

# The Worldwide LHC Computing Grid

## Introduction & Housekeeping

Collaboration Workshop, Jan 2007



Worldwide LHC Computing Grid  
Distributed Production Environment for Physics data Processing



## Housekeeping

- Coffee will be served outside Monday - Thursday morning inclusive & Wednesday afternoon - timing!
- Lunch is a problem - delay to ~13:30 ???
- Collaboration drink Wednesday evening in R1
- Don't forget to wear your badges!



## Workshop Feedback

- >160 people registered and (a few more) participated!
  - This is very large for a workshop - about same as Mumbai
    - Some comments related directly to this (~40 replies received so far)
- Requests for more:
  - Tutorials, particularly “hands-on”
  - Direct Tier2 involvement
  - Feedback sessions, planning concrete actions etc.
- **Active help from Tier2s in preparing / defining future events would be much appreciated**
  - Please not just the usual suspects...
- See also [Duncan Rand's talk to GridPP16](#)
  - Some slides included below



## Previous Workshop Gripes

- Why no visit to e.g. ATLAS?
- Why no introduction to particle physics?
- These things could clearly have been arranged
- *Why no suggestion in the meeting Wiki?*
- Why no name badges? (We had CERN access cards, but not for 'locals'...)
- Start time (11:00 on Mon&Tue) (dictated by room availability)
- Better coffee, air conditioning, ...
- More involvement of Tier1s and Tier2s

