

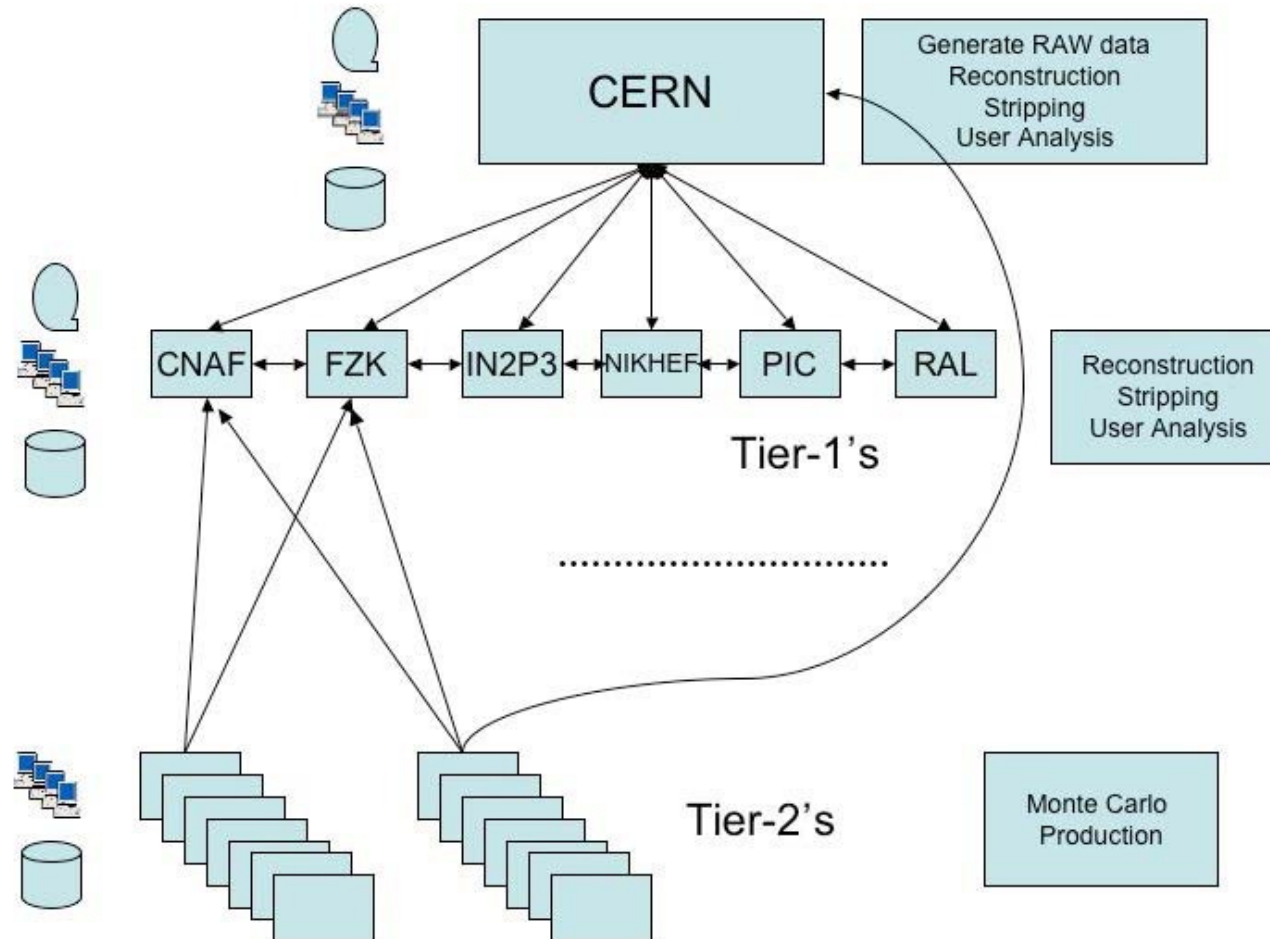


LHC*b*

Taming of the inefficiency

Raja Nandakumar

The LHCb computing model



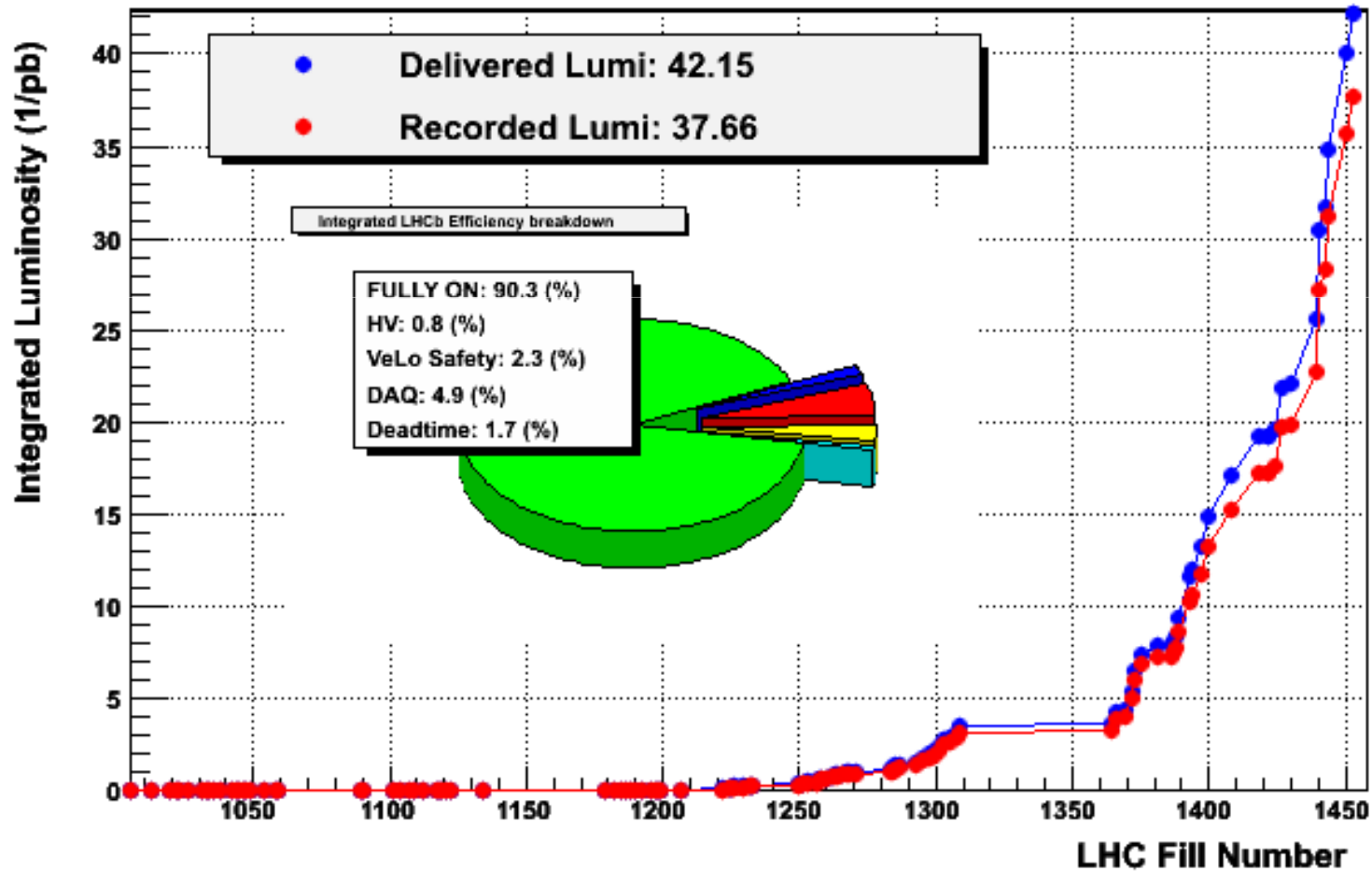
All LHCb grid work goes through DIRAC



