LHCb Computing status and plans
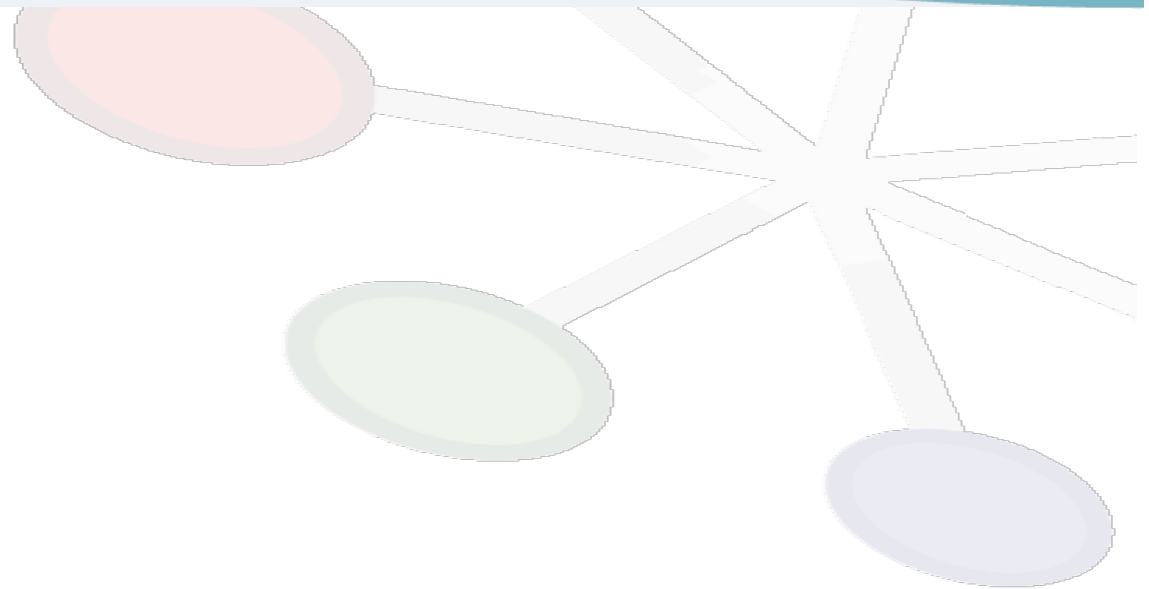
○ **Completed 2nd incremental restripping of 2011 and 2012 data**

