LcgCAF: CDF submission portal to LCG

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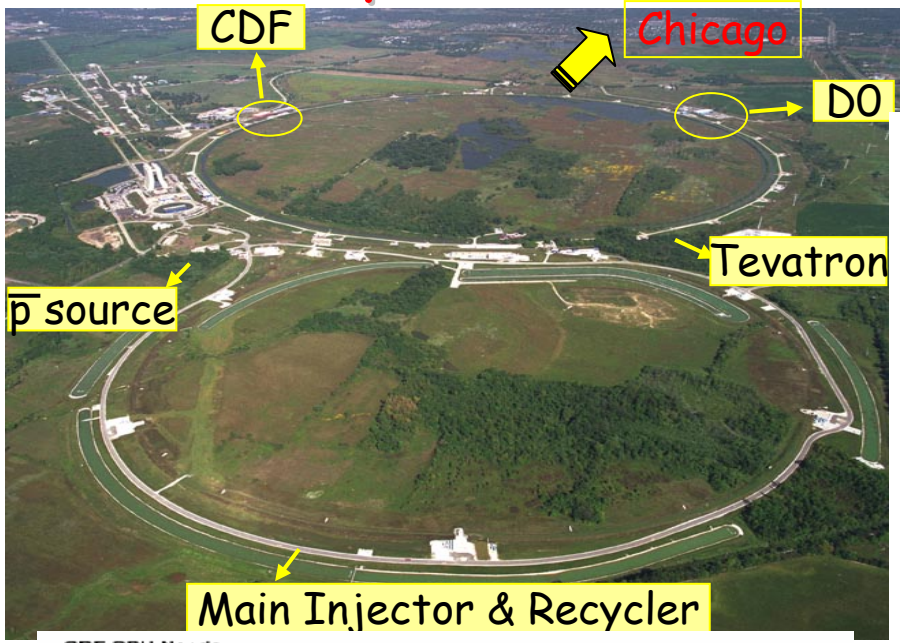
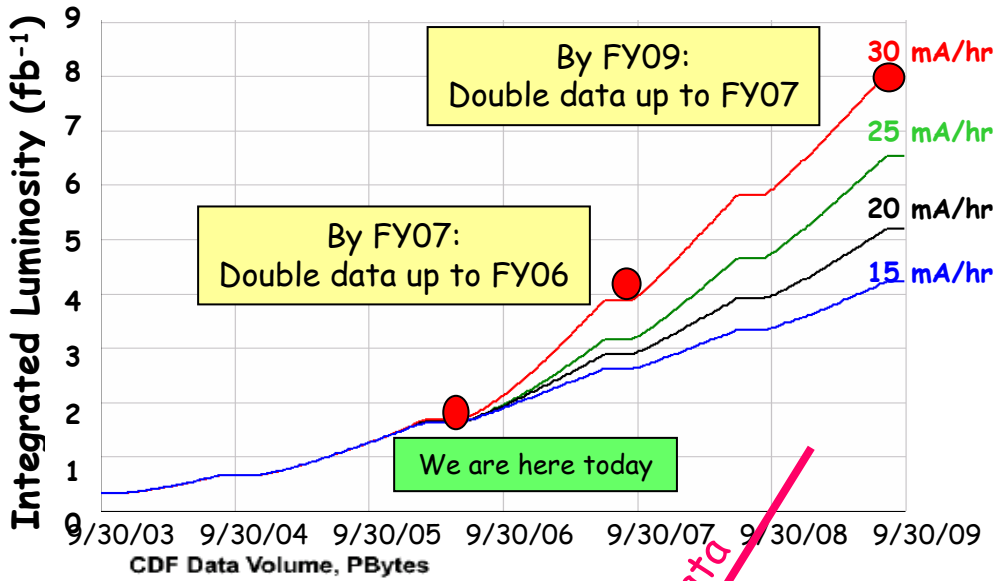
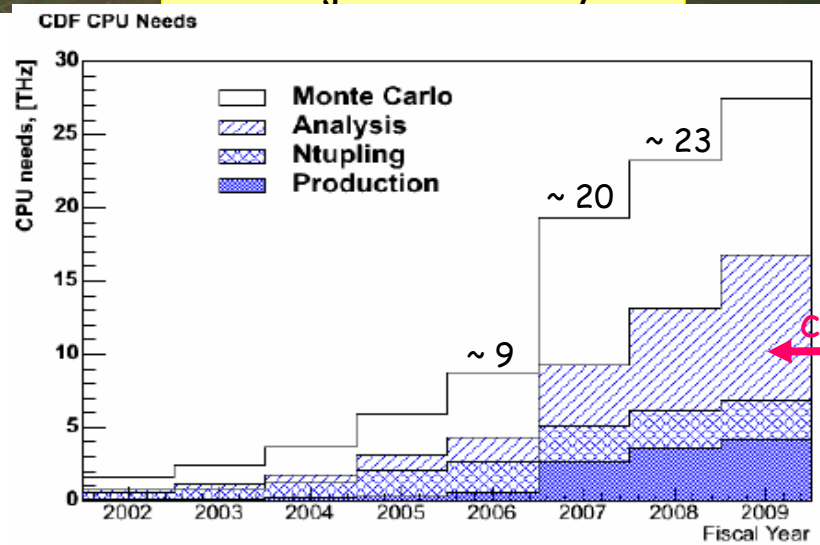
CDF experiment and data volumes



