

Switch to CMSSW_11_1_0_pre6 - Part 1

Step3 from the release (trackingOnly):

```
> cmsrel CMSSW_11_1_0_pre6
> cd CMSSW_11_1_0_pre6/src/ && cmsenv
> runTheMatrix.py -w upgrade -n | grep 2026 | grep trackingOnly | grep 14TeV
> runTheMatrix.py -w upgrade -l 23234.1 > 23234.1.log & (geometry: D49)
```

or

```
> cmsDriver.py step3 --conditions auto:phase2_realistic_T15 -n 10 --era Phase2C9 --eventcontent RECO SIM,DQM
--runUnscheduled -s
RAW2DIGI,RECO:reconstruction_trackingOnly,VALIDATION:@trackingOnlyValidation,DQM:@trackingOnlyDQM --datatier
GEN-SIM-RECO,DQMIO --geometry Extended2026D49 --procModifier phase2_PixelCPEGeneric --filein file:step2.root --fileout
file:step3.root
```

Reconstruction and validation done with:

```
cmsRun step3_RAW2DIGI_RECO_VALIDATION_DQM.py
```

Switch to CMSSW_11_1_0_pre6 - Part 2

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_11_1_0_pre6 or
https://github.com/hevjinyarar/CMS_HLT_Phase2_Tracking

Release generated script with cleaned up cff files & paths

Version 2) Release generated script with new paths plugged in

#####

step3_RAW2DIGI_RECO_VALIDATION_DQM.py
needs:

- raw2digi_step_cff.py
- MC_Tracking_v2.py / v4 / v6 / v6_1 / v7_1
- MC_prevalidation_cff.py / MC_prevalidation_v6_cff.py
- MC_Dqmoffline_cff.py

hltPhase2Xxx modules

```
process.load('raw2digi_step_cff')
process.load('MC_Tracking_v6_cff')
process.load('MC_Vertexing_v6_cff')
process.load('MC_prevalidation_v6_cff')
process.load('MC_Dqmoffline_cff')
```

```
process.load('Configuration.StandardSequences.Services_cff')
process.load('SimGeneral.HepPDTESSource.pythiapdt_cfi')
process.load('FWCore.MessageService.MessageLogger_cfi')
process.load('Configuration.EventContent.EventContent_cff')
process.load('SimGeneral.MixingModule.mixNoPU_cfi')
process.load('Configuration.Geometry.GeometryExtended2026D49Reco_cff')
process.load('Configuration.StandardSequences.MagneticField_cff')
process.load('Configuration.StandardSequences.RawToDigi_cff')
process.load('Configuration.StandardSequences.Reconstruction_cff')
process.load('Configuration.StandardSequences.Validation_cff')
process.load('DQMServices.Core.DQMStoreNonLegacy_cff')
process.load('DQMOffline.Configuration.DQMOfflineMC_cff')
process.load('Configuration.StandardSequences.FrontierConditions_GlobalTag_cff')
```

No need to comment out
all modules are imported now

```
process.schedule = cms.Schedule( *[process.raw2digi_step,
process.MC_Tracking_v6, MC_Vertexing_v6, process.MC_prevalidation,
process.MC_validation, process.MC_Dqmoffline,
process.DQMOutput_step])
```

Remarks

- **GT: auto:phase2_realistic_T15**
- **Underperforming pixel CPE issue** → --procModifier
phase2_PixelCPEGeneric (slide 1)

Switch to CMSSW_11_1_0_pre3 - Part 1

Step3 from the release (trackingOnly):

```
> cmsrel CMSSW_11_1_0_pre3
```

```
> cd CMSSW_11_1_0_pre3/src/ && cmsenv
```

```
> runTheMatrix.py -w upgrade -n | grep 2026 | grep trackingOnly | grep 14TeV
```

```
> runTheMatrix.py -w upgrade -l 23234.1 > 23234.1.log & (geometry: D49)
```

Reconstruction and validation done with:

```
cmsRun step3_RAW2DIGI_RECO_VALIDATION_DQM.py
```

Switch to CMSSW_11_1_0_pre3 - Part 2

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_11_1 or
https://github.com/hevjinyarar/CMS_HLT_Phase2_Tracking

Release generated script with cleaned up cff files & paths

Version 2) Release generated script with new paths plugged in

#####

step3_RAW2DIGI_RECO_VALIDATION_DQM.py
needs:

- raw2digi_step_cff.py
- MC_Tracking_v2.py / v4 / v6 / v6_1 / v7_1
- MC_prevalidation_cff.py / MC_prevalidation_v6_cff.py
- MC_Dqmoffline_cff.py

hltPhase2Xxx modules

```
process.load('raw2digi_step_cff')
process.load('MC_Tracking_v2_cff')
process.load('MC_Vertexing_cff')
process.load('MC_prevalidation_cff')
process.load('MC_Dqmoffline_cff')
```

See next slide for
technical changes

```
process.load('SimGeneral.MixingModule.mixNoPU_cfi')
process.load('Configuration.Geometry.GeometryExtended2026D49Reco_cff')
process.load('Configuration.StandardSequences.MagneticField_cff')
process.load('Configuration.StandardSequences.RawToDigi_cff')
process.load('Configuration.StandardSequences.Reconstruction_cff')
process.load('Configuration.StandardSequences.Validation_cff')
process.load('DQMServices.Core.DQMStoreNonLegacy_cff')
process.load('DQMOffline.Configuration.DQMOfflineMC_cff')
process.load('Configuration.StandardSequences.FrontierConditions_GlobalTag_cff')
```

No need to comment out
all modules are imported now

```
process.schedule = cms.Schedule( *[process.raw2digi_step,
process.MC_Tracking_v2, MC_Vertexing, process.MC_prevalidation
,process.MC_validation, process.MC_Dqmoffline,
process.DQMoutput_step])
```

Remarks

- GT: auto:phase2_realistic_T15
- Underperforming pixel CPE issue, for now we are using CPEGeneric instead of CPETemplate → see next slide

For Pixel CPE : In step3_RAW2DIGI_RECO_VALIDATION_DQM.py enforce:

```
##### PixelCPE issue
process.TrackProducer.TTRHBuilder = "WithTrackAngle"
process.PixelCPEGenericESProducer.UseErrorsFromTemplates = False
process.PixelCPEGenericESProducer.LoadTemplatesFromDB = False
process.PixelCPEGenericESProducer.TruncatePixelCharge = False
process.PixelCPEGenericESProducer.IrradiationBiasCorrection = False
process.PixelCPEGenericESProducer.DoCosmics = False
process.PixelCPEGenericESProducer.Upgrade = cms.bool(True)
#####
```

Some technical changes:

- Cleaner
- Modules which are non-modified are imported from release
- Tracking modules have hltPhase2 prefix
- MultiTrackSelector (obsolete) → TrackCutClassifier

Some technical changes since cmssw_11_0_pre6 (found by a comment search cmssw_11_1) :

- MC_prevalidation_cff:
 - All MTV modules EDAnalyzer → EDProducer
 - For all RecoTrackViewRefSelector add "invertRapidityCut = cms.bool(False)"
 - Parameter "cores" assigned for each MTV to "highPtJetsForTrk" or "highPtJets"
 - maxPhi = 3.2 , minPhi = -3.2 for all GPSelector in each MTV

Switch to CMSSW_11_0_0_pre6 - Part 1

Step3 from the release (trackingOnly):

```
> cmsrel CMSSW_11_0_0_pre6  
> cd CMSSW_11_0_0_pre6/src/ && cmsenv  
> runTheMatrix.py -w upgrade -n | grep 2026 | grep trackingOnly | grep 14TeV (need step2.root)  
> runTheMatrix.py -w upgrade -l 20434.1 > 20434.1.log &
```

Reconstruction and validation done with:

```
cmsRun step3_RAW2DIGI_RECO_VALIDATION_DQM.py (running over step2.root, do we have MC samples?)
```

Switch to CMSSW_11_0_0_pre6 - Part 2

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_11_0_pre6

Release generated script with cleaned up cff files & paths

example

Version 2) Release generated script with new paths plugged in

#####

step3_RAW2DIGI_RECO_VALIDATION_DQM.py

needs:

- step2.root
- extras_cmssw_11_0_cff.py (extra modules needed)
- raw2digi_step_cff.py
- MC_Tracking_v0_cmssw_11_0_cff.py / MC_Tracking_v1_cmssw_11_0_cff.py / MC_Tracking_v2_cmssw_11_0_cff.py
- MC_prevalidation_v0_cff.py / MC_prevalidation_v1_cff.py / MC_prevalidation_v2_cff.py
- MC_Dqmooffline_step_v0_cff.py / MC_Dqmooffline_step_v1_cff.py / MC_Dqmooffline_step_v2_cff.py

