ATLAS Distributed Computing

ATLAS session
WLCG pre-CHEP Workshop

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For ATLAS Distributed Computing

Topics

- ATLAS sites
  - Status
  - Networking
  - Expected improvements
- ADC Operating model
  - Clouds and sites support
  - Central support
  - ADC-CERN/Cloud Communication

More about Distributed Computing Operations (ADC CHEP 2012 presentations)

- "ATLAS Distributed Computing Operations: Experience and improvements after 2 full years of data-taking" (S.Jezequel et al)

- "ATLAS Distributed Computing Shift Operation in the first 2 full years of LHC data taking" (J.Schovancova et al)

- "Evolving ATLAS computing for today's networks" (S.Campana et al)
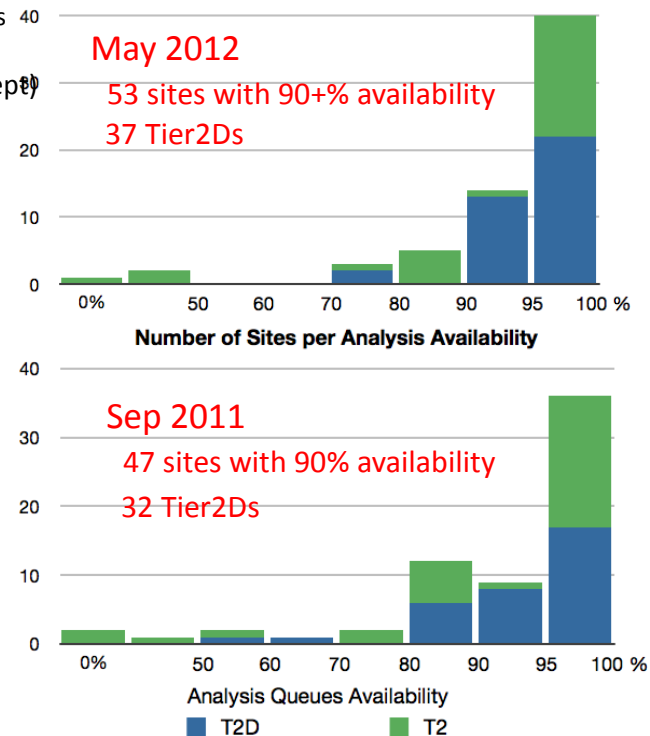
ATLAS Sites

- 107 sites in DDM Functional Test (10 Tier-1s, 97 Tier-2+)
- Tier-2s
  - Tier-2Ds ("connectivity")
    - Motivation : Speedup cross-cloud transfers for data distribution and user datasets
      - Moving from strictly planned replicas to dynamic data replication
    - Recommendation of Napoli Technical Interchange Meeting (Feb 2011)
      - ".. Identify O(10) Tier-2s to be connected directly to all Tier-1s". Today : 37 Tier2Ds
    - Monitoring, sonar test, etc were set up
    - Actually we took into account network performance (coherent with LHCONE concept)
    - Sites flexible association with Tier-1s
      - Tier-2s and Tier-3s are in production even during 'parent' Tier-1's downtime
  - Alpha/Bravo/Charlie/Delta Tier-2s ("availability")

