



ATLAS RNTuple Update

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Impact of updates on page size optimization

- **100k MC ($t\bar{t}$) events in DAOD PHYSLITE format:**
- **File Size: 2.5 GB → 1.8 GB in RNTuple** (almost 30% disk-space gain, **TTree version is 2.3 GB**)
- **Max. PSS: 19.1 GB → 14.9 GB in RNTuple** (20+% reduction, **TTree version is 14 GB**) over 8 workers

```
*
*Br 531 :HLTNav_Summary_DAODSlimmedAuxDyn.decisions :
*      | vector<vector<unsigned int> >
*Entries :100000 : Total Size= 2466916770 bytes File Size = 783080156
*Baskets : 20679 : Basket Size= 131072 bytes Compression= 3.15
*
```

Great but there is still room for improvement

```
.....
HLTNav_Summary_DAODSlimmedAux::decisions [#0] -- SplitIndex64{id:757}
# Elements:      100000
# Pages:         52
Avg elements / page: 1923
Avg page size:   2454 B
Size on storage: 127655 B
Compression:     6.27
.....
HLTNav_Summary_DAODSlimmedAux::decisions._0 [#0] -- SplitIndex64{id:758}
# Elements:      22717891
# Pages:         2774
Avg elements / page: 8189
Avg page size:   4371 B
Size on storage: 12126105 B
Compression:     14.99
.....
HLTNav_Summary_DAODSlimmedAux::decisions._0._0 [#0] -- SplitUInt32{id:759}
# Elements:      592901234
# Pages:         36188
Avg elements / page: 16383
Avg page size:   39369 B
Size on storage: 1424699362 B
Compression:     1.66
.....
```

ROOT v6.32.02

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.....
HLTNav_Summary_DAODSlimmedAux::decisions [#0] -- SplitIndex64{id:723}
# Elements:      100000
# Pages:         39
Avg elements / page: 2564
Avg page size:   3243 B
Size on storage: 126499 B
Compression:     6.32
.....
HLTNav_Summary_DAODSlimmedAux::decisions._0 [#0] -- SplitIndex64{id:724}
# Elements:      22717891
# Pages:         238
Avg elements / page: 95453
Avg page size:   46022 B
Size on storage: 10953381 B
Compression:     16.59
.....
HLTNav_Summary_DAODSlimmedAux::decisions._0._0 [#0] -- SplitUInt32{id:725}
# Elements:      592901234
# Pages:         2493
Avg elements / page: 237826
Avg page size:   339400 B
Size on storage: 846126624 B
Compression:     2.80
.....
```

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