

Profiling Analysis at Startup

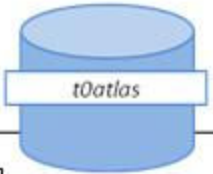
Jim Cochran
Iowa State

Outline:

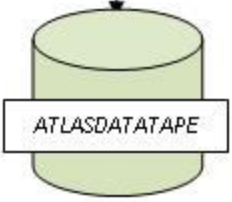
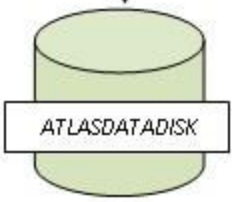
- Computing model status
- Expected Early analyses
- Expected dataset needs
- profiling/benchmarking analysis tools

ATLAS Computing Model

Tier-0



Tier-1

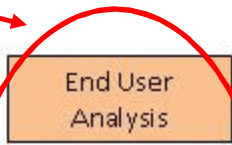
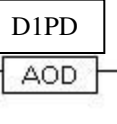
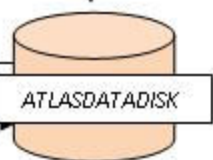
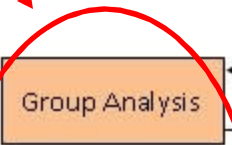
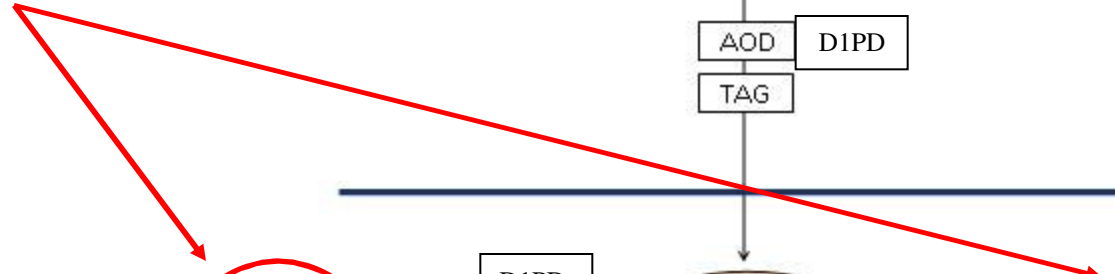


Note that user analysis on T1 **not** part of Computing Model (will be user analysis at T1s)

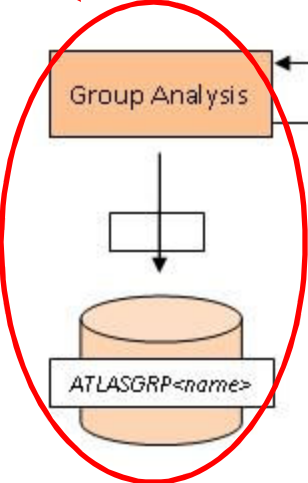


Tier-2

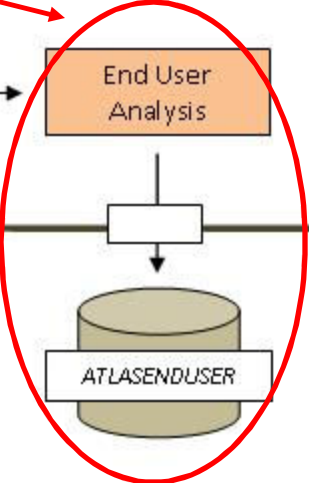
analysis focus



Tier-3



may be different for early data (i.e. ESDs @ T2)



Status of the Computing Model

New draft to be available soon

Changes discussed in Michael's talk

Expected Early Analyses

A summary of the Walkthroughs gives a starting point:

$J/\Psi \rightarrow \mu\mu$

Min Bias

Jet Analysis

Electron

Muon

Top dilepton

W/Z+jets

Direct photon

top lepton + jets ?

...

each with several analyses (& many tasks)

Difficult to predict which will be US centric
Expect US fraction to be greater than 23%

In addition expect many subsystem commissioning studies:

Trigger

ID (pixel, TRT, SCT)

Lar, Tile

Muons

Expected Data Set Types to be Used

$J/\Psi \rightarrow \mu\mu$	Muon dESD and AOD
Min bias	primarily minbias dESD
Jet Analysis	Primarily AOD, some dESD
Electron	Custom ntuples from dESD/AOD
Muon	-- scheduled for 11/23 --
Top dilepton	?
W/Z+jets	AOD ?
Direct photon	? Expect dESD/AOD ?
Top lepton + jets ?	?