  https://twiki.cern.ch/twiki/bin/viewauth/Atlas/DataDistributionSharesForT2
    - Main motivation to decrease analysis jobs failure rate due to sites instability and to set data acceptance status based on the availability for the analysis
      - Send more jobs to more stable (including network) sites
    - Today's snapshot
      - 65 Tier-2s
        » Alpha 35
        » Bravo 19
        » Charlie 5
        » Delta 6
          - Charlie/Delta distribution between clouds is unequal
          - Great support from clouds to promote sites to A/B groups
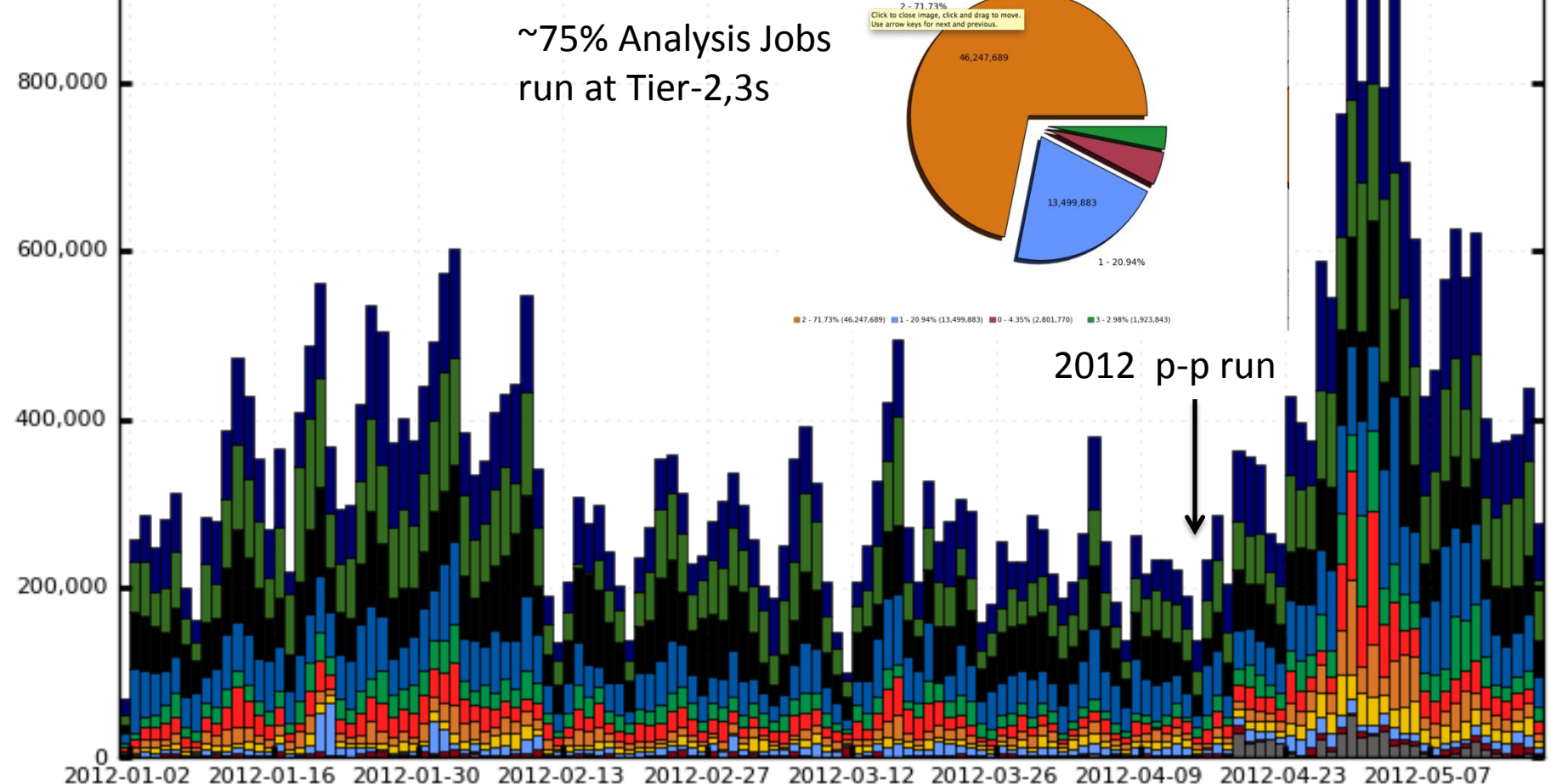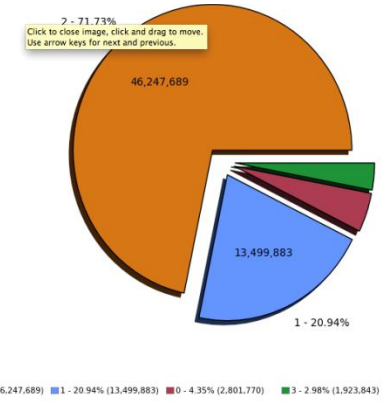   - Groups are reviewed monthly
- Tier-3s
  - Intensive discussions during 2011, two well defined sites categories
    - Grid Centers (~half of them are potential Tier-2s)
      - Participate in ADC Functional tests (HC, DDM, …)
    - Off-Grid Analysis sites
  - New sites must be approved by ICB

