ROOT I/O

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ROOT

Data Analysis Framework

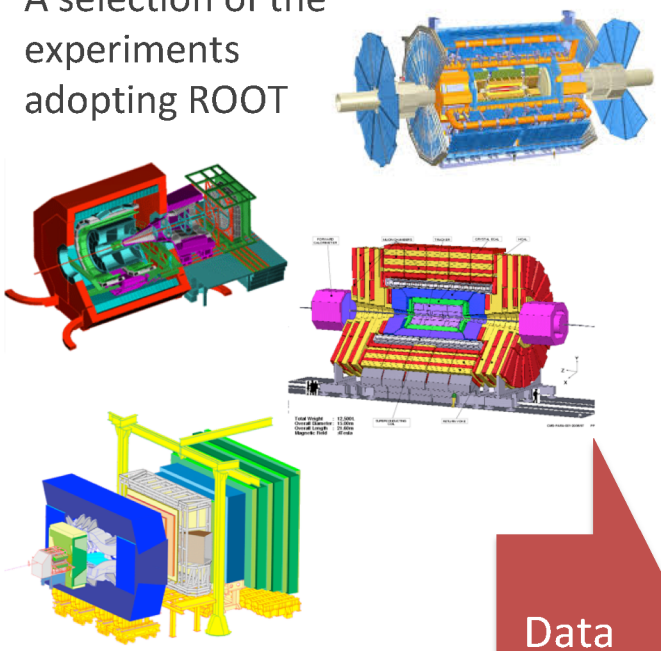
https://root.cern

Resources

- ROOT Website: https://root.cern
- Introduction material: https://root.cern/getting-started
  - Includes a booklet for beginners: **the "ROOT Primer"**
- Reference Guide: https://root.cern/doc/master/index.html
- Training material: https://github.com/root-project/training
- Forum: https://root-forum.cern.ch