Extra needed modules

```
process.load('raw2digi_step_cff')
process.load('MC_Tracking_v2_cmssw_11_0_cff')
process.load('MC_prevalidation_v2_cff')
process.load('MC_Dqmooffline_v2_cff')
```

slight changes in the new release, like a parameter called `seedAs5DHit` is needed for `TrajectoryBuilders` (all changes can be found with a comment search `#cmssw_11_0`)

```
process.load("extras_cmssw_11_0_cff")
process.load('Configuration.Geometry.GeometryExtended2026D41Reco_cff')
process.load('Configuration.StandardSequences.MagneticField_cff')
#process.load('Configuration.StandardSequences.RawToDigi_cff')
#process.load('Configuration.StandardSequences.Reconstruction_cff')
#process.load('Configuration.StandardSequences.Validation_cff')
#process.load('DQMServices.Core.DQMStoreNonLegacy_cff')
#process.load('DQMOOffline.Configuration.DQMOOfflineMC_cff')
process.load('Configuration.StandardSequences.FrontierConditions_GlobalTag_cff')
```

commented out

```
process.schedule = cms.Schedule(
*[process.raw2digi_step,process.MC_Tracking_v2,
process.MC_prevalidation_v2,process.MC_validation_v2,
process.MC_Dqmooffline_v2, process.DQMoutput_step])
```

Switch to CMSSW_10_6_0_patch2 - Part 1

Step3 from the release (trackingOnly):

```
> cmsrel CMSSW_10_6_0_patch2
> cd CMSSW_10_6_0_patch2/src/ && cmsenv
> cmsDriver.py step3 --conditions auto:phase2_realistic -n 10 --era Phase2C8_timing --eventcontent DQM --runUnscheduled
-s RAW2DIGI,RECO,VALIDATION:@trackingValidation,DQM:@trackingOnlyDQM --datatier DQMIO --geometry
Extended2023D41 --filein file:step2.root --fileout file:step3_inDQM.root --mc --no_exec (to get only the step3 file and not the
rest, we have MC_samples)
```

Reconstruction and validation done with:

```
cmsRun step3_RAW2DIGI_RECO_VALIDATION_DQM_MC.py
```


Switch to CMSSW_10_6_0_patch2 - Part 2

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_10_6_0_patch2

Release generated script with cleaned up cff files & paths

example

Version 2) Release generated script with new paths plugged in

#####

step3_RAW2DIGI_RECO_VALIDATION_DQM_MC.py

needs:

- input_TTbar_PhaseITDRSpring19DR-NoPU_106X_upgrade2023_realistic_v3_cff.py
- input_TTbar_PhaseITDRSpring19DR-PU200_106X_upgrade2023_realistic_v3_cff.py
- extras.py (extra modules needed)
- raw2digi_step_cff.py
- MC_Tracking_v0_cmssw_10_6_cff.py / MC_Tracking_v1_cmssw_10_6_cff.py / MC_Tracking_v2_cmssw_10_6_cff.py
- MC_prevalidation_v0_cmssw_10_6_cff.py / MC_prevalidation_v1_cmssw_10_6_cff.py / MC_prevalidation_v2_cmssw_10_6_cff.py (all cleaned)
- MC_Dqmooffline_v0_cff.py / MC_Dqmooffline_v1_cff.py / MC_Dqmooffline_v2_cff.py

```
process.load('raw2digi_step_cff')
process.load('MC_Tracking_v2_cmssw_10_6_cff')
process.load('MC_prevalidation_v2_cmssw_10_6_cff')
process.load('MC_Dqmooffline_v2_cff')
```

slight changes in the new release, like offlineBeamSpot is in the cms.Path after local reco (all changes can be found with a comment search #cmssw_10_6)

```
process.load("extras")
process.load('Configuration.Geometry.GeometryExtended2023D41Reco_cff')
process.load('Configuration.StandardSequences.MagneticField_cff')
#process.load('Configuration.StandardSequences.RawToDigi_cff')
#process.load('Configuration.StandardSequences.Reconstruction_cff')
#process.load('Configuration.StandardSequences.Validation_cff')
#process.load('DQMServices.Core.DQMStoreNonLegacy_cff')
#process.load('DQMOffline.Configuration.DQMOfflineMC_cff')
process.load('Configuration.StandardSequences.FrontierConditions_GlobalTag_cff')
```

commented out

```
process.schedule = cms.Schedule(
*[process.raw2digi_step,process.MC_Tracking_v2,
process.MC_prevalidation_v2,process.MC_validation_v2,
process.MC_Dqmooffline_v2, process.DQMoutput_step])
```