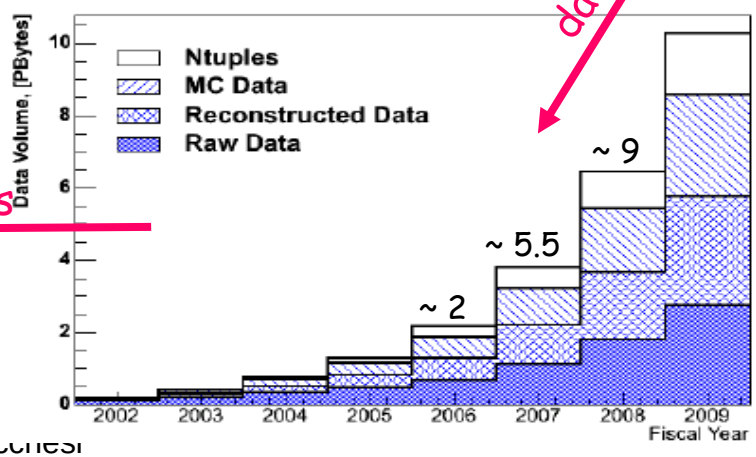
- L_{peak}: $2.3 \times 10^{32} s^{-1} cm^{-2}$ $\sqrt{s}$ =1.96 TeV
  36 bunches, 396 ns crossing time





