

# ATLAS MC Production Workflow

## Input to the ATLAS Sites Jamboree

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ATLAS Sites Jamboree  
March 5th, 2018



# Introduction

## > Mandate

- *To produce the official MC samples in the central production system*
- *To monitor and manage the available Grid resources for this purpose*
- *To improve the MC production efficiency of the central production system*

## > 2 Production Coordinators (Doug Gingrich, DS)

- *Overall coordination, interaction with other groups, as well as bulk sample production*

## > 3 shifters on rotation: Dominic Hirschbühl, Hulin Wang, Matteo Negrini

- *Produce all requests from Physics (BPHYS, EXOT, HIGG, STDM, SUSY, TOPQ) and CP Groups (EGAM, FTAG, IDET, JETM, MUON, TAUP, MCGN) with standard tags*

## > 1 upgrade production coordinator: Hector de la Torre

## > 1 special requests coordinator: Sascha Mehlhase

# Interactions with other groups

> MC is the interface between Physics and Computing

> From the Physics side:

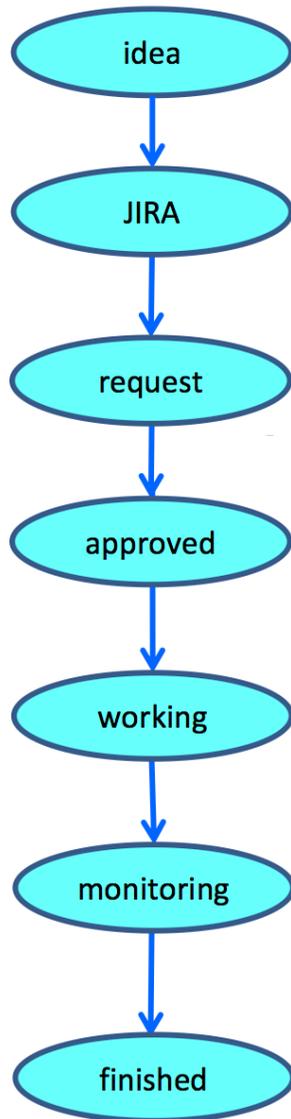
- *Physics Coordination (PC)*
- *Physics Modelling Group (PMG)*
- *Combined Performance (CP) Groups via MC Contacts*
- *Physics Analysis Groups via MC Contacts*
- *Physics Validation*

> From the Computing and Software side:

- *ATLAS Distributed Computing (ADC):*
  - *Workflow Management System (WFMS), ProdSys, PanDA*
  - *Metadata (AMI)*
  - *Distributed Data Management (DDM)*
  - *Non-standard resources (HPC, Cloud, volunteer computing)*
- *Simulation*
- *Reconstruction*

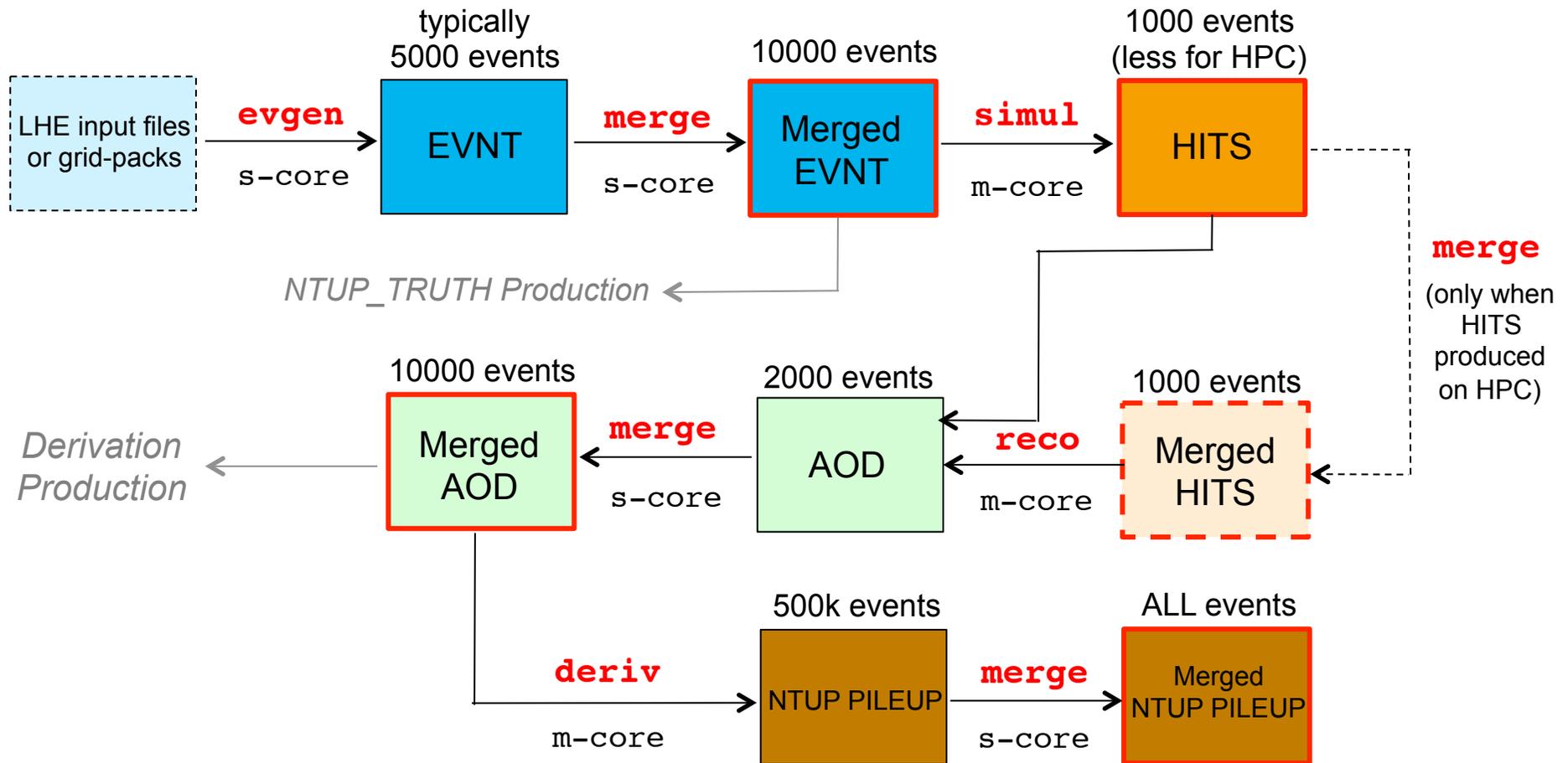
> Further contacts with trigger, data preparation, group production, ...

