

Kors,  
here are my notes from the meeting. Bit thin in parts - sorry!  
Cheers, Jamie

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#### **David Foster:**

- 10Gbit connections from T0-T1 should be sufficient(?)
- T1-T1 and T1-T2 connections also extremely important and may even dominate?
- T1 role critical

#### **Roger Jones (ATLAS Computing Model):**

- event sizes could be factor 2 or even 4 bigger
- LEP (1988 review) underestimated by order of magnitude
- compactification but not zero suppression in first years
- 10 T1s, 29 T2s, 4 of which are in UK.
- comment - what about comparison with BaBar? Estimates largely correct; migration from Objectivity and major changes to data model introduced major changes
- T0 - T1: 3.5Gbps ok incl. headroom, efficiency and bandwidth but must take into account the fact that many T1s support multiple experiments
- T1 - T1: 2.5Gbps incl. same factors
- factors are: headroom (1.5) to cater for peak rates; efficiency (2) networks < 50% of full capacity; recovery (2) to allow backlogs to be recovered rapidly (24-48 hours) plus re-copies of datasets lost due to disk crashes etc. (to be further discussed and agreed)
- How are T2s connected? A: not a hierarchy - mesh

#### **Piergiorgio Cerello (ALICE Computing Model)**

- pp AOD 10% of ESD = 20KB (50KB in 17-DEC-04 draft)
- AA data distributed during 1 month of data taking plus 4 months shutdown. Overlap with 2nd and 3rd pass reconstruction at T1? (JDS - my guess is that they need to transfer the data ~twice as fast or else schedule 2nd & 3rd pass recons during Y+1 pp data taking if poss?) Further questions on transfer time and network requirements. Clearly very important to finalise requirements asap.
- CMS (absent)
- LHCb (Ricardo Graciani)
- Q: why is data distribution between T0 and T1 completely different to other expts? A: model
- Q: who decides what part of data is on disk and which on MSS? A: LHCb

#### **Service Challenges (Les Robertson)**

- Q3 2006 is time for service to be running fully

- Q2 2007 should be at full capacity
- SC3: which RCs? which expts?
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- Q: Harvey Newman: network planning is much more than data volume / time interval. T2s probably have most computing power and hence modest networking to T2s not consistent.
- A: T2s certainly big issue but hard to extract clear conclusions from current numbers.
- Q: will expts do individual tests or will they be part of this?
- A: have to go round and discuss with expts and T1s.
- Q: data dissemination well defined problem; other network usage requires more flexibility
- Q: so what is networking number?
- JDS: some update on update of calculations
- Harvey: up to 15% don't see others; 30% start to see; 40% should be well into upgrade cycle
- Hans Doebbeling: would ideally like per route table(!)
- Kors: how relaxed can we be? e.g. can we live with 1Gbit now and then move to 10Gbit in 2006?
- Dany van Dromme: constantly changing technology; wait for new technology (next few months!)
- David: need to understand end-end flows. Need to distill planning into 'LHC planning'
- Harvey: need to foresee what people will be doing as common practice. i.e. no thing as service challenge without 10Gbit i/f. 700MB/s single server - single server.
- Klaus Ullmann: Keep aggressiveness in end-end testing.
- Kors: fits well with Les' proposal of production system + test system.
- KU: 'vpn' on nren/geant i/f?
- David: need planning for each T1 to understand when giving i/f will be in place
- KU: demonstrate that we can obtain 'x' over a given link. Then match this to computing requirements.
- Harvey: some links work perfectly, some have occasional packet losses. Need to test links - few packet losses per day.

### **Networking to/from US (Silvain Ravot)**

- Q (Steve McDonald, Triumf): problem getting 10Gbit circuit directly to CERN. Currently go via Surfnet. Plans to increase capacity from AMS to CERN. Or go through US?
- David: what do BNL + FNAL + Triumf plan to rely on for connections to CERN?
- Hans: 2 new 10Gbit links from NY to Europe by Internet2 (one AMS, one LON). Geant consortium planning similar procurement. Canarie also procuring single link.
- David (to Don): If service challenges will become production, what network i/f are you counting on?
- Don: anticipating proposal to DOE for dedicated 10Gbit links, at least one in each of Manhattan and Chicago.

- Kors: what about Taipei? Yu-Lin Chang: problem with link from Asia to Europe. Link goes through SE Asia. Link currently broken by Tsunami. Currently go via US. Provider cannot provide dedicated lambdas.
- Bruce Gibbard: need to establish multi-Gbit connectivity to NY in expectation that 10Gbit connection to NY will be provided.
- Harvey: plan is to say to DOE that connectivity will be split between Chicago and NY.

## **Day 2:**

David: looking at 10Gbit (or multiple thereof) links T0-T1. Numbers will be updated by JDS. Need plan for how links will be put in place.

### **Paolo: networking at CERN**

- Need list of actions, e.g. every T1 should look at list of IP addresses to see if enough
- Klaus Ullmann: would be good to get a summary paper describing what is expected of people (partners)

### **Hans Dobbeling: Dante / Geant2**

Q: link to Canada - is this a shared link? Needs to be clarified.

### **Erik-Jan Bos: SURFnet and the LHC**

#### **Klaus Ullmann: DFN**

- David: seems very well advanced. Q: Chinese supplier bought (largely) by 3 Com
- Paolo: how far from Basle does DFN go? A: connection to Zurich via Basel.

### **David: summary and conclusions**

- recap of goals of meeting
- Create a few small groups; first round end-Feb; next meeting March
- 10Gbit to each T1 from CERN is a fundamental requirement; good T1-T1 and T1-T2 also required
- High level requirements and list of T2s
- Important to get planning as activities ramp up to LHC Startup
- Target date for a 10Gb production circuit to CERN for each T1
- Network vision for LHC
- Infrastructure and exploitation
- Q: Kors: how do we get multiple of 1Gbit circuit to each T1 'now' and 10Gbit next year?
- A: Hans: Geant should come up with list of what is possible when
- A: Don: need different level of depth under management and technical considerations

- Things much clearer now than end of last year. Need to finalise architecture asap before things are finalised for Geant2.