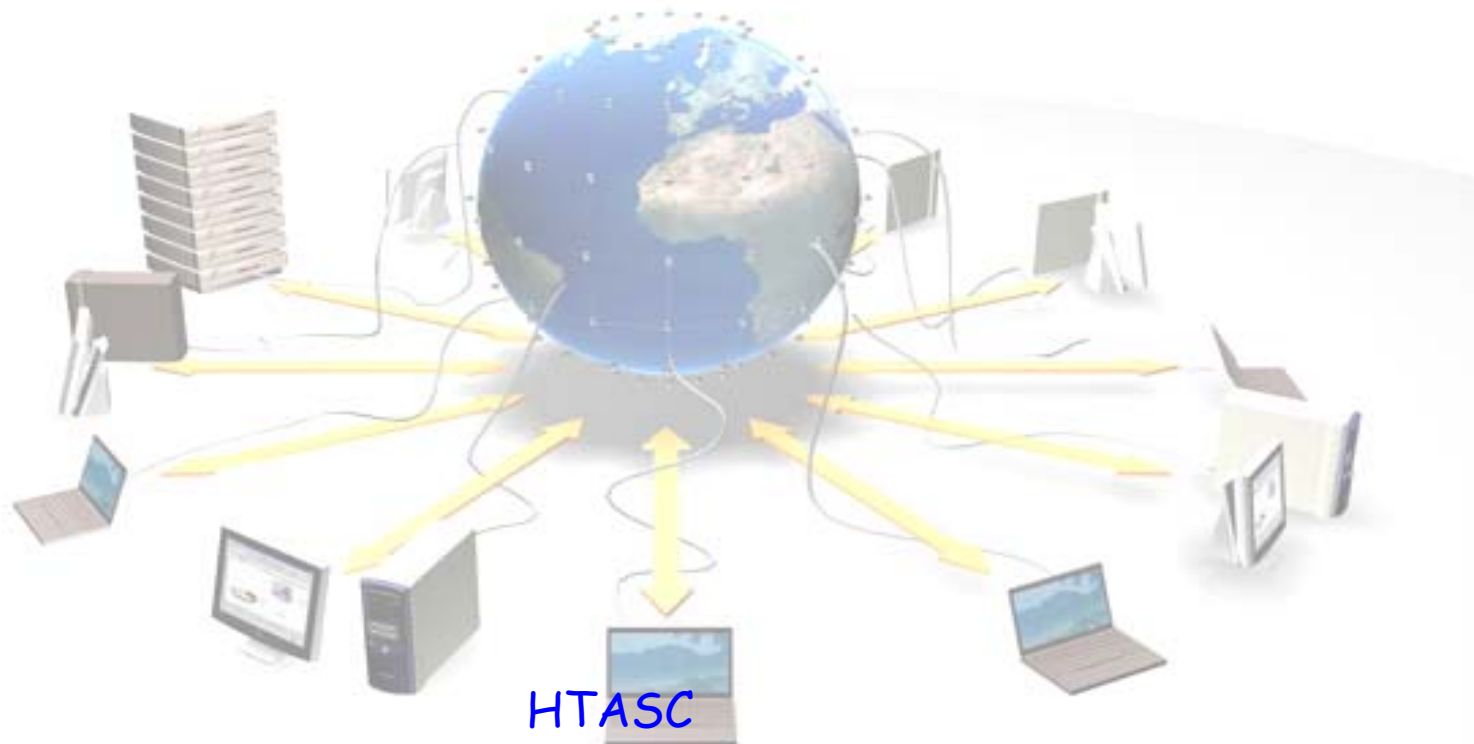# CERN and LCG report

HTASC

10 September 2004

Jürgen Knobloch

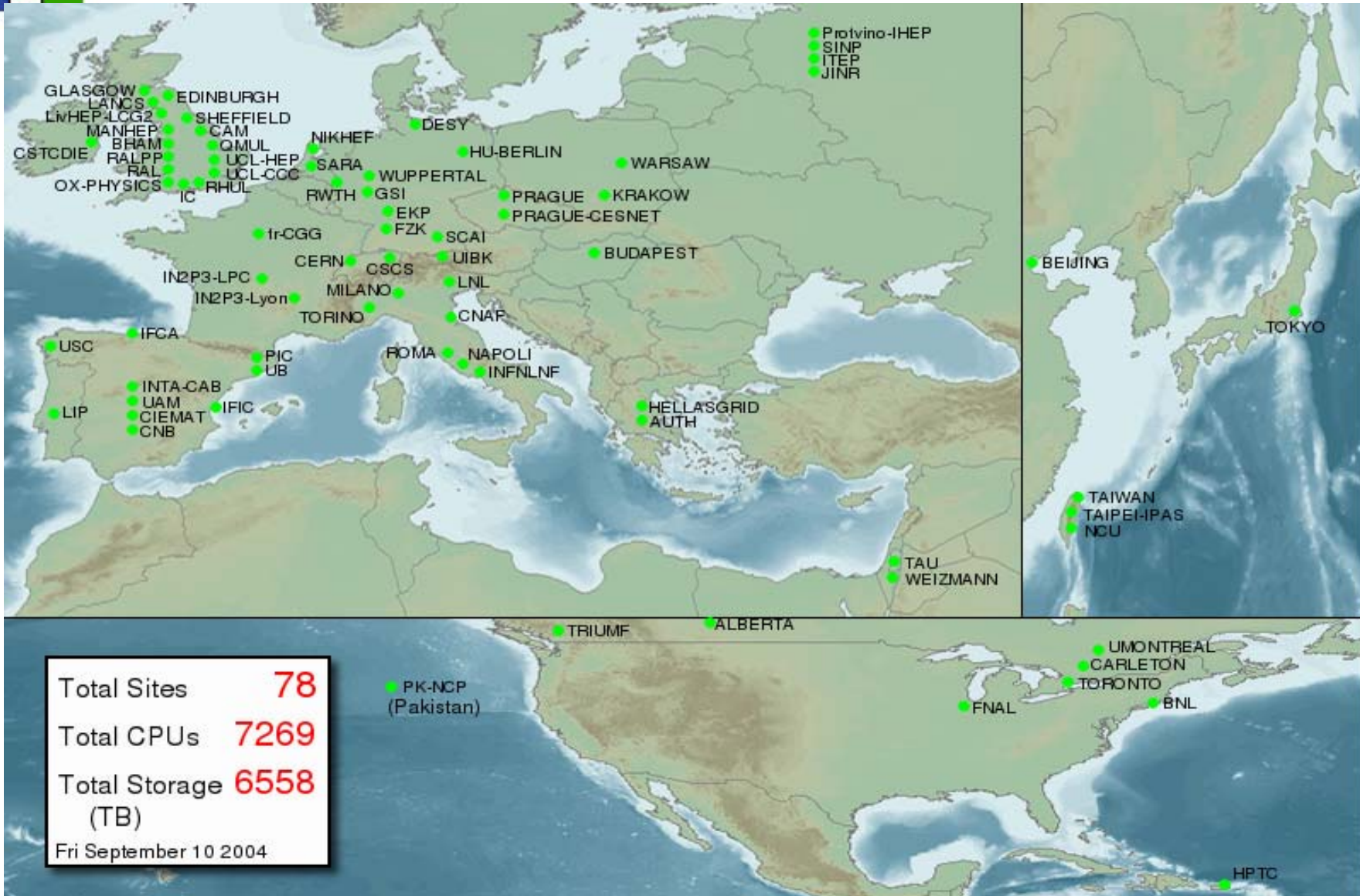IT Department, CERN

This file is available at:
http://cern.ch/lcg/presentations/LCG_JK_HTASC_2004_09.ppt

LCG-2 sites – status 10 September 2004

Total Sites	78
Total CPUs	7269
Total Storage (TB)	6558

Fri September 10 2004

LCG

- Experiment data challenges phase-1 terminated – a lot has been learned – improvements have been and are being implemented

- Data challenges are being complemented by service challenges – trying high throughput data transfer – sustained operation between Tier-0 and selected Tier-1s

