



Event Index Core

(Hadoop & HBase)

- Import
- Compression
- Graphical Web Service



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EI WS, 12-13 Feb 2018, Valencia



Import

- No problems
- Completely automatic
 - Incl. creation of derived structures, testing and re-tries in case of a problem

IMPORTED EVENTS

```
=====
EI 2009      34 444 939
EI 2010      1 196 985 327
EI 2011      1 844 680 412
EI 2012      3 313 189 845
EI 2013      331 475 303
EI 2014      436 763 032
EI 2015      38 124 797 422 (was 38 527 094 863)
EI 2016      63 645 397 516 (was 63 203 930 561)
EI 2017      22 009 950 323 (was 17 004 632 956)
MC 2012      300 000
MC 2015      29 091 443 614 (was 28 763 092 958)
MC 2016      5 990 694 947 (was 3 825 805 416)
ALL          > 166 billion events (was 158)
```



Compression

- We are creating BLOCK compressed TagFiles
- All tools work
 - Thanks to fix by Grigori
- Factor of 5-10 compression
- Can start compressing already imported files



Graphical Web Service

- A completely new way of navigation in dataset space & EI services
- Fully graphical, interactive & dynamical
- First version fully implemented for overlap tables (Dataset overlaps & Trigger overlaps)
- Demo of the top-level also available
- Evolving

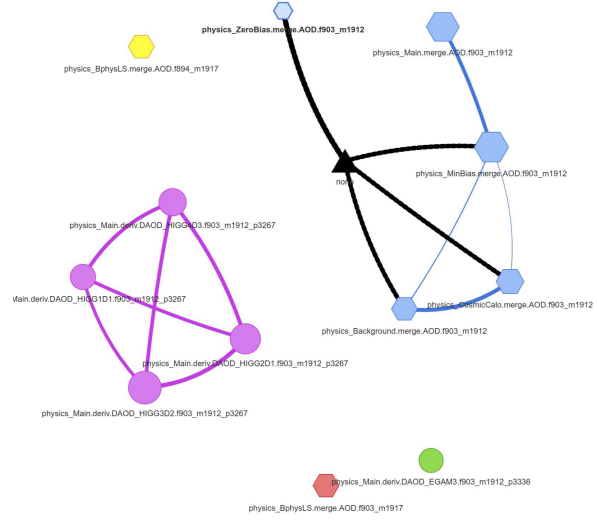
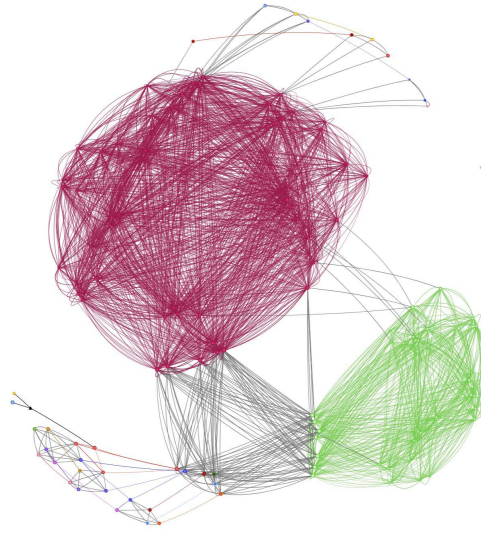
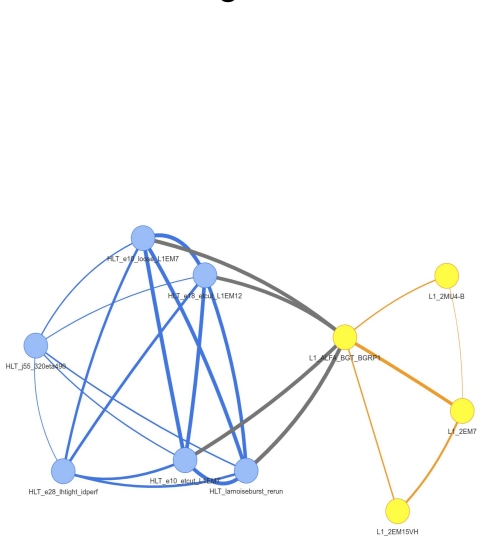
Event Index

- Global Help
- FAQ, Use Cases, Home
- Data-Centric View (prototype)
- Catalog
- **Event Index (Expert Mode)**
- Event Lookup
- Trigger Info
- TagFile Inspector
 - Dataset Overlaps
 - Trigger Overlaps
 - Trigger Statistics
- System Journal (for admins)
- External Services

