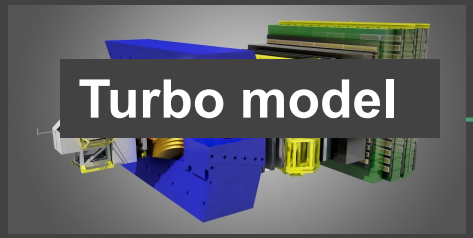
Sprucing for all lines in Run 3



HLT2

Sprucing

Transparent to analyst - no action required

Exclusive HLT2 Line
`Hlt2Line(persistreco=False)`

Pass-through Sprucing line
`PassLine()`

Sprucing will

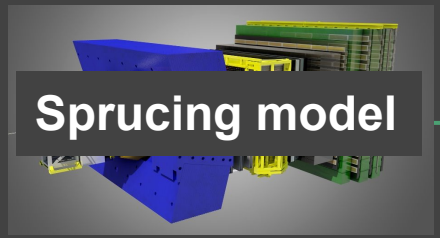
- Run either exclusive OR pass-through line(s)
- Stream events
- Drop RawBanks between tape and disk
- Create FSRs

Tape
10GB/s

Disk
3.5GB/s

Analysis production (DaVinci)

EoYS

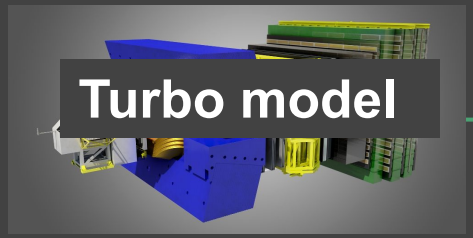


Inclusive HLT2 Line
`Hlt2Line(persistreco=True)`

Exclusive Sprucing line
`SpruceLine()`

HLT2 lines that are to be spruced require *persistreco=True* which saves the **full event reconstruction** which is then forever available on tape

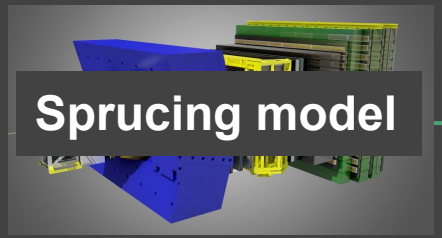
Sprucing for all lines in Run 3



HLT2

Exclusive HLT2 Line

`Hlt2Line(persistreco=False)`



Inclusive HLT2 Line

`Hlt2Line(persistreco=True)`

On tape

/Event/DAQ/RawEvent
ODIN
DstData
HltDecReports
VP
UT
FTCluster
Rich
EcalPacked
...

MDF

DstData RawBank

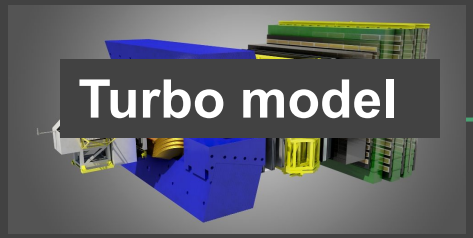
/Event/HLT2/Rec/Track/Best
/Event/HLT2/Rec/Vertex/Primary
/Event/HLT2/Rec/ProtoP/Charged
/Event/HLT2/Rec/ProtoP/Neutrals
/Event/HLT2/Rec/Calo/Electrons
/Event/HLT2/Rec/Calo/Photons
/Event/HLT2/Rec/Calo/MergedPi0s
/Event/HLT2/Rec/Calo/SplitPhotons
/Event/HLT2/Rec/Muon/MuonPID
/Event/HLT2/Rec/Rich/PIDs

Unpacked from `pRec/`

/Event/HLT2/Hlt2_my_Line/Particles
/Event/HLT2/Hlt2_my_Line/decayVertices
/Event/HLT2/Hlt2_my_Line/Particle2Vertex
...Relations

Unpacked from `pPhys/`

Sprucing for all lines in Run 3



HLT2

Sprucing

Transparent to analyst - no action required

Exclusive HLT2 Line
`Hlt2Line(persistreco=False)`

Pass-through Sprucing line
`PassLine()`

On tape

/Event/DAQ/RawEvent
ODIN
DstData
HltDecReports
VP
UT
FTCluster
Rich
EcalPacked
...