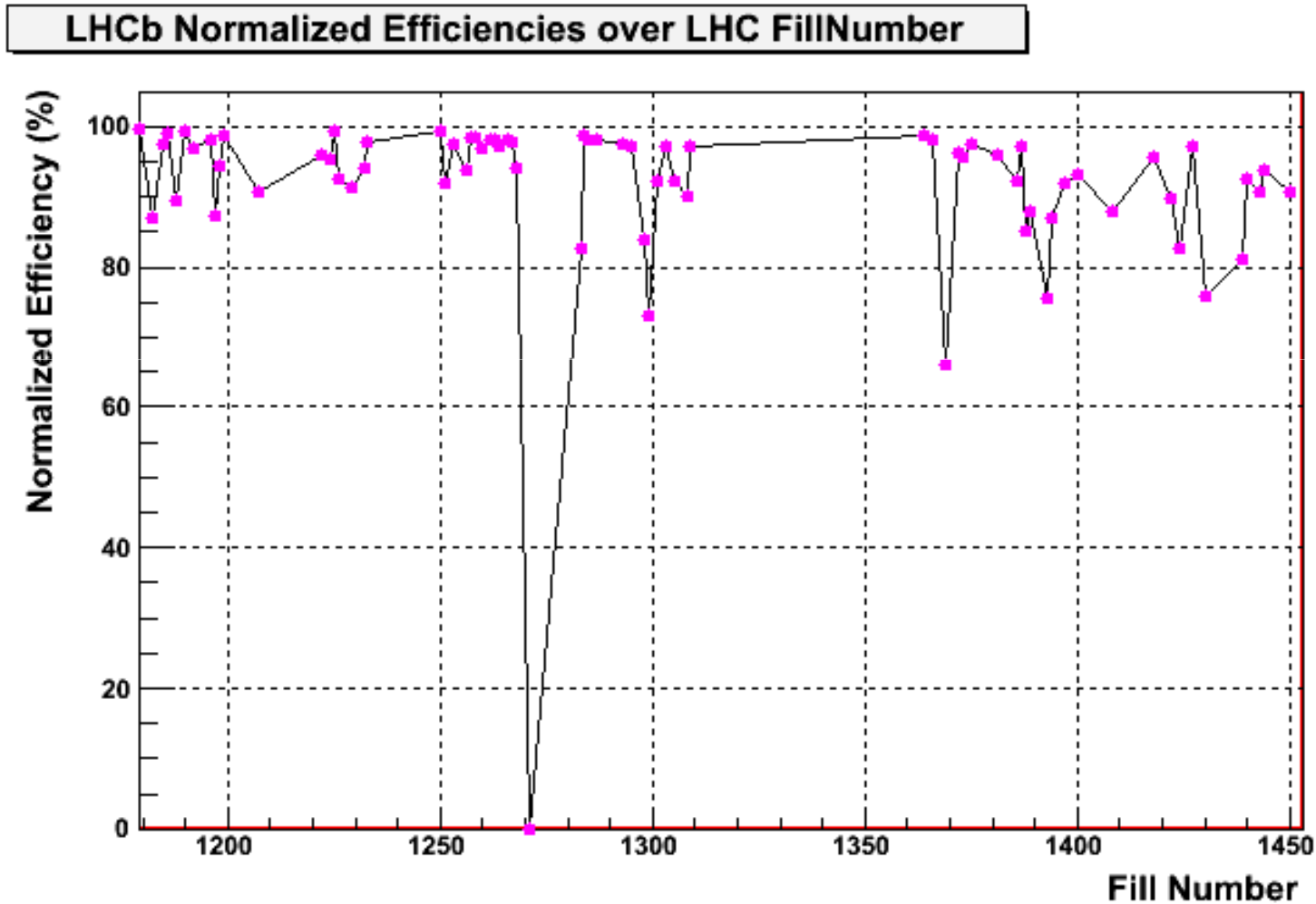
First – the tale of last year

LHCb Integrated Lumi over Fill Number at 3.5 TeV

2011-01-31 18:00:05



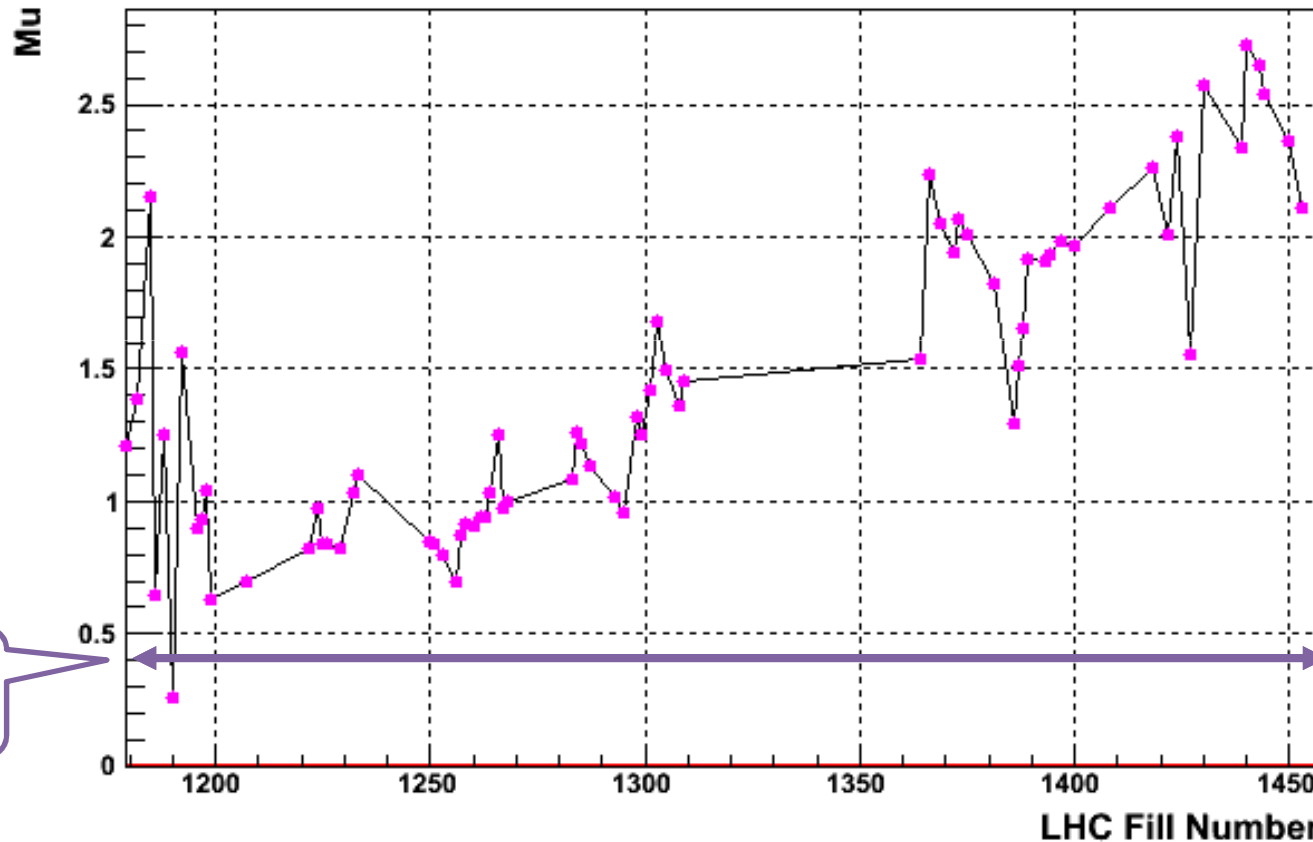
First – the tale of last year