- ARDA & Scientific Linux – see other talks

- Phase-2 planning is progressing

- Issues on missing resources are being addressed

- Grid deployment and gLite development proceed in parallel

- The following slides are summaries from the last GDB meeting: of ALICE, ATLAS, CMS, LHCb and Ian Bird

ALICE - Considerations

- ✦ LCG is providing a (more and more) coherent infrastructure with a large quantity of resources
- ✦ Relations with LCG are good
  - ✦ With the inevitable strains of time-constrained exercise
  - ✦ Special thanks to P.Mendez for playing the difficult and ungrateful role of interface between the unruly ALICE mob and LCG support and site admins
  - ✦ Thanks to LCG for providing additional storage resources for a local SE at CERN exclusively for ALICE (3.5 TB).
- ✦ The middleware is improving within the limits of its current design and architecture
  - ✦ GAG is preparing a detailed feedback based on the experience of the Data Challenges
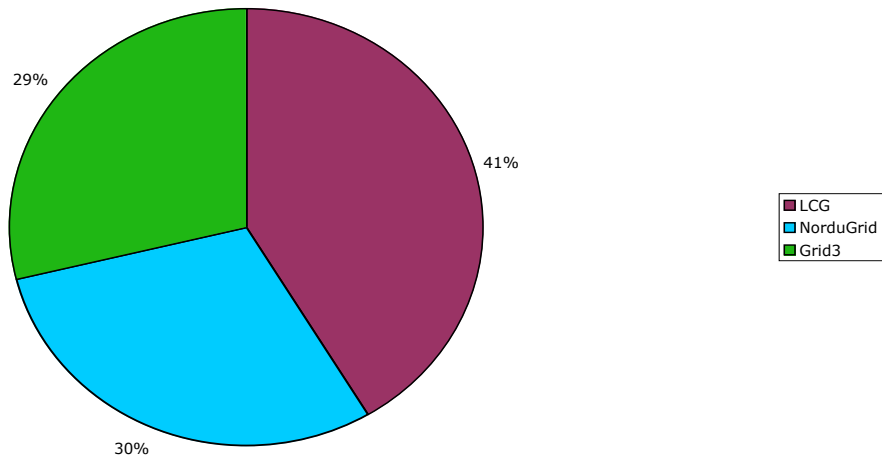 - ✦ ALICE observations are similar to those of the other experiments

ALICE - Conclusions

✦ The ALICE DC04 started out with (almost unrealistically) ambitious objectives

✦ We are coming very close to reach this objectives and LCG has played an important role in this

