



# DIRAC at LHCb

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For the LHCb distributed computing team

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KEK



# DIRAC vs LHCbDIRAC

## DIRAC

- WMS (pilots, jobs)
- DMS (replica catalog, storage management)
- Transformation System for Jobs and DataManagement
- Accounting, Monitoring

## LHCbDIRAC

- LHCb bookkeeping
  - metadata and provenance catalog
- LHCb Production Request System
  - Production requests
  - MC submission system **New**
  - Analysis production submission **New**

# MC submission system

## Extension of LHCb Production Request system

- Description of set of productions in one YAML file
- Committed to GitLab and tested in CI
- On merge, submit as Production requests (LHCbDirac)
- Submitting and running productions with Production Request system through WebApplication

# MC submission system

## Testing result

LHCb MC Requests Log out Vladimir Romanovskiy (vladimir.romanovskiy@cern.ch)

Home  
Pipelines  
Documentation

MC Request Pipelines / 769 / Bs2PhiPhi

6 jobs triggered by [reamalri](#) tested at commit [60973d17](#) for [lhcb-simulation/mc-requests!267](#)

Configuration files

**Looks good!**  
6 jobs completed successfully.

Jobs (6 total)  Retry Failed/Cancelled Cancel Running

WG	Status	Job Name	Test job statistics			Production resource usage			
			Generated	Stored	Size	Requested	Generate	Disk	CPU years (Gauss)
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2016 pp MagUp:13104013	10	10	2.54 MB	1,000,000	1,000,000	253.92 GB	44
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2016 pp MagDown:13104013	10	10	1.87 MB	1,000,000	1,000,000	186.93 GB	23
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2012 pp MagUp:13104013	10	10	2.28 MB	1,000,000	1,000,000	228.37 GB	16
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2012 pp MagDown:13104013	10	10	1.86 MB	1,000,000	1,000,000	186.11 GB	28
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2011 pp MagUp:13104013	10	10	1.76 MB	1,000,000	1,000,000	175.77 GB	17
BnoC	SUCCESS	request.yaml:BnoC_Sim09_MaryRichardsonSlipper 2011 pp MagDown:13104013	10	10	1.77 MB	1,000,000	1,000,000	177.4 GB	15

# User Analysis production system

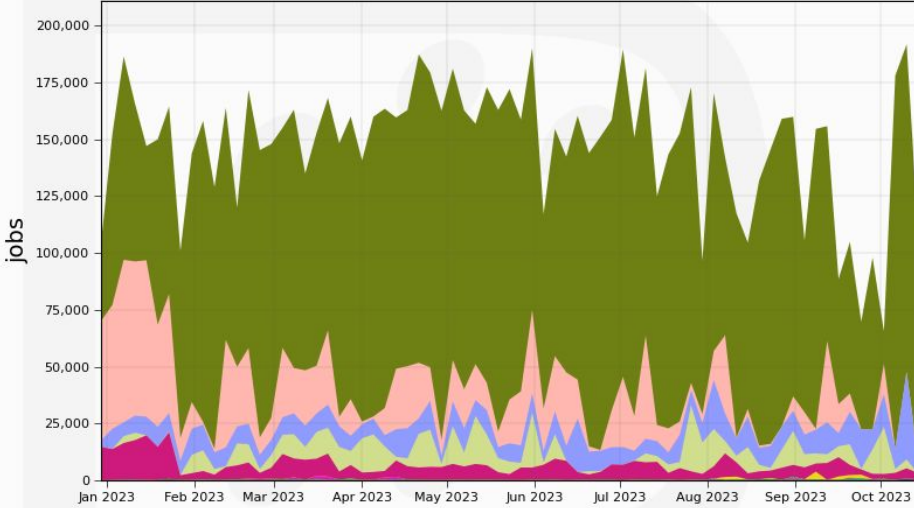
## Access for users to Transformation system

- Same workflow as MC requests (YAML + GitLab CI + MR)
- Testing user application by submitting jobs to Dirac via GitLab CI
- Submitting, running and finalisation of productions automatically using Production Request system by scripts