First – the tale of last year

Peak Mu over LHC FillNumber

2011-02-16 16:25:28



LHCb
design

Mu = Visible number of interactions / bunch crossing

Core numbers ...

Process	CPU (HS06-s/evt)		Data Type	Storage (kB/evt)	
	New	Old		New	Old
Data Taking			RAW	50	30
Reconstruction	25	12	SDST	40	25
Stripping	1.75	0.8	RDST	130	80
			MDST	13	
Simulation	1700	376	DST	400	300

➤ Taming of the estimates

☀ Also - taming of the computing model

▒ Primarily due to the increase in “Mu”

▒ Changes to the LHCb computing model

⇒ Better efficiency!

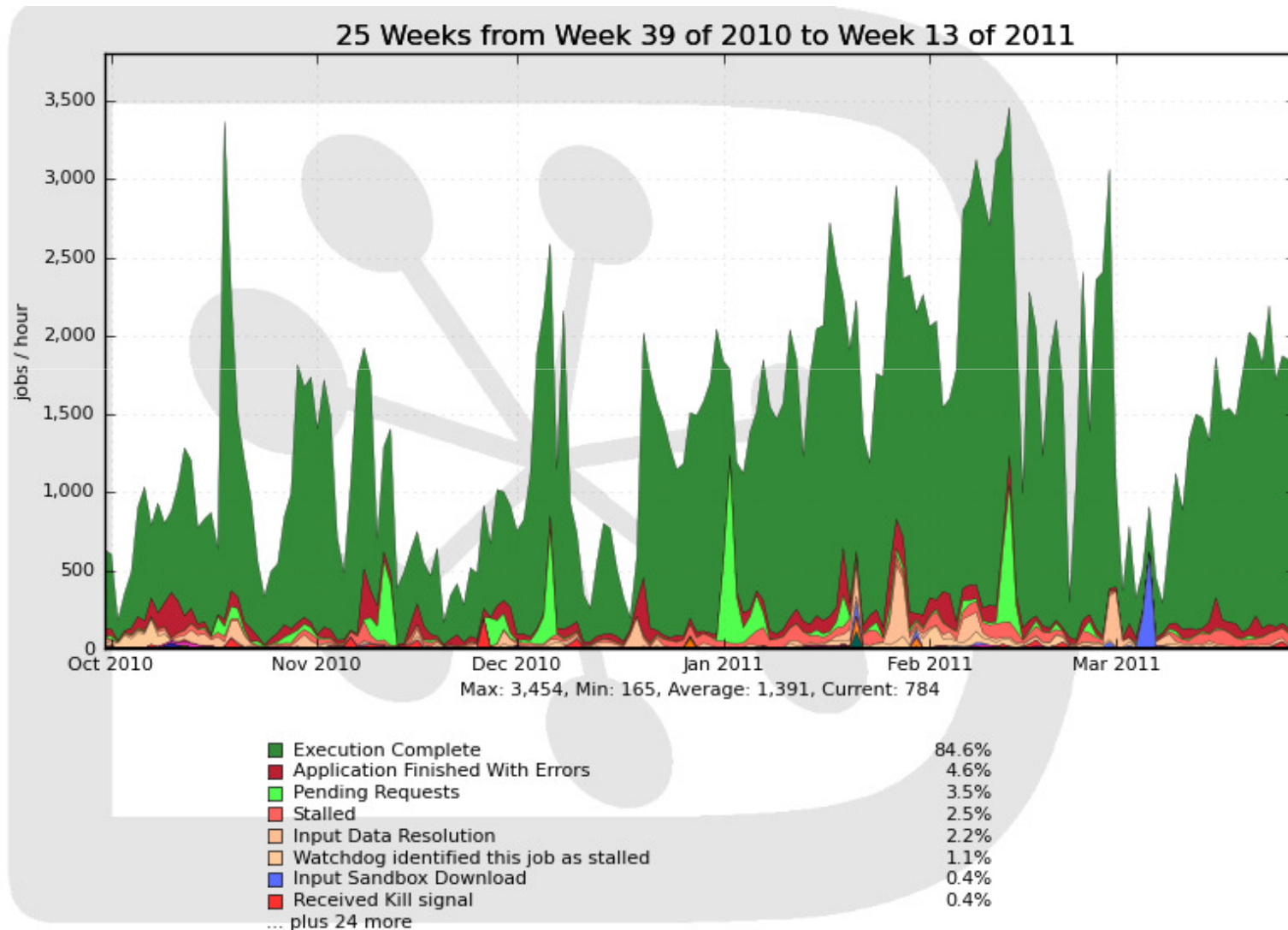
More numbers ...