# MC Production Workflow



- > Requester talks to their sub-group convenor about MC needs and to their MC contact person about samples
- > ATLMCPROD JIRA ticket is created, usually by MC contact
- > Production request is created in ProdSys by MC contact, via input spread-sheet
- > PMG convenor approves request
- > MC production team member takes over the request (becomes manager), modifying it if necessary, before submitting it for production
- > MC production manager monitors the request until finished
- > MC production manager puts notification in JIRA when done

# Current MC Production Chain



Keep only the **(merged) dataset** at each step, according to the relevant rules of the lifetime model for each data type

# MC Production: Tags

- > All tags maintained in AML, main ones: e-tag, s-tag, a-tag, r-tag, p-tag
- > e-tags: EVNT (EVGEN) production and merging
  - *We run MC event generators, for example Pythia6/8, Herwig++, Powheg, Sherpa, MadGraph, Alpgen, etc. Sometimes using LHE files or grid-packs as inputs*
  - *e-tag must contain tar.gz file of relevant Job Options and as this is different for each request there are many e-tags in the current model*
- > s-tags: Geant4 simulation to produce HITS and merging
- > a-tags: Simulation tag when running faster, less detailed AFII simulation
- > r-tags: Digitisation and reconstruction, as well as AOD merging
- > p-tags: Production of NTUP\_PILEUP format and merging
  - *Used by analysis in conjunction with merged AOD, contains same events*

# MC Production: Requests and Slices

- > Each MC production request consists of a logical set of samples
  - Request made up of many (up to 300) slices, typically grouped in physics not computing!
  - There may also be sub-slices within a slice (see later)
- > Each chain consists of different production steps, each with its own tag
  - Example of MC15 production, much simpler workflow than MC16: submitted in two clicks!

	Evgen	Evgen Merge	Simul	Merge	Digi	Reco	Rec Merge	Atifast	Atif Merge	TAG	Deriv	Deriv Merge
<b>Slice 0</b>	0 + MC15.309044.MadGraphHerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh_m270_4b.py (Fullsim)Please produce with e4729_s2726_r7772_r7676 to match existing samples. Uses modified MadGraphControl_HerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh.py events: 100000											
	e6202		s2726			r7772	r7676				p2761	
T:	done		finished			finished	finished				finished	
<b>Slice 1</b>	1 + MC15.309045.MadGraphHerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh_m280_4b.py (Fullsim)Please produce with e4729_s2726_r7772_r7676 to match existing samples. Uses modified MadGraphControl_HerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh.py events: 100000											
	e6202		s2726			r7772	r7676				p2761	
T:	done		finished			finished	finished				finished	
<b>Slice 2</b>	2 + MC15.309046.MadGraphHerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh_m290_4b.py (Fullsim)Please produce with e4729_s2726_r7772_r7676 to match existing samples. Uses modified MadGraphControl_HerwigppEvtGen_UEEE5_CTEQ6L1_CT10ME_Xhh.py events: 100000											
	e6202		s2726			r7772	r7676				p2761	
T:	done		finished			finished	finished				finished	
...	3 + MC15.309038.MadGraphPythia8EvtGen_A14NNPDF23LO_RS_G_hh_bbbb_c10_M260.py (Fullsim)Please produce with e3820_e2608_e2183_r4459_r7676 to match existing samples. Uses modified											