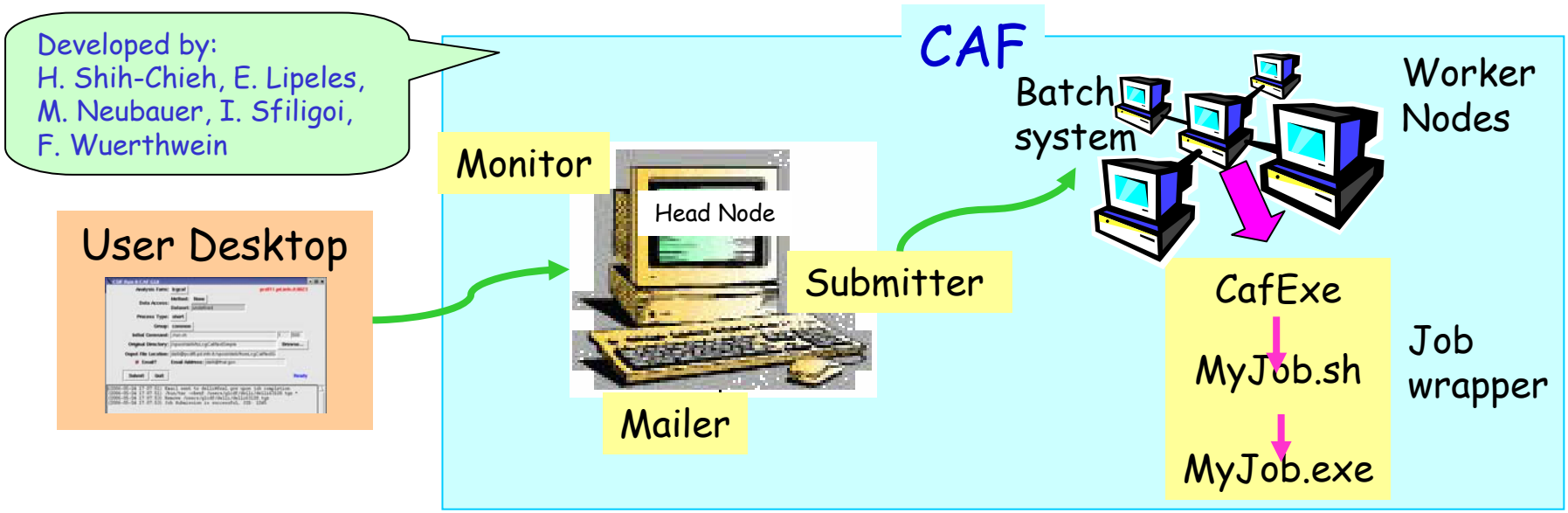
cpu needs

data



CDF Data Handling Model: how it was

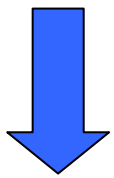
- Data processing: dedicated production farm at FNAL
- User analysis and Monte Carlo production: CAF Central Analysis Facility.
  - FNAL hosts data->farm used to analyze them
