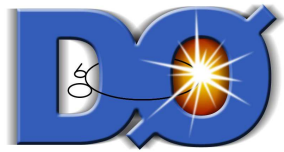
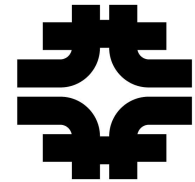


# DØ Data Reprocessing



Daniel Wicke  
(Fermilab)



<http://www-d0.fnal.gov/computing/reprocessing/>

## Outline

- Introduction
- Application Flow
- Error Handling and Recovery
- Resources
- Summary and Outlook

# Introduction

## Improved understanding of the DØ-Detector

- We have improved calorimeter calibration in p17
- Basis:
  - improved understanding of the detector
  - based on reality rather than design/plans
- All of our data were reconstructed with p14

⇒ *Redo reconstruction of all data*

# The Computing Task

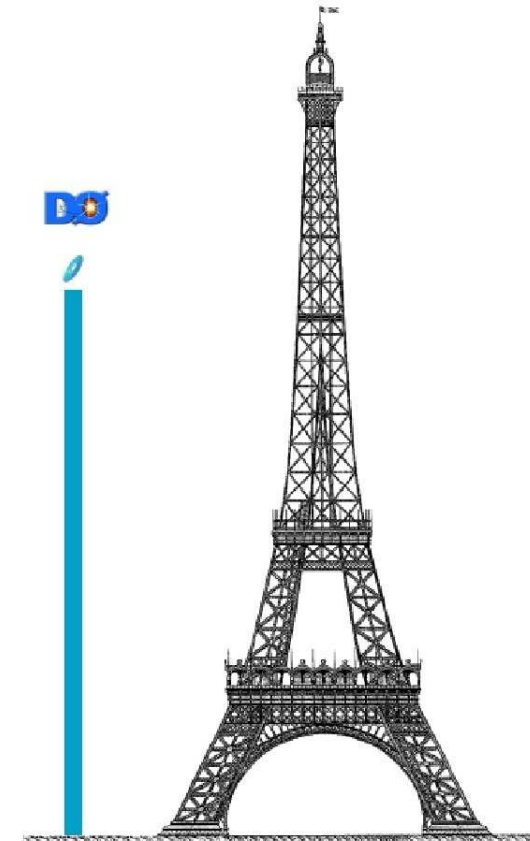
	p17 reprocessing	p14 reprocessing
Luminosity	470 pb <sup>-1</sup>	100 pb <sup>-1</sup>
Events	1G	300M
Rawdata 250kB/Event	250TB	75TB
DSTs 150kB/Event	150TB	45TB
TMBs 70kB/Event	70TB	6TB
Time 50s/Event	20,000months	6000months
(on 1GHz Pentium III)	3400CPUs for 6mths	2000CPUs for 3mths
Remote processing	100%	30%

Central Farm (1000CPUs) used to capacity with data taking.

# The Computing Task

	p17 reprocessing
Luminosity	470 pb <sup>-1</sup>
Events	1G
Rawdata 250kB/Event	250TB
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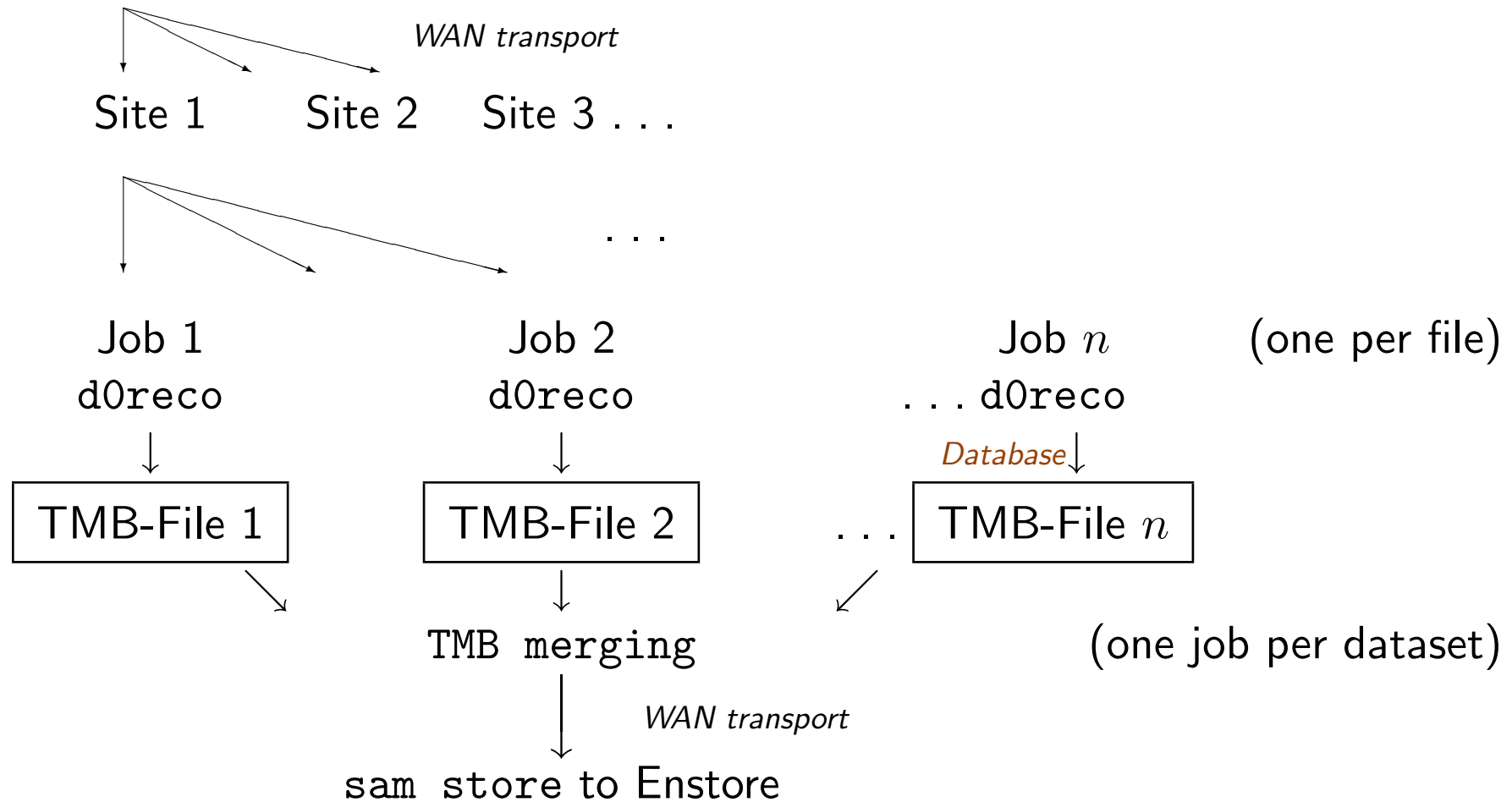
*A stack of CDs as high as the Eiffeltower*