PNG

Relational Graph

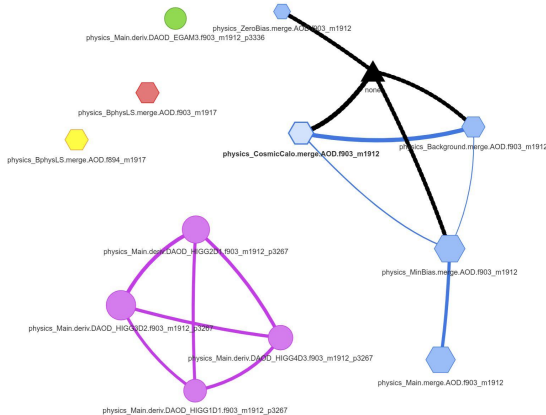
E117.1/00341534 Show Selection	AOD physics_Background merge #903_m1912	AOD physics_BphysLS merge #894_m1917	AOD physics_BphysLS merge #903_m1917	AOD physics_CosmicCalo merge #903_m1912	DAOD_EGAM3 physics_Main deriv #903_m1912_p3336	DAOD_HIG physics_Main deriv #903_m1912
AOD physics_Background merge #903_m1912	219982 (219982) 100.00%,100.00%	0 (452604) 0%,0%	0 (452604) 0%,0%	48593 (1369607) 22.09%,4.06%	1 (273846) 0%	5 (36940) 0%,0%
AOD physics_BphysLS merge #903_m1912	0 (452604)	232622 (232622)	232622 (232622)	0 (1430840)	1 (286485)	5 (38204)





Graphical Web Service - Symbols

- A dataset or a collection of datasets represented by a symbol
 - AOD dataset is an hexagon
 - Other datasets are circles
 - Collections of datasets are stars
 - E.g. all datasets with the same AMI tag
- Relations between datasets are represented by lines
- Similar for triggers

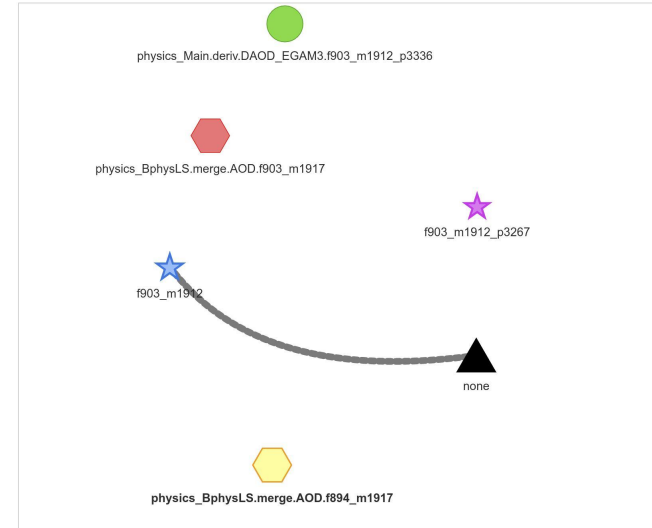


Expand all

E117_1100341534: Scale of nodes and edges depend on their value. Color of nodes and edges depend on their role or relationship. Hover over nodes and edges to get more information.

Cluster by AMI Tag Cluster by group size Expand all active

slim0: slim1: target: Recreate





Graphical Web Service - Properties

- User can choose the presentation threshold - the lower limit of % overlap between datasets with the same AMI tag (slim0) or different AMI tags (slim1)
 - Overlaps within the same AMI tag are represented by the line with the color corresponding to that AMI tag, other overlap lines are grey, overlap line with “none” are black dashed
- User can choose a ‘target’ string - all connections to all dataset containing that string in their names will be shown
- A collection of datasets (represented by a star) is expanded on a click (or “Expand all” button)
- A “moving” graph can be frozen with “active” button
- Object properties (symbol size, line width,...) correspond to data properties (number of events in a dataset, overlap/union ratio,...)