  - Remote sites decentralized CAF (dCAF) → produce Monte Carlo, some sites (ex. CNAF) have also data.
- CAF and dCAF are CDF dedicated farms structured:



Moving to a GRID Computing Model

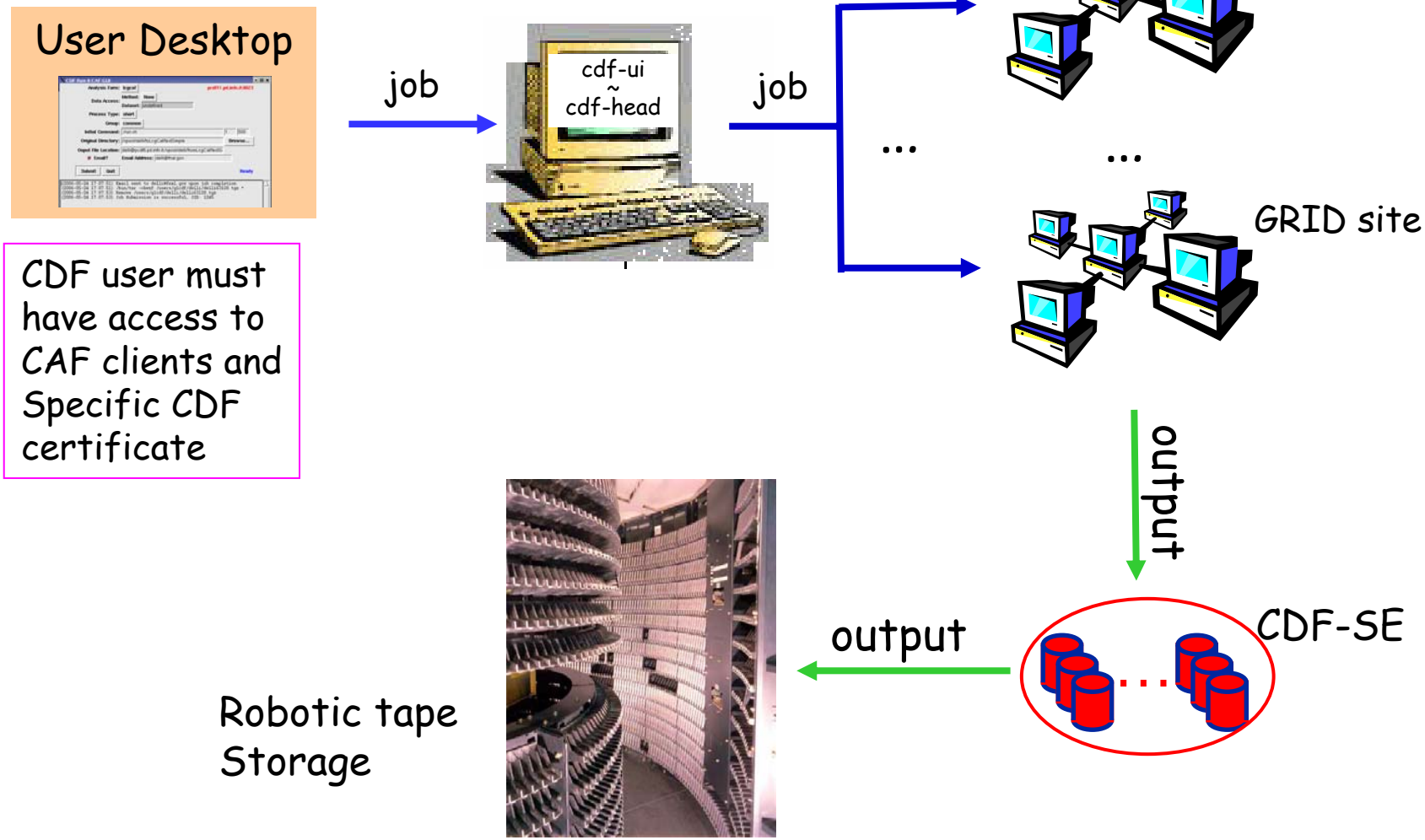
Reasons to move to a GRID computing model:

- Need to expand resources, luminosity expect to increase by factor ~4 until CDF ends.
- Resource were in dedicated pools, limited expansion and need to be maintained by CDF personnel
- GRID resources can be fully exploited before LHC experiments will start analyze data
- CDF has no hope of have a large amount of resources without GRID!



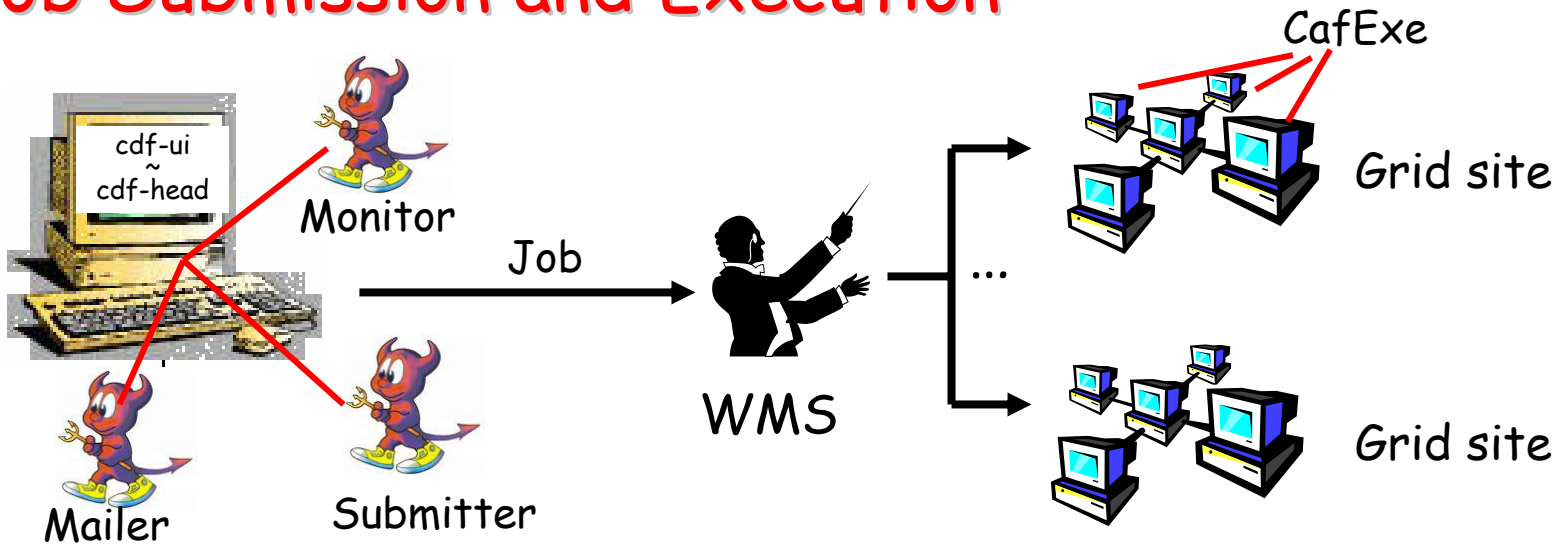
LcgCAF

LcgCAF: General Architecture



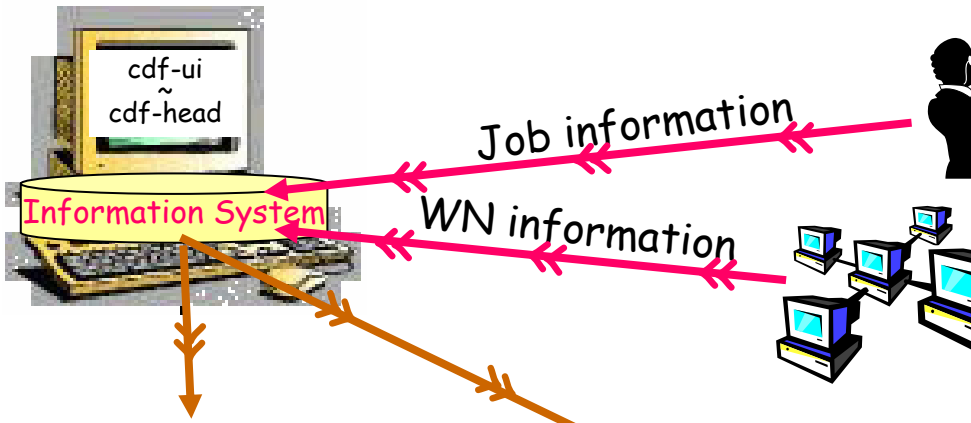
CDF user must have access to CAF clients and Specific CDF certificate

Job Submission and Execution



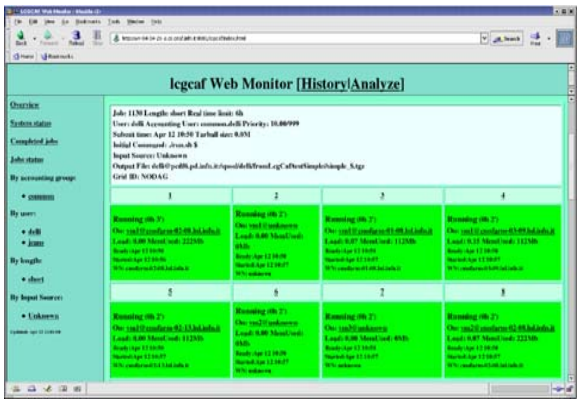
- Daemons running on CDF head:
  - Submitter: receive user job, create its wrapper to run it on GRID environment, make available user tarball
  - Monitor: provide job information to user
  - Mailer: send e-mail to user when job is over with a job summary (useful for user bookkeeping)
- Job wrapper (CafExe): run user job, copy whatever is left at the end of user code to user specified location

Job Monitor



WMS: keeps track of job status on the GRID

WN: job wrapper collects information like load dir, ps, top..



