

# ATLAS SOFTWARE AND GRID

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- IU Personnel Working on Software
- ATLAS SW and IU Work
- GRID Work
- Current and Future Work at IU

# IU SW and Grid Work Areas

- IU has been working in four SW / Grid areas:
  1. Simulation/Reconstruction/Analysis SW for Atlas
  2. Core Atlas SW
  3. Grid Operations
  4. Tier 2 Center Operation
- FL roles:
  - TRT SW Coordinator (member TRT Steering Committee)
  - Inner Detector Librarian
  - US Atlas Level 3 Manager for Application Software
  - Leader of Atlas Software Infrastructure Team (SIT)
  - Member of the Atlas Software Project Management Board
  - Member of US ATLAS Analysis Support Group
  - Atlas SW Release coordinator for 6 months.
  - PI for IU iVDGL Grant.
  - PI for IU part of EGO (Extended Grid Operations) ITR Proposal

# Offline / Core ATLAS SW Personnel

- New Core SW Research Associate (ATLAS Comp. Proj.)
  - Funding supplied by Srinu Ragagopalan
  - Will work on making Atlas software user friendly, especially in a distributed/grid environment.
- New Post Doctoral hire DOE
  - Will start around first of the year
  - Will work on analysis, among other things (see Harold's talk)
- Thom Sulanke, System Administration IU
  - Supported entirely by university funds.
  - Shared with task D and E also.
- Pauline Gagnon, Sr. Research Scientist (IU)
  - Will return to Atlas physics analysis once module acceptance is done.

# Grid Personnel (Operations)

- Doug Pearson, Sr. Manager IU NOC UITS
  - iVDGL contact at UITS (also OSG)
  - Senior Manager of IU NOC (includes Abilene NOC)
- Leigh Grundhoefer, Sr. Grid Technologist iVDGL/UITs
  - Leads iVDGL Operations Group
  - Works on project full time
- Steve Peck, Line Manager IU NOC UITS
  - Supervises operators at the IU NOC
- Rob Quick Jr., Grid Technologist/Operator UITS
  - Central contact for Trouble Tickets, Grid3, DC2, and iGOC
  - Works on project full time
- Web Developer iVDGL
  - Half time position working on iVDGL web pages.

# Grid Personnel (Tier 2)

- Craig Stewart, Sr. Manager Research Computing  
  UITS
  - Supervises AVIDD large scale computing at IU
- Matt Allen, System Administrator UITS
  - Maintains Grid middleware on AVIDD cluster used for Tier 2
  - Works half time on project

# Critical Path Items for ATLAS SW

- ATLAS is busy implementing persistency using LCG products POOL & SEAL
  - Ongoing work debugging the ATLAS and LCG code
  - ROOT data files will be used to store the data
- Reconstruction is now running on GEANT4 data sets
  - Much work remains to validate results
  - Pile-up is now being debugged
  - Joint tracking classes shared between Inner Detector and Muon System being put into production
- Effort to define the ATLAS analysis environment
  - Event Summary Data (ESD) and Analysis Object Data (AOD) being defined