  ❏ **6 weeks (8 weeks expected)**

Incremental Stripping Fall '13 - Number of Stripped Files
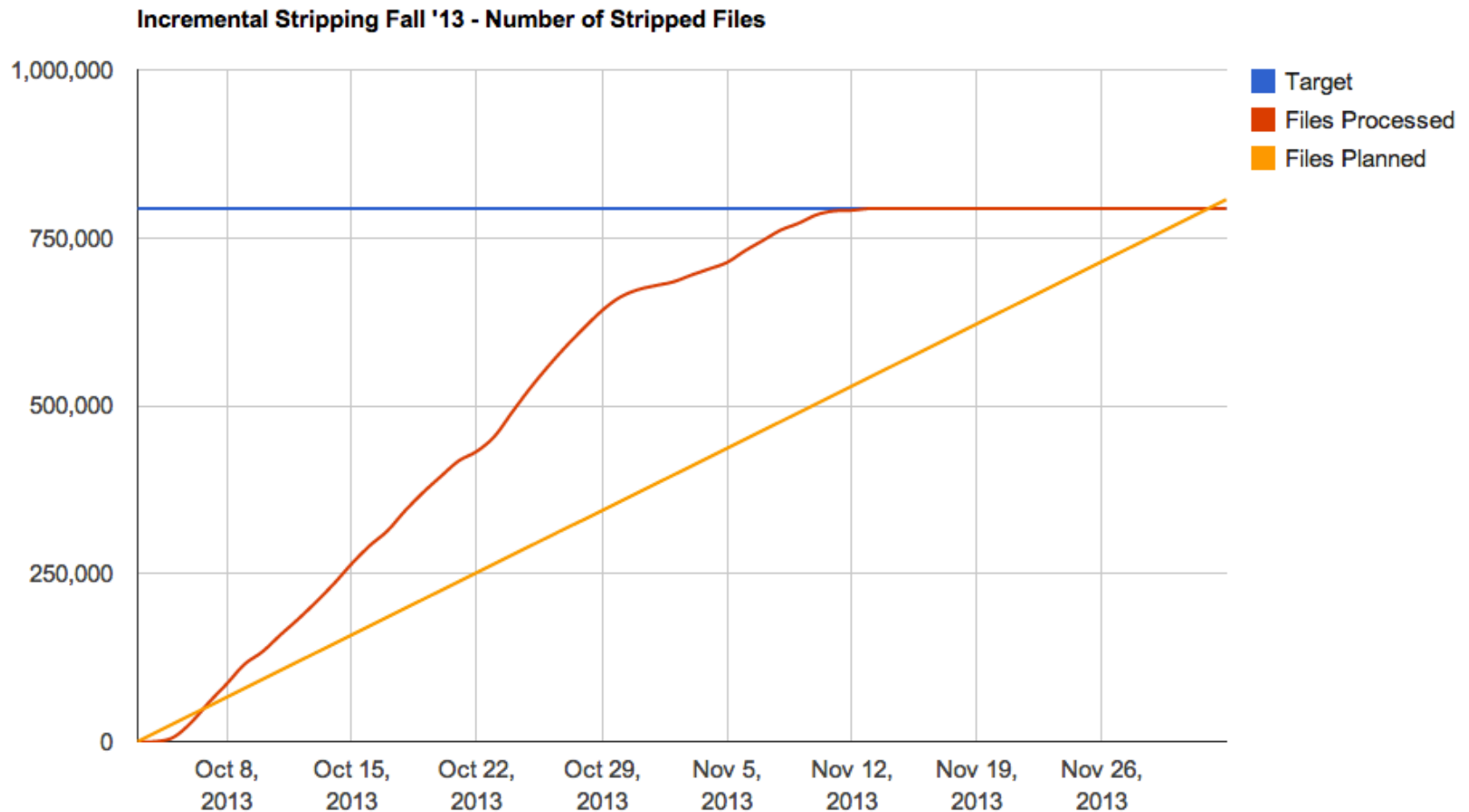
○ **Simulation activities**

  ☆ **2012 simulation**

  ☆ **Preparation of upgrade TDRs**

  ☆ **2015 HLT tuning**

Running simulation jobs by processing type

12 Weeks from Week 34 of 2013 to Week 47 of 2013

Max: 36.0, Min: 6.99, Average: 20.1, Current: 22.8
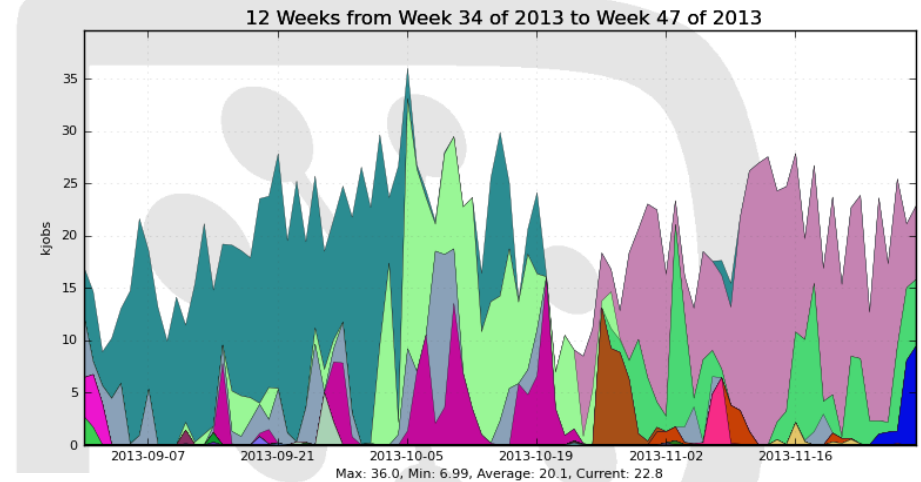
CPU usage for simulation, by site

