

CMS Generator Event Accounting

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HSF Physics Generators WG Meeting
25 March 2021

Approach, conditions, assumptions

- David Lange made calculations to be able to obtain reliable HS06 values using machines with known specifications using the configurations from a recent ultra-legacy campaign (that has separate GEN and SIM steps).
 - Run ~10 minute jobs, or jobs long enough to have at least 100 events and 5 output events using the information for all requests in the 2018 ultra-legacy GEN campaigns.
 - *Requests that haven't been submitted yet were not considered.*
 - *Longer jobs for the 200 most resource intensive to better sample the time/event*
 - *Factor of 21 for cpu-sec -> HS06 conversion*
 - Environment: Single threaded jobs, with a thread queue that kept 32 jobs running at a time (hyper-threading on but each core had at most one thread - but the corresponding HS06 measurement is used in any case).
 - Filter efficiencies are taken into account.

Summary for standard configurations

- Eventually, parse sample names with a python script to obtain the following tables.

Process	Generators	CPU/evt [s]	HS06/evt [s]
V+Jets	MinNLO/FxFx/MLM	27	560
LO	MLM	26	540
>LO	MinNLO/FxFx	27	570
MinNNLO	MinNLO	61	1300
FxFx	FxFx	8.1	170
tt+jets (all NLO)	PW/FxFx/PWO	4.9	100
ttbb 4f	PWO	1.7	36
no ttbb	PW/FxFx	5.0	100
no HT500Njet	PW/FxFx	2.4	50
tt+jets(b_bbar_4l)	PW	7.4	160
ttV	MLM/FxFx/amc@nlo	4.1	85
LO	MLM	5.7	120
NLO	FxFx/amc@nlo	2.9	61
Single top	PW/amc@nlo/CH	6.8	140
NLO	PW/amc@nlo	7.2	150
VV	PW/MG/FxFx/amc@nlo/PY	3.7	78
NLO	PW/amc@nlo/FxFx	4.1	86
LO	MG5/PY	2.2	46
Multijet	PY/MG/MLM	31	650
Gamma+jets	MLM	21	430

PW=POWHEG

MinNLO=PW-MinNLO

PWO=PW+OpenLoops

MG=MG5_aMC

CH=COMPHEP

ttV=ttZ, ttW

VV=WW,WZ,WZJJ_EWK,WWG,WZG

Samples with variations to calculate systematic uncertainties are also included in the calculations.

Sherpa and Herwig samples still need to be included - not part of campaign yet.

Summary for standard configurations: HT-binned WJets MG5_aMC [MLM] (0-4j @ LO)

0-4j @ LO

Process	CPU/evt [s]	HS06/evt [s]
WJetsToLNu_HT-70To100_TuneCP5_13TeV-madgraphMLM-pythia8	27	560
WJetsToLNu_HT-100To200_TuneCP5_13TeV-madgraphMLM-pythia8	32	670
WJetsToLNu_HT-200To400_TuneCP5_13TeV-madgraphMLM-pythia8	32	670
WJetsToLNu_HT-400To600_TuneCP5_13TeV-madgraphMLM-pythia8	29	610
WJetsToLNu_HT-600To800_TuneCP5_13TeV-madgraphMLM-pythia8	39	820
WJetsToLNu_HT-800To1200_TuneCP5_13TeV-madgraphMLM-pythia8	54	1100
WJetsToLNu_HT-1200To2500_TuneCP5_13TeV-madgraphMLM-pythia8	61	1300