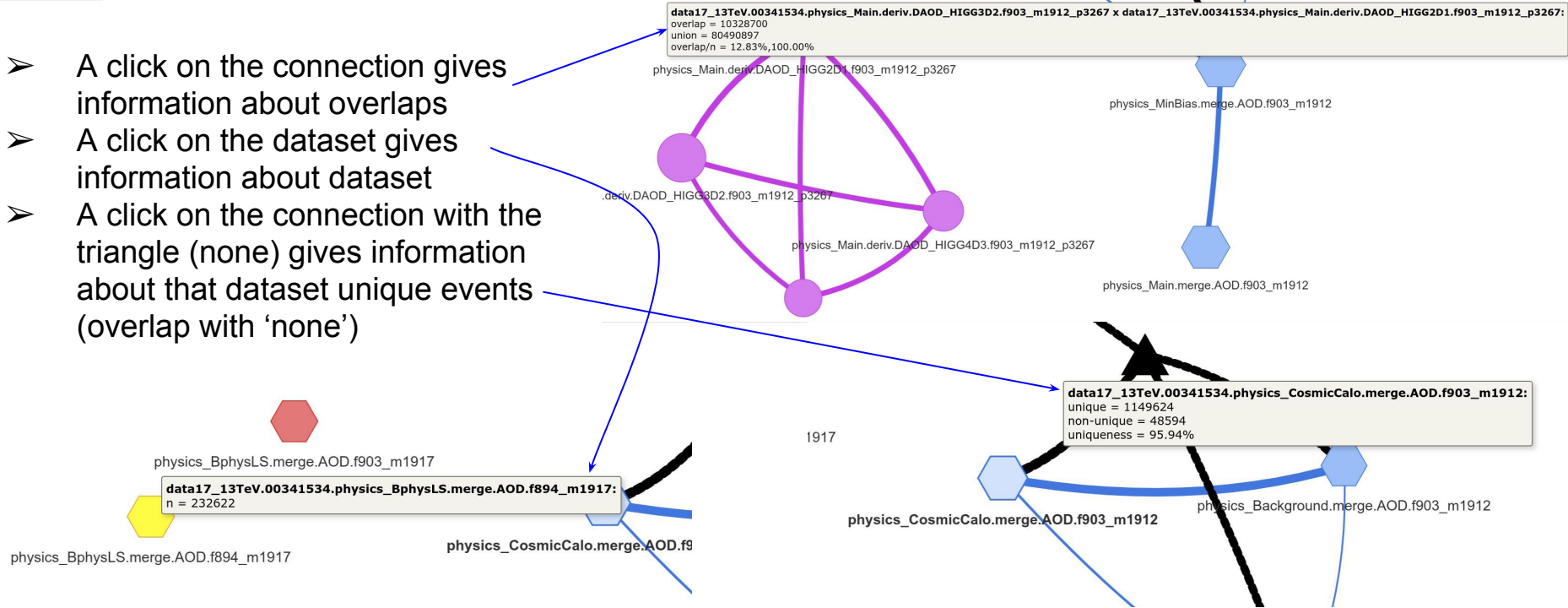
E117.1/00341534: Scale of nodes and edges depend on their value. Color of nodes and edges depend on their role or relationship. Hover over nodes and edges to get more information.





Graphical Web Service - Interactions

- A click on the connection gives information about overlaps
- A click on the dataset gives information about dataset
- A click on the connection with the triangle (none) gives information about that dataset unique events (overlap with 'none')



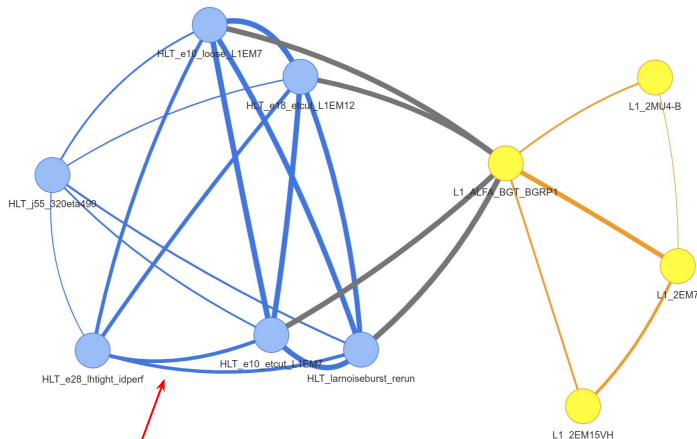
Example (click on **Relational Graph** button):

Small: <https://atlas-event-index.cern.ch/EIHadoop/InspectView.jsp?runs=00341534&view=DOverlap>