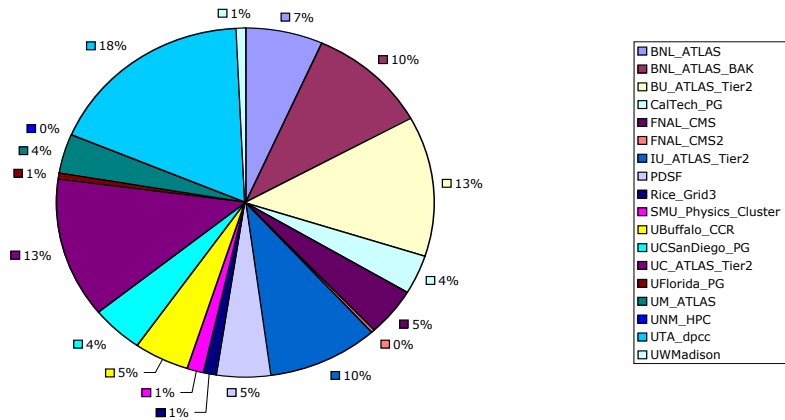✦ We are ready and willing to move to gLite as soon as possible and contribute to its evolution with our feedback
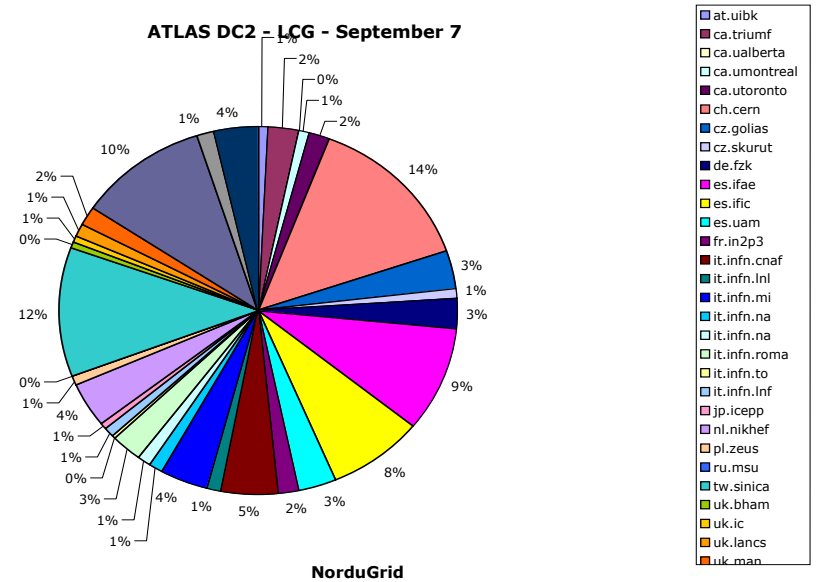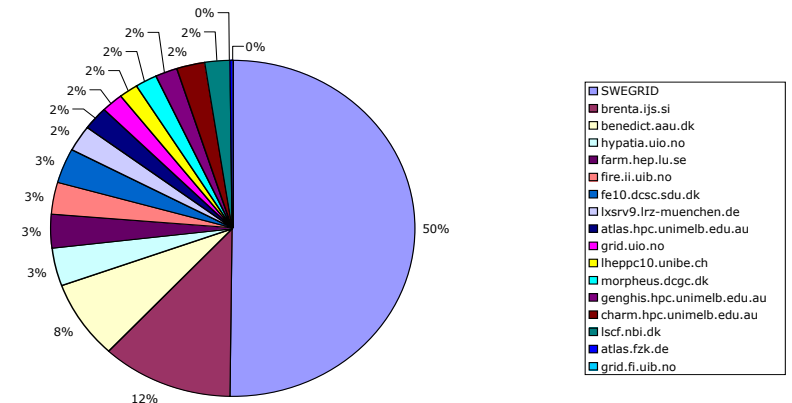
CPU usage & Jobs

ATLAS DC2 - CPU usage

- LCG
- NorduGrid
- Grid3

41%
29%
30%

ATLAS DC2 – LCG – September 7

- at.uibk
- ca.triumf
- ca.ualberta
- ca.umontreal
- ca.utoronto
- ch.cern
- cz.golias
- cz.skurut
- de.fzk
- es.ifae
- es.ific
- es.uam
- fr.in2p3
- it.infn.cnaf
- it.infn.lnl
- it.infn.mi
- it.infn.na
- it.infn.na
- it.infn.roma
- it.infn.to
- it.infn.lnf
- jp.icepp
- nl.nikhef
- pl.zeus
- ru.msu
- tw.sinica
- uk.bham
- uk.ic
- uk.lancs
- uk.man

ATLAS DC2 - Grid3 - September 7

- BNL_ATLAS
- BNL_ATLAS_BAK
- BU_ATLAS_Tier2
- CalTech_PG
- FNAL_CMS
- FNAL_CMS2
- IU_ATLAS_Tier2
- PDSF
- Rice_Grid3
- SMU_Physics_Cluster
- UBuffalo_CCR
- UCSanDiego_PG
- UC_ATLAS_Tier2
- UFlorida_PG
- UM_ATLAS
- UNM_HPC
- UTA_dpcc
- UWMadison

NorduGrid

- SWEGRID
- brenta.ijs.si
- benedict.aau.dk
- hypatia.uio.no
- farm.hep.lu.se
- fire.ii.uib.no
- fe10.dcsc.sdu.dk
- lxsrv9.lrz-muenchen.de
- atlas.hpc.unimelb.edu.au
- grid.uio.no
- lheppc10.unibe.ch
- morpheus.dcgc.dk
- genghis.hpc.unimelb.edu.au
- charm.hpc.unimelb.edu.au
- lscf.nbi.dk
- atlas.fzk.de
- grid.fi.uib.no