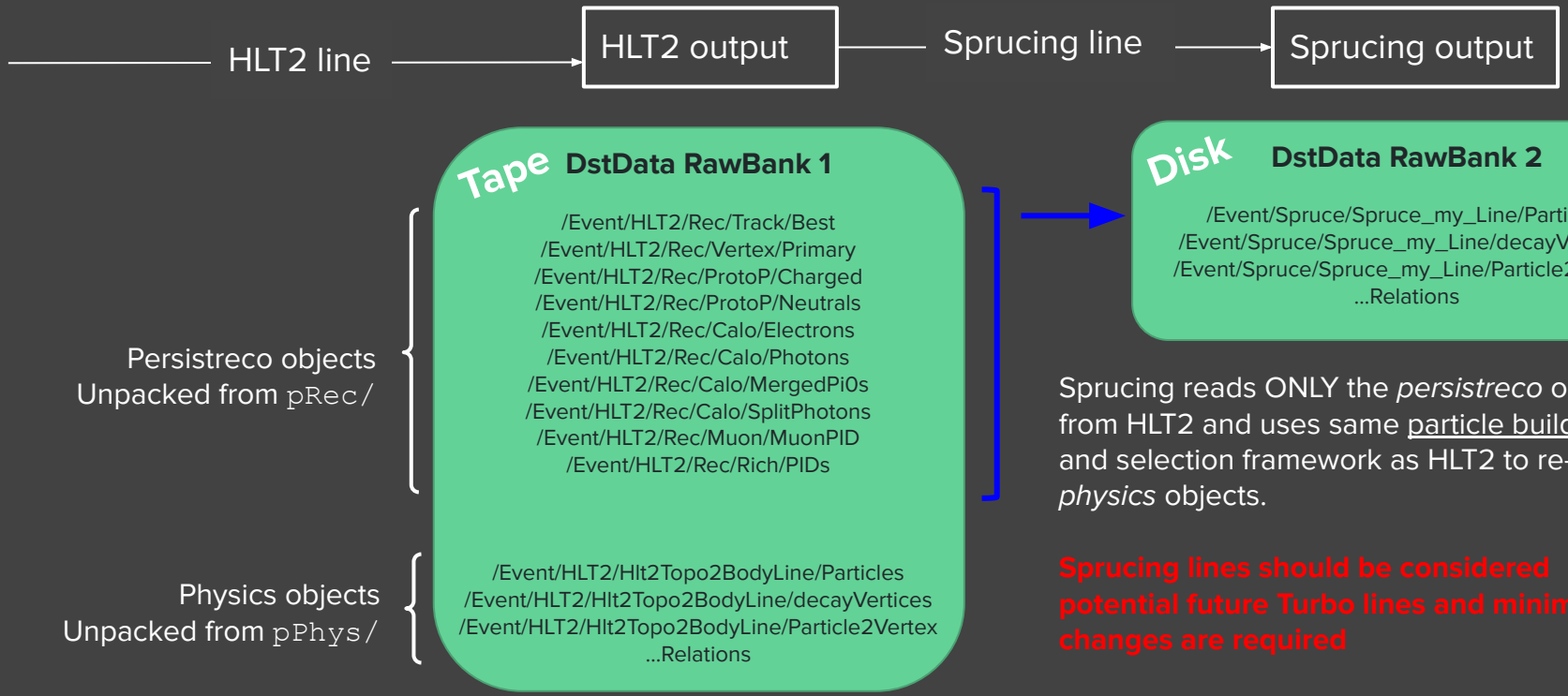
On disk

/Event/{stream}
ODIN
DstData
HltDecReports
Rich

+**FSRs...**

DST

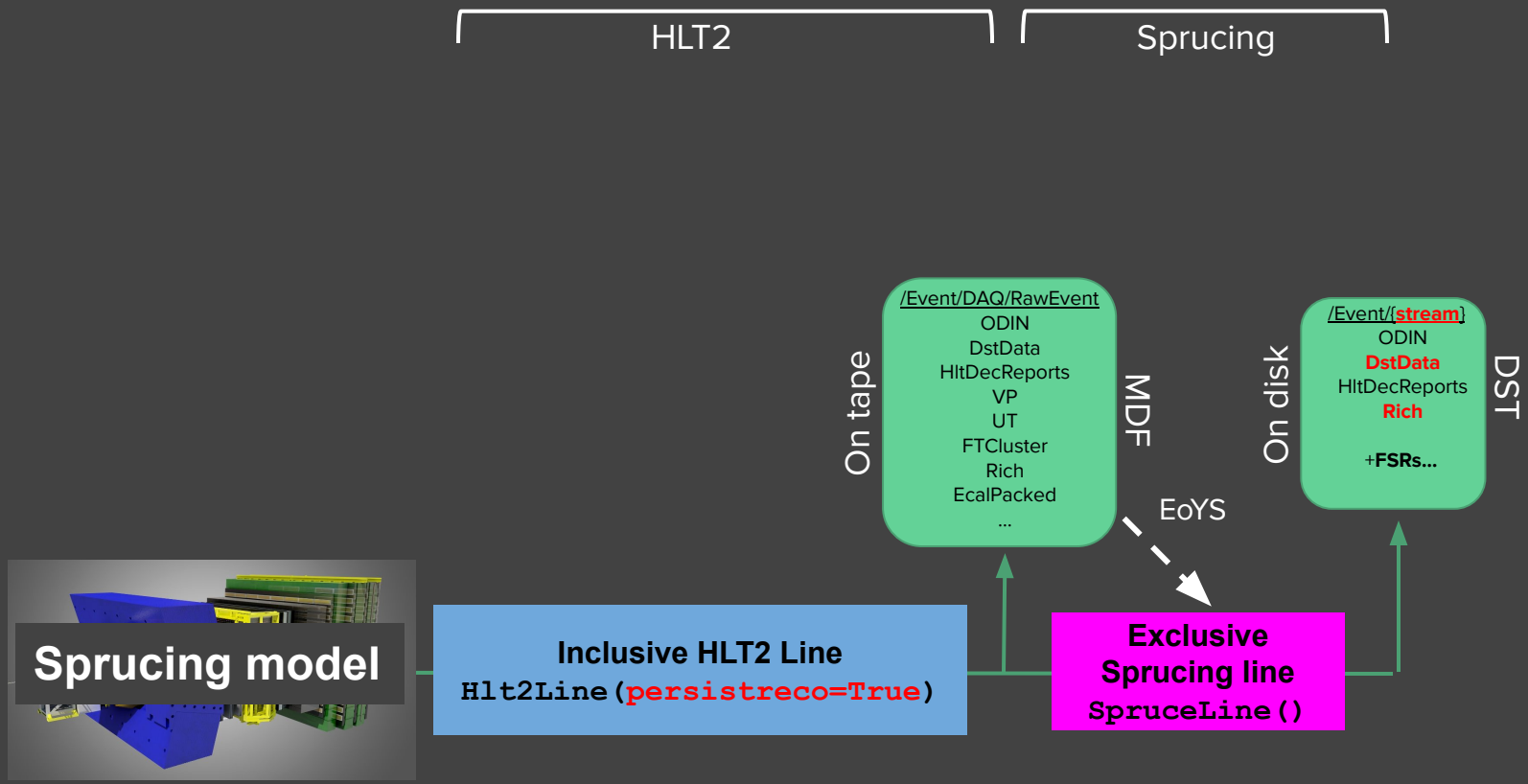
What does the exclusive Sprucing do?



Sprucing reads ONLY the *persistreco* objects from HLT2 and uses same particle builders and selection framework as HLT2 to re-select *physics* objects.

Sprucing lines should be considered potential future Turbo lines and minimal changes are required

Sprucing for all lines in Run 3



Relevant snippets:

To be used with 2022 StarterKit tarball

Pass through options

Bc->Bspi line builder

Exclusive Sprucing options

Backup

You have gone too far...