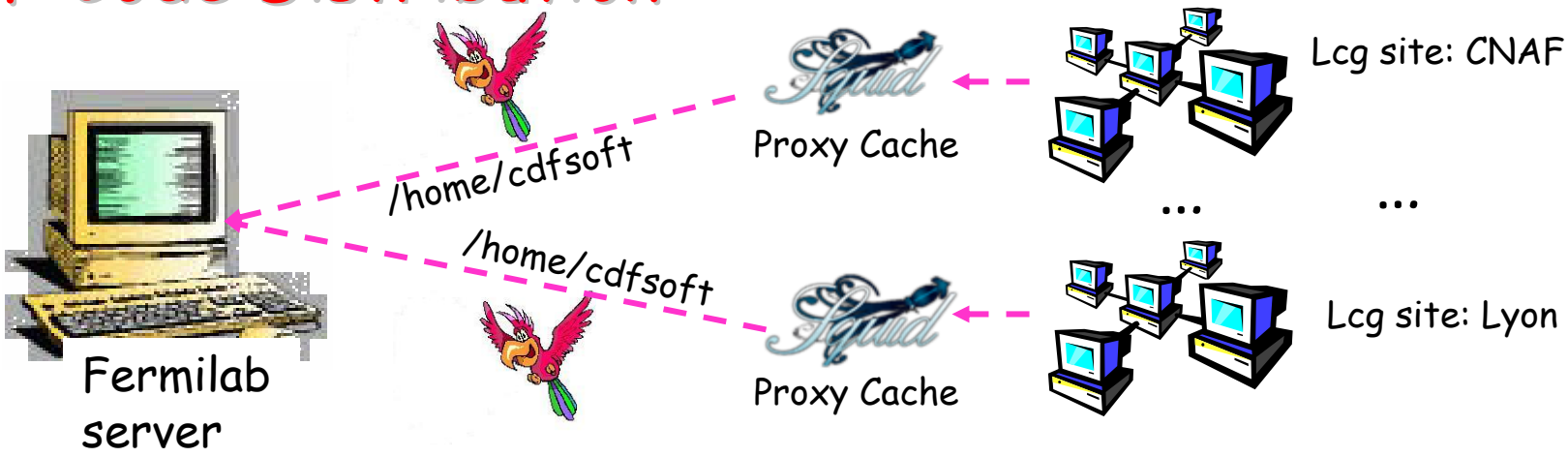

```
$ CafMon jobs

Analysis Farm: lcgcaf    Host: pcdf11.pd.infn.it
    Job        Group     From      To    Status

    1208        short       Total:    50
-------------------------------------------------------
    1208        short         1       11 Pending
    1208        short         7       15 Running
    1208        short        16       50 Success
-------------------------------------------------------
    1208        short       Success:    42 Pending:     8
    1208        short       Success:   84% Pending:   16%
$
```

Web based Monitor: information on running jobs for all users and jobs/users history are read from LcgCAF Information System

Interactive job Monitor: running jobs information are read from LcgCAF Information System and sent to user desktop. Available commands:

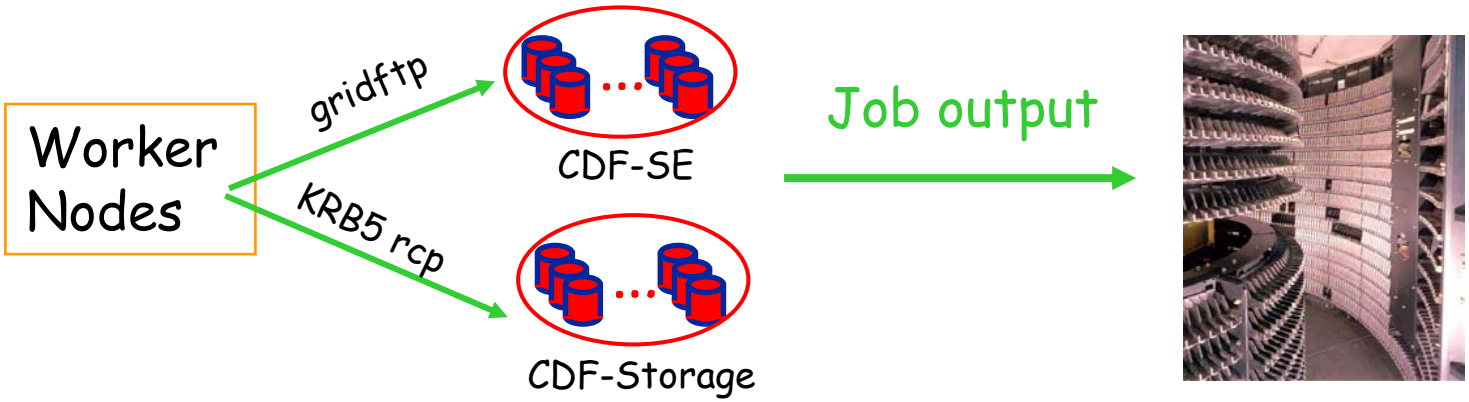
- CafMon list
- CafMon kill
- CafMon dir
- CafMon tail
- CafMon ps
- CafMon top