**Step** →

**Chain**

# ATLAS Monte Carlo for Run 2: The MC16 Campaign

Sub-campaign	Data match	Processing	Description
MC16a	2015+2016	HITS+digi+reco	matches 2015+2016 dataset + mu profile
MC16b	none	digi+reco	uses higher mu (30-70) for trigger and CP studies for 2017 data
MC16c	2017	HITS+digi+reco	uses expected 2017 mu profile, geometry and trigger
MC16d	2017	digi+reco	uses true 2017 mu profile
MC16e	2018	HITS+digi+reco	uses expected 2018 mu profile and trigger
MC16f	2018	digi+reco	uses true 2018 mu profile if required

- > There are six **sub-campaigns** foreseen in MC16
- > MC16a, MC16c and MC16e have to use statistically different EVGEN events but the same EVGEN configuration, so they can be combined for analyses using all run 2 data
- > The simulation configuration for HITS production is the same for all sub-campaigns
- > MC16c and MC16e are initial versions for 2017 and 2018 with the initial mu profile for that year; MC16c is now superseded by MC16d, which has the updated pile-up distribution for 2017
- > MC16d and MC16f samples may also use different conditions, e.g. if part of some detector got disabled during the run and is thus masked in the new MC version

# What does this mean for production?

Physics	evgen		simul		recon	
Sub-campaign	Project	Campaign	Project	Campaign	Project	Campaign
MC16a	mc15_13TeV	MC16:MC16a or MC15:MC15* or None	mc16_13TeV	MC16:MC16a	mc16_13TeV	MC16:MC16a
MC16b	mc15_13TeV	MC16:MC16b	mc16_13TeV	MC16:MC16b	mc16_13TeV	MC16:MC16b
MC16c	mc15_13TeV	MC16:MC16c	mc16_13TeV	MC16:MC16c	mc16_13TeV	MC16:MC16c
MC16d	mc15_13TeV	MC16:MC16c	mc16_13TeV	MC16:MC16c	mc16_13TeV	MC16:MC16d
MC16e	mc15_13TeV	MC16:MC16e	mc16_13TeV	MC16:MC16e	mc16_13TeV	MC16:MC16e
MC16f	mc15_13TeV	MC16:MC16e	mc16_13TeV	MC16:MC16e	mc16_13TeV	MC16:MC16f

- > We have multiple configurations to cover the six MC16 sub-campaigns
- > Project is the same for a given step across all sub campaigns
  - *Only the evgen step has project mc15\_13TeV*
  - *All others, including evgen merge, are mc16-13TeV*
- > In the case of MC16d and MC16f, only the reco (with the updated pile-up distribution) has that sub-campaign
- > Some examples...

# MC16a Workflow

4	+ MC15.300307.Pythia8B_A14_CTEQ6L1_bb_mu3p5mu3p5_Py8RepDec_4to6p5GeV.py											events: 20000000
(Atlfast)(1)Evgen-only for the moment; 19.2.4.16 for evgen;												
	e6179											submitted <a href="#">edit (saved)</a>
T:	done											
	^ext.^											

Evgen	Evgen Merge	Simul	Merge	Digi	Reco	Rec Merge	Atlfast	Atif Merge	TAG	Deriv	Deriv Merge
-------	-------------	-------	-------	------	------	-----------	---------	------------	-----	-------	-------------

35	+ MC15.300307.Pythia8B_A14_CTEQ6L1_bb_mu3p5mu3p5_Py8RepDec_4to6p5GeV.py											events: -1 (20000000)	
(Atlfast)(1)Evgen-only for the moment; 19.2.4.16 for evgen;													
	e6179	e5984	a875			r9364	r9315				p3288	p3126	submitted <a href="#">edit (saved)</a>
T:	done	done			done	done				done	done		

## Request 1

Project:

**mc15\_13TeV**

Sub-campaign:

**MC15c/MC16a/None**

## Request 2

Project:

**mc16\_13TeV**

Sub-campaign:

**MC16a**

- > For both MC16a and MC16c, the standard workflow is 2 requests:
  - *First request performs the Evgen step*
  - *Second request to do the Evgen merge, (Fast)Simul, Reco+Merge and Deriv+Merge steps*
  
- > This example is for MC16a: the workflow is similar for MC16c (and MC16e), which uses the MC16c (MC16e) sub-campaign for both request 1 and 2

# MC16d Workflow

11 + MC15.301255.Pythia8EvtGen\_A14NNPDF23LO\_Wprime\_WZqqqq\_m600.py  
 (Fullsim) events: 125000

e3749													submitted	<a href="#">edit (saved)</a>
T: done														
	^ext.^													

