

# LHCb Software & Computing

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Stefan Roiser

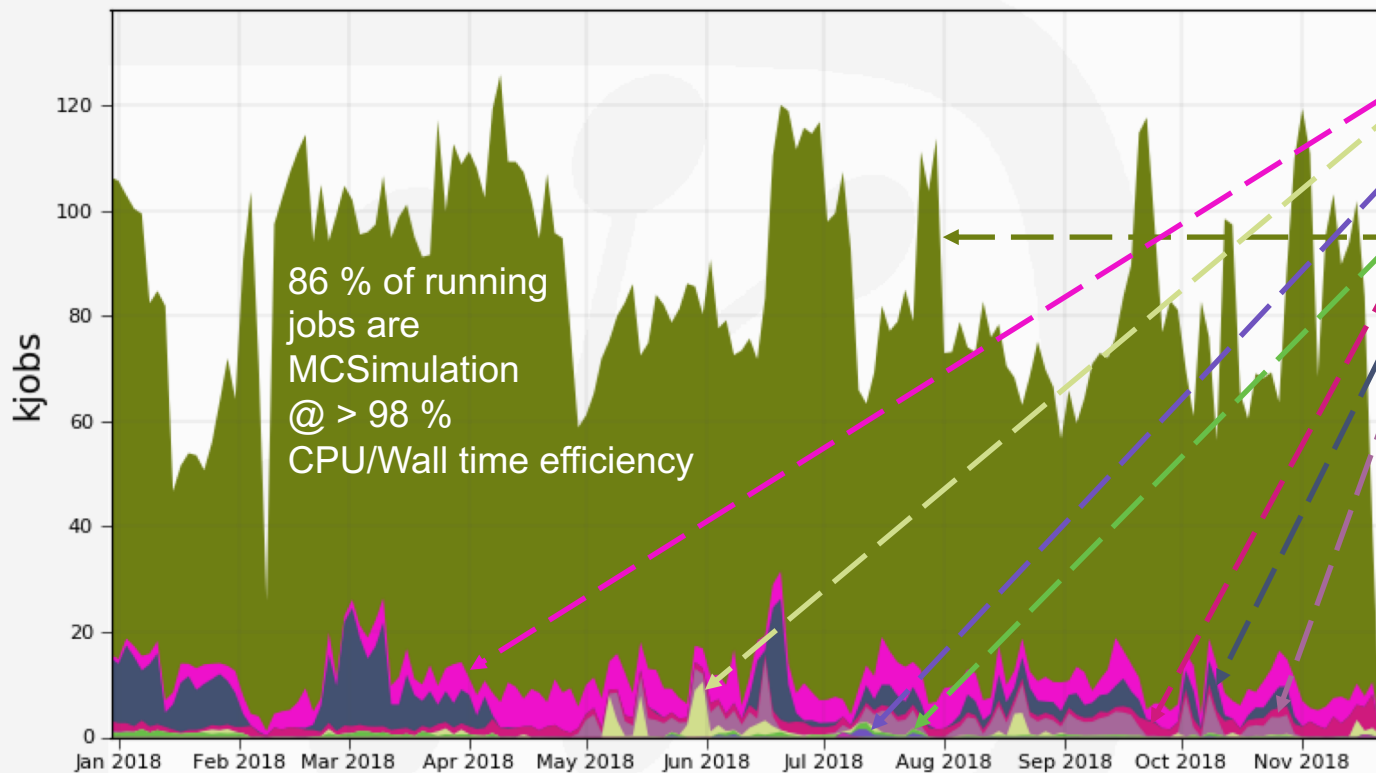
WLCG/LHCC Referees

27 November 2018



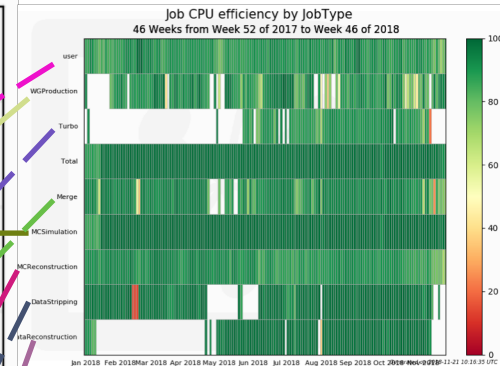
# Running jobs by JobType

## 46 Weeks from Week 52 of 2017 to Week 46 of 2018



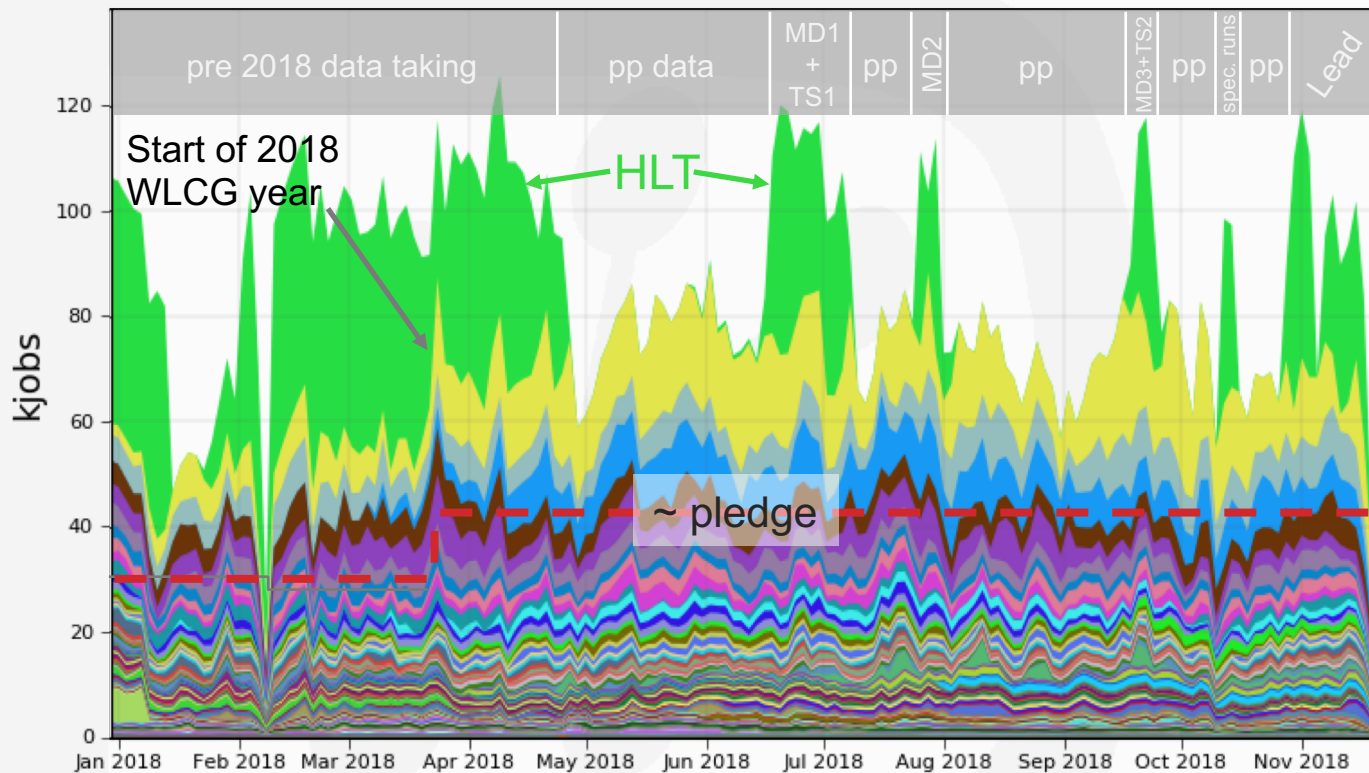
Max: 126, Min: 2.00, Average: 85.7, Current: 2.00

MCSimulation	86.7%	DataReconstruction	1.5%	MCMerge	0.0%	unknown	0.0%
user	5.0%	WGProduction	0.6%	Hospital	0.0%		
DataStripping	4.1%	Merge	0.4%	HistoMerge	0.0%		
MCRReconstruction	1.6%	Turbo	0.1%	test	0.0%		