CDF Code Distribution



- In order to run a CDF job needs CDF code and Run Condition DB available to WN, since this cannot be expected to be available in all the GRID sites,
  ⇒ Parrot is used as virtual file system for code and FroNTier for DB
- Since most request are the same, a local cache is used: Squid web proxy cache

CDF Output storage



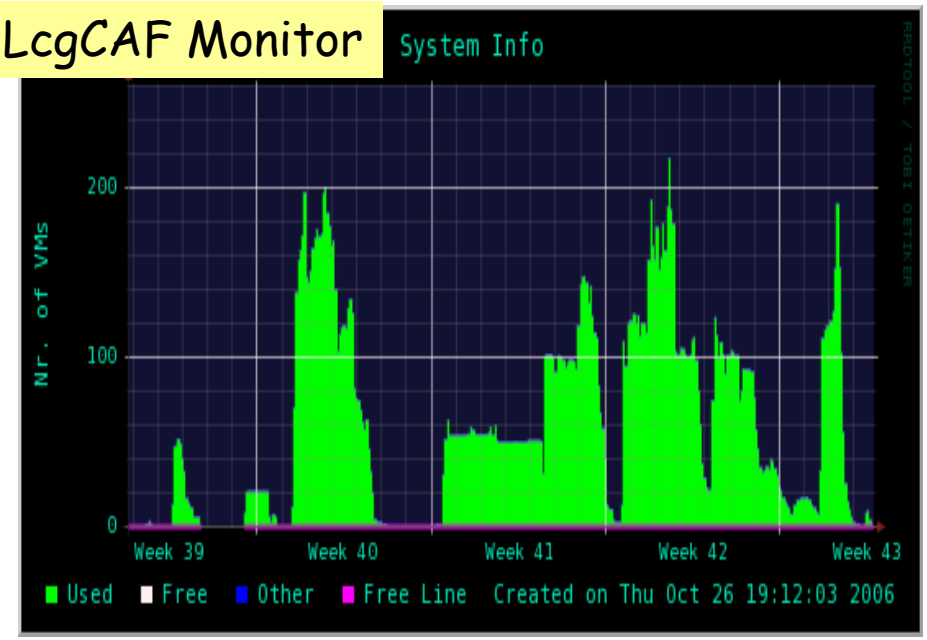
- User job output is transferred to CDF Storage Element (SE) via gridftp or to a CDF-Storage location via rcp
- From CDF-SE or CDF-storage output copied using gridftp to FNAL fileservers.
- Automatic procedure copies files from fileservers to tape and declare them to the CDF catalogue

LcgCAF Usage

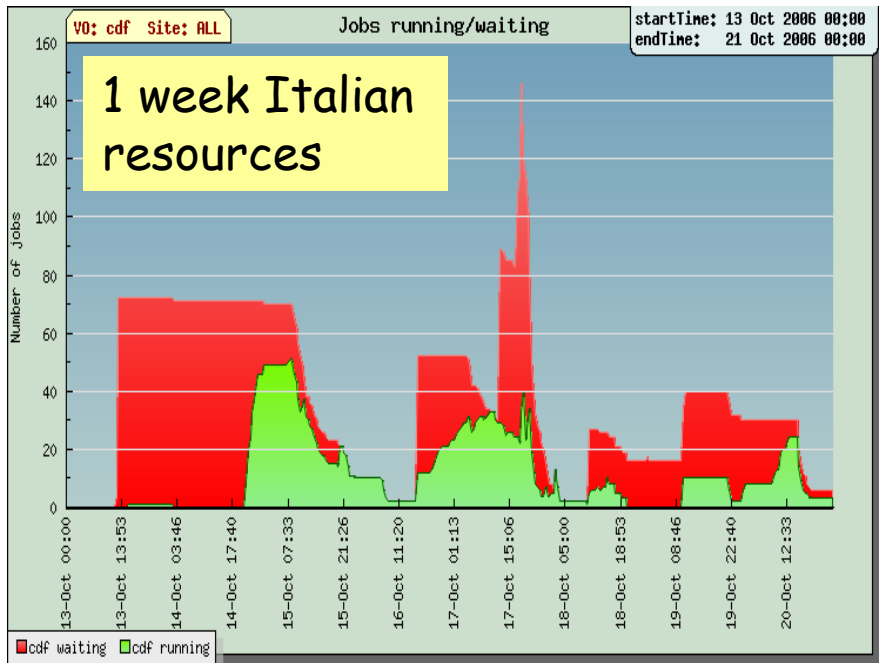
LcgCAF used by power users for B Monte Carlo Production but generic users also start to use it!