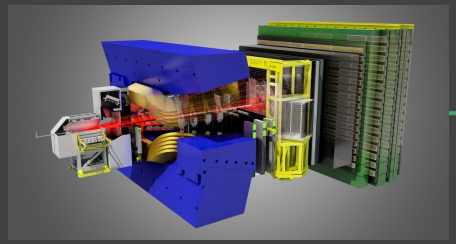
Run 3 data taking model

Data to tape at 10GB/s
Data to disk at 3.5GB/s

Disk limited

Online | **Offline**

Default Turbo model



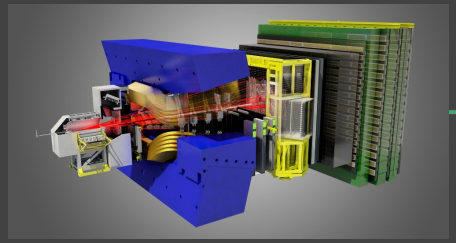
HLT2 → **Tesla** → **To disk**

Tesla → **Analysis production**

HLT2 → **To tape**

Tesla → **Streaming**

Sprucing model



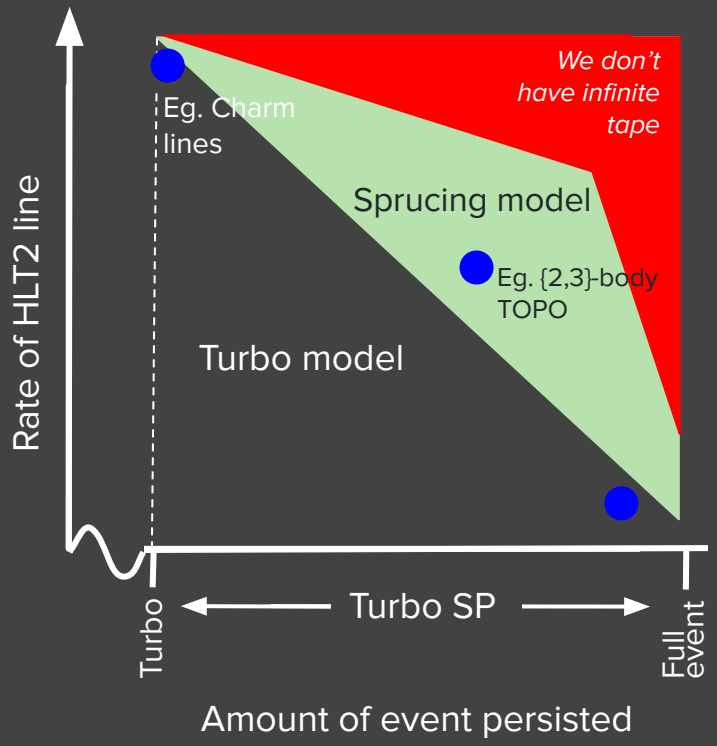
HLT2 → **Sprucing** → **Tesla**

Tesla → **Analysis production**

Tesla → **To disk**

Turbo model refers to Turbo(+SP)

What to Spruce ?



- **Turbo** - only persist the physics objects involved in the triggering decision along with the PVs of the event
- **Turbo SP** - Turbo plus a customised set of other physics objects including optional detector RawBanks
- **Full event** - All physics objects (along with their reconstruction) and detector RawBanks

All physics lines will be somewhere on this spectrum with the extremes unlikely

Sprucing is for HLT2 lines that are “too big” in **bandwidth** to go straight to disk (limits defined by RTA), eg. TOPO HLT2 lines can be saved to tape and then Sprucing lines with more exclusive selections run on top of this and are saved to disk (a la Stripping)

Also for lines that cannot be run within “online limits” eg. very high combinatorics. These can be Sprucing lines that run on the output of some inclusive HLT2 line

What matters is the bandwidth (rate x event size)

Why would I not just use the Sprucing for all my channels - its “safer” right?

We could run appropriate inclusive lines at HLT2, save the full event reconstruction with persistreco=True and then run our “actual” selection lines as Sprucing lines. This way we would have the full event reconstruction of “interesting” events saved on tape forever => “safer”

In Run 3 we cannot do this...

-Turbo model is the default because we cannot afford to save the full event reconstruction for all the events of interest (equivalent to Run 1 model) eg. Charm does not have the luxury of being “safe”

-If you know and understand your decay a Turbo+SP line will provide better efficiency than a generic inclusive HLT2 line + Sprucing line (inclusive lines may have to be prescaled). Remember with Turbo+SP you can fully customise what you save using *extra_outputs* and so you may still be able to rerun eg. isolation variables

-At the beginning of Run 3 “understanding your decay” is difficult to claim - but any Sprucing lines should be considered as future Turbo model lines (HLT2 and Sprucing lines are trivially interchangeable for this reason)