12 Weeks from Week 35 of 2013 to Week 47 of 2013

Site	Value
DIRAC.ONLINE.ch	255714.1
LCG.CNAF.it	184520.5
LCG.CERN.ch	117205.8
DIRAC.YANDEX.ru	111732.8
LCG.GRIDKA.de	108101.1
LCG.RAL.uk	96115.9
LCG.IN2P3.fr	82759.3
LCG.IN2P3-T2.fr	76354.6
LCG.USC.es	45264.2
LCG.NIKHEF.nl	41222.5
LCG.Manchester.uk	35195.5
LCG.RAL-HEP.uk	34185.1
LCG.UKI-LT2-IC-HEP.uk	32493.2
LCG.UKI-LT2-Brunel.uk	31994.6
LCG.GLASGOW.uk	27454.1
LCG.NIPNE-07.ro	25660.3
LCG.JINR.ru	25542.7
LCG.Barcelona.es	25363.1
LCG.IHEP.su	25180.3
LCG.SARA.nl	24945.2
LCG.KIAE.ru	24012.1
LCG.CSCS.ch	23311.7
LCG.CNAF-T2.it	21050.8
LCG.PIC.es	19837.2
LCG.CPPM.fr	19047.1
LCG.Liverpool.uk	18081.3
LCG.ICM.pl	17174.6
LCG.LAL.fr	15812.7
LCG.DESY.de	14081.2
LCG.Oxford.uk	13175.6
LCG.Krakow.pl	12935.5
LCG.RUG.nl	11598.7
LCG.RRCKI.ru	11585.7
LCG.LPC.fr	10166.4
LCG.AUVER.fr	9502.5
LCG.LAPP.fr	8857.2
ARC.RAL.uk	8620.2
LCG.DURHAM.uk	8380.7
LCG.UKI-LT2-RHUL.uk	7452.0
LCG.UKI-LT2-QMUL.uk	5938.7
LCG.Bologna.it	5908.3
LCG.BIFI.es	5852.9
... plus 41 more	

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Process	%		Process	%
Sim08a/Digi13/Trig0x409f0045/Rec	31.1%		Digi13/Trig0x409f0045/Reco14a/St	0.7%
Sim08c/Digi13/Trig0x409f0045/Rec	26.0%		Sim08c-P8Frag/Digi13/Trig0x409f0	0.6%
Sim08b/Digi13/Trig0x409f0045/Rec	14.6%		Sim08a-FT5/Digi13/Reco14U3	0.4%
Sim08c/Digi13/Trig0x40760037/Rec	8.2%		Digi13/Trig0x40760037/Reco14a/St	0.2%
Sim08c/Digi13/Reco14a	7.3%		Sim08c/Digi13/Reco14a/Reconstruc	0.2%
Sim08b/Digi13/Trig0x40760037/Rec	6.2%		Sim05d/Trig0x40760037Flagged/Rec	0.1%
Sim08c/Digi13/Reco14a	2.2%		Sim08a/Digi13/Reco14U2	0.1%
Sim08c/Digi13/Reco15DEV/Reconstr	1.1%		Gen08a	0.1%
Sim08c/Digi13/Reco14U4	0.7%		... plus 6 more	

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HLT farm continues to be top simulation site

- 2013 pledge: 11PB, installed ~12PB
  - Current usage: 9.5 PB
    - Slope 80 TB/week
      - Dominated by MC 2012 production
    - Expect 11 PB by start of 2014 WLCG year (1-Apr-2014)

- Tier2-D status
  - 3 (dcache) sites in production, accepting analysis jobs
    - Further 2 (DPM) sites commissioned, SRM issue being addressed
  - 500 TB online, funding for further 600 TB by April
    - Several more sites have expressed interest

- 2014 pledges:
  - Introduction of T2-D has allowed additional pledges
    - Not clear if this is just once-off boost
  - No increase at CERN
   - May impact plans to move users to EOS from $CASTORHOME

- Migration to slc6, gcc48, c++11 support
  - Software migration complete (last slc5 release next week)
    - Validation complete except for simulation, ongoing
- ROOT6
  - Beta release imminent, LHCb software stack validated against it (compiles, tests run)
    - On track for official release in spring 2014
- Geant 4.10
  - Release imminent
    - 10% reduction in CPU time through use of VDT library
      - Validation and adoption by summer 2014
- Automated calibration, suppression of reprocessing
  - Offline workflows unchanged from 2012
  - Calibration procedures closely related to HLT splitting
    - Work in progress
  - Calibration challenges planned as part of commissioning weeks, starting spring 2014
    - Exercising the full online-offline workflow