# Running jobs by Site

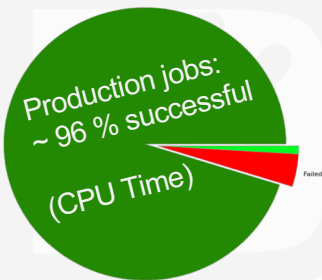
46 Weeks from Week 52 of 2017 to Week 46 of 2018



Max: 126, Min: 2.00, Average: 85.7, Current: 2.00

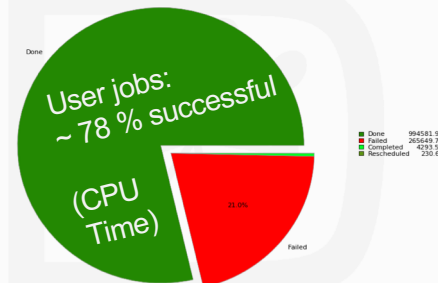
DIRAC.HLTfarm.lhcb	21.9%	LCG.NIKHEF.nl	2.0%	LCG.JINR.ru	0.8%
LCG.CERN.cern	15.1%	LCG.UKI-LT2-IC-HEP.uk	1.6%	VAC.Cambridge.uk	0.8%
LCG.RAL.uk	7.4%	CLOUD.YANDEX.ru	1.4%	LCG.LAL.fr	0.7%
LCG.CNAF.it	6.6%	LCG.SARA.nl	1.4%	LCG.GLASGOW.uk	0.7%
LCG.GRIDKA.de	5.3%	LCG.CBPF.br	1.3%	LCG.CPPM.fr	0.6%
LCG.IN2P3.fr	4.7%	LCG.PIC.es	1.1%	LCG.LAPP.fr	0.6%
LCG.NCBJ.pl	3.8%	LCG.Manchester.uk	1.0%	LCG.UKI-LT2-Brunel.uk	0.6%
LCG.RRCKI.ru	2.2%	LCG.USC.es	1.0%	LCG.LPNHE.fr	0.6%
LCG.CSCS.ch	2.1%	LCG.CSCS-HPC.ch	0.9%	... plus 73 more	

Production Jobs CPU days used by Final Major Status  
46 Weeks from Week 00 of 2018 to Week 46 of 2018



Generated on 2018-11-21 12:40:09 UTC

User Jobs CPU days used by Final Major Status  
46 Weeks from Week 00 of 2018 to Week 46 of 2018