## Request 1

Project: **mc15\_13TeV**  
 Sub-campaign: **MC16c**

Evgen	Evgen Merge	Simul	Merge	Digi	Reco	Rec Merge	Attfast	Attf Merge	TAG	Deriv	Deriv Merge
-------	-------------	-------	-------	------	------	-----------	---------	------------	-----	-------	-------------

0 + MC15.301255.Pythia8EvtGen\_A14NNPDF23LO\_Wprime\_WZqqqq\_m600.py  
 (Fullsim) events: 125000

e3749	e5984	s3126											submitted	<a href="#">edit (saved)</a>
T:	done	finished												

## Request 2

Project: **mc16\_13TeV**  
 Sub-campaign: **MC16c**

Evgen	Evgen Merge	Simul	Merge	Digi	Reco	Rec Merge	Attfast	Attf Merge	TAG	Deriv	Deriv Merge
-------	-------------	-------	-------	------	------	-----------	---------	------------	-----	-------	-------------

0 + MC15.301255.Pythia8EvtGen\_A14NNPDF23LO\_Wprime\_WZqqqq\_m600.py  
 (Fullsim) events: 125000

		s3126			r10201	r10210				p3384	p3385		submitted	<a href="#">edit (saved)</a>
T:					finished	finished				finished	finished			

## Request 3

Project: **mc16\_13TeV**  
 Sub-campaign: **MC16d**

- > The standard MC16d workflow for new requests necessarily involves three requests:
  - 1) Evgen
  - 2) Evgen merge and Simul
  - 3) Reco + merge and Deriv + merge

# MC16d Workflow using existing MC16c HITS

Evgen	Evgen Merge	Simul	Merge	Digi	Reco	Rec Merge	Attfast	Atif Merge	TAG	Deriv	Deriv Merge	
9 + MC15.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.py											mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu	
(Fullsim)											events: -1	
e5271		s3126			r10201	r10210				p3384	p3385	submit
T:					finished	finished				finished	finished	
					done	done				done	done	

- > Only run steps from reco, using HITS produced in an earlier MC16c production
- > Here you see sub-slices, so there are two input MC16c HITS tids
- > In fact there multiple tids from different sub campaigns available as inputs:  
Here we have 2 x MC16a, 2 x MC16c and 1 xMC16e HITS tids:

Dataset Name	Events Number	SubCampaing	Tasks
mc16_13TeV:mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.simul.HITS.e5271_e5984_s3126_tid12196360_00	1489400	MC16:MC16c	13038485
mc16_13TeV:mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.simul.HITS.e5271_e5984_s3126_tid12592858_00	7431200	MC16:MC16e	
mc16_13TeV:mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.simul.HITS.e5271_s3126_tid10730514_00	1995000	MC16:MC16a	
mc16_13TeV:mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.simul.HITS.e5271_s3126_tid10944971_00	3986600	MC16:MC16a	
mc16_13TeV:mc16_13TeV.364105.Sherpa_221_NNPDF30NNLO_Zmumu_MAXHTPTV70_140_BFilter.simul.HITS.e5271_s3126_tid11324488_00	5981200	MC16:MC16c	13038493

- > Note that for historical reasons not all evgen datasets have been merged, so there are some tids with one e-tag and some with two e-tags

# Trying to reduce the number of tags (stay with me, now it starts to get complicated..)

- > Analysts (should) work with containers, rather tids
- > In fact, they should only really be interested in EVNT (possibly) and AOD (mainly)
- > Many containers are produced in one chain (here including even a simul merge):

*mc15\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.evgen.EVNT.e5271*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.EVNT.e5271\_e5984*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.simul.HITS.e5271\_e5984\_s3126*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.HITS.e5271\_e5984\_s3126\_s3136*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.recon.AOD.e5271\_e5984\_s3126\_s3136\_r10201*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.AOD.e5271\_e5984\_s3126\_s3136\_r10201\_r10210*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.deriv.NTUP\_PILEUP.e5271\_e5984\_s3126\_s3126\_r10201\_r10210\_p3384*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.NTUP\_PILEUP.e5271\_e5984\_s3126\_s3136\_r10201\_r10210\_p3384\_p3385*

- > You also potentially have, as seen in the previous example, several tids with a mixture of the number of e-tags and s-tags
- > The solution is to move all tids to single tag containers, for example for MC16d AODs:

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_Bfilter.recon.AOD.e5271\_s3126\_r10201*

which contains two MC16d tids (1 single e-tag, 1 double e-tag):

**single tags**

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.AOD.e5271\_e5984\_s3126\_r10201\_r10210\_tid13038487\_00*

*mc16\_13TeV.364105.Sherpa\_221\_NNPDF30NNLO\_Zmumu\_MAXHTPTV70\_140\_BFilter.merge.AOD.e5271\_s3126\_r10201\_r10210\_tid13038495\_00*

