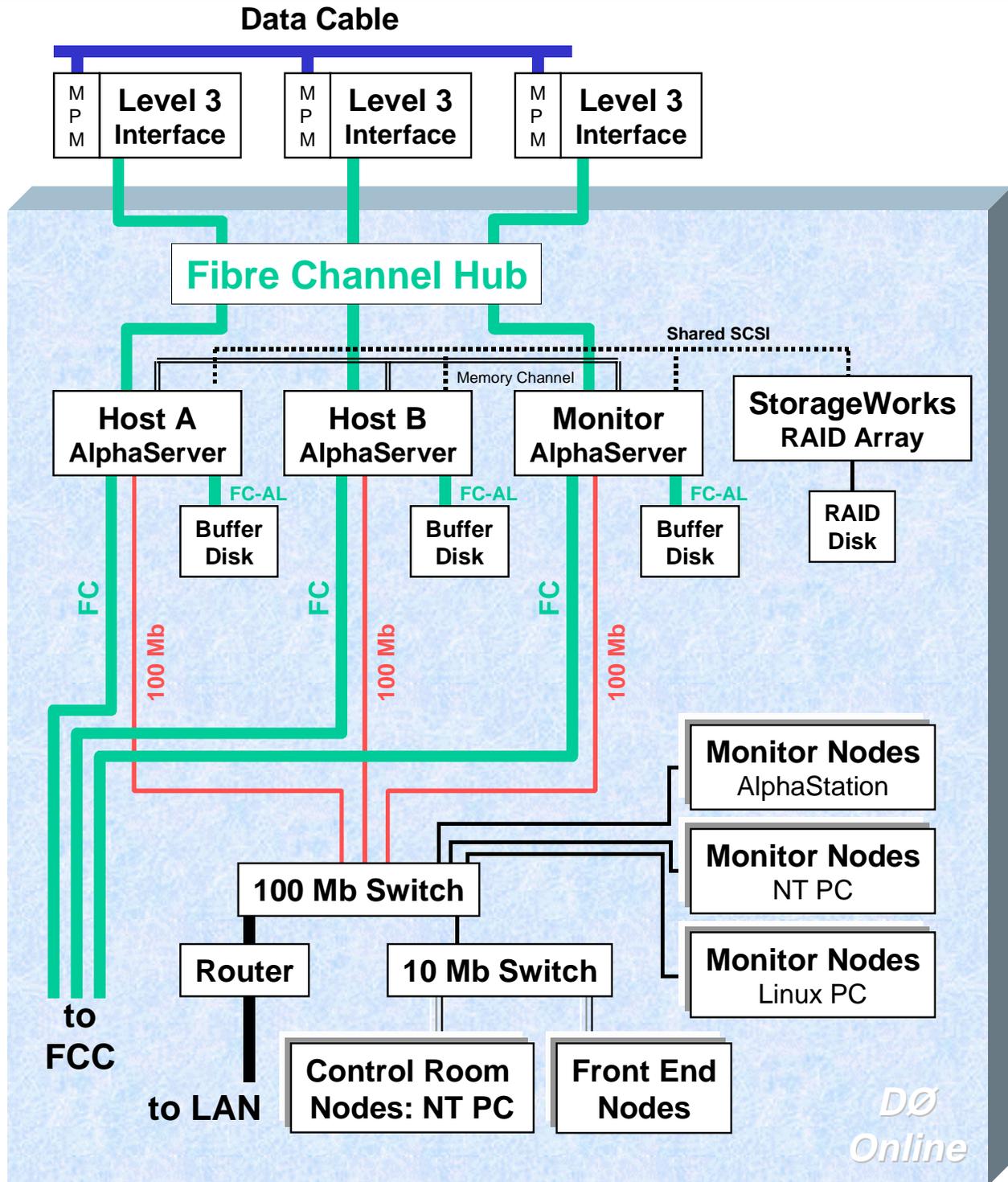


Accomplishments

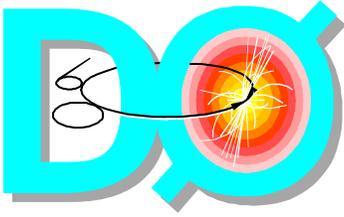
- ***System architecture set***
 - ◆ **Conceptual design complete**
 - ◆ **Technical design progressing**
- ***Initial acquisitions complete***
 - ◆ **1st Host Server**
 - ◆ **Development platforms**
- ***Software progress***
 - ◆ **Successful control path readout of VRB**
- ***Manpower progress***
 - ◆ **Computing Division involvement**