Generated on 2018-11-21 12:49:37 UTC

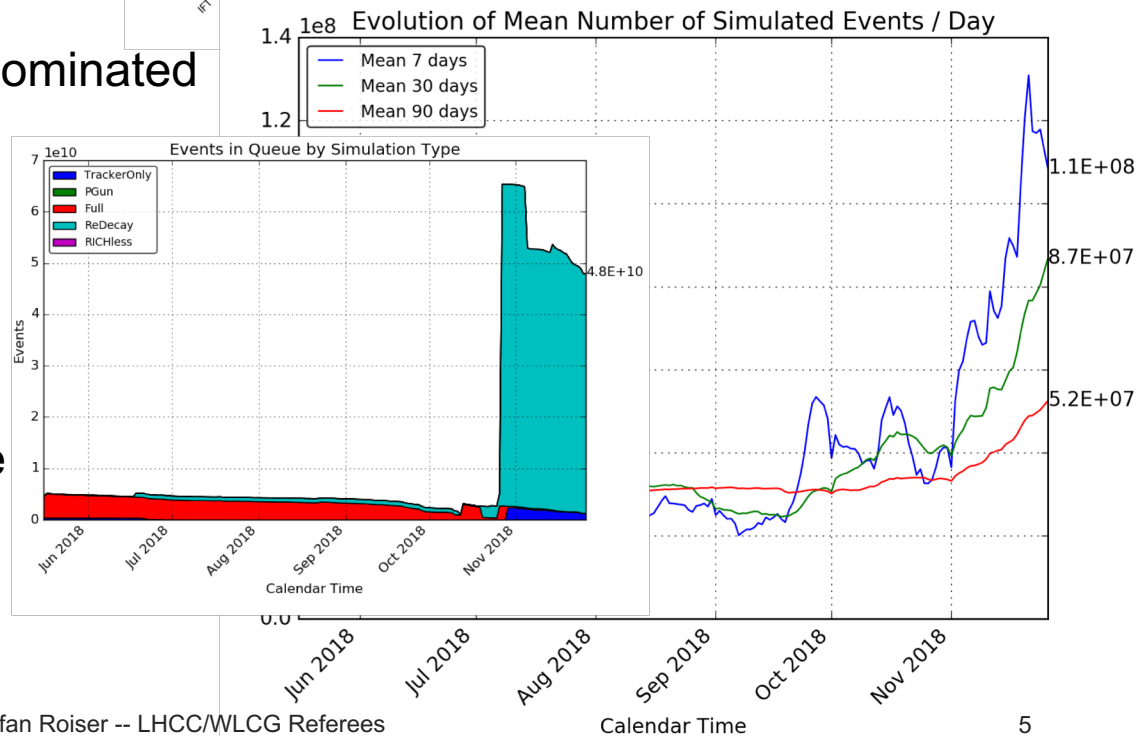
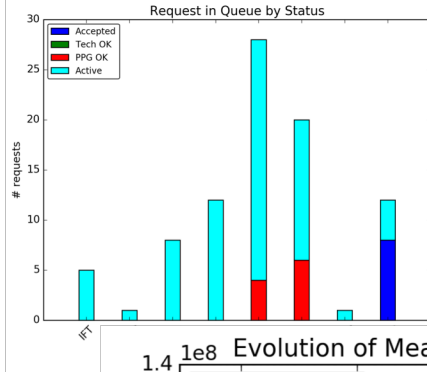
Generated on 2018-11-21 09:16:27 UTC

# Plans for 2019 Distributed Computing Productions

- Monte Carlo productions
  - Estimate to complete current “queue” of requested events account for several months
  - More simulation requests expected for 2017 MC simulation and with readiness of new Sim10 simulation framework currently under validation
- Incremental stripping campaigns for all Run1 and Run2 data foreseen
  - Plan to finish processing of data by fall 2019
    - Estimate 6 - 8 weeks for each Run 2 data taking year and Run1 combined
  - Very tight schedule, mostly limited by tape staging throughput