Tier-2s availability for Grid Analysis

May 2012
53 sites with 90+% availability
37 Tier2Ds

Number of Sites per Analysis Availability

Sep 2011
47 sites with 90% availability
32 Tier2Ds

Analysis Queues Availability

■ T2D   ■ T2

#Jobs

T2 Analysis jobs running and waiting time

~75% Analysis Jobs run at Tier-2,3s

2012 p-p run

Daily Completed Analysis Jobs at Tier-2s and Tier-3s

- US
- CA
- other
- UK
- NL
- DE
- ES
- FR
- ND
- IT
- TW

- ***Excellent sites performance and support***
- ***Many thanks to ALL sites and cloud squads***

ATLAS Sites : Foreseen changes

- CVMFS
  - Simplify the software and database releases distribution
  - Bypass the limitation of central repository accessed by many jobs
  - Avoid to host all software versions at all sites
  -> It is strongly recommended to deploy CVMFS on all ATLAS sites (already done by 75% of sites)

- HOTDISK and squid
  - Replace access of condition data and DBrelease from SE HOTDISK to Frontier+cvmfs
    - Decommission HOTDISK
    - Access DB releases and conditions via Frontier/squid
  - Expected in the coming months

- Decreasing number of space tokens
  - Eliminating HOTDISK
  - Merging GROUPDISK+DATADISK space tokens on Grid Storage
    - Motivation : More flexibility and reactivity on space assignment between group and ATLAS data
    - Avoids to store datasets in both places
    - Requires few improvements on DDM accounting tools (expected this year)
    - Fall 2012

ATLAS Sites : Network

- Network :
  - As important as site infrastructure
  - Key point to optimize storage usage and jobs brokering to sites
- Globally, network is working and ATLAS expects to use it transparently
- But ATLAS exposed to too many failures
  - 1 issue per week
  - Mainly related to LHCONE migration but not only

  -> Short term : ATLAS needs network monitoring tools

  (Improved FTS monitoring, perfsonar,…)

- Medium term : These monitoring tools will be used as input for transfer optimization
- Long term : Production and analysis will use networking status/performance information
- Depending on new technology evaluation, remote access over WAN might become as critical as scheduled transfers (FTS)

Distributed Computing Operating Model

- Current model was proposed and set up in 2009
- Big blocks of Operational model
  - ADC Coordination : Representatives of 18 ATLAS Institutes and Universities
    - Many of them are playing an important role in cloud operations as well
  - ADC controls and operates ATLAS Grid (Distributed Computing) Activities + Software development
    - Control data flow and jobs execution (From CERN up to final destination)
      - Final destination – any ATLAS Grid sites
    - ATLAS shifters : Permanent follow up of ADC related issues
    - Experts on call (AMOD) : the first line of support
    - PanDA/DDM/Database experts : the second line of support
  - Central Operations team responsible for
    - Software and architectural changes
    - Databases
    - DDM and PanDA services
    - Pilot factories (together with regional teams)
    - Monitoring
  - Cloud Operations team to support group of sites (aka clouds)
  - Tier-1s support teams (sometimes part of cloud team) for some Tier-1s very well integrated with ADC activities
    - <at least> one person of contact per Tier-1
  - Weekly ADC meetings to analyse major issues and validate changes in operation
  - Daily WLCG meetings to report on-going issues
  - Morning ADC meetings to follow ATLAS specific issues
  - GGUS tickets to report sites issues and ATLAS Savannah portals to report ATLAS specific issues
- O(70) people involved (ATLAS wide)
  - Excellent support to users

ATLAS Distributed Computing Jamboree

- Nov 2012
  - Two days workshop, most probably in conjunction with GDB or ATLAS SW&C week

- We propose to discuss :
  - LS1 (2013-2014) Operating model
  - New technologies like cloud computing, xroot, glexec, SLC6, etc (the list will be formed after evaluation and tests to be conducted in Jun-Sep)

- Start to work on agenda in Aug-Sep together with ATLAS sites