# Job Activity

## Jobs by JobSplitType

41 Weeks from Week 52 of 2022 to Week 41 of 2023



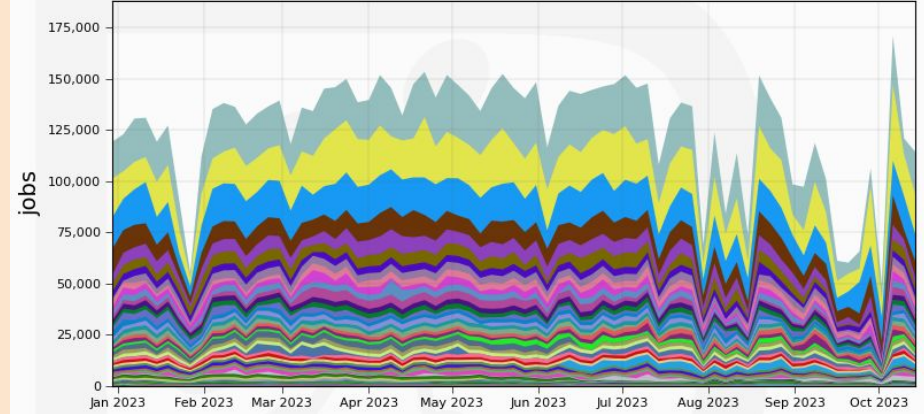
Max: 191,657, Min: 65,546, Average: 147,877, Current: 110,662

MCSimulation	71.9%	WGProduction	4.5%	user	0.1%	MCMerge	0.0%
MCFastSimulation	12.5%	MCReconstruction	4.3%	Merge	0.1%	DataReconstruction	0.0%
User	6.3%	Sprucing	0.1%	Test	0.1%	DataStripping	0.0%

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## Jobs by Site

41 Weeks from Week 52 of 2022 to Week 41 of 2023



Max: 170,960, Min: 49,730, Average: 126,456, Current: 114,380

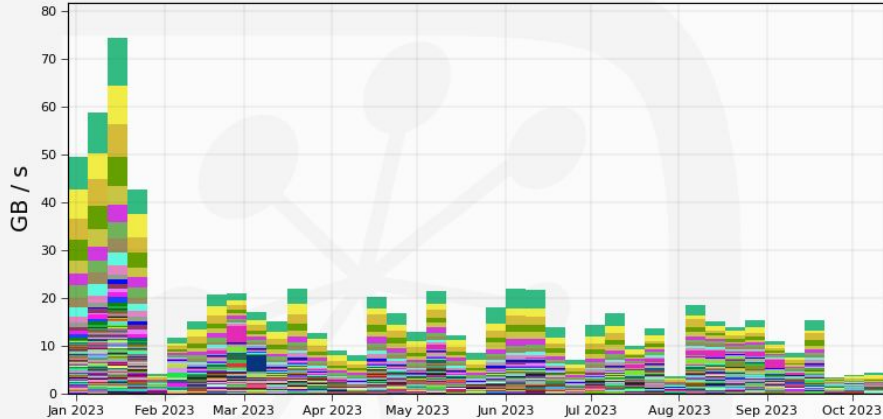
LCG.RAL.uk	16.0%	LCG.NIKHEF.nl	2.0%	LCG.CPPM.fr	1.3%	LCG.Oxford.uk	0.9%
LCG.CERN.cern	14.6%	LCG.UKI-LT2-QMUL.uk	2.0%	LCG.LAPP.fr	1.3%	LCG.JINR.ru	0.9%
LCG.CNAF.it	12.1%	LCG.MIT.us	1.9%	LCG.RAL-HEP.uk	1.2%	LCG.GRIF.fr	0.9%
LCG.GRIDKA.de	6.8%	LCG.Glasgow.uk	1.7%	LCG.PIC.es	1.2%	LCG.NIPNE-07.ro	0.8%
LCG.IN2P3.fr	4.6%	LCG.Liverpool.uk	1.5%	LCG.LAL.fr	1.2%	LCG.SARA.nl	0.8%
LCG.Manchester.uk	3.6%	LCG.Lancaster.uk	1.4%	LCG.UKI-LT2-RHUL.uk	1.2%	LCG.LPC.fr	0.8%
LCG.NCBJ-CIS.pl	2.5%	LCG.RRCKI.ru	1.4%	LCG.Beijing.cn	1.2%	LCG.DESYHH.de	0.7%
LCG.NCBJ.pl	2.4%	LCG.CBPF.br	1.3%	LCG.Krakow.pl	1.1%	LCG.Durham.uk	0.7%
LCG.CSCS.ch	2.0%	LCG.UKI-LT2-IC-HEP.uk	1.3%	DIRAC.UZH.ch	1.0%	...	plus 32 more