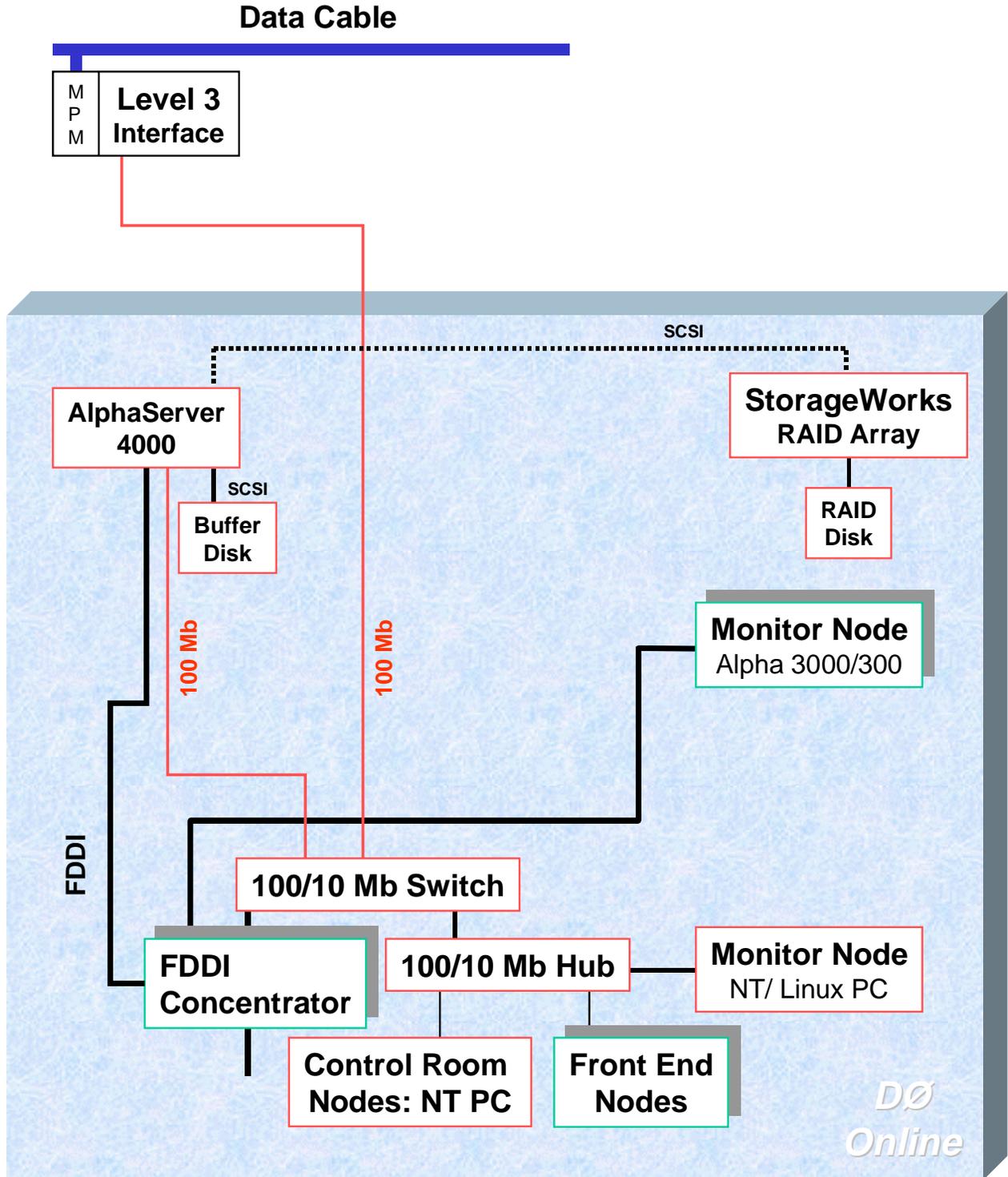
Target Configuration

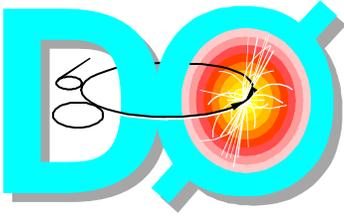


DO
Online



FY97 Acquisitions





Technical Issues

related to 12.5 Mbytes/sec data throughput requirement...

◆ Storage I/O

- ▲ **SCSI probably capable, but ...**
Fibre Channel appears to be appropriate future technology

◆ Network

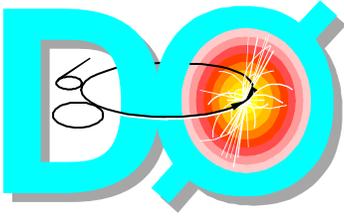
▲ Questions:

- FDDI vs Gigabit Ethernet vs Fibre Channel?
- 2 km path to Feynman Computing Center

