TRIUMF SC3 Status

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TRIUMF

GDB Meeting, July 20th, CERN

TRIUMF GRID Activities

- **Tier-1 centre for ATLAS only**

- **Various systems (clusters) are in place:**

  - **LCG production site(s)**

    - Full-fledged LCG site (TRIUMF-LCG2)
      - CE, classic SE's, Worker nodes, etc.
    - Grid Canada interface (TRIUMF-GC-LCG2)
      - CE (CondorG)
      - Gateway to other Canadian shared resources (not visible otherwise)
      - LCG and Canadian GRID federation (R. Walker *et al.*)

  - **SC3 development site** (*today's talk*)

    - Service challenges specifics

TRIUMF SC3 Setup

- **Current Hardware:**
  - dual Opterons and EMT64 based servers
  - 5.6 TB (disk)
  - 8.3 TB (tape)

- **Software:**
  - dCache/SRM based storage management
  - FTS + LFC (yet to be deployed/tested)

- **Networking:**
  - 2 x 1 GigE dedicated lighpaths available (only 1 GigE used so far)
 - 10 GigE link was temporarily available to do few tests (permanent by Sep. 1st)

Hardware details

- **Dcache admin node (SRM/GRIDftp doors & pool), connected to tape system**
  - **dual opteron 246 2.0 GHz (800 MHz FSB) , 2 GB RAM**
  - **1 system disk WD 80 GB SATA**
  - **2 x 250 GB WD SATA**
  - **3Ware 9500S-LP 4 channels**
  - **ADAPTEC Ultra160 SCSI 29160-LP**

- **Dcache pool nodes (pool & gridftp doors)**
  - **dual 3 GHz, Nocona EMT64 (1 MB cache/ 800 MHz FSB), 2 GB RAM**
  - **1 system disk 80 Gig IDE (laptop)**
  - **8 x 250 GB SATA150 (Seagate Barrac. NCQ, 8 MB)**
  - **3Ware 9500S-8MI RAID5 Infiniband connections**

- **Tape system:**

  2 x IBM 4560SLX SDLT libraries
  - **each with 1 SDLT 320 drive + 26 SDLT tapes**
  - **have fibre channel interface card**