	Norm CPU	Fraction	CPU Efficiency
All	49587	100%	88%
All Tier-1s	18148	36.6%	85%
All Tier-2s	24273	48.9%	92%
UK Tier-1 (RAL)	3255	17.9% / Tier-1s	84%

- Reasonably consistent with model (& pledges)
- cpu efficiency reasonably high
- Job success rate = 88%
 - Over last 6 months (next slide)
 - Including user jobs!



All LHCb grid Jobs – last 6 months



Changes to computing model

- Reduce number of replicas of stripped data
 - 4 t0d1 copies (originally 7)
 - ☀ Removed when old
 - 2 t1d0 copies (archive)
 - Max 2.5 processings on disk
- Improve efficiency of storage (CERN / Tier-1s)
 - Fewer space tokens / service classes
 - ☀ Just need t1d0 and t0d1 spaces
 - Currently some space tokens are full, while others have space remaining at a given site
 - Still working out the details
 - ☀ RAL already almost there 😊

Other changes

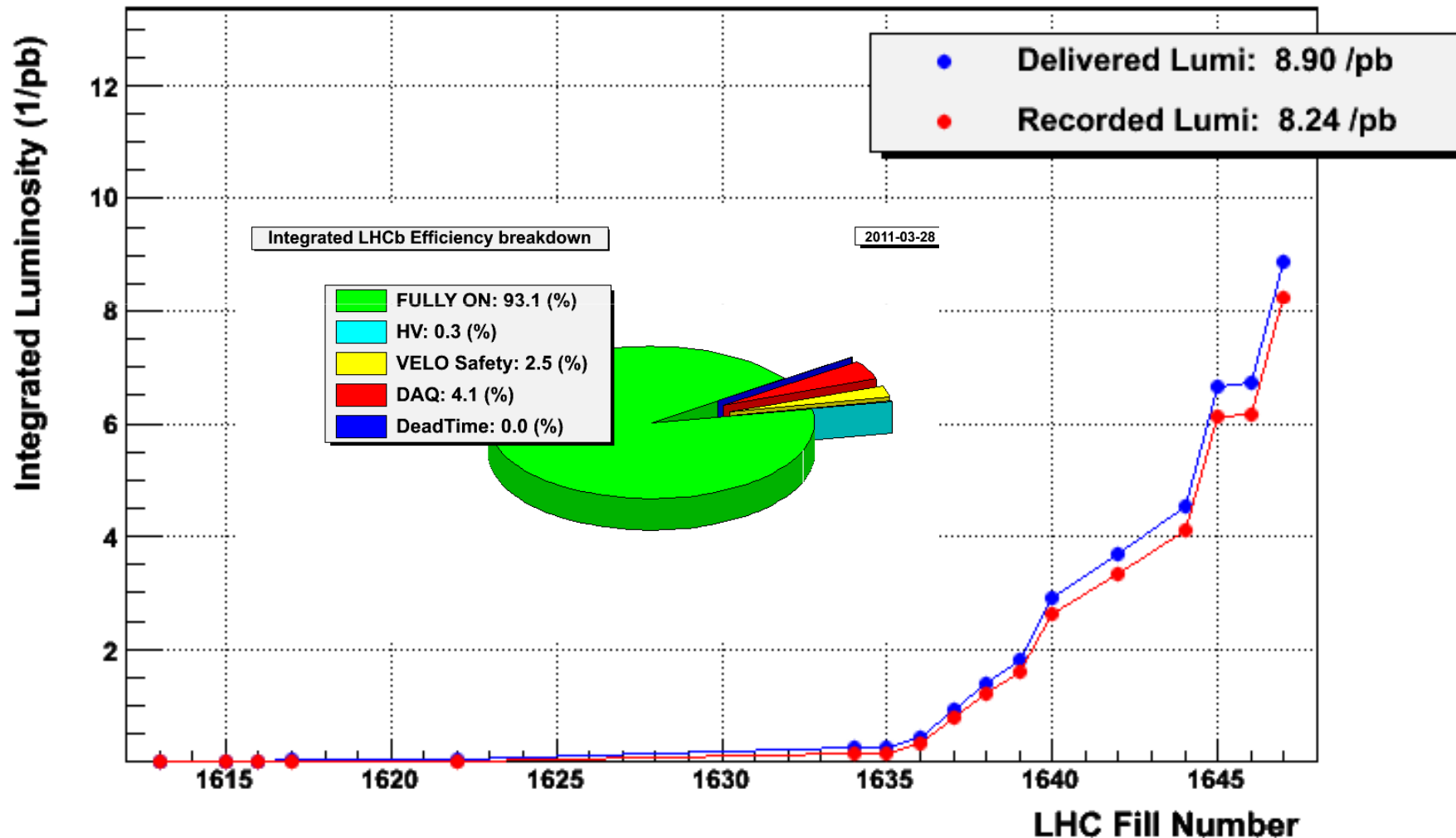
- Additional Charm line in the trigger
 - ▣ +1KHz to the trigger rate
 - ▣ Waiting for C-RSG to give their official verdict
- Assume the following for future calculations
 - ▣ CPU efficiency
 - ☀ Simulation : 80%
 - ☀ Data processing : 70%
 - ☀ User analysis : 60%
 - ▣ Storage efficiency
 - ☀ Disk : 70%
 - ☀ Tape : 100%



And this year so far

LHCb Integrated Lumi over Fill Number at 3.5 TeV

2011-03-28 18:03:29



Processing model for 2011 - 2013

- Standard year (2011, 2012):
 - ▣ Partial reprocessing of current year before summer conferences
 - ⚙ Reconstruction + Stripping
 - ▣ Partial re-stripping of current year during the summer
 - ▣ Full reprocessing at end of year
- Changes in 2012 with respect to 2011:
 - ▣ One additional reprocessing of 2010+2011 data
 - ▣ 30% increase in user activity
- Changes in 2013 with respect to 2012
 - ▣ No LHC running
 - ▣ Re-stripping of full 2010-2012 sample in spring
 - ▣ Reprocessing of full 2010-2012 sample in autumn
 - ▣ Additional simulation using Tier-0/Tier-1s (in addition to Tier-2s)