Last month running sections

LcgCAF Monitor



CDF VO monitored with standard LCG tools: GridIce

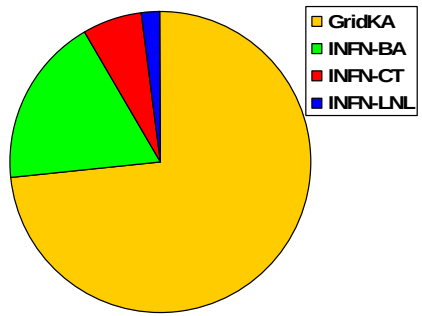


Performances

- CDF B Monte Carlo production: ~5000 jobs in ~1 month

Samples	Events on tape	ε	ε with 1 Recovery
B_s->$D_s\pi$ D_s->$\phi\pi$, D_s->K*K, D_s->K_sK	~6,2 · 10^6	~94%	~100%

- User jobs: ~1000 jobs in a week ε~100% executed on these sites:



Failures:

GRID: site miss-configuration, temporary authentication problems, WMS overload

LcgCAF: Parrot/Squid cache stacked

Retry mechanism:

GRID failures ⇒ WMS retry

LcgCAF failures ⇒"home-made" retry (logs parsing)

Conclusions and Future developments

- ✓ CDF has developed a portal to access the LCG resources used to produce Monte Carlo data and for every-day user jobs ⇒ GRID can serve also a running experiment

- o No policy mechanism on LCG, user policy rely on site rules, for LcgCAF user ⇒ "random priority"
  Plan to implement a mechanism of policy management on top of GRID policy tools
- o Interface between SAM (CDF catalogue) and GRID services under development to allow:
  - output file declaration into catalogue directly from LcgCAF ⇒ automatic transfer of output files from local CDF storage to FNAL tape
  - data analysis on LCG sites

Backup

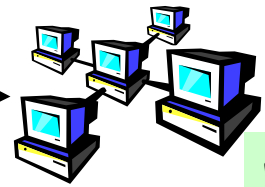
Submitter and Job wrapper

User Desktop

Submission parameters

User tarball

JDL: Job Description Language



worker nodes

Performances

CDF B Monte Carlo production

Samples	Events on tape	ε	ε with 1 Recovery
B_s->$D_s\pi$ D_s->$\phi\pi$	1969964	~92%	~100%
B_s->$D_s\pi$ D_s->K*K	2471751	~98%	~100%
B_s->$D_s\pi$ D_s->K_sK	1774336	~92%	~100%

$$\varepsilon = \frac{\#\ \text{segments succeeded}}{\#\ \text{segments submitted}}$$

GRID failures: site miss-configuration, temporary authentication problems, WMS overload

LcgCAF failures: Parrot/Squid cache stacked

Retry mechanism: necessary to achieve ~100% efficiency WMS retry for GRID failures and LcgCAF "home-made" retry based on logs parsing

Available resources

- Currently CDF access the following sites:

Site	Country	KSpecInt2K
CNAF-T1	Italy	1500
INFN-Padova	Italy	60
INFN-Catania	Italy	248
INFN-Bari	Italy	87
INFN-Legnaro	Italy	230
IN2P3-CC	France	500
FZK-LCG2	Germany	2000
IFAE	Spain	20
PIC	Spain	150
UKI-LT2-UCL-HE	UK	300
Liverpool	UK	100