

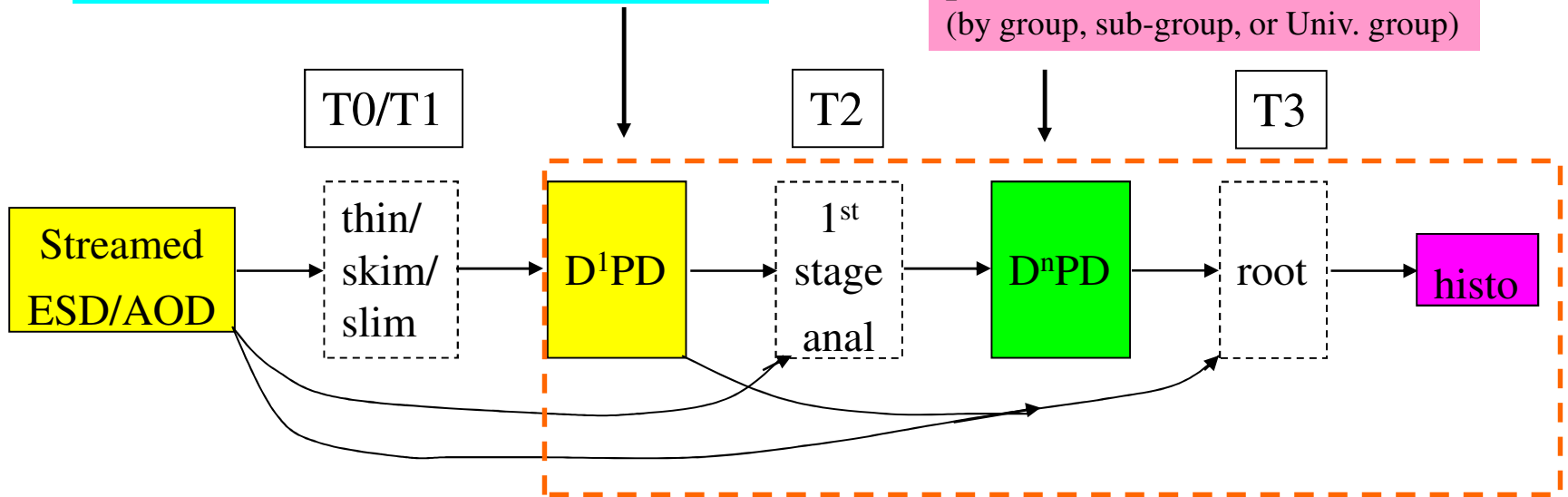
Tier 3 Commissioning and Integration plans

Doug Benjamin
Duke University

ATLAS Analysis Model – analyzer view

Contents defined by physics group(s)
- made in official production (T0)
- remade periodically on T1

Produced outside official
production on T2 and/or T3
(by group, sub-group, or Univ. group)



ESD/AOD, D¹PD, D²PD - POOL based

D³PD - flat ntuple

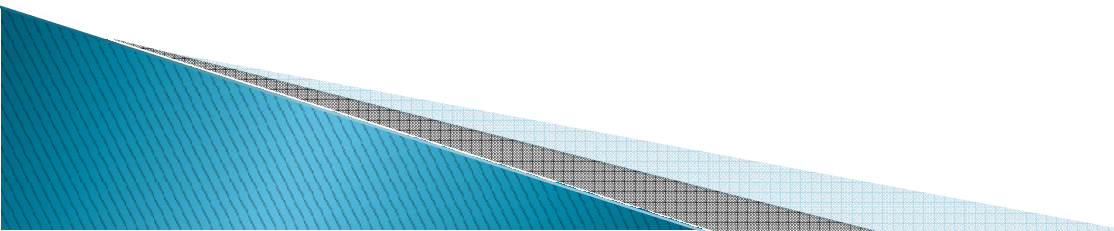
Jim Cochran's slide about the Analysis Model