Upcoming work from LHCb

➤ Dynamic data placement

- ▣ All LHCb work goes through DIRAC

- ☀ Dataset popularity easy to understand

- ▣ Work in progress on lines similar to ATLAS

- ☀ In collaboration with ATLAS experts at CERN-IT

➤ Improvement in reconstruction and stripping algorithms

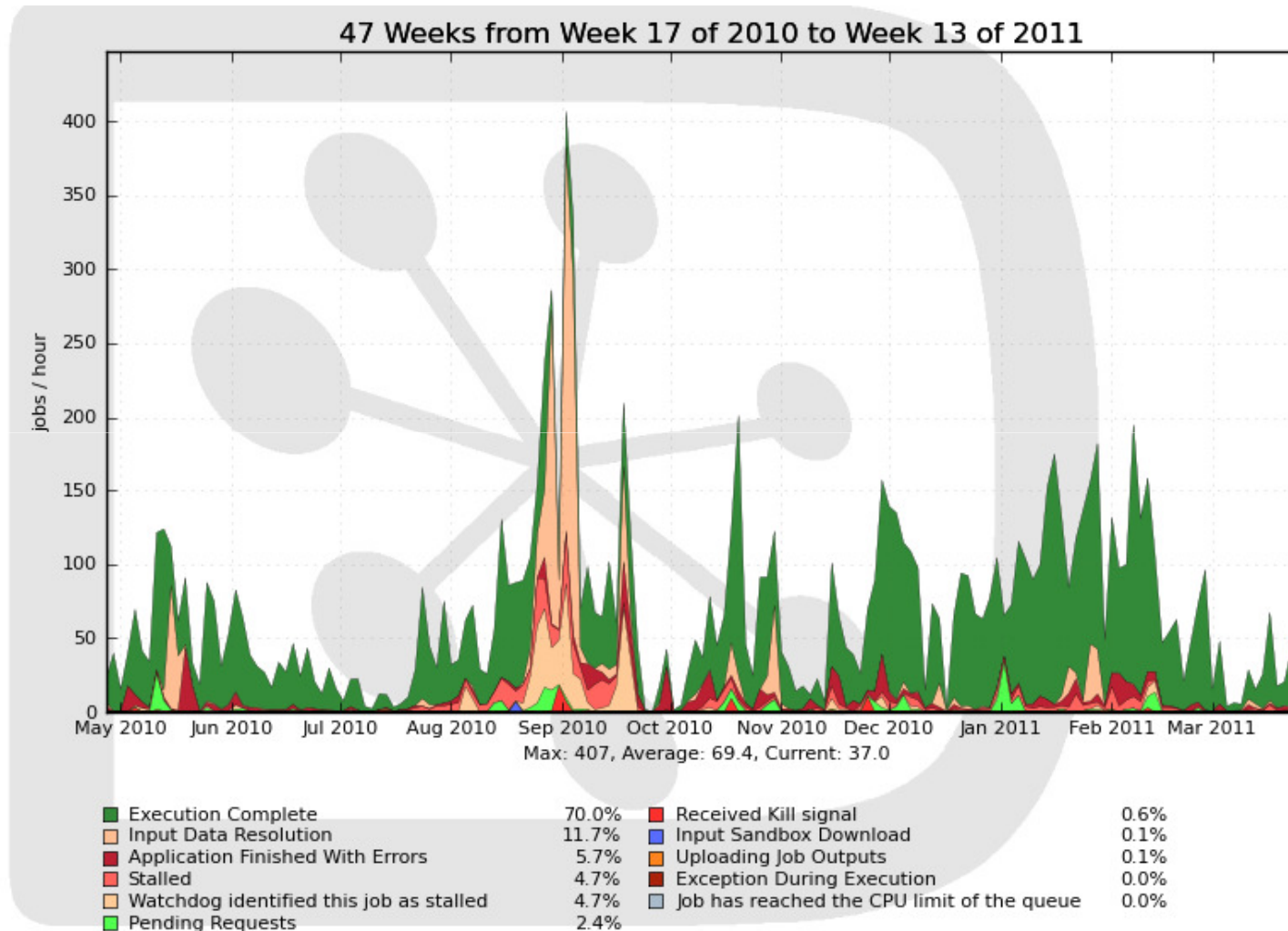
- ▣ Work always in progress

- ☀ More pressure now on various working groups

- ▣ Many recent fixes for memory leaks

- ▣ Need these improvements to be able to analyse data

RAL over the last year



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And to summarise

➤ Continuing concern about diskserver failures at RAL

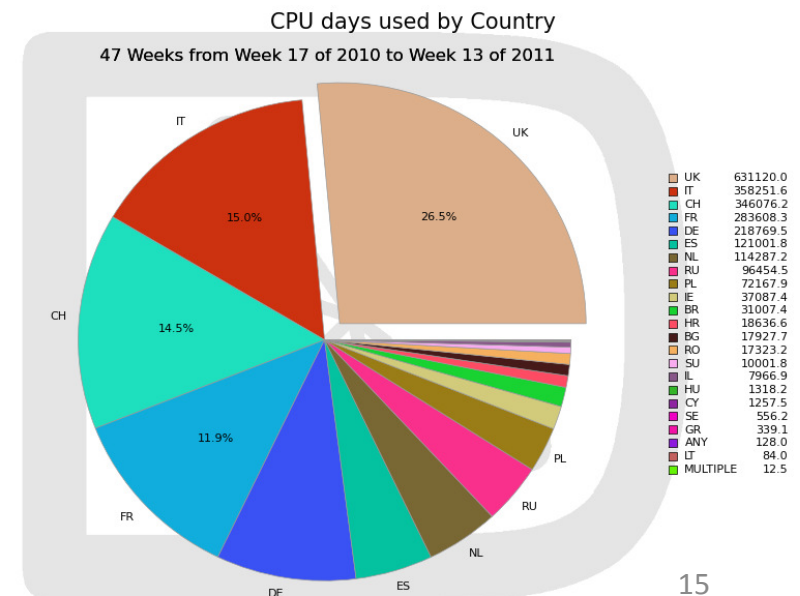
⊞ Otherwise very good performance all around UK

