

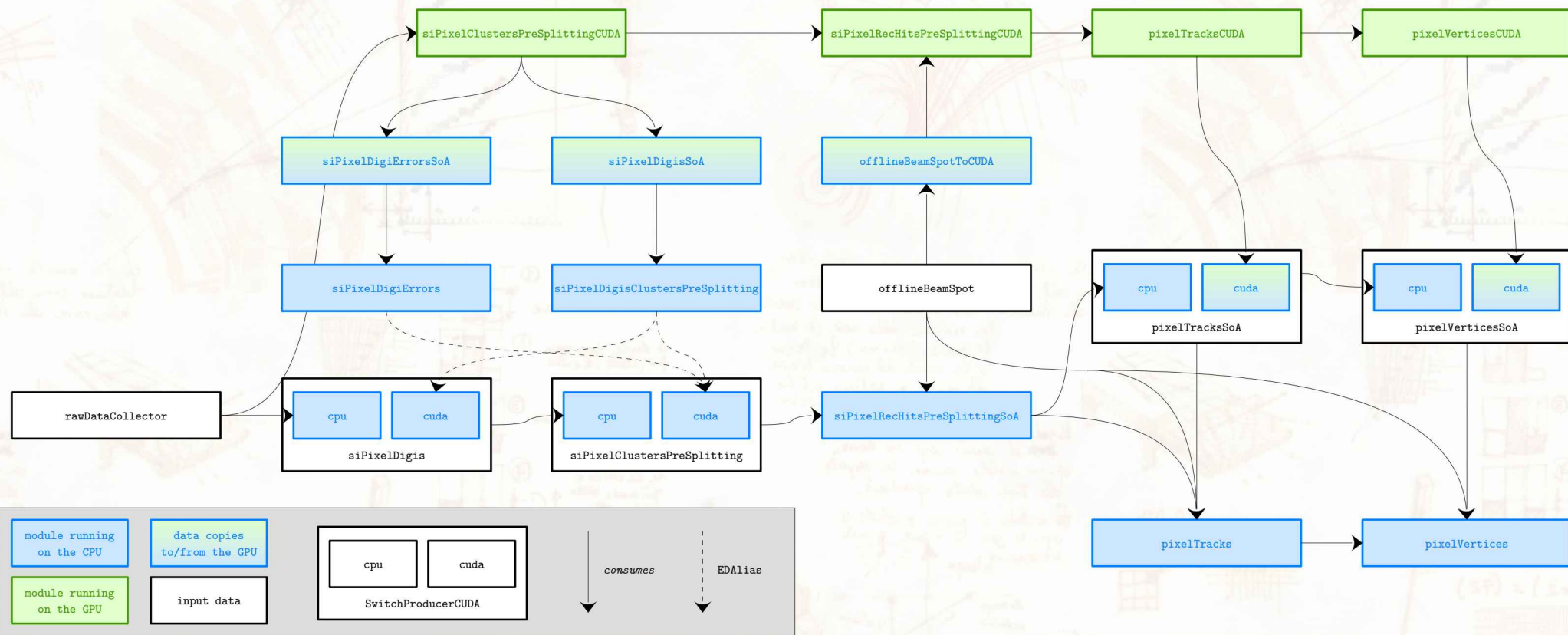
GPU workflows in CMSSW

- currently (*e.g.* as of CMSSW_11_3_0_pre6) there are 4 representative workflows that can run (only) on GPUs
 - #.502 pixel-only reconstruction with "Patatrack" quadruplets
 - #.506 pixel-only reconstruction with "Patatrack" triplets
 - #.512 ECAL-only reconstruction
 - #.522 HCAL-only reconstruction
- and their corresponding CPU-only workflows
 - #.501 pixel-only reconstruction with "Patatrack" quadruplets
 - #.505 pixel-only reconstruction with "Patatrack" triplets
 - #.511 ECAL-only reconstruction
 - #.521 HCAL-only reconstruction
- running on CPU or GPU must be decided when the workflow is created

redesigned workflows

- as of [#33428](#) / [#33519](#) the GPU workflows no longer *require* a GPU
 - `#.502` pixel-only reconstruction with "Patatrack" quadruplets
 - `#.506` pixel-only reconstruction with "Patatrack" triplets
 - `#.512` ECAL-only reconstruction
 - `#.522` HCAL-only reconstruction
- these workflows now detect if a GPU is available at runtime, and adapt accordingly
 - based on the `SwitchProducerCUDA` mechanism
 - choose at job startup whether to follow the `cpu` branch or the `cuda` branch
- the corresponding CPU workflows use the same configuration
 - but implement only the `cpu` branch of the switches

pixel ntuplets workflows (#.502/#.506)



next steps (for future PRs)

- add workflows that consume *both* CPU and GPU products
 - useful for DQM and validation of GPU vs CPU results
 - should be reasonably easy, by explicitly consuming both branches of the `SwitchProducerCUDAs`
 - implement a switch that forces the reconstruction to run on CPU or on GPU
 - *i.e.* a workflow does not use a GPU even if it is available, or fails if no GPUs are available
 - do we want to keep the current CPU-only workflows (*e.g.* `#.501`) ?
 - or replace them with running the GPU-optional workflows (*e.g.* `#.502`) without a GPU ?
 - add a single workflow that runs all producers
 - pixel tracks and vertices, ECAL local reconstruction, HCAL local reconstruction
- which should be useful for various developments
- speed up validation and benchmarks
 - continue the development of reconstruction modules, *e.g.* pixel-based particle flow, electron seeding