# Application flow

## Overview

Datasets of RAW-files



# Implementation

SAMGrid was chosen to implement this task on distributed systems.

- Each dataset processed through d0reco in one grid job. (*Gabriele Garzoglio*)
- The corresponding merge job submitted separately. (*Andrew Baranovski*)

Using a grid ...

- provides common environment for d0reco at all sites.
- allows common operation scripts (d0repro). (*DW*)
  - submission (and recovery) is done by  
sub\_production.py <dataset> <d0release>  
sub\_merge.py <dataset> <d0release>
  - production and merge status can be checked (poor man's request system)

Tests on the 700CPU DØFarm revealed scalability issues in JIM

Behaviour was improved by a factor of 60(!).

# Error Handling and Recovery

Beside unrecoverable crashes of d0reco there will be *random* crashes.

(Network outages, file delivery failures, batch system crashes/hangups, worker-node crashes, filesystem corruption...)

## Book-keeping

### 1. of succeeded jobs/files

needed to assure completion without duplicated events.

SAM is used avoid data duplication and to define recovery jobs.

### 2. of failed jobs/files

needed to trace problems in order fix bugs and to assure efficiency.

JIMs XML-DB is used to ease bug tracing and provide fast recovery.

# Available Resources

FNAL Farm,	1000CPUs	SAMGrid	used by data-taking
Westgrid,	600CPUs	SAMGrid	ready to go
Lyon,	400CPUs	SAMGrid	ready to go
SAR (UTA),	230CPUs	SAMGrid	ready to go
Wisconsin,	30CPUs	SAMGrid	ready to go
GridKa,	500CPUs	SAMGrid	minor problems
Prague,	200CPUs	SAMGrid	minor problems
CMS Farm,	100CPUs	LCG with JIM jobmanger	under test
UK,	750CPUs	SAMGrid, 4 sites,	being deployed
External	~2800CPUs	(1GHz PIII equiv.)	

Ready to go 45%, Expected soon 25% , To join later 30%.

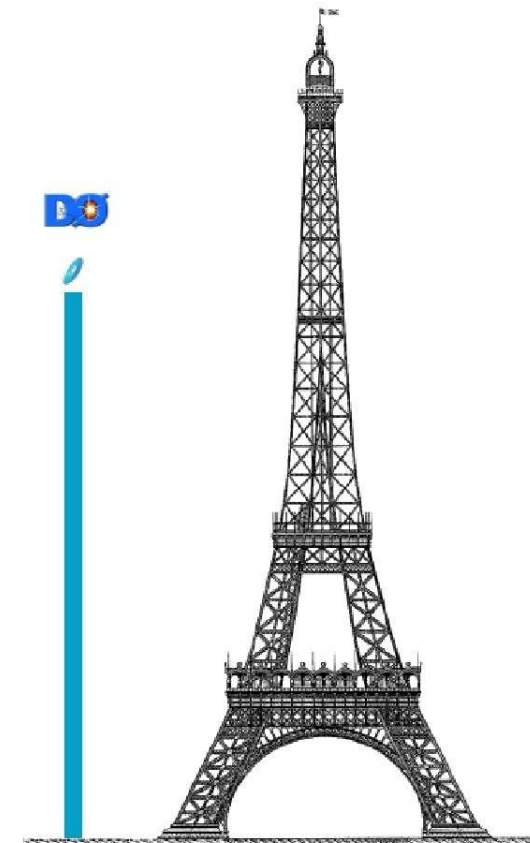
*(SAMGrid team with remote admins)*

⇒ *not* sufficient for completion in 6mths, but d0reco is faster than projected



# Summary

- The p17 reprocessing effort is more than  $3\times$  bigger than the 2003/4 p14 effort.
  - 250TB need to be shipped out to remote sites
  - Est. 20,000CPU months or 1600CPU years
  - to produce 70TB of TMBs.
- Planning
  - Time for completion: 6 months.
  - SAMGrid provides:  
Common mode of operation.
- Status
  - Certifying sites
  - Awaiting final DØ release



# Outlook

- Production
  - enter production with upcoming DØ release p17.03.02;
  - start with 4 sites; join remaining asap
- SAM Grid
  - add brokering
    - ⇒ decrease person power required
  - interface SAMGrid to LCG
    - ⇒ increase CPU resources
- Operation scripts
  - auto pilot in d0repro
    - ⇒ decrease person power required