➤ Many many thanks from LHCb to everyone at the Tier-1 and Tier-2s

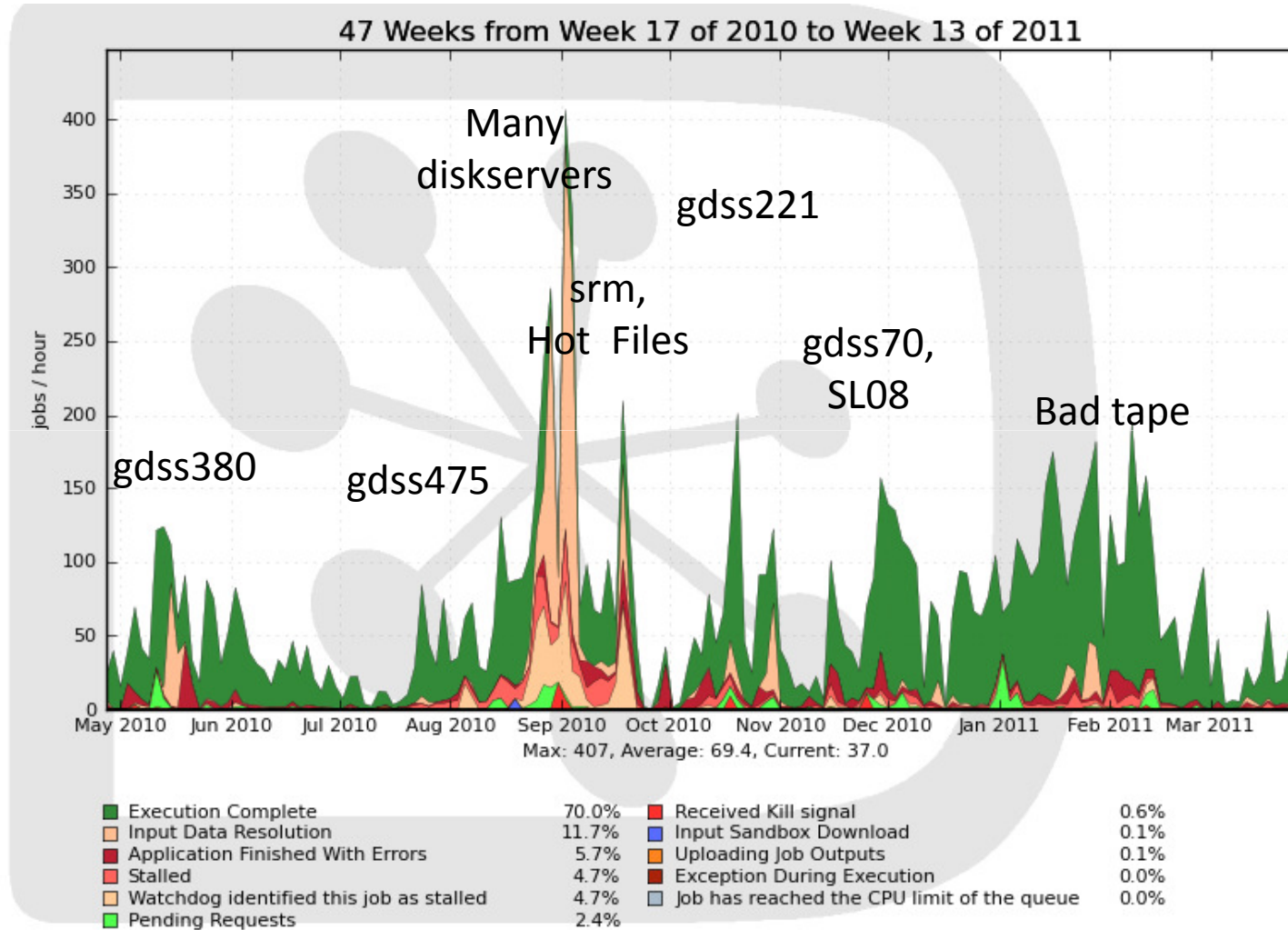
⊞ Helped LHCb's effectiveness

⊞ Over the last few weeks, 2 papers, 13 conference reports

⊞ And more results coming hopefully soon from LHCb.



Backup



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