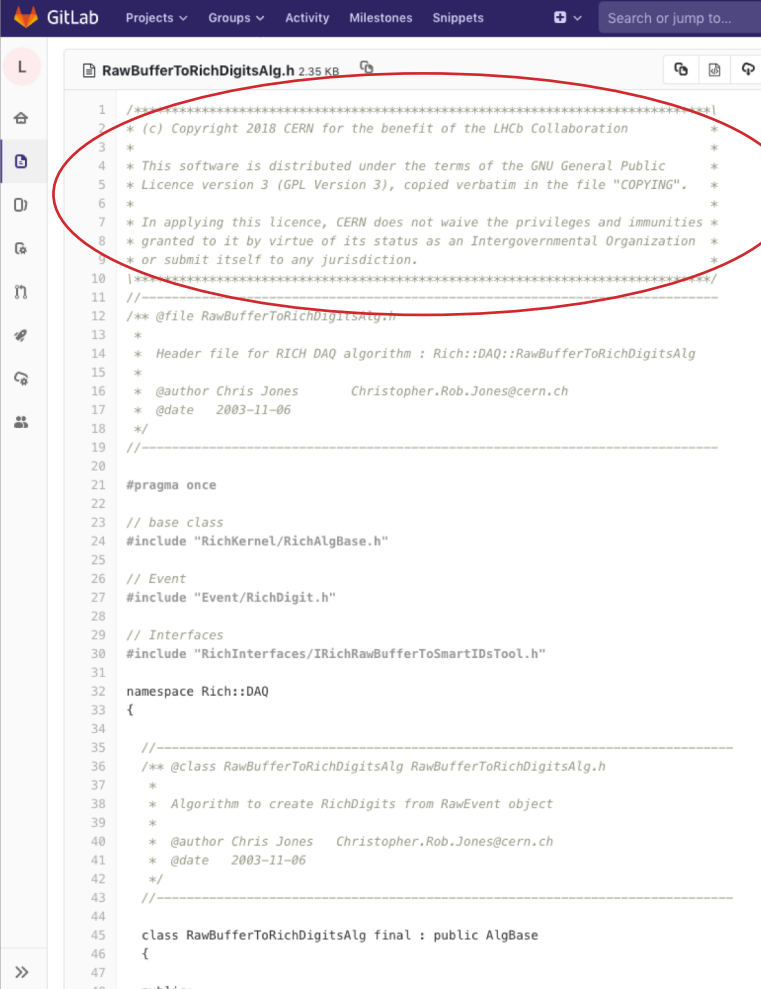
# Simulation Queue

- After almost clearing "queue" of requested events
  - Huge requests submitted, dominated by 2 working groups
- Working "democratically" on requests from all working groups
  - → every working group gets their requested sample in a reasonable time scale
  - → huge requests will take a lot of time  $O(\text{months})$