Graphical Web Service - Trigger Overlaps

- Similar to dataset overlaps
- Two colors correspond to HLT & L1 triggers
- Trigger overlap tables
 - Based on a subset of events only
 - Very big => quite slow to load



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```
data17_5TeV.00340697.physics_Main.merge.AOD.1896_m1902
data17_5TeV.00340718.physics_Main.merge.AOD.1896_m1902
data17_5TeV.00340814.physics_Main.merge.AOD.1897_m1902
data17_5TeV.00340849.physics_Main.merge.AOD.1897_m1902
data17_5TeV.00340850.physics_Main.merge.AOD.1897_m1902
data17_5TeV.00340910.physics_Main.merge.AOD.1898_m1902
data17_5TeV.00340918.physics_Main.merge.AOD.1898_m1902
data17_5TeV.00340925.physics_Main.merge.AOD.1898_m1902
data17_5TeV.00340973.physics_Main.merge.AOD.1899_m1912
data17_5TeV.00341027.physics_Main.merge.AOD.1902_m1912
data17_5TeV.00341123.physics_Main.merge.AOD.1902_m1912
data17_5TeV.00341184.physics_Main.merge.AOD.1902_m1912
data17_5TeV.00340644.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340683.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340697.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340718.physics_MinBias.merge.AOD.1896_m1902
```

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```
data17_5TeV.00341123.physics_Main.merge.AOD.1902_m1912
data17_5TeV.00341184.physics_Main.merge.AOD.1902_m1912
data17_5TeV.00340644.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340683.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340697.physics_MinBias.merge.AOD.1896_m1902
data17_5TeV.00340718.physics_MinBias.merge.AOD.1896_m1902
```

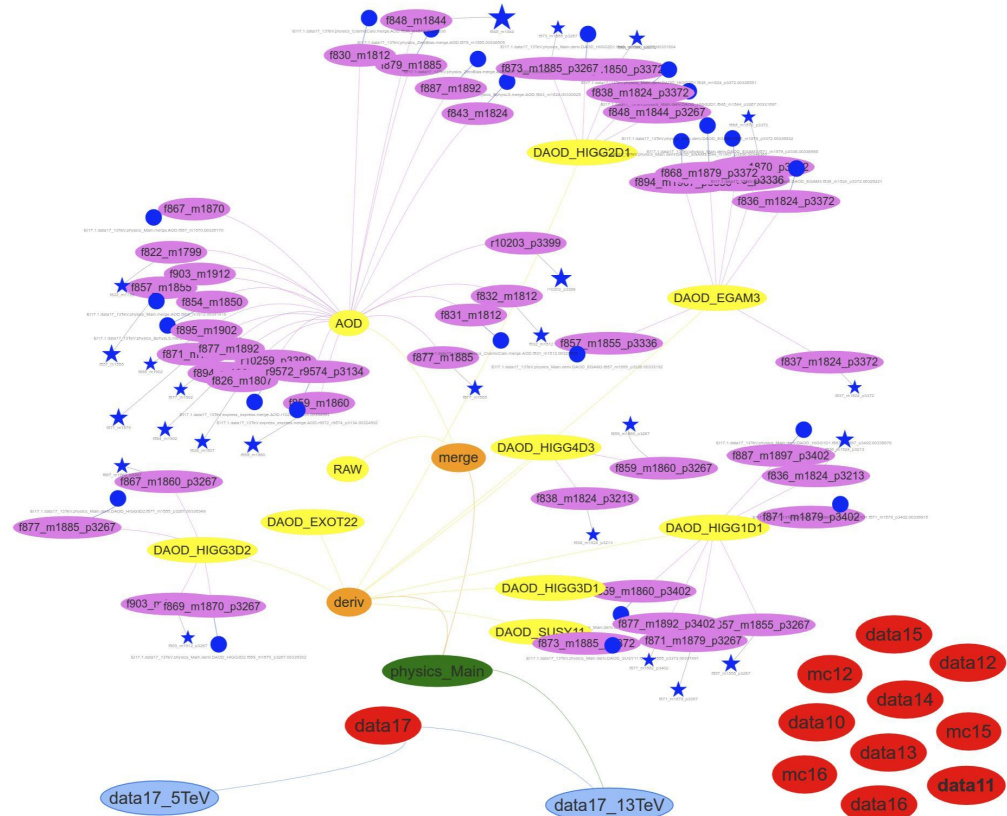
PNG		Relational Graph
data17_5TeV.00341184.physics_Main.merge.AOD.1903_m1912 evt=61791906,t3=6.1852791E7		
HLT_e10_etcut_L1EM7	46157877 (74.70%)	<input checked="" type="checkbox"/>
HLT_e10_lhloose_L1EM7	45663549 (73.90%)	<input checked="" type="checkbox"/>
HLT_e10_loose_L1EM7	46096086 (74.60%)	<input checked="" type="checkbox"/>
HLT_e13_etcut_L1EM12	35468034 (57.40%)	<input checked="" type="checkbox"/>
HLT_e13_etcut_L1EM7	46096086 (74.60%)	<input checked="" type="checkbox"/>
HLT_e14_lhtight_nod0	35529825 (57.50%)	<input checked="" type="checkbox"/>
HLT_e15_lhloose_L1EM7	45292803 (73.30%)	<input checked="" type="checkbox"/>
HLT_e15_lhloose_nod0_L1EM7	45292803 (73.30%)	<input checked="" type="checkbox"/>
HLT_e15_lhmedium_nod0_L1EM12	33428931 (54.10%)	<input checked="" type="checkbox"/>
HLT_e15_loose_L1EM12	21812223 (35.30%)	<input checked="" type="checkbox"/>
HLT_e15_loose_L1EM7	45478176 (73.60%)	<input checked="" type="checkbox"/>
HLT_e18_etcut	17301480 (28.00%)	<input checked="" type="checkbox"/>
HLT_e18_etcut_L1EM12	35220870 (57.00%)	<input checked="" type="checkbox"/>
HLT_e18_etcut_L1EM15	28547442 (46.20%)	<input checked="" type="checkbox"/>
HLT_e18_etcut_L1EM7	46157877 (74.70%)	<input checked="" type="checkbox"/>