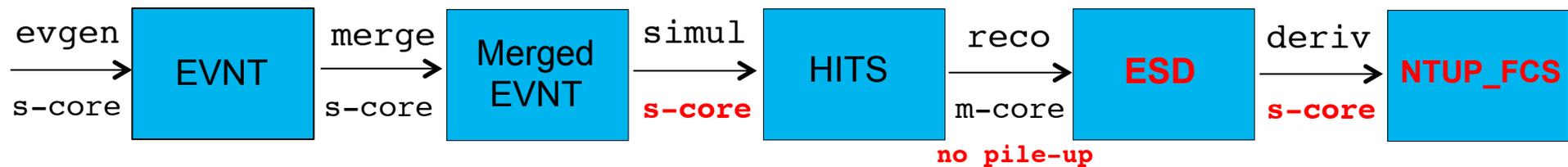
# MC Production: Status of the MC16 bulk campaigns

#hashtag	Status/~Events	Steps	Comments
#MC16a_CP	Finished/2.0B	simul + pile	Evgen in MC15
#MC16a (scrutiny)	Finished/720M	simul + pile	Evgen in MC15
#MC16a_PA	Finished/500M	simul + pile	Evgen in MC15
#MC16c_CP	Finished/2.6B	evgen + simul + pile	
#MC16c (scrutiny)	Finished/650M	evgen + simul + pile	
#MC16c_PA	Finished/250M	evgen + simul + pile	
#MC16d_CP	Finished/2.3B	pile	Reco on MC16c HITS
#MC16d_PA	Finished/1.2B	pile	Reco on MC16c HITS
#MC16e_CP	92%/780M	evgen + simul (HPC)	Much more to come here. Reco not expected until after data tasking starts

- > These are big and long campaigns, often taking many months to complete, chasing the tails
- > MC16d bulk production just concluded, large scale MC16e coming

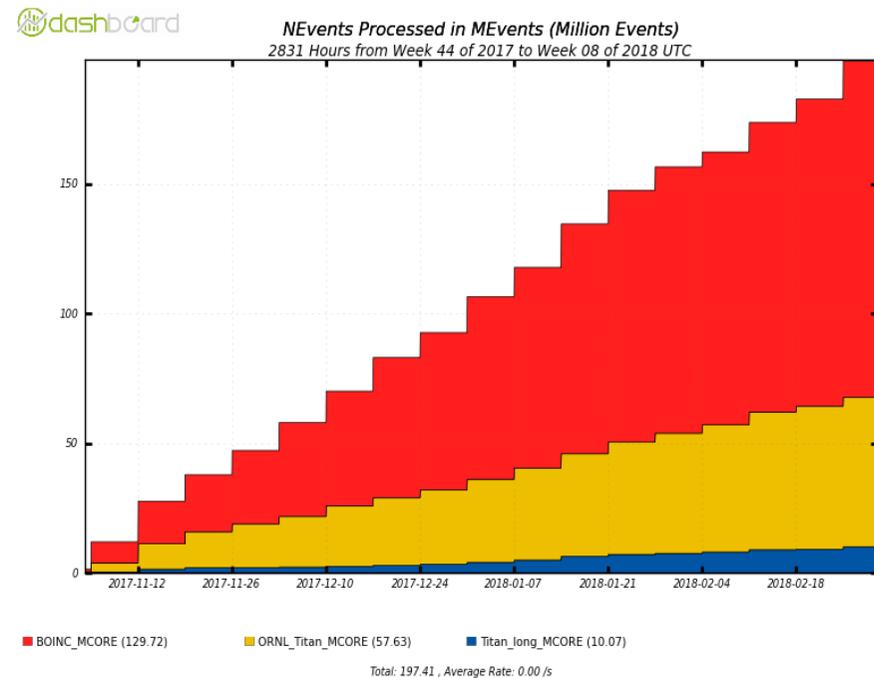
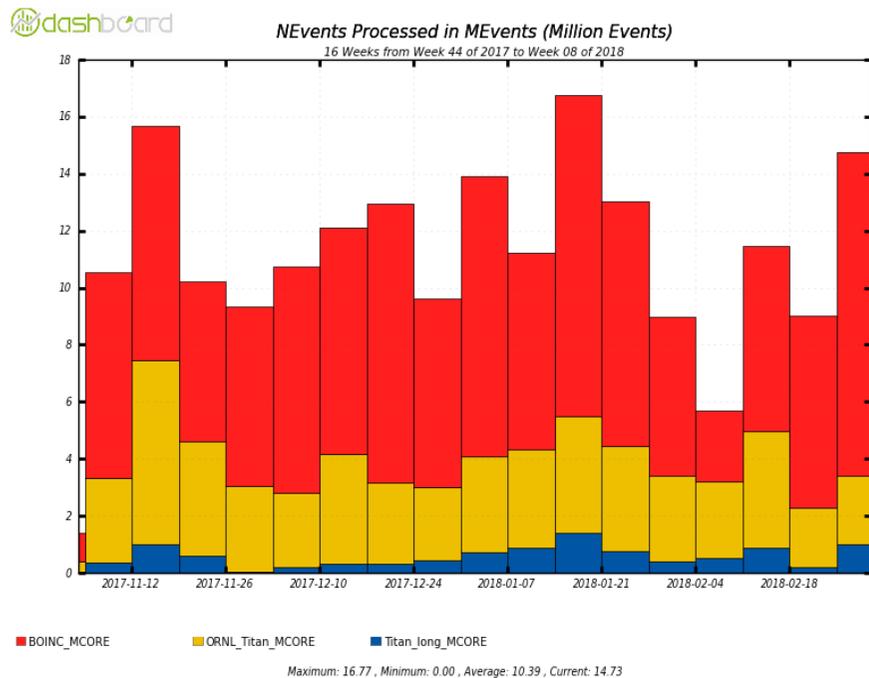
## Alternative workflows