- **Extra hardware available to be integrated into SC3 (if needed)**

CERN-TRIUMF disk-disk transfers @ 1 GigE

- **SRM + gridftp initiated transfers:** *(NB: before SC3 throughput phase /FTS)*
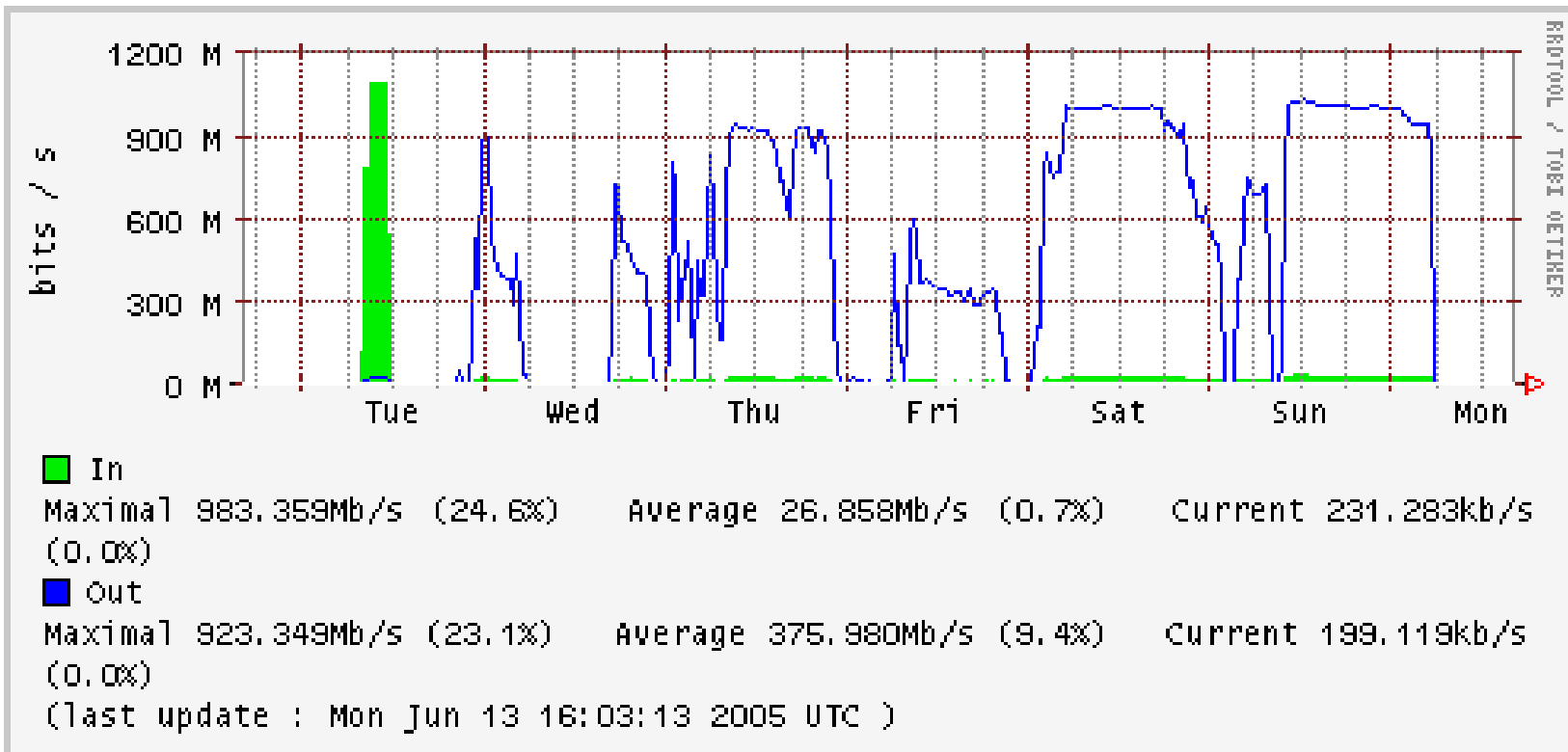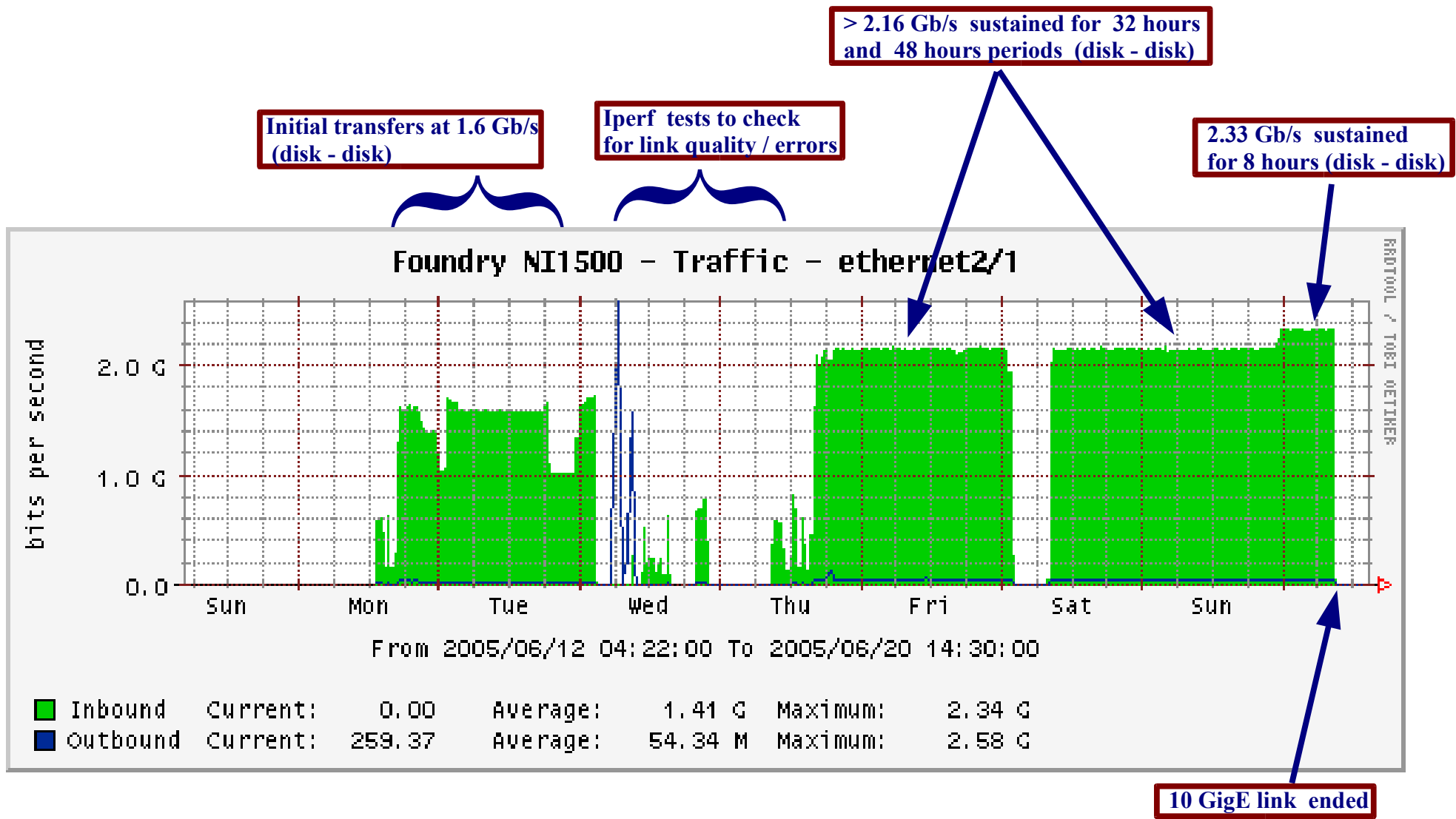