ATLAS - Summary (1)

❑ Major efforts on the past few months
- o Redesign of the ATLAS Event Data Model and Detector Description
- o Integration of the LCG components (G4; POOL; ...)
- o Introduction of the **Production System**
  - ➢ Interfaced with 3 Grid flavors (and "legacy" systems)

❑ Delays in all activities have affected the schedule of DC2
- o Note that Combined Test Beam is ATLAS 1st priority
- o And DC2 schedule was revisited
  - ➢ To wait for the readiness of the software and of the Production system

ATLAS - Summary (2)

❑ DC2
  - o About 80% of the Geant4 simulation foreseen for PhaseI has been completed using only Grid and using the 3 flavors coherently; Pile-up just starting
  - o The 3 Grids have been proven to be usable for a real production and this is a major achievement

❑ BUT
  - o Phase I progressing slower than expected and it's clear that all the involved elements (Grid middleware; Production System; deployment and monitoring tools over the sites) need improvements
  - o It's one of the goals of the Data Challenges to identify these problems as early as possible.

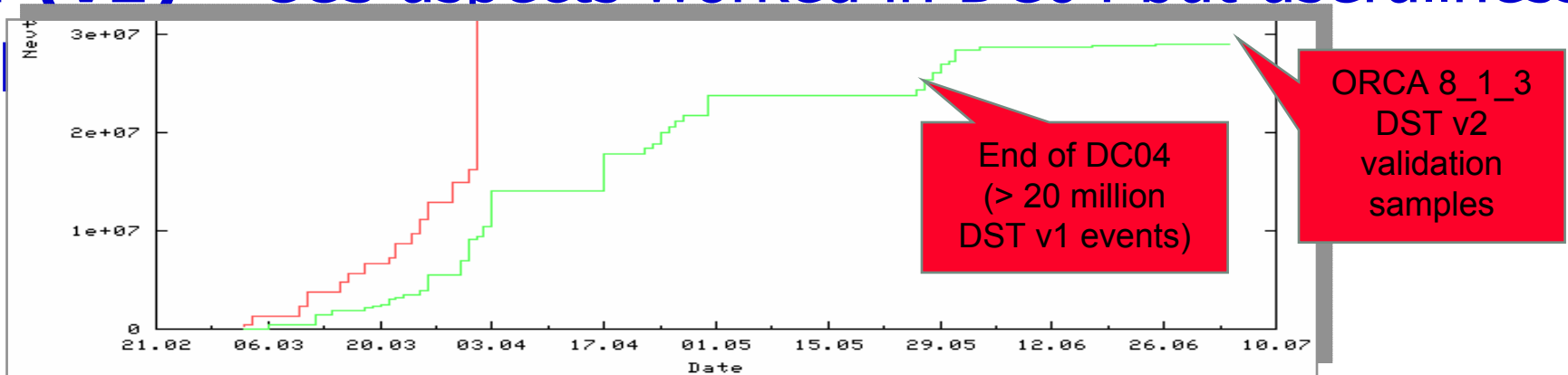❑ Phase II (Tier0 exercise) is scheduled for October

Continuous Operation

❖ We have been in full time production for a year now
- ◆ Some of this on GRID resources and some on dedicated resources

❖ We are aggressively working on:
- ◆ Enabling complex tasks like Digitization to run on GRID resources
- ◆ Smoothing the production operations (continuous delivery rather than large blocks at a time;
- ◆ End-to-end delivery;
- ◆ Data movement;
- ◆ Publication;
- ◆ Enabling user jobs

❖ New CCS Tasks of Data Management, Workload management and Production Operations and cross-project APROM to coordinate and to do the work.

❖ Continuous user access to data at GRID sites is a big issue.
- ◆ Analysis issues being implemented and tested and made to work

❖ **DST (v1)** – CCS aspects worked in DC04 but usefullness to Pl...