▲ **again...**

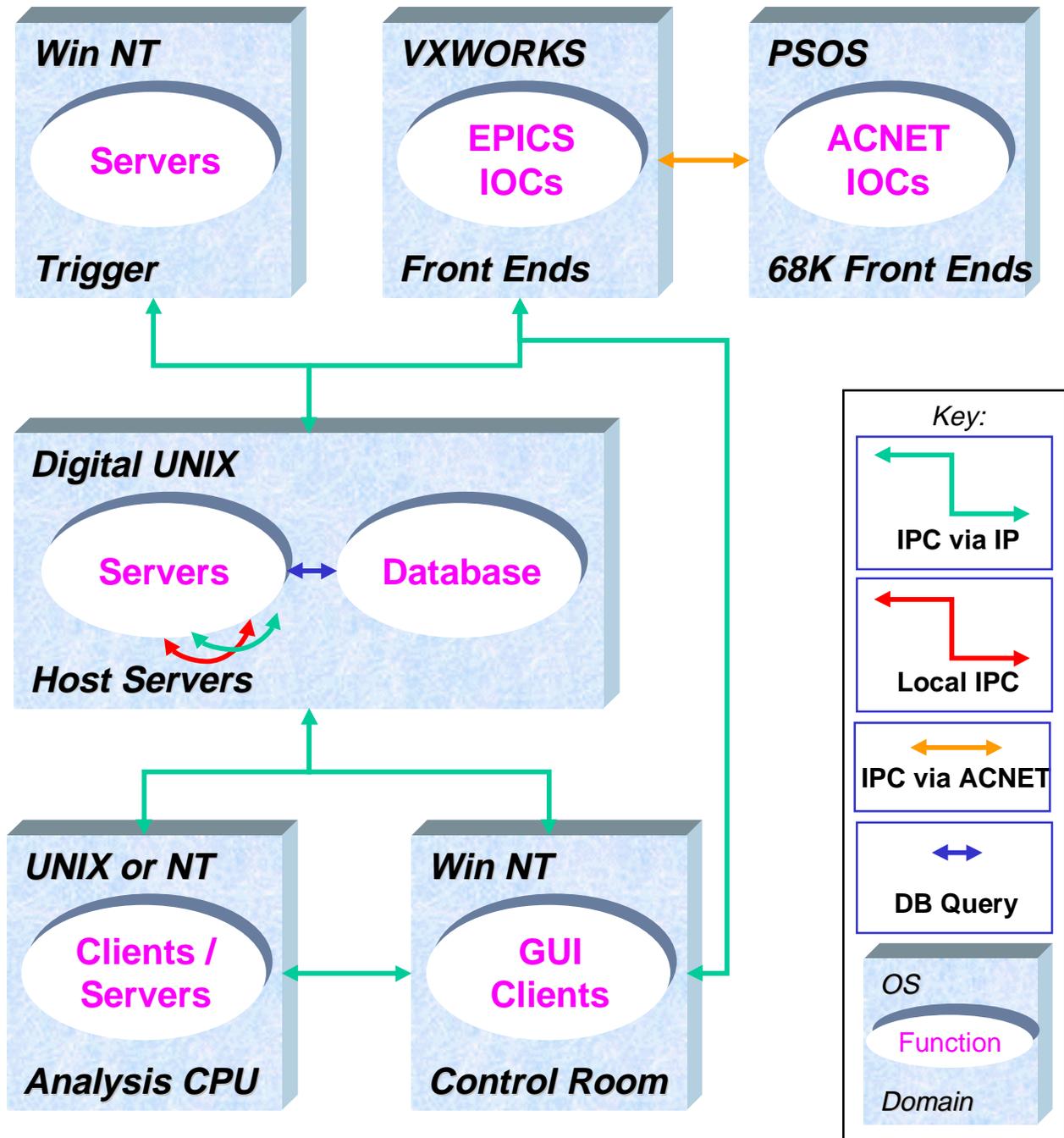
Fibre Channel appears to be appropriate future technology

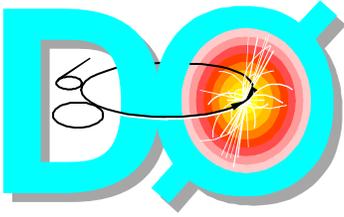
FY98 purchases will be directed towards initial Fibre Channel installation