Types of Tier 3's

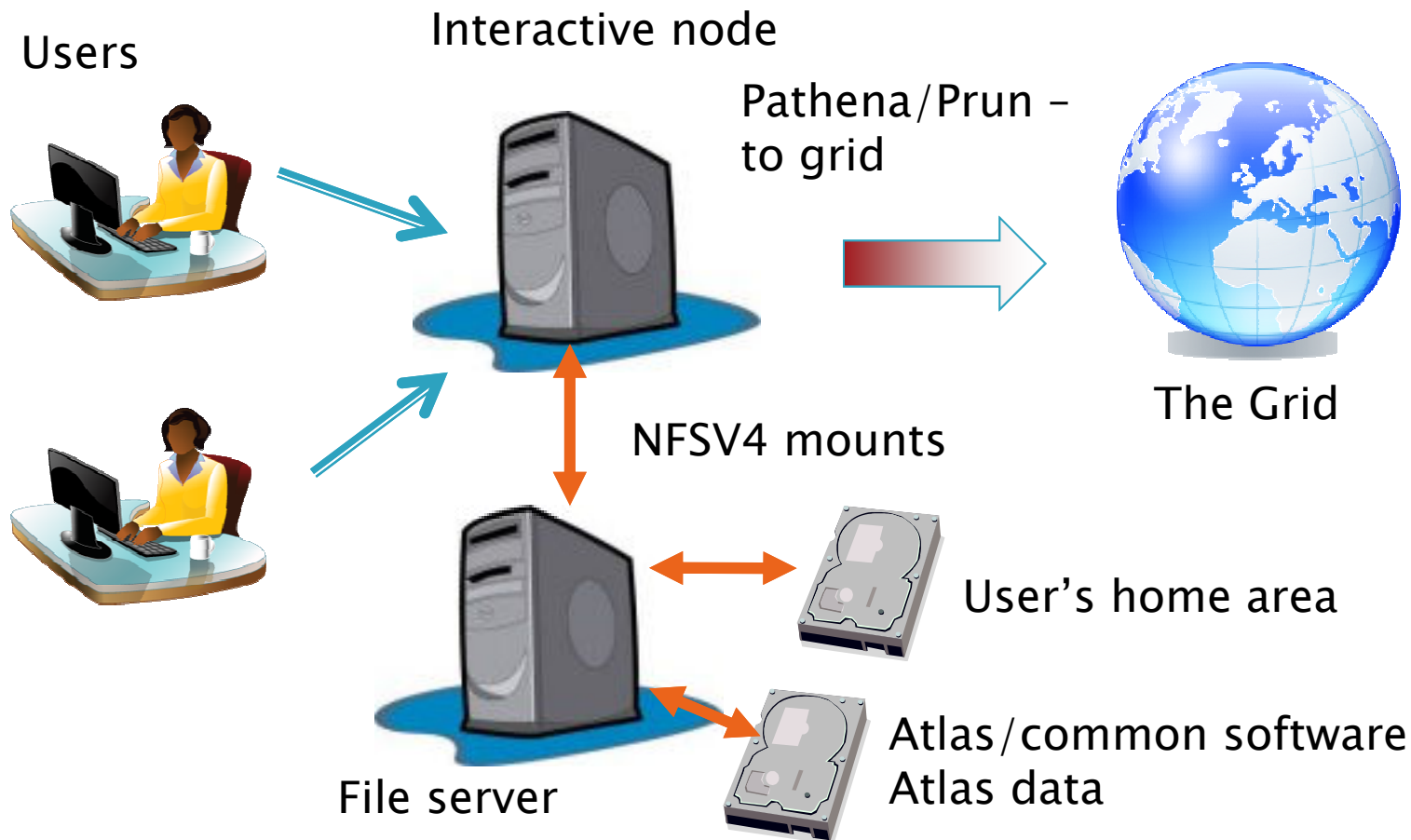
- Tier 3 gs (grid services)
 - Part of US Panda Cloud – accepts Panda jobs
 - Requires significant labor to keep production quality (at least 0.5 FTE – talented system admin).
- Tier 3 w (workstation) (Interactive)
 - Interactive workstation with Atlas Software
 - No batch system – Can submit Pathena or Prun grid jobs
 - All Atlas data retrieved using client tools (dq2-get)
- Tier 3g (most common type)
 - Interactive nodes – submit jobs to grid or local batch
 - Same functionality as Tier 3w
 - Atlas Data through Grid Storage Element and **data subscription**