ORCA 8_1_3 DST v2 validation samples

End of DC04 (> 20 million DST v1 events)

❖ **DST (v2)** - OK for 10 million $W \rightarrow e\nu$ calibration sample

❖ **DST (v3)** - PRS have made physics objects "generally good enough"

Physics TDR

- ❖ **Physics TDR scheduled for December 2005**
  - ◆ Not a "yellow report", but a detailed study of methods for initial data taking and detector issues such as calibration as well as physics reach studies.

- ❖ **Current Simulated samples more or less adequate for low luminosity**
  - ◆ About to enter re-reconstruction phase with new DST version
  - ◆ Estimate similar sample sizes for high luminosity

- ❖ **Target 10M events/month throughput**
  - ◆ Generation, Simulation, Digitization, Reconstruction, Available for analysis
  - ◆ New production operations group in CMS to handle this major workload

- ❖ **In light of DC04 experience, DC05 is cancelled as a formal computing exercise**
  - ◆ Not possible to serve current physics requirements with data challenge environment
  - ◆ However, specialized component challenges are foreseen

Continuous Operation Scale and Scope

❖ Instead of DC05 we need to progressively bring up a full time operation, including data access
  - ◆ Not a test or a challenge.
  - ◆ Physicist access to data required.

❖ Generic GRID resources (for Generation/Simulation)
  - ◆ ~750 CPU Continuous
    - ▪ CPU means current generation ~2.4+GHz

❖ CMS T1 resources (Grid with significant Disk and MSS)
  - ◆ Needed for data intensive Digitization and Reconstruction steps
  - ◆ ~750 CPU Continuous
  - ◆ Now 60TB +20TB/month (Spread across T1 centers)

❖ T1/T2 resources (probably not generic)
  - ◆ ~150 CPU Continuous
  - ◆ Now 40TB Analysis disk space to grow by about 2-5TB/month (T1+T2)

❖ We intend to run all this within LCG
  - ◆ "LCG" being all those resources available to CMS being steady migration from/between LCG2, GRID3, gLite, …

❖ We need to reach the 10M event/month level soon (Autumn)

❖ We need to make the resources available to a growing CMS user base in the same time scale

Status and Outlook

- LHCb DC'04 Phase 1 is over.

- The Production Target has been achieved:

  - 186 M Events in 424 CPU years.

  - ~ 50% on LCG Resources (75-80% at the last weeks).

- Right LHCb Strategy:

  - Submitting "empty" DIRAC Agents to LCG has proven to be very flexible allowing a success rate above LCG alone.

- Big room for improvements, both on DIRAC and LCG:

  - DIRAC needs to improve in the reliability of the Servers:

    - big step already during DC.

  - LCG needs improvement on the single job efficiency:

    - ~40% aborted jobs, ~10% did the work but failed from LCG viewpoint.

Outlook

- Phase 2
    - Stripping in last steps of preparation
    - Need to Run over 65 TB of Data distributed over 4 Tier1 Sites (CERN, CNAF, FZK, PIC), with "small" CPU requirements.

- Phase 3
    - End user analysis will follow
    - GANGA tools in preparation

- (Phase 1)
    - Keep a continuous rate of production activity with programmed mini DC (i.e., few days once a month).

Summary of issues (I. Bird at last GDB)

- **LCG-2 services have been supporting the data challenges**
    - Many middleware problems have been found – many addressed
    - Middleware itself is reasonably stable
- **Biggest outstanding issues related to providing and maintaining stable operations**
- **Has to be addressed in large part by management buy-in to providing sufficient and appropriate effort at each site**
- **Future middleware has to take this into account:**
    - Must be more manageable, trivial to configure, etc
    - Management and monitoring must be built into services from the start

Other points on CERN computing

- **Security**
  - High rate of incidents since July
  - Lionel Cons nominated Deputy Computing Security Officer
  - ACB stopped July 1st
  - Windows: reset password of local admin
  - W-XP: service pack 2 - pilot
  - Recently, LCG and MACs were also hit
- **IP telephony pilot project running**