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# Data transfers activity

## Throughput by Channel

41 Weeks from Week 52 of 2022 to Week 41 of 2023



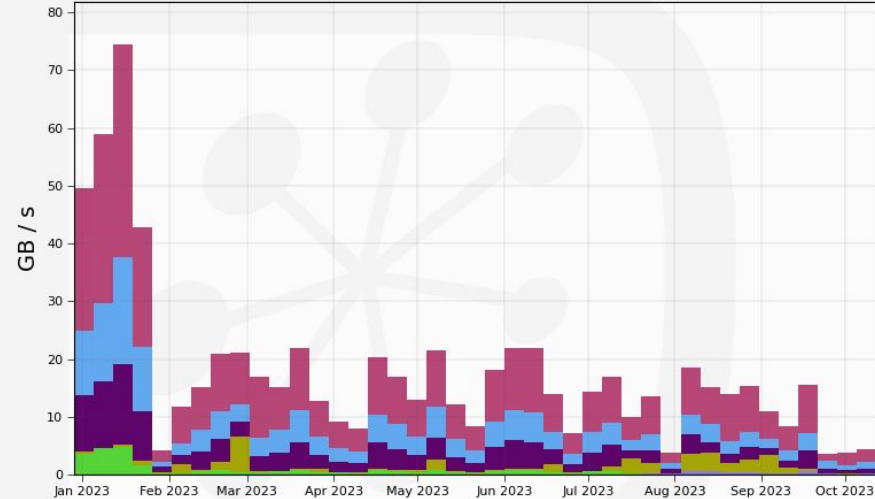
Max: 74.4, Min: 3.36, Average: 17.4, Current: 3.36

LCG.RAL.uk -> RAL-BUFFER	12.7%	IN2P3-BUFFER -> LCG.IN2P3.fr	2.4%
LCG.CERN.cern -> CERN-BUFFER	9.0%	lbvobox309.cern.ch -> CERN-DAQ-EXPORT	1.9%
LCG.CNAF.it -> CNAF-BUFFER	7.9%	LCG.RRCKI.ru -> RRCKI-BUFFER	1.5%
LCG.GRIDKA.de -> GRIDKA-BUFFER	6.4%	LCG.PIC.es -> PIC-BUFFER	1.4%
RAL-BUFFER -> LCG.RAL.uk	5.1%	RRCKI-BUFFER -> LCG.RRCKI.ru	1.3%
LCG.IN2P3.fr -> IN2P3-BUFFER	4.8%	PIC-BUFFER -> LCG.PIC.es	1.2%
CERN-BUFFER -> LCG.CERN.cern	4.0%	CERN-DAQ-EXPORT -> CERN-RAW	1.2%
CNAF-BUFFER -> LCG.CNAF.it	3.5%	LCG.SARA.nl -> SARA-BUFFER	1.0%
GRIDKA-BUFFER -> LCG.GRIDKA.de	3.0%	... plus 4305 more	

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## Throughput by Protocol

41 Weeks from Week 52 of 2022 to Week 41 of 2023



Max: 74.4, Min: 3.36, Average: 17.4, Current: 3.36

DataManager	48.9%	FTS3	5.1%	gsiftp	0.0%
root	22.9%	SRM	3.8%	dips	0.0%
https	18.8%	file	0.5%	Stager	0.0%

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# Answers to the questions

What is your biggest frustration with DIRAC?

**My opinion only**

Jobs stalled forever at any state (Matched, Waiting, Rescheduled )

It's a bug in the WMS which has been there since 7.3(?)

It blocks all automatic action of Production system



# Answers to the questions

Any notable operations incident in the last year?

Few times installation of new (certified) version of (LHCb)DIRAC brakes everything.

# Answers to the questions

What can be improved for communication in the project?

Most (All) LHCbDIRAC developers are simultaneously DIRAC developers. No problems!

# Answers to the questions

What are your expectations with DiracX?

Fixing old problems without introducing new.