- **SRM did not fill the pipe on its own, so added additional gridftp initiated transfers.**

- **Switched to 10 GigE link on Monday (June 13th).**
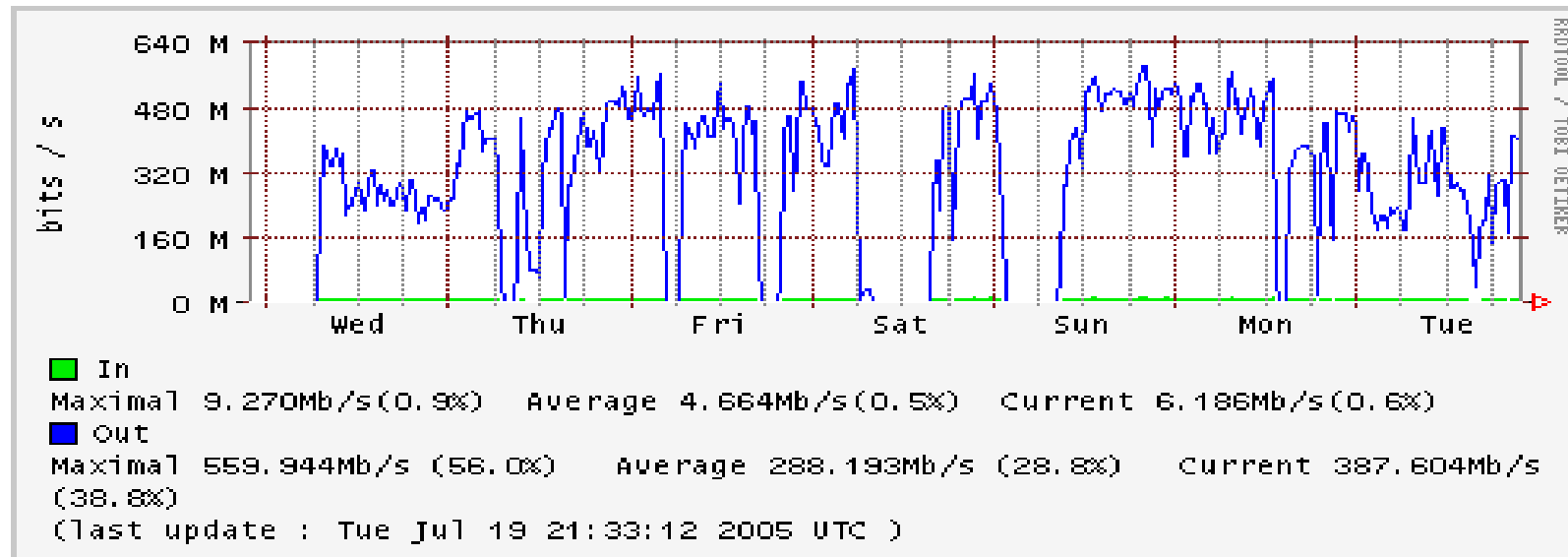
CERN-TRIUMF disk-disk transfers @ 10 GigE (I)