Software Architecture

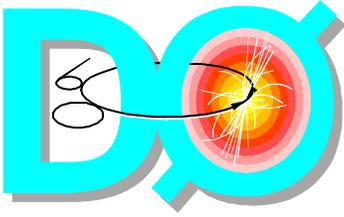
Revised 04-Jan-1998





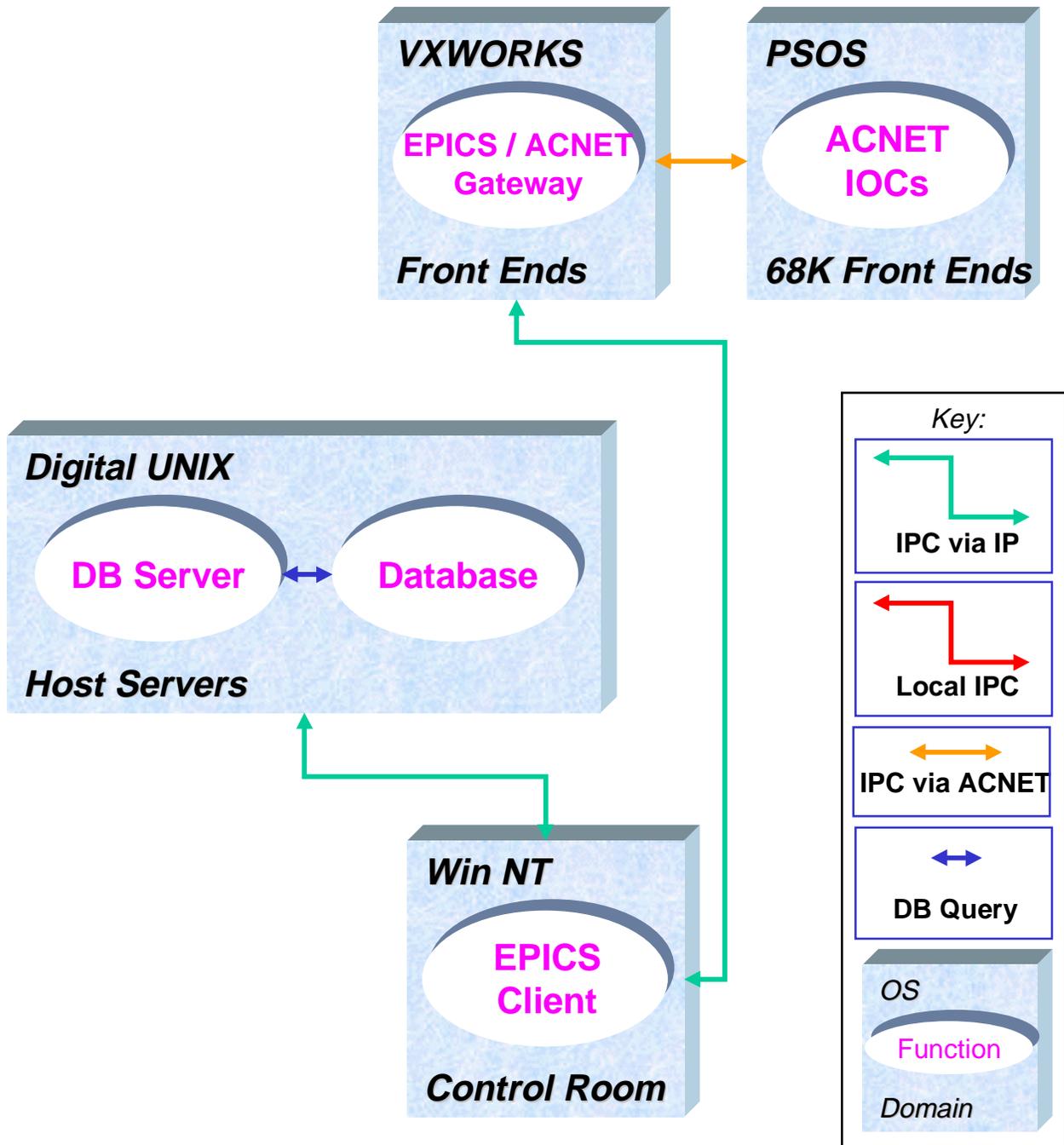
Software Components

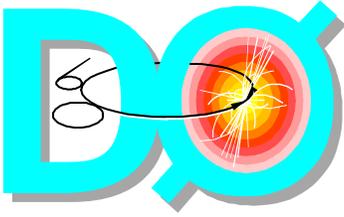
- **Host Servers:**
 - ◆ COOR
 - ◆ COMM_TKR
 - ◆ Data Logger
 - ◆ DAQ Monitor
 - ◆ Event Distributor
 - ◆ Calibration Server(s)
 - ◆ Clock Server
 - ◆ Alarm Server (and associated servers)
 - ◆ Control & Monitoring Logger
 - ◆ Luminosity Server
 - ◆ Database Server(s)
- **Analysis CPU Clients/Servers:**
 - ◆ EXAMINE(s)
 - ◆ Express Line
- **Control Room Clients:**
 - ◆ Run Control Client
 - ◆ DAQ Monitor Client
 - ◆ EXAMINE Client
 - ◆ Calibration Client
 - ◆ Alarm Display
 - ◆ EPICS clients:
 - ▲ Parameter pages
 - ▲ High Voltage
- **Trigger Servers:**
 - ◆ L1 TCC (Trigger Control Computer)
 - ◆ L2 TCC
 - ◆ L3 elements