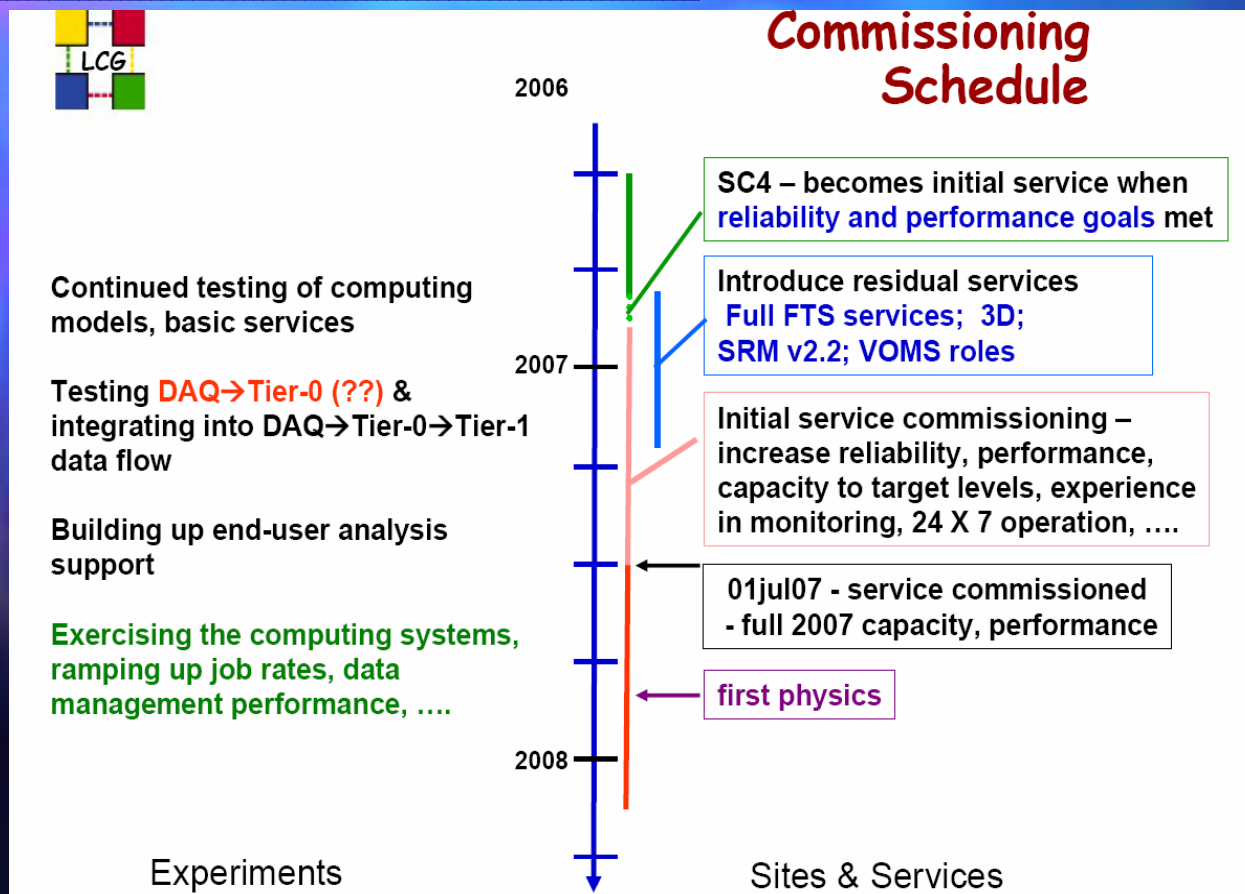




## Summary

- Workshops have been well attended and received
  - Feedback will help guide future events
- Need to improve on Tier1+Tier2 involvement
  - Preparing agenda / chairing sessions / giving talks etc.
- Strong demand for more tutorials
  - Hands-on where possible / appropriate
- Hopefully lots of volunteers to help with future events...

# WLCG Commissioning Schedule



- Still an ambitious programme ahead
- Timely testing of full data chain from DAQ to T-2 chain was major item from last CR
  - DAQ → T-0 still largely untested

## Inter-Site Rates - Revised Megatable

Centre	T0->T1	T1->T2	T2->T1	T1<->T1
	Predictable - Data Taking	<b>Bursty - User Needs</b>	Predictable - Simulation	Scheduled Reprocessing
IN2P3, Lyon	220	286.2	85.5	498.0
GridKA, Germany	220	384.9	84.1	395.6
CNAF, Italy	190	321.3	58.4	583.8
FNAL, USA	110	415.0	52.6	417.0
BNL, USA	300	137.7	24.8	358.0
RAL, UK	120	108.3	36.0	479.4
NIKHEF, NL	160	34.1	6.1	310.4
ASGC, Taipei	120	126.5	19.3	241.2
PIC, Spain	100	167.1	23.3	234.5
Nordic Data Grid Facility	60	-	-	62.4
TRIUMF, Canada	60	-	-	55.0

Continued testing of computing models, basic services

Testing **DAQ→Tier-0 (??)** & integrating into DAQ→Tier-0→Tier-1 data flow

Building up end-user analysis support

Exercising the computing systems, ramping up job rates, data management performance, ....

# WLCG Commissioning Schedule

2006

2007

2008

SC4 – becomes initial service when reliability and performance goals met

Introduce residual services  
Full FTS services; 3D; gLite 3.x;  
SRM v2.2; VOMS roles; SL(C)4

Initial service commissioning – increase performance, reliability, capacity to target levels, experience in monitoring, 24 x 7 operation, ....

01 jul07 - service commissioned - full 2007 capacity, performance

first collisions in the LHC. Full FTS services demonstrated at 2008 data rates for all required Tx-Ty channels, over extended periods, including recovery (T0-T1).

## ***Looking further ahead: 'The Dress Rehearsal'*** ***(A Mid Summer Night's Dream?)***



**A complete exercise of the full chain from trigger to (distributed) analysis, to be performed in 2007, a few months before data taking starts**

### **Some details for experts:**

- **Generate  $O(10^7)$  evts: few days of data taking,  $\sim 1 \text{ pb}^{-1}$  at  $L = 10^{31} \text{ cm}^{-2} \text{ s}^{-1}$**
- **Filter events at MC generator level to get physics spectrum expected at HLT output**
- **Pass events through G4 simulation (realistic "as installed" detector geometry)**
- **Mix events from various physics channels to reproduce HLT physics output**
- **Run LVL1 simulation (flag mode)**
  
- **Produce byte streams  $\rightarrow$  emulate the raw data**
- **Send raw data to Point 1, pass through HLT nodes (flag mode) and SFO, write out events by streams, closing files at boundary of luminosity blocks.**
- **Send events from Point 1 to Tier0**
  
- **Perform calibration & alignment at Tier0 (also outside ?)**
- **Run reconstruction at Tier0 (and maybe Tier1s ?)  $\rightarrow$  produce ESD, AOD, TAGs**
- **Distribute ESD, AOD, TAGs to Tier1s and Tier2s**
- **Perform distributed analysis (possibly at Tier2s) using TAGs**
- **MCTruth propagated down to ESD only (no truth in AOD or TAGs)**

***Ambitious goals... need to plan it carefully (both in terms of effort needed and of technical issues and implications)***





## Operations Issues

- WLCG Collaboration workshop 'pauses' Thursday lunchtime & restarts Friday with BOF sessions and Experiment Tutorials
- Thursday afternoon:
  - Joint Operations Workshop (continues Friday am)
  - [ WLCG Collaboration Meeting (closed) ]
- Final Plenary session:
  - **Integration of Grid and Experiment service operations, both globally and regionally**
    - Experiment Operations Coordinators, Tier1 Representatives, EGEE / OSG / NDGF / WLCG Operations Coordinators