Tier 3g design/Philosophy

- ▶ Design a system to be flexible and simple to setup (1 person < 1 week)
- ▶ Simple to operate – < 0.25 FTE to maintain
- ▶ Scalable with Data volumes
- ▶ Fast – Process 1 TB of data over night
- ▶ Relatively inexpensive
 - Run only the needed services/process
 - Devote most resources to CPU's and Disk
- ▶ Using common tools will make it easier for all of us
 - Easier to develop a self supporting community.



Tier 3g - Interactive computing



Design done - Instructions
on wiki first week November

How data comes to Tier 3g's

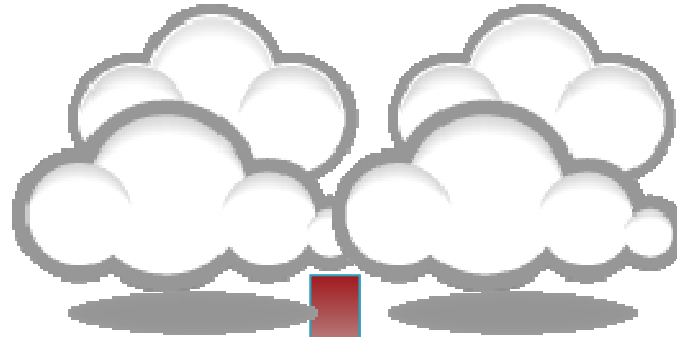
As T3 Storage Elements come online and are tested - will be added to Atlas Data Management System (DDM) as Tiers of Atlas -

Installation Instructions in wiki (**your comments encouraged**)

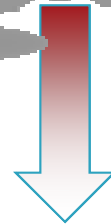
Recent throughput test with ANL SE - (> 500 Mb/s)

Shows \$1200 PC (Intel i7 chip/ X58 chipset/ SL5.3) can be a SE for a small T3.

US Tier 2 Cloud



Data will come from **any** Tier 2 site



Bestman Storage Resource Manager (SRM) (fileserver)