Computing manpower

- Current manpower insufficient to cover core activities
  - Estimate 29 FTE needed, 22.6 FTE available
    - Some activities not covered
- Very little manpower available for non-core activities
  - ~4 FTE at CERN in principle working on Gaudi and Dirac software development
    - In practice making up some of above missing manpower
  - Small pockets of effort in various countries, for example:
    - Spain (DIRAC development)
    - Italy, UK, CERN (Data Preservation and Outreach)
    - Italy, Netherlands (Multicore R&D)
  - Barely sufficient to keep our software and computing abreast with evolving technology

- Discussion in CB next week to address this
  - More on this next time

Backup
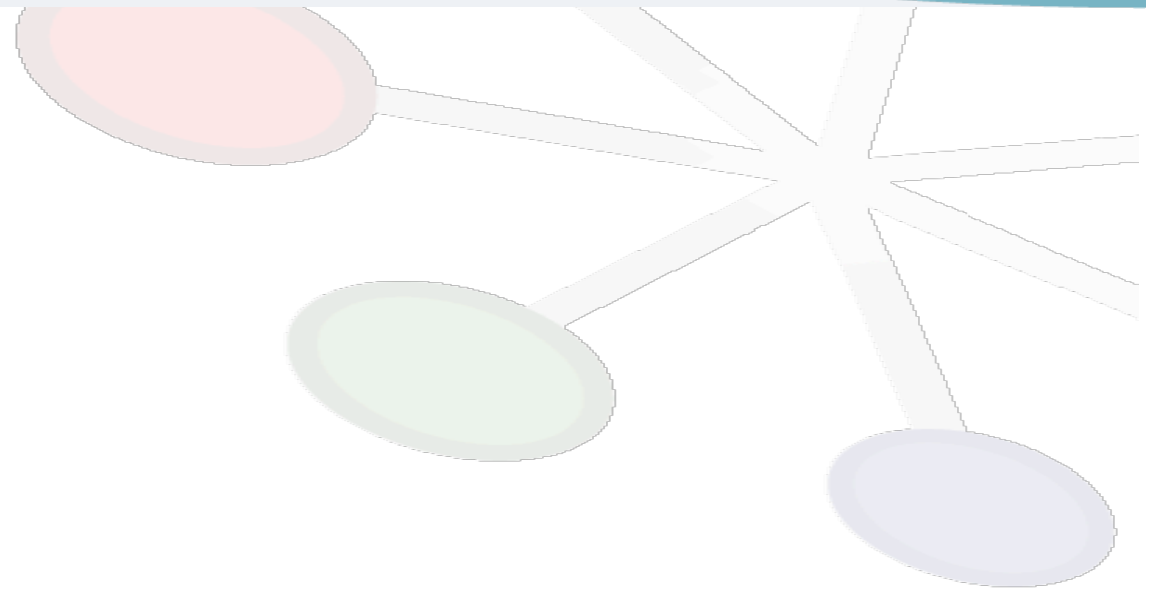
Changes to computing model, 2015-2017

- ○ **Executive summary:**
  - ❑ **12.5 kHz HLT rate**
    - ☆ **10 (decreasing to 5) kHz Prompt**
    - ☆ **0 (increasing to 5) kHz Parked**
    - ☆ **2.5 kHz Turbo**
  - ❑ **Only prompt reconstruction, no reprocessing**
    - ☆ **Automatic calibration shared with HLT2**
  - ❑ **Gradual reduction in CPU time for MC**
    - ☆ **Major developments required**
      - ❋ **10% gain already possible by adopting VDT in Geant 4.10**
  - ❑ **Adjust parking rate and MC production to fit in (~constant budget) envelope of**
    - ☆ **20%/year CPU growth**
    - ☆ **15%/year disk growth**
    - ☆ **(25%/year tape growth not possible)**
  - ❑ **Moore's law still applies, but requires specialised manpower**
    - ☆ **Adapt software for more efficient vectorisation and multicore CPUs**
    - ☆ **Adopt more flexible data placement strategies**