Network Working Group

Introduction

▶ In June the transatlantic networking group had a workshop

  ▶ Issue of Tier-2 networking came up

    ▶ Generally high rates Tier-1 to Tier-2 and increasing Tier-2 to Tier-2 traffic

      ▶ CMS T2 to T2 traffic
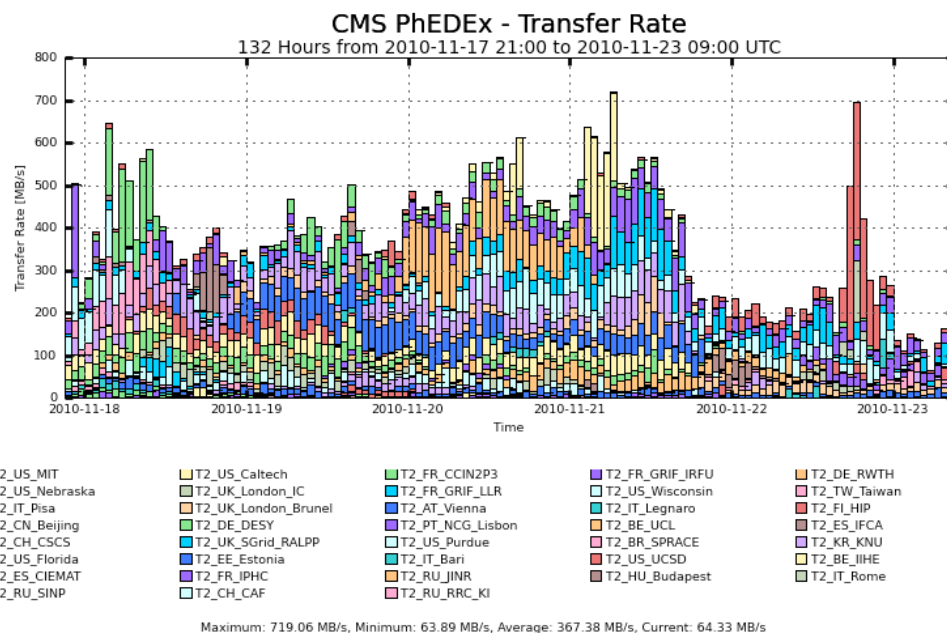
    ▶ ATLAS dynamic placement of data activities require good networking to Tier-2s

Concern

▶ The traffic from CERN to Tier-1s goes over the dedicated OPN network

   ▶ Provisioning and usage is carefully defined

▶ The Tier-1 to Tier-2 and Tier-2 to Tier-2 traffic in many places runs over the general purpose network

   ▶ Rely on good research networks, which are happy to be used and unhappy to be overwhelmed

   ▶ Concern that current use without formal requirements or infrastructure was probably unsustainable as needs grow
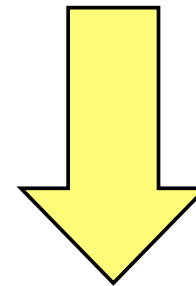
      ▶ Begin by defining the problem

Networking Group

▶ Tier-2s are primarily used for Simulation and Analysis

  ▶ Analysis is the biggest driver of networking to either feed applications or to flush the disk

▶ Networking needs approached in 3 ways

  ▶ How long it takes to flush a few hundred TB of disk?

    ▶ Data for the LHC is reasonably dynamic and flushing a disk cache of 200TB in 2 weeks, takes about 1-2Gb/s of usable bandwidth before provisioning

  ▶ How long does it take to refresh a sample of 5-10TB for a user?

    ▶ Updating a sample in 12 hours is 2Gb/s of networking per person before provisioning

  ▶ How much networking does it take to feed AODs to 1000 cores given the current applications

    ▶ Requires ~1Gb/s before provisioning

Results in the report

Category	Speed	Target
Minimal	1Gb/s	Small Tier-2 installations: at the minimal connection speed a Tier-2 will be able to function, but will not be able to provide users with the same flexibility and quality of service.
Nominal	5Gb/s	Normal Sized Tier-2 installations: at nominal connection speeds the samples can be updated in reasonable time and the Tier-2 storage can be updated at regular intervals.
Leadership	10Gb/s and greater	Large Tier-2 installations: leadership Tier-2 facilities are significant analysis facilities supporting large numbers of analysis users. The high connection speed allows the large local storage to be updated and samples provided to several individual users working simultaneously.

▶ Looking at the relative sizes and activities levels of the Tier-2s we tried to break into categories.

▶ Networking needs to evolve with the other site resources

　▶ Rough doubling every 1-2 years

Growing network needs with time

Capacity

▶ How to provide connectivity between from Tier-1s to Tier-2s and between Tier-2s is left up to the network experts.

  ▶ Report emphasizes the end goal is *not* to have 10Gb/s simultaneously to everywhere

  ▶ A few times the leadership connectivity rate for the backbone is probably a good start

▶ Architectural issues for providing a backbone and technology implementations are left for a design report.

Connectivity

▶ As guidance to the network experts the analysis sites are given in a table ordered by pledge.

  ▶ It's not 100% mapping to analysis activity, but it's a reasonably good objective indicator

  ▶ Largest sites have the largest analysis capacity and should have highest networking needs.