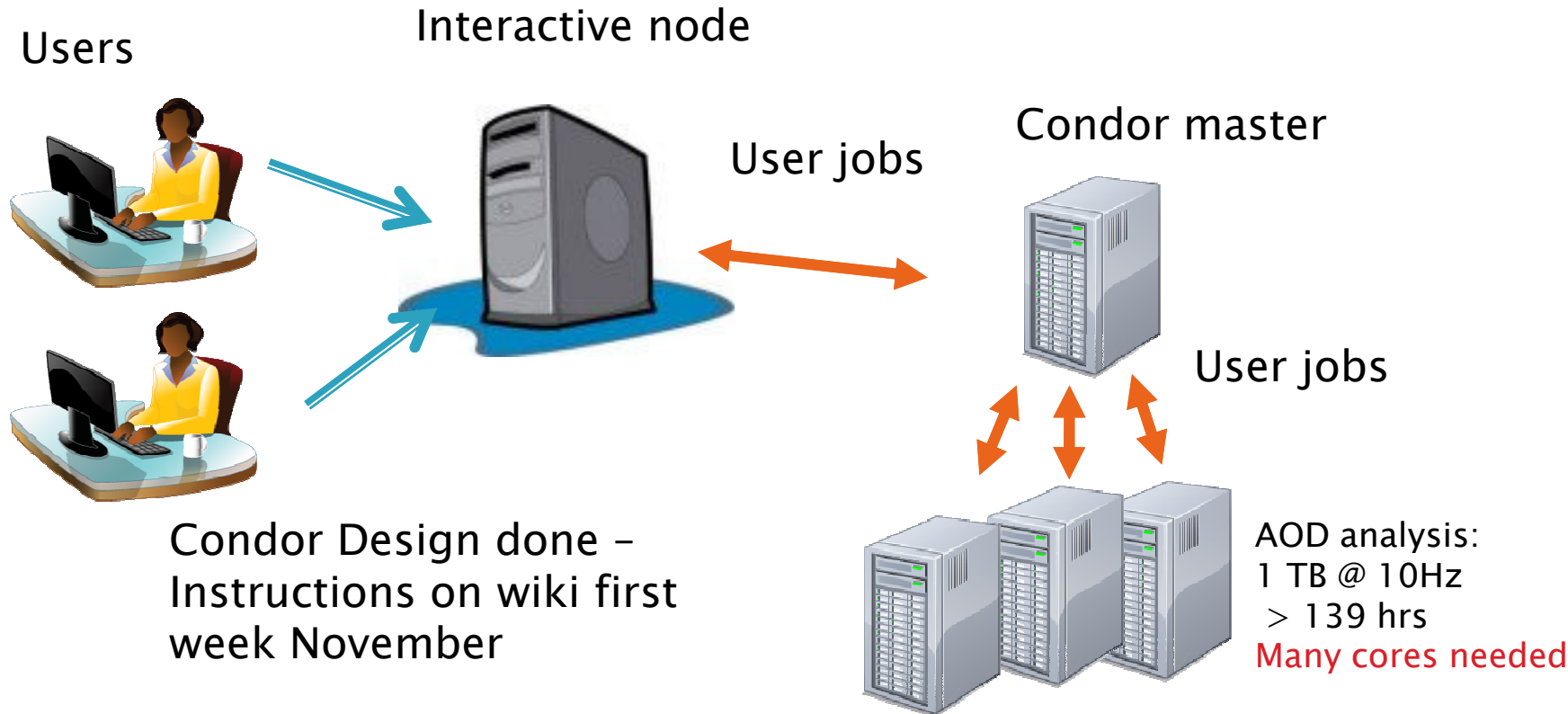
2 T3g's in Tiers of Atlas (Duke and ANL)

-Part of throughput testing

-Asked other T3g's to setup their SE's

(all are welcome/encouraged to setup SE)

Tier 3g - Batch/ Distributed computing

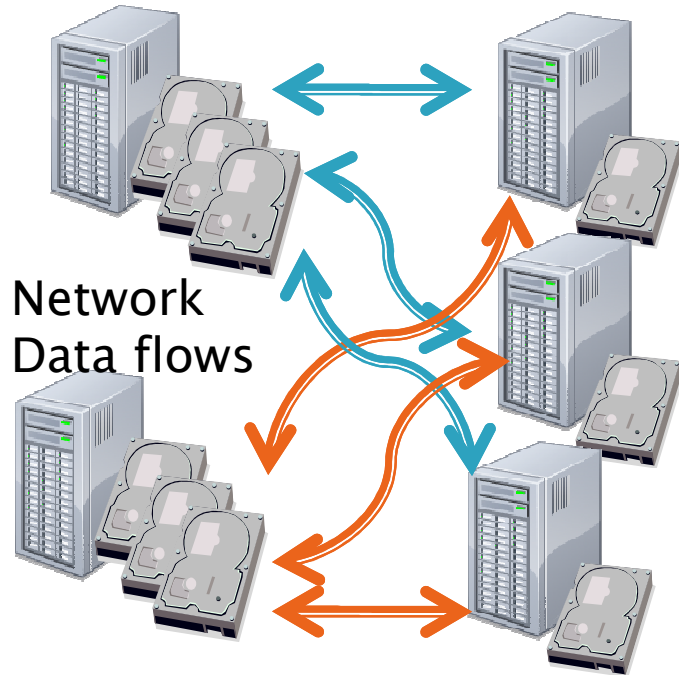


- ✧ Common user interface to batch system simplifies users' work
- ✧ ANL has developed such an interface **ARCOND**
 - ✧ Well tested on their system
 - ✧ Will need to be adapted for other Tier 3 sites