- > On top of the bulk campaigns, there are always a large number of small requests, some of which are standard, some highly specialised
- > A recent example is the on going *FastCaloSim* production <https://its.cern.ch/jira/browse/ATLMCPROD-5583>
- > Total of 324 slices of 10k events, workflow developed with the requestors:



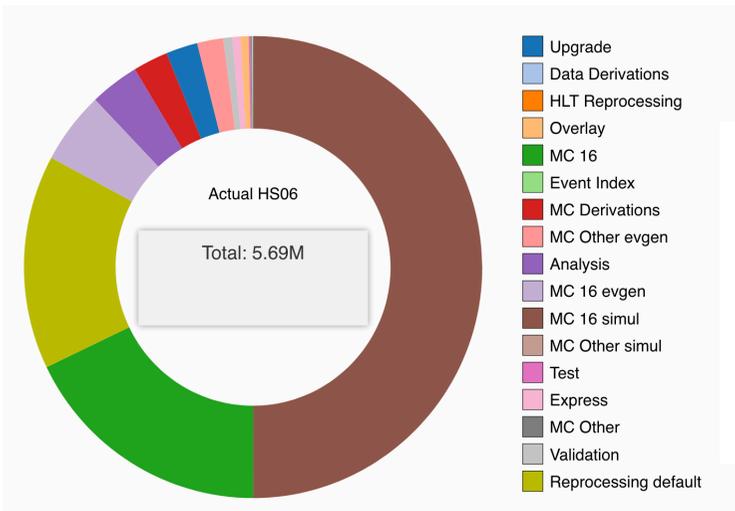
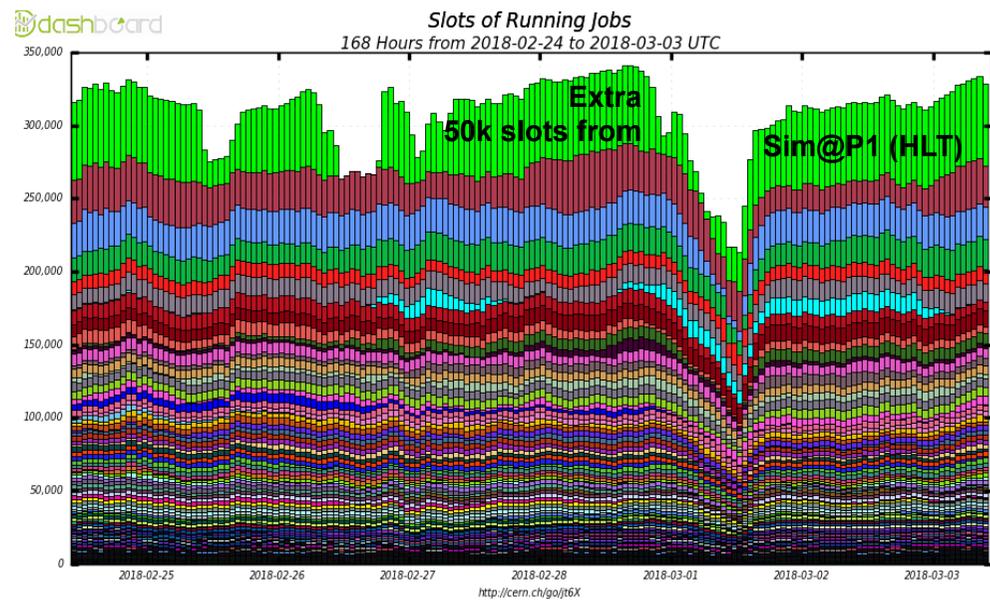
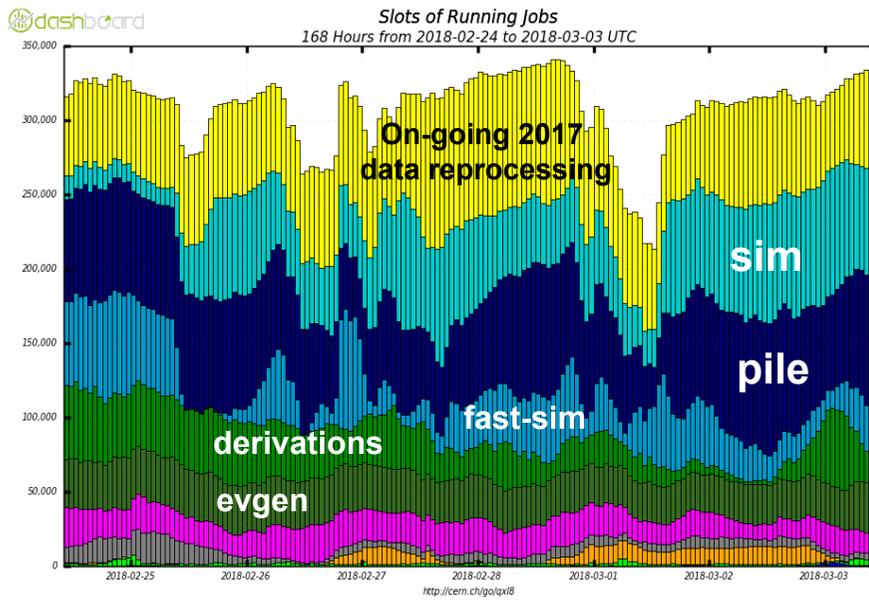
- > Further ~ 1500 slices to come in large scale production