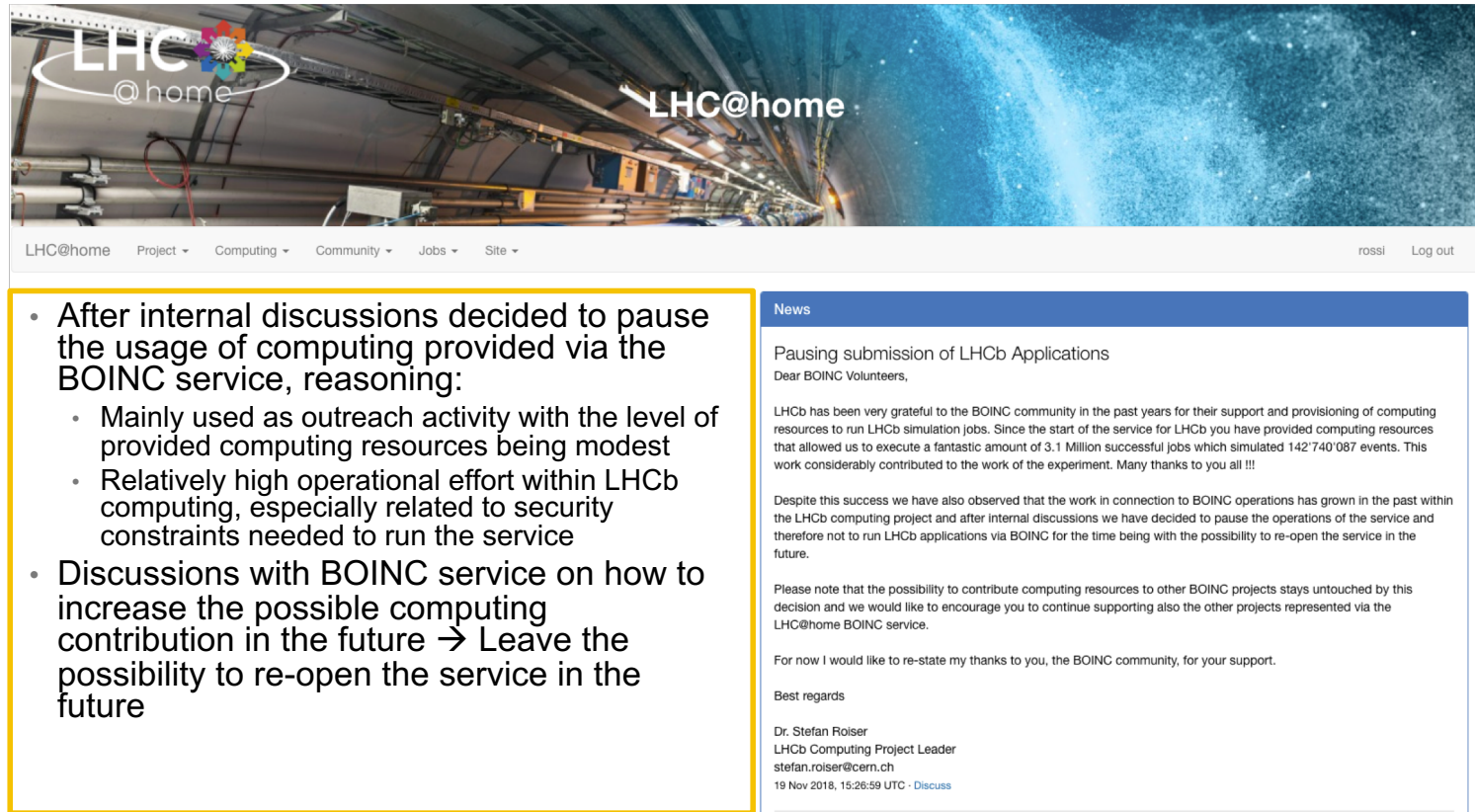
# Copyright & License

- Agreement within the experiment collaboration board to assign copyright and licence on all LHCb centrally managed software repositories, i.e.
  - “Copyright CERN for the benefit of the LHCb collaboration”
  - “GNU General Public Licence v3”
- Statements are currently applied to all source files (.cpp, .h, .py, .xml, etc.)



```
GitLab Projects Groups Activity Milestones Snippets Search or jump to...
RawBufferToRichDigitsAlg.h 2.35 KB
1  /*****
2  * (c) Copyright 2018 CERN for the benefit of the LHCb Collaboration
3  *
4  * This software is distributed under the terms of the GNU General Public
5  * Licence version 3 (GPL Version 3), copied verbatim in the file "COPYING".
6  *
7  * In applying this licence, CERN does not waive the privileges and immunities
8  * granted to it by virtue of its status as an Intergovernmental Organization
9  * or submit itself to any jurisdiction.
10  */
11  -----
12  /** @file RawBufferToRichDigitsAlg.h
13  *
14  * Header file for RICH DAQ algorithm : Rich::DAQ::RawBufferToRichDigitsAlg
15  *
16  * @author Chris Jones Christopher.Rob.Jones@cern.ch
17  * @date 2003-11-06
18  */
19  -----
20
21  #pragma once
22
23  // base class
24  #include "RichKernel/RichAlgBase.h"
25
26  // Event
27  #include "Event/RichDigit.h"
28
29  // Interfaces
30  #include "RichInterfaces/IRichRawBufferToSmartIDsTool.h"
31
32  namespace Rich::DAQ
33  {
34
35  -----
36  /** @class RawBufferToRichDigitsAlg RawBufferToRichDigitsAlg.h
37  *
38  * Algorithm to create RichDigits from RawEvent object
39  *
40  * @author Chris Jones Christopher.Rob.Jones@cern.ch
41  * @date 2003-11-06
42  */
43  -----
44
45  class RawBufferToRichDigitsAlg final : public AlgBase
46  {
47
48  public:
```

# Volunteer Computing – BOINC Paused



The screenshot shows the LHC@home website interface. The top navigation bar includes 'LHC@home', 'Project', 'Computing', 'Community', 'Jobs', and 'Site'. The main content area features a blue header for 'News' and a news article titled 'Pausing submission of LHCb Applications'. The article text is as follows:

Pausing submission of LHCb Applications  
Dear BOINC Volunteers,

LHCb has been very grateful to the BOINC community in the past years for their support and provisioning of computing resources to run LHCb simulation jobs. Since the start of the service for LHCb you have provided computing resources that allowed us to execute a fantastic amount of 3.1 Million successful jobs which simulated 142'740'087 events. This work considerably contributed to the work of the experiment. Many thanks to you all !!!

Despite this success we have also observed that the work in connection to BOINC operations has grown in the past within the LHCb computing project and after internal discussions we have decided to pause the operations of the service and therefore not to run LHCb applications via BOINC for the time being with the possibility to re-open the service in the future.