For subsystems expect mostly ESD & RDO and higher concentration of dESD

Data Set Needs for US ?

Expect we need (for early data) all AOD & all dESD, limited ESD & very limited RDO

For breakdown by type (& number of copies) see next talk (strawman)

Potential 10 pb⁻¹ analyses

- SM QCD
 - A study of minimum bias events in pp collisions (track based)
 - Charged and neutral particle production in minimum bias collisions (track+calo based)
 - Charged jet evolution and the underlying event in pp collisions (track based)
 - Study of diffractive events in pp collisions
 - Dijet angular distribution
 - Dijet mass measurement
 - Inclusive jet production
 - Multi-jet production
 - Study of jet shapes
 - Measurement of gaps between jets

Potential 10 pb^{-1} analyses

- SM WZ signatures
 - Measurement of the total W cross section (e, mu)
 - Measurement of the total Z cross section (e, mu - fwd e?)
 - Measurement of the W charge asymmetry (e, mu)
 - Measurement of the incl. W/Z cross section ratio (e,mu)
 - Observation of W production in the tau channel
 - Observation of Z production in the tau channel
 - Measurement of the W transverse momentum spectrum
 - Measurement of the Z transverse momentum spectrum
 - Measurement of the Z rapidity distribution (e,mu - fwd e?)
 - Study of the high transverse mass spectrum in W events (e,mu)
 - Study of the high mass spectrum in Z events (e,mu)
 - Study of the low mass Drell Yan spectrum (e, mu)

Potential 10 pb⁻¹ analyses

- SM WZ+jets
 - Measurement of W+jets and Z+jets cross-sections (split into two?)
 - Measurement of Z+1 jet / Z and W+1 jet / W ratios (split into two?)
 - Measurement of the W+1 jet/Z+1 jet ratio
 - Measurement of the underlying event in Z events
 - Measurement of underlying event in W to muon electroweak
 - Observation of W gamma and Z gamma production
 - Reconstruction of the W mass in leptonic decays
 - Forward-backward asymmetry in Z→ee photons
- SM Photons
 - observation of direct photon production

ATLAS cannot possibly do all on the 10 pb^{-1}
time scale - decisions must be made ...

A “10 pb-1 Strawman ” – for discussion

- Bphys
 - Fraction of J/ψ 's from B's
 - Shape of the J/ψ spectrum
 - Observation of Upsilon production (?)
- SM QCD
 - A study of minimum bias events in pp collisions (track based)
 - Dijet angular distribution (probably one angle - ϕ)
 - Measurement of gaps between jets
- SM WZ signatures
 - Observation of W production in the (e/ μ) channels
 - Measurement of the incl. W/Z cross section ratio (e/ μ)
 - Measurement of the Z rapidity distribution (probably one channel)
- SM WZ+jets
 - Measurement of Z+1 jet / Z and W+1 jet / W ratios (split into two?)
- Top
 - Can we say something about an excess of e- μ events over “topless” predictions?
- Plus Supporting CP results

Looking forward: 10-50 pb⁻¹

- Many of the SM analyses seem to more naturally fit on this timescale
- Top physics starts to be more feasible around this level of luminosity
- Finally, search physics starts to come in around here
 - Question from the Jet Walkthrough (paraphrased): “Do we try and find an excess over a well-measured but perhaps not well-predicted background, or do we impose tight cuts so we expect zero SM events and then count?”
 - It’s not too early to be thinking about this – we need to make sure that the 10 pb⁻¹ analyses support what we decide to do here.
 - There was a question in today’s Exotics meeting about “whether SM or Exotics sets the limit”: this is easy. *ATLAS* sets the limit.

Profiling/Benchmarking analysis jobs

Our resources are (and will be) limited - we must use them optimally

Users often do not pay sufficient attention to the resource demands of their jobs

This is an issue for both “grid” jobs and local (“post-grid”) jobs

We should monitor (at some level) analysis jobs with goal of improving performance

For pAthena jobs, new panda job stats site will be very helpful

- also new tool from Saul (egg!)
- will use it to continue efforts started by Sergei (as presented at UC workshop)
- may need to extend to include db access info
- provide feedback in PAT group

For postgrid jobs, will need to develop a testing procedure (NK)

- will start with the procedure used by Akira for ATL-COM-SOFT-2009-002
- will require close cooperation with users and PAT group