Development start in CMSSW_10_4_0_mtd5 - Part 1

Step3 from the release:

```
> cmsrel CMSSW_10_4_0_mtd5  
> cd CMSSW_10_4_0_mtd5/src/ && cmsenv  
> runTheMatrix.py -w upgrade -n | grep 2023 | grep trackingOnly  
> runTheMatrix.py -w upgrade -l 21224.1 --dryRun
```

Reconstruction and validation done with:

```
cmsRun step3_RAW2DIGI_RECO_VALIDATION_DQM.py
```

Development start from CMSSW_10_4_0_mtd5 - Part 2

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_10_4_0_mtd5

VERSION 1 - use step3_performance/timing_modular.py

README.txt

Version 1) Cleaned up from the release generated script

#####

step3_performance_modular.py #performance studies
needs:

- input_TTbar_PhaseIIMTDTDRAutumn18DR-noPU_103X_upgrade2023_realistic_v2-v1_cff.py
- input_TTbar_PhaseIIMTDTDRAutumn18DR-PU200_103X_upgrade2023_realistic_v2-v1_cff.py
- raw2digi_step_cff.py
- MC_Tracking_v0_cff.py / MC_Tracking_v1_cff.py / MC_Tracking_v2_cff.py
- MC_prevalidation_v0_cff.py / MC_prevalidation_v1_cff.py / MC_prevalidation_v2_cff.py (all cleaned)
- MC_Dqmooffline_step_v0_cff.py / MC_Dqmooffline_step_v1_cff.py / MC_Dqmooffline_step_v2_cff.py

#####

step3_timing_modular.py #timing studies

needs:

- input_TTbar_PhaseIIMTDTDRAutumn18DR-noPU_103X_upgrade2023_realistic_v2-v1_cff.py (input sample list)
- input_TTbar_PhaseIIMTDTDRAutumn18DR-PU200_103X_upgrade2023_realistic_v2-v1_cff.py
- raw2digi_step_cff.py
- MC_Tracking_v0_cff.py / MC_Tracking_v1_cff.py / MC_Tracking_v2_cff.py

Development start from CMSSW_10_4_0_mtd5 - Part 3

→ /afs/cern.ch/work/h/hyarar/public/Phase2/MC_Tracking/MC_Tracking_CMSSW_10_4_0_mtd5

VERSION 2 - release generated script with cleaned up cff files & paths

README.txt

Version 2) Release generated script with new paths plugged in

#####

step3_RAW2DIGI_RECO_VALIDATION_DQM.py

needs:

- input_TTbar_PhaseIIMTDTDRAutumn18DR-noPU_103X_upgrade2023_realistic_v2-v1_cff.py (input sample list) or step2.root
- input_TTbar_PhaseIIMTDTDRAutumn18DR-PU200_103X_upgrade2023_realistic_v2-v1_cff.py
- extras.py (extra modules from step3_performance_modular.py)
- raw2digi_step_cff.py
- MC_Tracking_v0_cff.py / MC_Tracking_v1_cff.py / MC_Tracking_v2_cff.py
- MC_prevalidation_v0_cff.py / MC_prevalidation_v1_cff.py / MC_prevalidation_v2_cff.py
- MC_Dqmooffline_step_v0_cff.py / MC_Dqmooffline_step_v1_cff.py / MC_Dqmooffline_step_v2_cff.py

example

```
process.load('raw2digi_step_cff')
process.load('MC_Tracking_v2_cff')
process.load('MC_prevalidation_v2_cff')
process.load('MC_Dqmooffline_v2_cff')
```

```
process.load("extras")
process.load('Configuration.Geometry.GeometryExtended2023D21Reco_cff')
process.load('Configuration.StandardSequences.MagneticField_cff')
#process.load('Configuration.StandardSequences.RawToDigi_cff')
#process.load('Configuration.StandardSequences.Reconstruction_cff')
#process.load('Configuration.StandardSequences.Validation_cff')
#process.load('DQMOffline.Configuration.DQMOfflineMC_cff')
process.load('Configuration.StandardSequences.FrontierConditions_GlobalTag_cff')
```

← commented out

```
process.schedule = cms.Schedule(
*[process.raw2digi_step,process.MC_Tracking_v2,
process.MC_prevalidation_v2,process.MC_validation_v2,
process.MC_Dqmooffline_v2, process.DQMoutput_step])
```

process=cms.Process("RECO") ----> process = cms.Process("RECOHLT") #or anything else, otherwise complains