# Opportunistic resources



- > The majority of the MC16e simulation done so far has been run on opportunistic resources and HPC
- > Here just as an example, the statistics covering the last 16 weeks for **BOINC\_MCORE**, **ORNL\_Titan\_MCORE** and **Titan\_long\_MCORE**
- > In these cases, the number of events per job is much reduced and the additional Simul merge step is used to obtain 1000 events per dataset

# A little on monitoring



- > Tasks are monitored by *everyone*: PC, PMG, ADC, MCProd and the requester
- > Ultimate responsibility of each task lies with assigned the MC Prod manager
- > Regular report in ADC Weekly; 9am daily if needed

## Future plans, ideas

- > The MC16 workflow has proven to be robust, despite of / thanks to a lot of necessary innovation in ProdSys and beyond, applied as we go along
  
- > The novel, non-trivial and let's be honest fairly complicated handling of multiple sub-campaigns, multiple tids within those sub-campaigns and the varying numbers of single and double tags has also shown to be successful
  
- > Nevertheless, we can always improve
  - *Fewer e-tags via new Job Options mechanism in release 21*
  - *Minimise or even remove use of input spread-sheets*
  - *Auto-merging like is done in the derivations*
  - *Pileup pre-mix in discussion (MC18 only)*
  - *Running EVNT on m-core resources, at least for some generators*
  - *... ?*

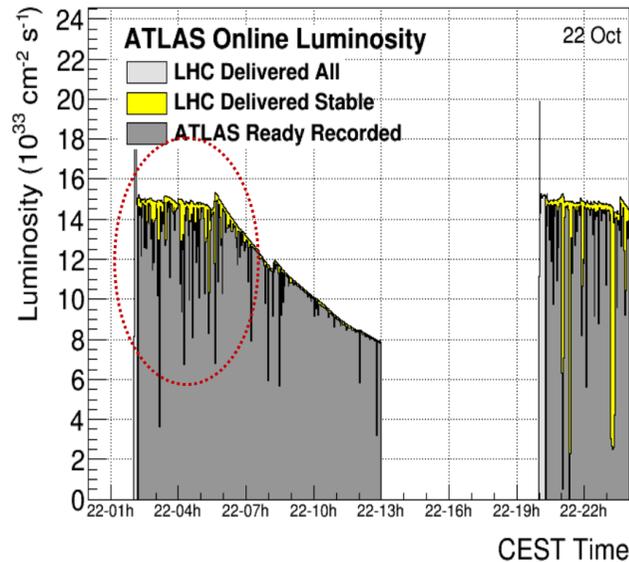
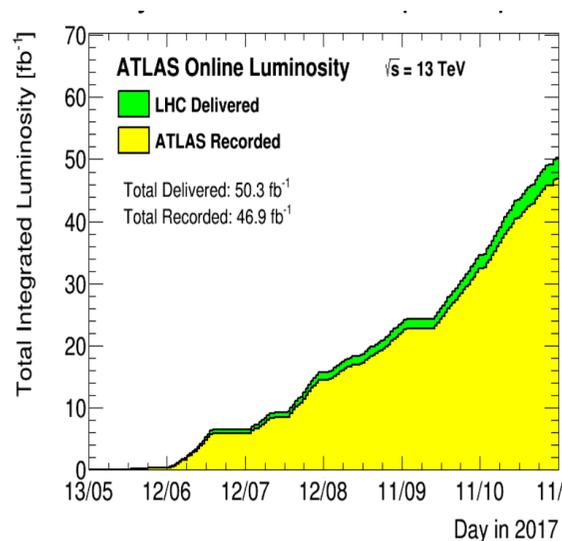


- Registration is now open - reduced fee until April 30th
- Details on accommodation, practicalities, social programme available at <http://desy.de/atlassoft18>
- See you all in Hamburg in June!

