
GDB

# New GDB Standing Working Group T0/1/2 Networking

*Kors Bos NIKHEF, Amsterdam*

*GDB Meeting, 12 January, 2005*


# GDB Working Groups

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**GDB has 3 active Working Groups now that operate independently but report regularly to the GDB so the progress can be monitored/guided/approved by all interested parties.**

- Security (Dave Kelsey)
- Installation Tools (Charles Loomis)
- T01/2 Networking (David Foster)

**We may have another one soon on “interoperability”**

**Need to update the website ( I have said this many times ☺)**

# Mandate I

- *The group prepares plans and follows the implementation of the wide area networking needed to support the Computing Models of the LHC experiments both during the preparation and operation of the LHC. The group reports regularly to the Grid Deployment Board (GDB) on progress.* ***The GDB approves the general strategy and plans*** *developed by the group and agrees on a set of milestones to enable progress to be followed by the project and the experiments. The GDB chair will include relevant information on planning, progress and potential problems in his regular report to the PEB.*

- *The network infrastructure interconnecting the centres providing computing resources for LHC will in most cases be provided by national and regional research network organisations, through agreements made between the computing centres and these organisations. The goal of the group is to ensure that these individual agreements will* ***provide a coherent infrastructure to satisfy the LHC experiments' computing models and requirements****, and that there is a credible solution for the management of the end-to-end network services.*

# Mandate II

- *The first priority of the group is **to plan the networking for the Tier-0 and Tier-1 centres**, based on the outcome of the LHCC Review of Experiment Computing Requirements scheduled for 17-19 January 2005, on a timescale compatible with the LCG Technical Design Report. The group should **also cover Tier-2 centres**, as appropriate information on requirements becomes available. The group is not concerned with networking for lower tiers*.

- *The membership of the group includes networking experts from Tier-1 and other major regional centres, representatives of relevant research networking organisations, and other experts as agreed by the group.*


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| Country | T1 Centre | Representatives | Email |
|---|---|---|---|
| Switzerland | CERN | David Foster<br>Paolo Moroni | David.Foster@cern.ch<br>Paolo.Moroni@cern.ch |
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| | | | |
| LCG Project Leader | CERN | Les Robertson | Les.Robertson@cern.ch |
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# Meetings

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- January 20-21 in Amsterdam
- http://agenda.cern.ch/fullAgenda.php?ida=a045746
- Depending on the first meeting outcome 2 or 3 more meetings may be needed this year
- We may try to colocate future meetings with other important network events like the Terena Conference, IGRID or SuperComputing


# Milestones

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- For the initial Service Challenge tests some of it is needed now
- The Service Challenge Milestones require the full T0/1 network be in place by the end of this year
- Performance tests for twice the nominal rate are planned in Q2 of 2006
- T1/2 network must be put in place in 2006 (some already end 2005)

# Nominal Data Rates

**Definition: *Nominal data rate* between CERN and all Tier-1s = the long term sustained average data rate**

*A quick calculation from the computing model presentations*
*Needs to be verified with experiment reps in detail*

**in Mbytes/sec**

| ALICE | ATLAS | CMS | LHCb | Total |
|---|---|---|---|---|
| 600 | 750 | 300 | 150 | 1800 |

To achieve this we must be able to run for long periods
*at least twice this rate*


# Comparable numbers ?

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- To compare and use these numbers we have to make sure that what is included in these numbers is the similar for all 4 experiments:

- This includes the raw data transport to the T1's
- This includes the derived data transport to the T1's
- This includes derived data transport between T1's

- *Does it include MC data transport from the T2's ??*
- *Does it include data transport for analysis ??*
- *What else does it include ??*
- *Does it include "safety factors" and "efficiencies" ??*

# Tier-1 Centres

*(January 2005)*

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| | | | | ALICE | ATLAS | CMS | LHCb | |
|---|---|---|---|---|---|---|---|---|
| 1 | GridKa | Karlsruhe | Germany | X | X | X | X | 4 |
| 2 | CCIN2P3 | Lyon | France | X | X | X | X | 4 |
| 3 | CNAF | Bologna | Italy | X | X | X | X | 4 |
| 4 | NIKHEF/SARA | Amsterdam | Netherlands | X | X | | X | 3 |
| 5 | Nordic | Distributed | Dk, No, Fi, Se | | X | | | 1 |
| 6 | PIC | Barcelona | Spain | | X | X | X | 3 |
| 7 | RAL | Didcot | UK | X | X | X | X | 4 |
| 8 | Triumf | Vancouver | Canada | | X | | | 1 |
| 9 | BNL | Brookhaven | US | | X | | | 1 |
| 10 | FNAL | Batavia, Ill. | US | | | X | | 1 |
| 11 | ASCC | Taipei | Taiwan | | X | X | | 2 |
| | | | | 5 | 10 | 7 | 6 | 28 |

# Estimated Rates per T1 Center

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| | #T1's | rate | rate/#T1 | CCIN2P3 | CNAF | FZK | NIKHEF | Nordic | PIC | RAL | BNL | FNAL | Triumf | ASCC | *checksum* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | All numbers in Mbytes/sec except the bottom row which is in Mbit/sec | | | | | | | | | | | |
| ALICE | 5 | 600 | 120 | 120 | 120 | 120 | 120 | | | 120 | | | | | *600* |
| ATLAS | 10 | 750 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | | 75 | 75 | *750* |
| CMS | 7 | 300 | 43 | 43 | 43 | 43 | | | 43 | 43 | | 43 | | 43 | *300* |
| LHCb | 6 | 150 | 25 | 25 | 25 | 25 | 25 | | 25 | 25 | | | | | *150* |
| Total/T1 | | 1800 | | 263 | 263 | 263 | 220 | 75 | 143 | 263 | 75 | 43 | 75 | 118 | *1800* |
| twice | | 3600 | | 526 | 526 | 526 | 440 | 150 | 286 | 526 | 150 | 86 | 150 | 236 | *3600* |
| Mbits/sec | | **28800** | | **4206** | **4206** | **4206** | **3520** | **1200** | **2286** | **4206** | **1200** | **686** | **1200** | **1886** | *28800* |
| | | **CERN** | | | | | | | | | | | | | |


# First Estimates

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- **Roughly speaking all T1 centers need to be connected with a 10 Gbit/sec to CERN**
- **And with a multiple of 1 Gbit/sec to each other and their T2's**

- **All numbers are a yearly average**
  - Will there be a substantial difference between beam on/off ?
  - Do we expect any "spikes" of more than a factor 2 ?
- **The bandwidth is needed 365 days 24 hours/day**

- **All these numbers need to be verified with the experiments and a more detailed model (also for analysis) should be developed if possible.**


# Points for the WG

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- Get a better estimate for the above numbers
- Get a more detailed network usage model
- CERN takes care for the networking inside CERN !
- The Centers pay for their connectivity to CERN ?
- Who pays for the T1/1 and T1/2 connectivity ?
- How to connect the US, Canada and Taipei ?
- An emergency plan needs to be made for 2005
- And a roadmap for the next 10 years