

Atlas Grid and Computing at IU

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GradDay

Atlas Data Production

- The LHC beams cross 40 million times per second.
- The Atlas multi-level trigger reduces these 40 million bunch crossings to the 100 most interesting crossings that are permanently recorded.
- At full luminosity there will be an average of 23 proton-proton collisions per crossing.
 - This means much of the Atlas detector will read out data and results in a large data size (~1 MB) each time the detector is fully readout.
- This means that Atlas will produce ~1 petabyte (i.e. 10^6 GB) data per year.
- It requires massive computing to handle this load.

Using Data Grids

- The question then becomes how to deal with all of this data.
 - NB: we need to process it at least as fast as we can take it or else we will never catch up.
- The answer is to build data grids:
 - A data grid (or grid for short) is a system that gives users a single secure ID which they can use to submit computer jobs to all of the sites belonging to the grid.
 - For example: Grid3 (one of three grids used by Atlas) has about 30 sites and 3000 computers all over the world.
 - It is not politically possible to have each country buy its own computers and send them to CERN.
 - It is also very smart to take advantage of existing resources that are only partly used (think of SETI).

A Tier 2 Center for IU

- IU (jointly with with the University of Chicago) has been selected as one of 3 Tier 2 grid sites for Atlas.
 - This means that there will be a considerable amount of hardware (CPU, Disk, and Network) installed at IU for running Atlas data analysis.
 - We already have have a prototype Tier 2 site with 54,400 SI2k of CPU power and ~10 TB Storage.
- In addition to all of the hardware, there will 4 people to run the center and help solve problems.
- This will be a good environment to Atlas data analysis in.
 - It could also be interesting to work on grid-issues as part of the service work required for participation in Atlas.