Example: Slow Control ACNET Client Components

Revised 04-Jan-1998





Technical Design Report

- **Outline**

- **Hardware**

- **Software Utilities**

- IPC

- User interfaces

- Databases

- **Run and Configuration Control**

- COOR

- Run Control

- **Event Data Path**

- Level 3 interface

- Data Logger

- RIP

- DAQ Monitoring

- Event Distribution

- Event Monitoring - Framework

- Event Monitoring - Detector

- Event Monitoring - Physics and Expressline

- **Calibration**

- Framework

- Databases

- Detector specific

- **Control and Monitoring**

- Legacy systems

- High Voltage

- Significant event / alarm system

- EPICS

- DART tools

- Clock

- ACNET front ends

- Hardware database

- Cryo controls

- Detector specific applications

- **Accelerator interface**

- Accelerator console

- Accelerator information exchange

- **Status**

- ♦ ~75% of 1st draft

- **Schedule**

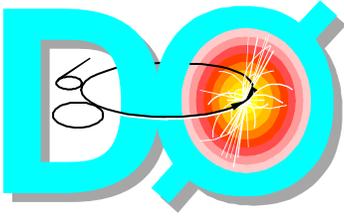
- ♦ 2/98 Draft

- ♦ 4/98 Reviewed

- ♦ 12/99 As-built

- **Philosophy**

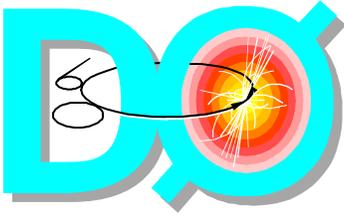
- ♦ Use as the base for complete system documentation



Milestones

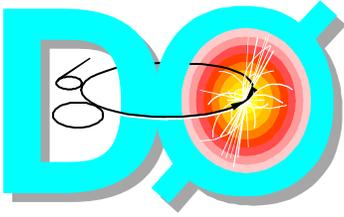
Online Computing

Description	Baseline	Current	Variance
Online System			
Control & Monitoring			
M3-Online Database Populated	4/20/99	4/20/99	0w
M3-EPICS Control System Operational	8/6/98	9/23/98	6.6w
M3-Online Parameter Page Available	2/23/99	4/9/99	6.6w
M3-Online Alarm System Operational	9/16/98	11/11/98	8w
Configuration & Run Control			
M3-Online Run Control System Operational	1/20/98	3/31/98	10w
Level 1 & 2 Operations			
M3-Online Level 1 Readout Available	10/1/97	4/1/98	23.8w
Level 3 Operations			
M3-Online Level 3 Readout Available	3/1/99	1/13/99	-6.6w
Data Logging			
M3-Online Data Logger Operational	7/23/98	7/23/98	0w
Documentation			
M3-TDR Review	NA	4/1/98	0w



Critical Paths

- ***Critical paths for the Online sub-project software***
 - ◆ **Template Client-Server framework**
 - ▲ *Target end of CY98 Q1*
 - ◆ **Configuration and Run Control**
 - ▲ *Milestone for early functionality at end of CY98 Q1, but requires extended further development which will depend upon...*
 - ◆ **Operational Control System**
 - ▲ *Milestone end of CY98 Q3*

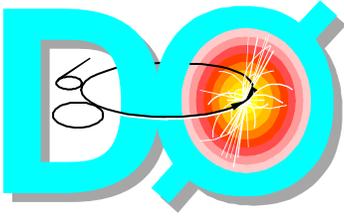


Schedule Integration

What portions of the Online system are available, and when, for detector system tests and commissioning?*

- ◆ From Test Beam and SDF / LabD efforts, now able to perform Control Path DAQ from any crate with embedded VXWORKS processor
- ◆ Extending these efforts to support muon system tests in early CY98
- ◆ Level 3 is being maintained in a state where DAQ can 'end' at that point, e.g. files written
- ◆ Coordinated host-based control of Event Path through Trigger system beginning CY98 Q2, but evolutionary development follows

** need more work to match "available" to "needed"*



Obligations (k\$)

- **Baseline cost from Lehman review '97 (in FY95\$) provided for comparison**

1.5.1	ONLINE COMPUTING	Difference	Baseline cost	EAC	ETCC	ETC
		EAC-Baseline	Lehman '97			
1.5.1.1	Workstations	-20	260	240	34	195
1.5.1.2	Network (switch, bridge, router)	0	80	80	19	77
1.5.1.3	Disk/tape Peripherals	20	90	110	16	79
1.5.1.4	Printers/Monitors	0	75	75	4	65
1.5.1.5	Software	0	100	100	22	90
		0	605	605	95	506

WBS level 3 Summary

EAC	ETCC	ETCC%	ETC	Prior	COMP	CP
605	95	19%	506	99	12%	185%

EAC - estimate at completion (= Prior + ETC)

ETC - estimate to complete (FY97\$)

ETCC - contingency on the ETC (FY97\$)

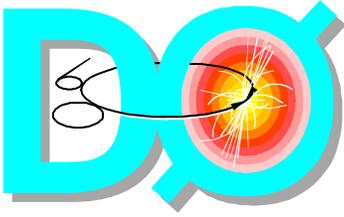
ETCC% - % contingency on ETC (ETCC/ETC)

Prior - Obligations for FY97 and earlier (then yr\$)