Please note that the possibility to contribute computing resources to other BOINC projects stays untouched by this decision and we would like to encourage you to continue supporting also the other projects represented via the LHC@home BOINC service.

For now I would like to re-state my thanks to you, the BOINC community, for your support.

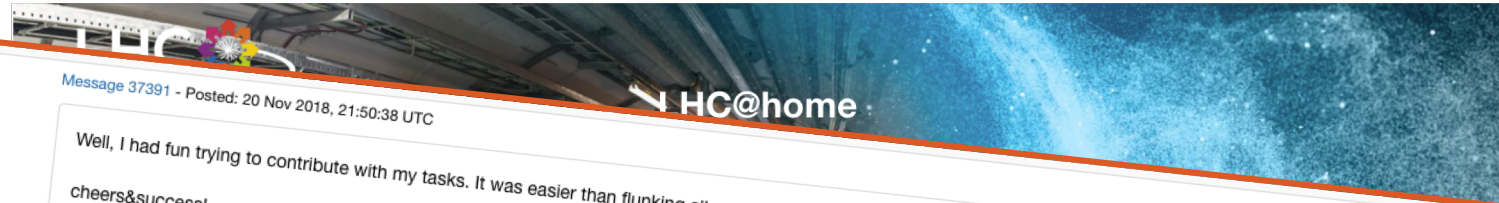
Best regards

Dr. Stefan Roiser  
LHCb Computing Project Leader  
stefan.roiser@cern.ch  
19 Nov 2018, 15:26:59 UTC · [Discuss](#)

The left side of the screenshot contains a list of bullet points explaining the decision to pause BOINC service:

- After internal discussions decided to pause the usage of computing provided via the BOINC service, reasoning:
  - Mainly used as outreach activity with the level of provided computing resources being modest
  - Relatively high operational effort within LHCb computing, especially related to security constraints needed to run the service
- Discussions with BOINC service on how to increase the possible computing contribution in the future → Leave the possibility to re-open the service in the future

# Volunteer Computing – BOINC Paused



Send message  
Joined: 28 Sep 08  
Posts: 1  
Credit: 94,970  
RAC: 14

Message 37391 - Posted: 20 Nov 2018, 21:50:38 UTC

Well, I had fun trying to contribute with my tasks. It was easier than flunking all my math & science courses in school..

cheers&success!

dan

ID: 37391 · Reply Quote

- BOINC service, is
- Mainly used as outreach activity with the rest of the community, provided computing resources being modest
  - Relatively high operation cost

Send message  
Joined: 18 Dec 15  
Posts: 892  
Credit: 6,984,339  
RAC: 12,997

Message 37388 - Posted: 20 Nov 2018, 17:25:45 UTC - in response to Message 37387.

on the other hand, it's really too bad that - like in so many other cases all around in our life - the reason for suspending (or maybe stopping at all) LHCb under BOINC was a monetary one :-)