ROOT Application Domains

A selection of the experiments adopting ROOT



Analysis

Offline Processing

Event Selection, statistical treatment …

Further processing, skimming

Reconstruction

Raw

Reco

…

Analysis Formats

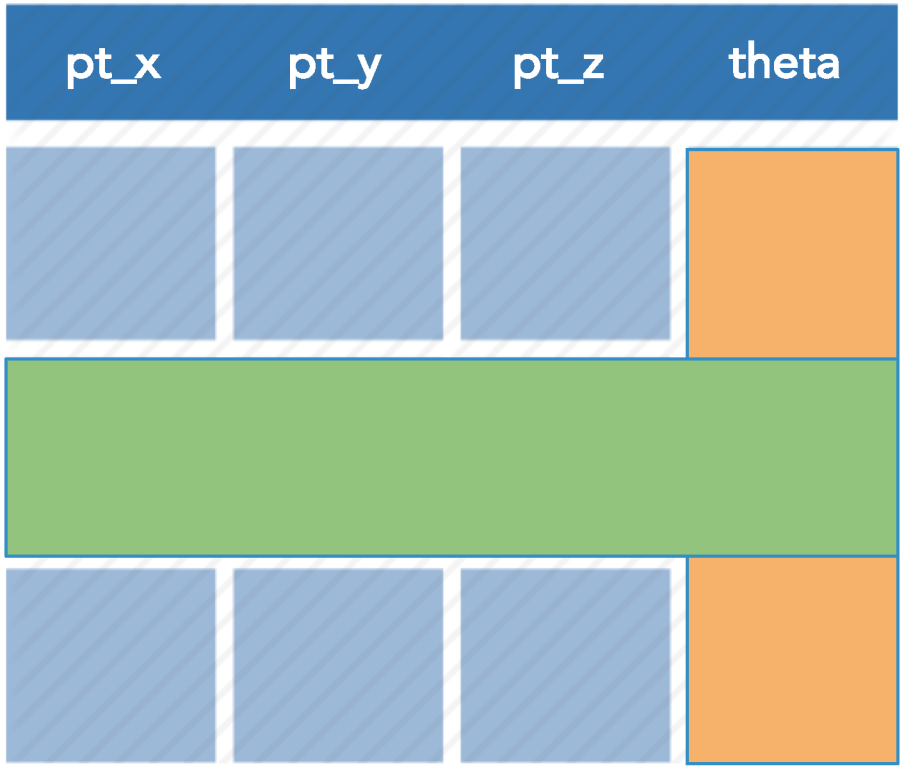
Images

Data

Event Filtering

Data Storage: Local, Network

Columnar Representation

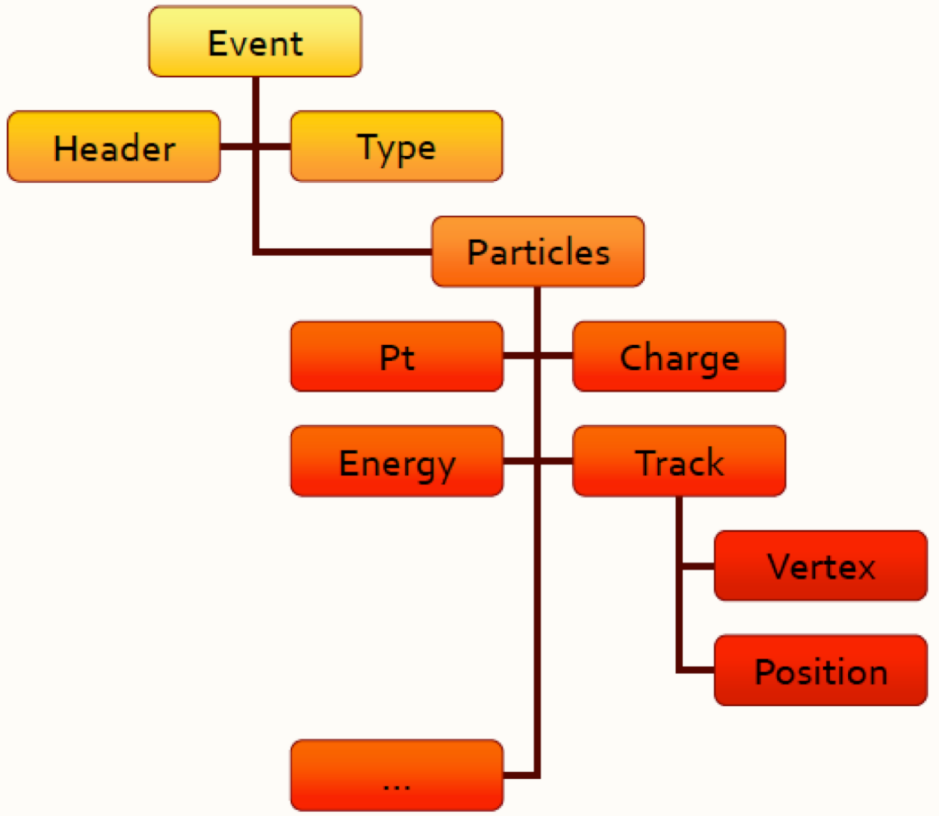


entries
or events
or rows

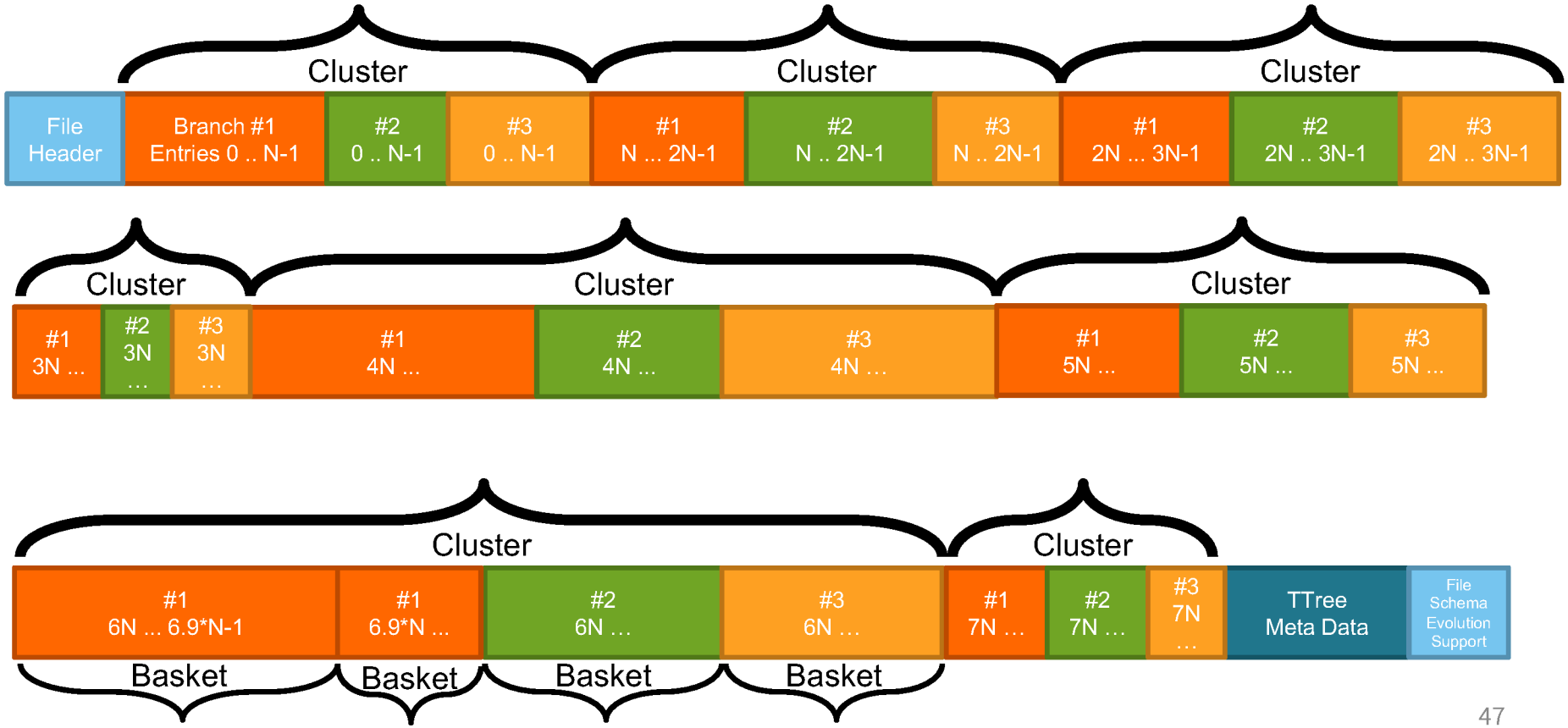
columns
or "branches"
can contain any kind
of c++ object

Relations Among Columns

x	y	z
-1.10228	-1.79939	4.452822
1.867178	-0.59662	3.842313
-0.52418	1.868521	3.766139
-0.38061	0.969128	1.084074
0.55	-0.21231	50281
-0.184	1.187305	.443902
0.20564	-0.770	0.635417
1.079222	0.32	1.271904
-0.27492	-	43 3.038899
2.047779	-	268 4.197329
-0.45868	4	2 2.293266
0.304731	0.884	0.875442
-0.712	-0.222	0.556881
-0.27	1.181767	470484
0.8	-0.65411	3209
-2.03555	0.527648	4.421883
-1.45905	-0.464	2.344113
1.230661	-0.00565	1.514559
		3.562347



Anatomy of a File



Cut on theta, fill histogram with pt

```
RDataFrame d("t", "f.root");
auto h = d.Filter("theta > 0").Histo1D("pt");
h->Draw(); // event loop is run here, when you access a result
           // for the first time
```

event-loop is run *lazily*, upon first access to the results