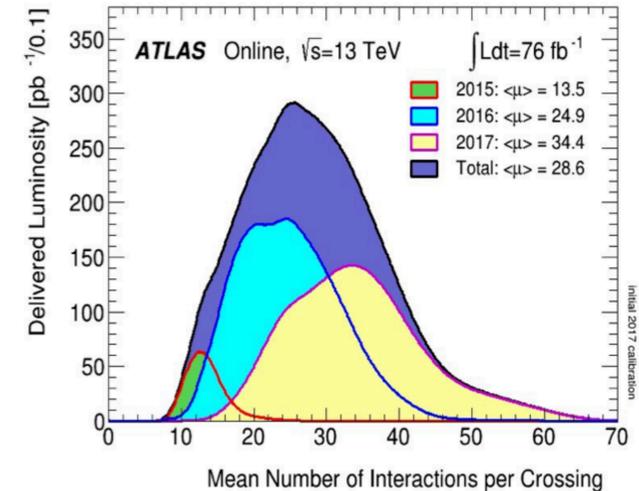


# Backup

# Pile-up in 2017 data taking: the need for MC16d

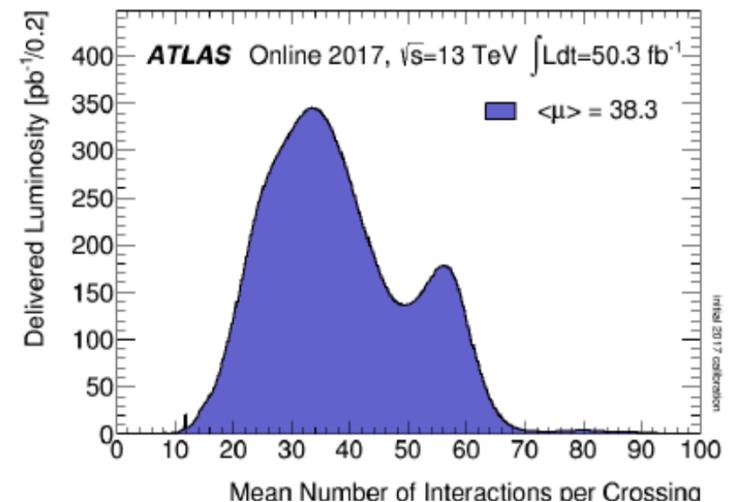


Initial 2017 pile-up profile (yellow)



- Successful 2017 data taking in terms of recorded luminosity, but challenging later in the year with novel 8b4e bunch structure
- Luminosity leveling at the beginning of each run meant significant and steady amount data with pile-up just below 60
- Clear need for MC16d to match the real data taking conditions

(final) 2017 pile-up profile



# Long list of tids possible

146 + MC15.364156.Sherpa\_221\_NNPDF30NNLO\_Wmunu\_MAXHTPTV0\_70\_CVetoBVeto.py

mc16\_13TeV.364156.Sherpa\_221

(Fullsim)

events: -1

e5340	s3126	r10201	r10210	p3384	p3385
		done	done	done	done
		done	done	failed	aborted
		done	done	done	done
		done	done	done	done
		done	done	done	done
		done	done	done	done
		done	done	done	done
		done	done	done	done
		done	done	done	done

T:

# Long list of tids possible

146 + MC15.364156.Sherpa\_221\_NNPDF30NNLO\_Wmunu\_MAXHTPTV0\_70\_CVetoBVeto.py mc16\_13TeV.364156.Sherpa\_221  
 (Fullsim) events: -1

e5340	s3126			r10201	r10210				p3384	p3385
				done	done				done	done

Dataset Name	Events Number	SubCampaign
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483117_00	1999900	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483123_00	1996300	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483128_00	1995800	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483136_00	1995900	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483142_00	1999850	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483149_00	1999950	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483154_00	1999800	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483161_00	1999950	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483166_00	1999950	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483172_00	1999700	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483177_00	1999800	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483184_00	1999950	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.merge.HITS.e5340_e5984_s3126_s3136_tid11483204_00	990000	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.simul.HITS.e5340_e5984_s3126_tid12197119_00	6217000	MC16:MC16c
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.simul.HITS.e5340_e5984_s3126_tid12944773_00	31098000	MC16:MC16e
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.simul.HITS.e5340_s3126_tid10730390_00	8330000	MC16:MC16a
mc16_13TeV:mc16_13TeV.364156.Sherpa_221_NNPDF30NNLO_Wmunu_MAXHTPTV0_70_CVetoBVeto.simul.HITS.e5340_s3126_tid10944745_00	16469000	MC16:MC16a