PNG		Relational Graph
data17_5TeV.00341184.physics_Main.merge.AOD.1903_m1912 evt=61791906,t3=6.1852791E7	HLT_e10_loose_L1EM7 46157877 (74.70%)	HLT_e10_loose_L1EM7 46096086 (74.60%)
HLT_e10_loose_L1EM7 46157877 (74.70%)	HLT_e10_loose_L1EM7 46157877 (74.70%)	HLT_e10_loose_L1EM7 46096086 (74.60%)
HLT_e10_loose_L1EM7 46096086 (74.60%)	HLT_e10_loose_L1EM7 46096086 (74.60%)	HLT_e10_loose_L1EM7 46096086 (74.60%)
HLT_e18_etcut_L1EM12 35220870 (57.00%)	HLT_e18_etcut_L1EM12 46157877 (74.70%)	HLT_e18_etcut_L1EM12 35220870 (57.00%)
HLT_e18_etcut_L1EM12 35220870 (57.00%)	HLT_e18_etcut_L1EM12 46157877 (74.70%)	HLT_e18_etcut_L1EM12 35220870 (57.00%)
HLT_e28_lhtight_idperf 5870145 (9.50%)	HLT_e28_lhtight_idperf 46157877 (74.70%)	HLT_e28_lhtight_idperf 46096086 (74.60%)
HLT_e28_lhtight_idperf 5870145 (9.50%)	HLT_e28_lhtight_idperf 46157877 (74.70%)	HLT_e28_lhtight_idperf 46096086 (74.60%)
HLT_j55_320eta490	865074 (1.40%)	865074 (1.40%)



Graphical Web Service - Top Level Demo

- A top-down navigation with selections
- Context-sensitive information and actions (to call other services)
- Possibility to show/hide & cluster/uncluster nodes according to various characteristics
- Structure from year down to datasets
- Relations between entities
- Implementation:
 - The whole graph represented by JSON structure => easy to interface with any data source
 - The visualisation done by JavaScript
 - Integrated in JSP EI Web Service



Demo:

<https://atlas-event-index.cern.ch/EIHadoop/RelationalGraphDemo.jsp>



Info

Web Service: <https://atlas-event-index.cern.ch/ElHadoop>

Documentation & Distribution: <https://atlas-event-index.cern.ch/doc>

Frequently Asked Questions: <https://atlas-event-index.cern.ch/doc/faq>

Sources: svn+ssh://svn.cern.ch/repos/atlasoff/Database/TAGHadoop/TagConvertor

AFS: /afs/cern.ch/project/jps/repos/atlas-eies/TagConvertor

CVMFS: \$ lsetup eicient

EOS: /eos/atlas/atlascerngroupdisk/proj-evind/Results