COMP - % of system completed

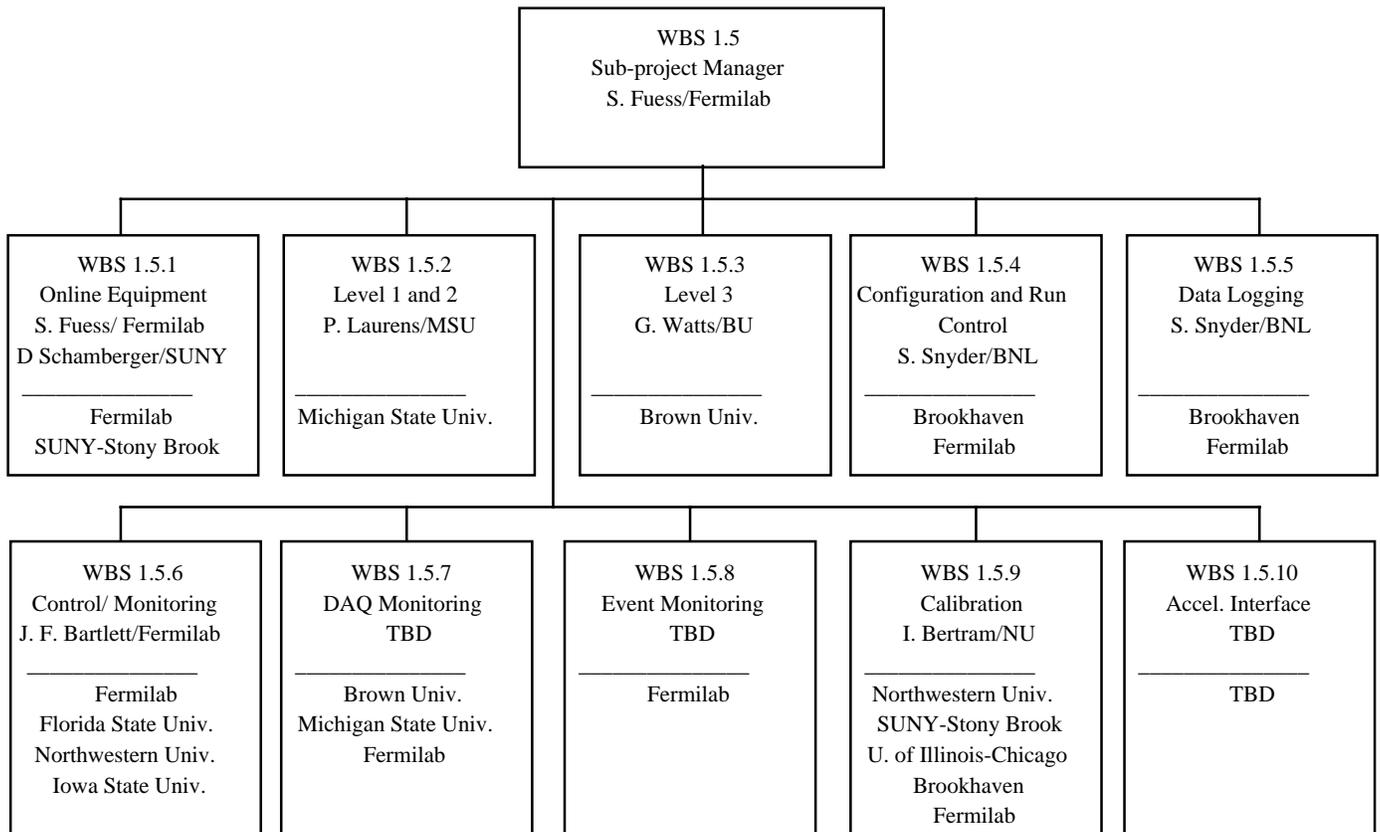
CP - contingency performance on items with obligations

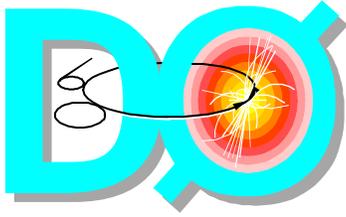
DoE Review
January 1998



Organization

Online Computing

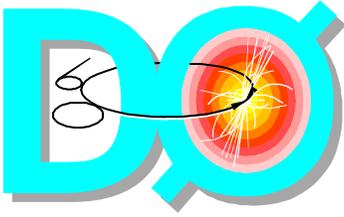




Manpower (FTEs)