- **The 10 GigE link was temporarily requested for May 30 - June 18, but was properly established/usable only on Monday June 13th.**

- **Used plain gridftp transfers (started initially with dCache, then switched to "unmanaged" disk area for maximum throughput)**

- **Several machines used at both the sending and receiving ends. (files were sent from CERN)**

- **Achieved for few days a sustained transfer rate of more than 275 MB/s.**

- **Iperf tests were also performed to check link quality/errors**

CERN-TRIUMF disk-disk transfers @ 10 GigE (II)

> 2.16 Gb/s sustained for 32 hours and 48 hours periods (disk - disk)

Initial transfers at 1.6 Gb/s (disk - disk)

Iperf tests to check for link quality / errors

2.33 Gb/s sustained for 8 hours (disk - disk)

10 GigE link ended

Foundry NI1500 - Traffic - ethernet2/1

From 2005/06/12 04:22:00 To 2005/06/20 14:30:00

	Current:	Average:	Maximum:
Inbound	0.00	1.41 G	2.34 G
Outbound	259.37	54.34 M	2.58 G

SC3 Throughput tests (FTS)

- FTS only transfers to our dCache/SRM:

- Seems difficult to obtain a higher throughput from CERN. Tried various tuning on CERN-TRIUMF FTS channel (number of files, streams).

- Previously was able to fill the bandwith with srmcp.

Tier-2's Status for SC3

- **The following Canadian sites will deploy dCache/SRM :**

  – **University of Toronto (done)**

  – **University of Victoria**

  – **Simon Fraser University (done)**

  – **University of Alberta**

  (Note: these are NOT officially ATLAS Tier-2)

- **TRIUMF (Tier-1) is providing support for these sites**

- **Target: toward end of July for Tier1-Tier2 transfers**

- **DPM could also be deployed at one institution (to gain experience/knowledge)**

Todo list

- **Networking**

  - Use 2 x 1 GigE lighpaths
    (ready from TRIUMF end, CERN need to complete the link)

  - For simplicity will use 2 VPN's instead of channel bonding

  - By September, 10 GigE link should be premanently available
    (exploring proper networking hardware)

- **Services:**

  - deploy and test FTS and LFC

- **Throughput tests:**

  - Try to achieve higher throughput with FTS

  - Participate in disk-tape throuput tests

  - Tier1 – Tier2 disk-disk transfers

- **Need to tune further some dCache parameters/pools behavior.**

Disk (Ottawa) to disk (TRIUMF) over 10GbE

- **S2IO interfaces -single stream, single 8GB files, 1500MTU, xfs Raid5 files with chunk 1024k, globus-url-copy with tcp-bs 2x normal (upper figure) and 4x normal (lower figure)**