*You can help by testing it at your site
LFS sites can help - new batch system*

Tier 3g - Data storage options

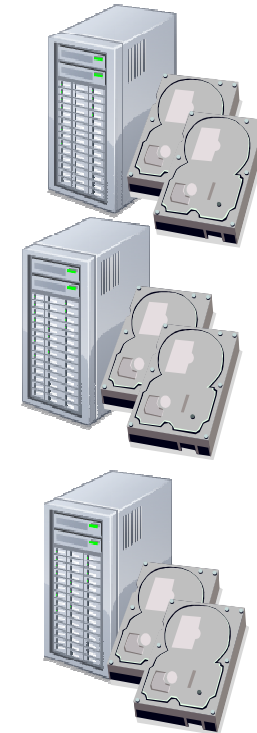
Storage on worker nodes



Network
Data flows

File servers

Worker nodes with
little local storage

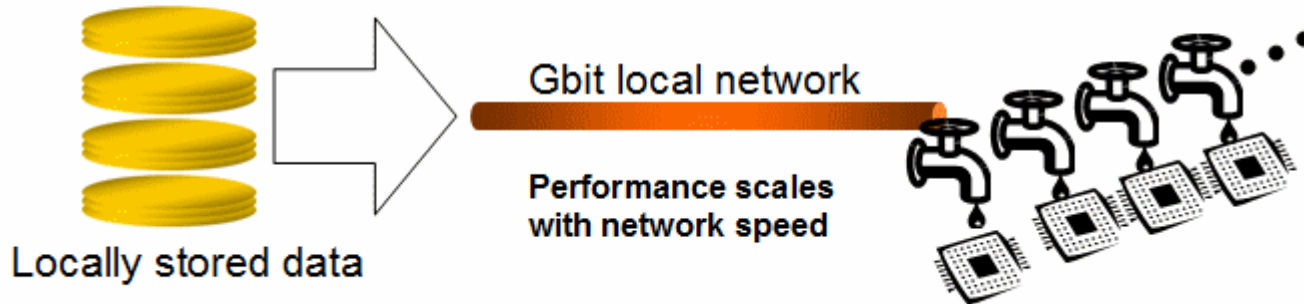


XRootD can be used to manage
either type of storage

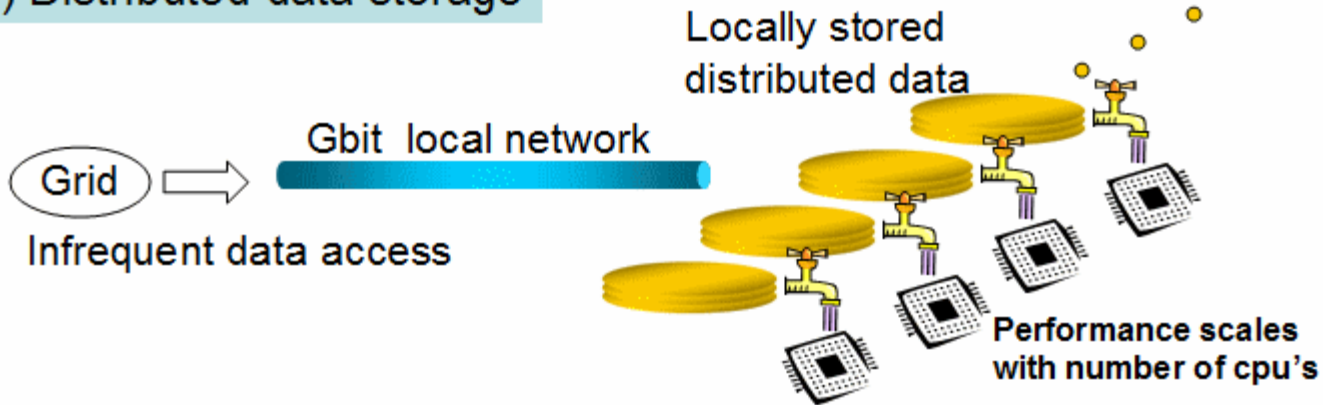
Draft of XRootD installation instructions exist