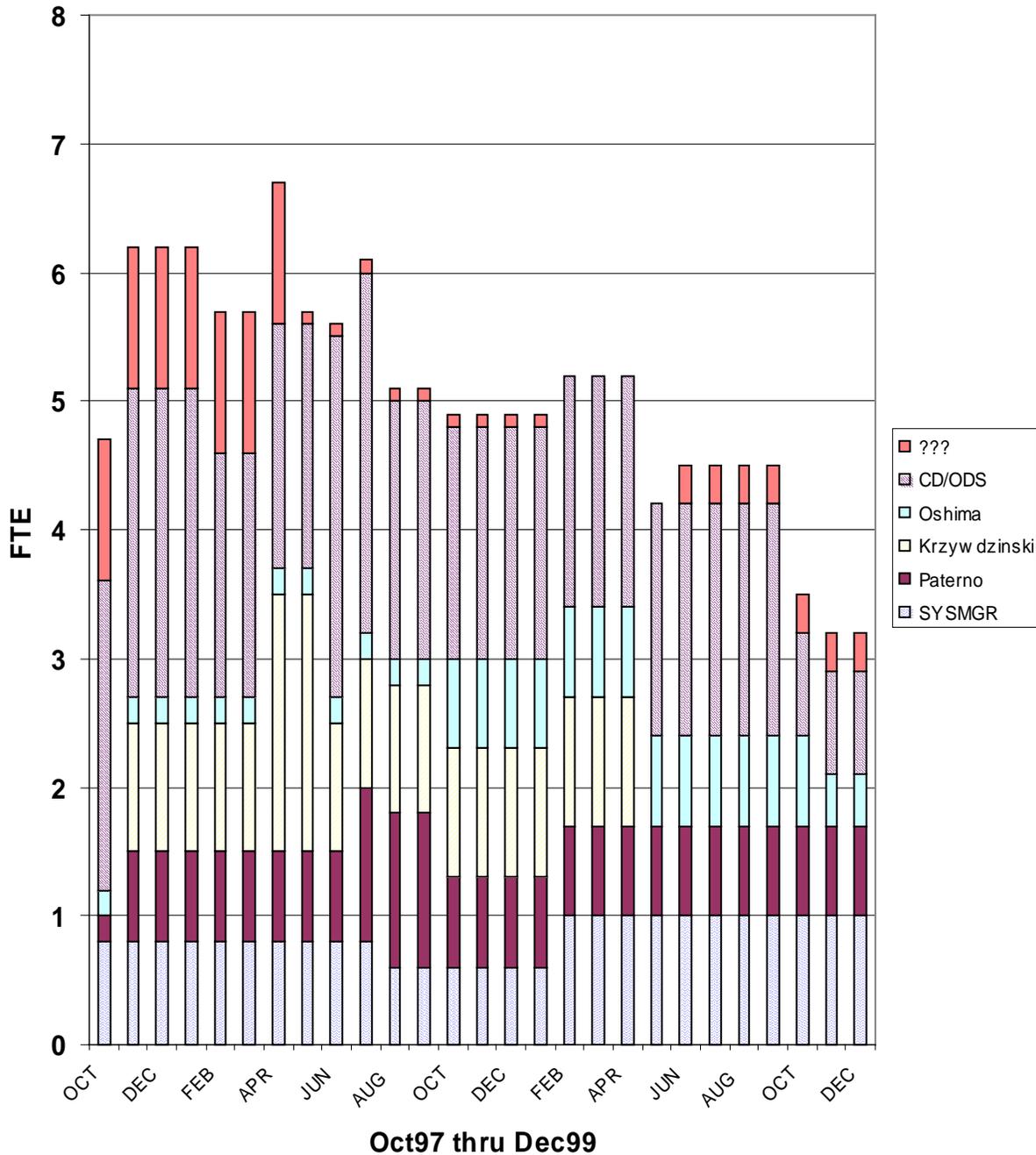
Online Computing WBS 1.5

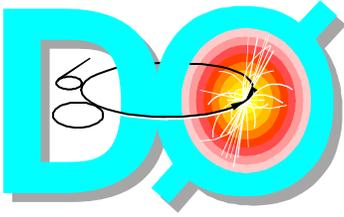
Position	FY97	FY98	FY99	FY00	Total
Computer Professional (F)	3.3	5.7	6.1	0.8	15.8
<i>TOTAL</i>	3.3	5.7	6.1	0.8	15.8