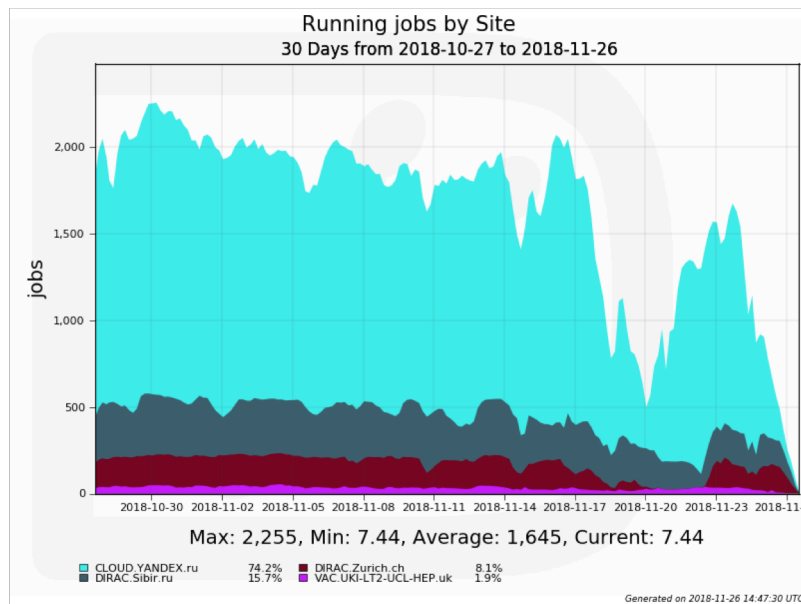
ID: 37388 · Reply Quote

Best regards  
Dr. Stefan Roiser  
LHCb Computing Project Leader  
stefan.roiser@cern.ch  
19 Nov 2018, 15:26:59 UTC · [Discuss](#)



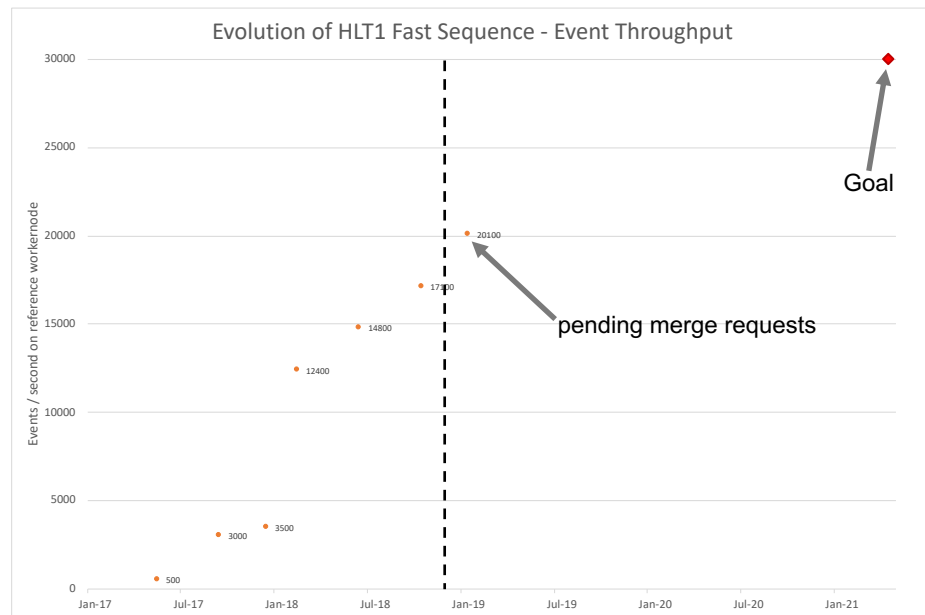
# Opportunistic Computing – Institute contributions

- Recently contacted LHCb institutes asking to provide additional computing resources via otherwise idle interactive or batch clusters
- Several institutes already provide resources
- Several new under discussion from Italy, UK and Switzerland



# Upgrade Software Status

- Engineering of the HLT1 sequence progressing well
  - Major improvements in the past months
    - Better memory management
    - Several small optimizations of algorithms
    - Improvements of the framework
    - New scheduler production ready
  - More improvements in the pipeline (estimates in plot based on measurements on reference machine)
- As of next year move focus more on HLT2 sequence



# Run 3 Computing Model

- Document finished and submitted to LHCC
- Lot of work reducing especially storage needs since May presentation
  - “Stripping” of the Full stream bandwidth to disk
  - Reduced storage needs for 2021 commissioning year
- Detailed presentation this morning



<https://cds.cern.ch/record/2319756>

# Summary

- Computing operations continue at high usage and efficiency
  - This year usage on average 2x above WLCG pledged resources
  - Trying to keep especially MC production requests under control
  - Reaching out to utilize even more opportunistic and unpledged resources
- Run 3 upgrade work progressing well
  - Continued improvements for throughput of HLT 1 CPU based trigger
  - Computing Model TDR submitted to LHCC
- Hand-over of the computing project leadership
  - Many thanks for the constructive meetings. All the best to Concezio!