Distributed data advantages (Data stored on worker nodes)

A) Centralized data storage



B) Distributed data storage



Disk on worker node cheaper than in dedicated file servers

Tier 3 integration

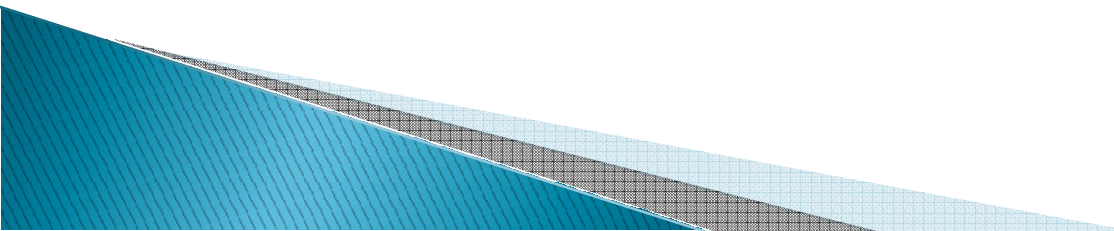
- ▶ Tier 3 installation instructions before Jan '10
 - You can help by reading instructions and provide us feedback (as you try them out)
- ▶ Starting to bring on line Storage Elements.
 - Need know limits of Atlas DDM *before* the crunch
 - The more sites the better
- ▶ Tier 3's are connected to the Tier 1-2 cloud through the Storage Elements – focus of integration with the US Atlas computing facilities.
- ▶ Once ARRA computing funds arrive will focus effort on sites starting from scratch initially

Tier 3 Support/Help

- ▶ US Atlas provides ½ person for T3 Support
- ▶ Open Science Grid (OSG) will help
- ▶ Our software providers are helping (Condor Team, XrootD team)
 - Rik and Doug just spent 2 days working with OSG and Condor team to setup and provide documentation for US Atlas Tier 3's.
- ▶ Tier 3's will be community supported
 - US Atlas Hypernews – HN-Tier3Support@bnl.gov
 - US Atlas Tier 3 trouble ticket at BNL
 - USAtlasTier3RT-RACF-USAtlasTier3@bnl.gov

Tier 3 Future...

- ▶ Continue to investigate technologies to make Tier 3's more efficient and easier to manage
 - Virtual machine effort continues.
 - Collaboration between BNL, Duke, LBL, UTA, CERN (and soon OSU)
 - Bestman-gateway SRM running in VM at BNL as proof of concept. (Will tune it for performance)
 - XRootD redirector next
 - Condor part of CERNVM
- ▶ ANL will setup integration and test clusters
 - Integration cluster – small Tier 3 – test code there before recommending upgrades in rest of Tier 3 cloud.



Conclusions

- ▶ Tier 3's are *our* tool for data analysis
 - We need your feedback on the design, configuration and implementation
 - Many tasks exist where you can help now
 - ▶ Tier 3's will be community supported
 - We should standardize as much as possible
 - Use common tools (modify existing tools to make them more inclusive)
 - ▶ Next 5 months are planning on a flurry of Tier 3 activity.
 - Your involvement now will pay off very soon
 - Thanks for attending this meeting it shows people are getting involved
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