Manpower: Computing Professionals

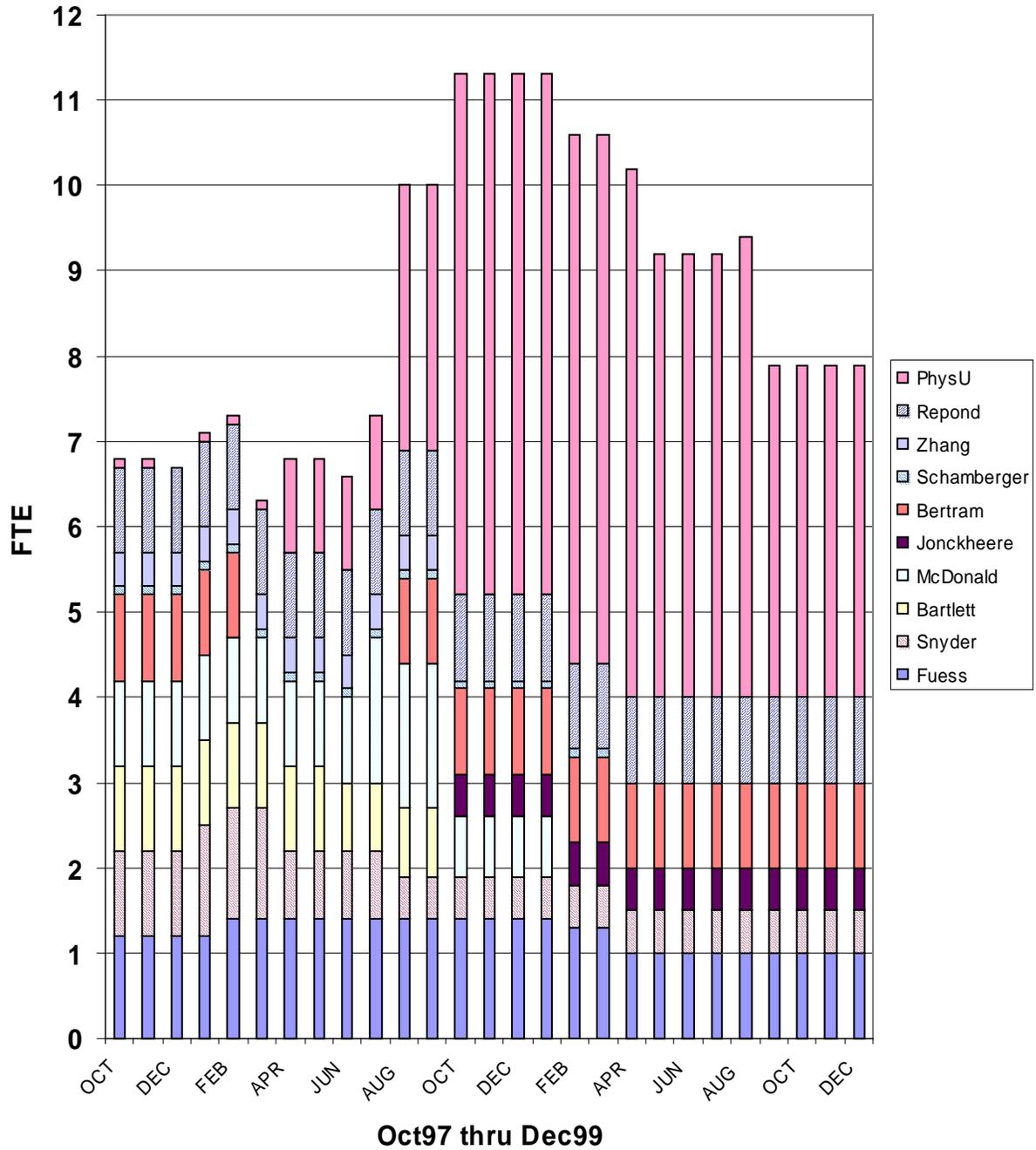
Computing Professionals

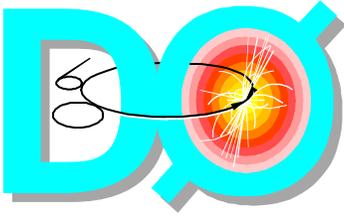




Manpower: Physicists

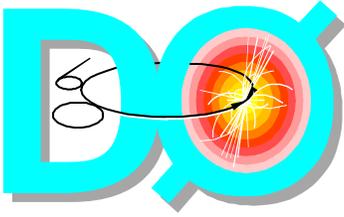
Physicists





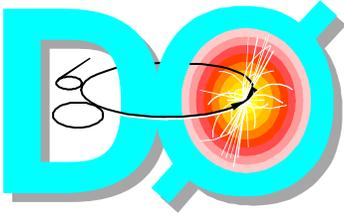
Manpower: Issues

- ***D0 Management positions***
 - ◆ Important by mid CY98
- ***Computing Division support***
 - ◆ DART (Fixed Target DAQ)
 - ◆ Joint CDF/D0/CompDiv projects:
 - ▲ *Databases*
 - ▲ *Reconstruction Input Pipeline (Path from disk buffer to FCC farms and archives)*
 - ◆ System management
- ***Use of external products***
 - ◆ EPICS (Slow Controls)
 - ◆ ACE (InterProcess Communication and OS primitives)



Goals

- ***Next 3 months***
 - ◆ Complete TDR
 - ◆ Establish development and testing environment on all potential platforms
 - ◆ Progress with software utilities
- ***Next 6 months***
 - ◆ Progress on Configuration & Run Control, Data Logger, and Data Distributor
- ***Next 9 months***
 - ◆ 2nd phase of acquisitions
 - ◆ Establish controls path libraries



Conclusion

- *Well on the way to assembling computing hardware*
- *Early software work has shown we can make use of EPICS, DART, etc*
- *Immediate push to complete TDR, then build products based on common framework*
- *Computing Division involvement appears promising*
- *Few key positions (System Manager, management) to be filled*