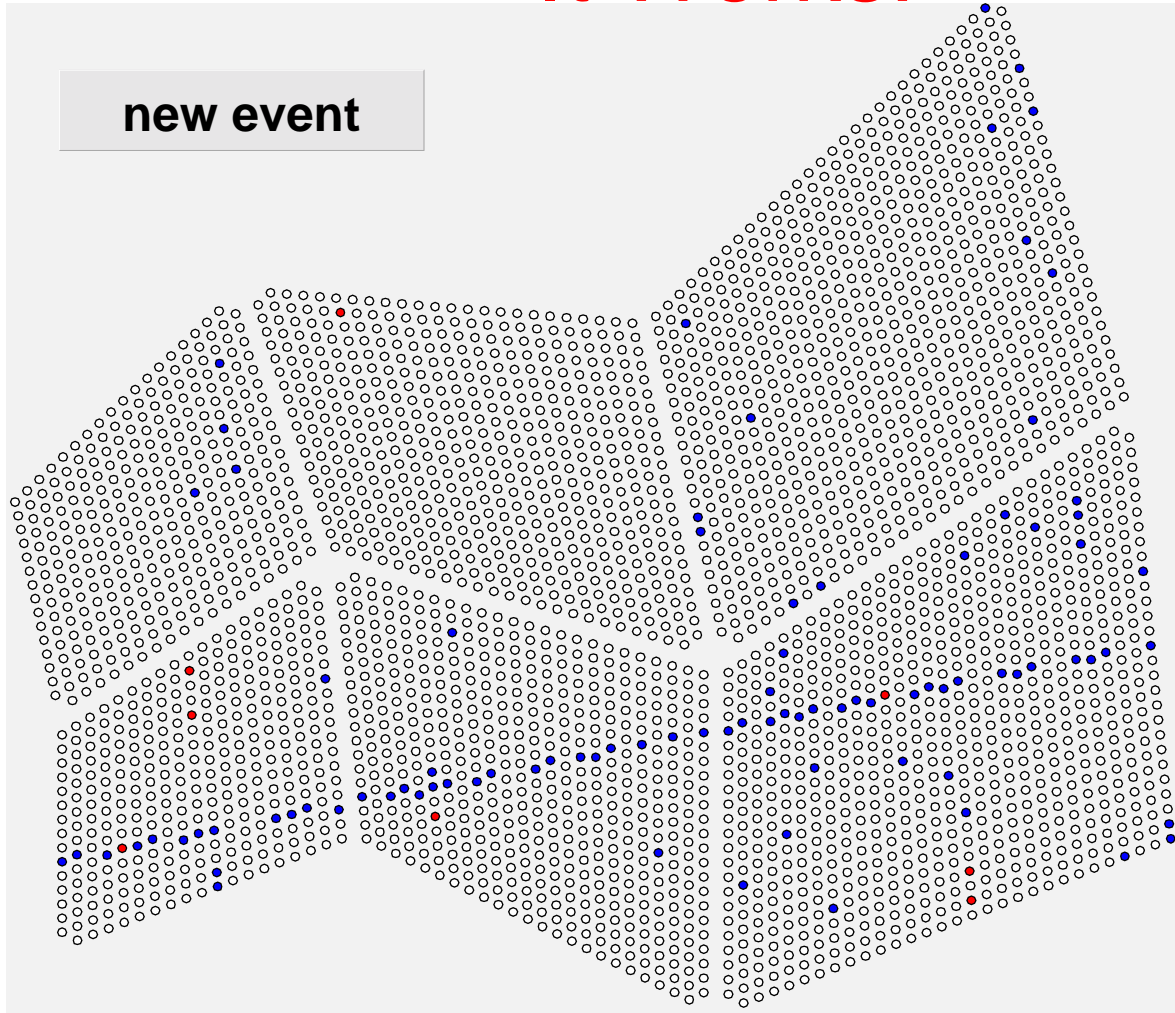
# Data Challenges

- Data Challenges (DC)
  - DC0 (Dec 2001 to Feb 2002) processed 100k events through Fortran reconstruction and analysis chain.
  - DC1 (Jul 2002 - May 2003) generated  $10^7$  events for the ATLAS High Level Trigger TDR using GEANT3. The events were reconstructed but much of the code was still Fortran.
  - DC2 (started June) will generate  $\sim 2.5 \times 10^7$  events. GEANT4 is used to simulate the events, which then undergo the full chain: simulation, reconstruction (with pile-up), and analysis. All work is done on the grid, though almost all of the pile-up reconstruction done at CERN (the “Tier 0” exercise).
    - DC2 will be used to write ATLAS Computing Technical Design Report
- Later this year we will go into continuous production.
  - Much larger samples will be generated for the Rome physics workshop.

# Simulation and Core SW Work

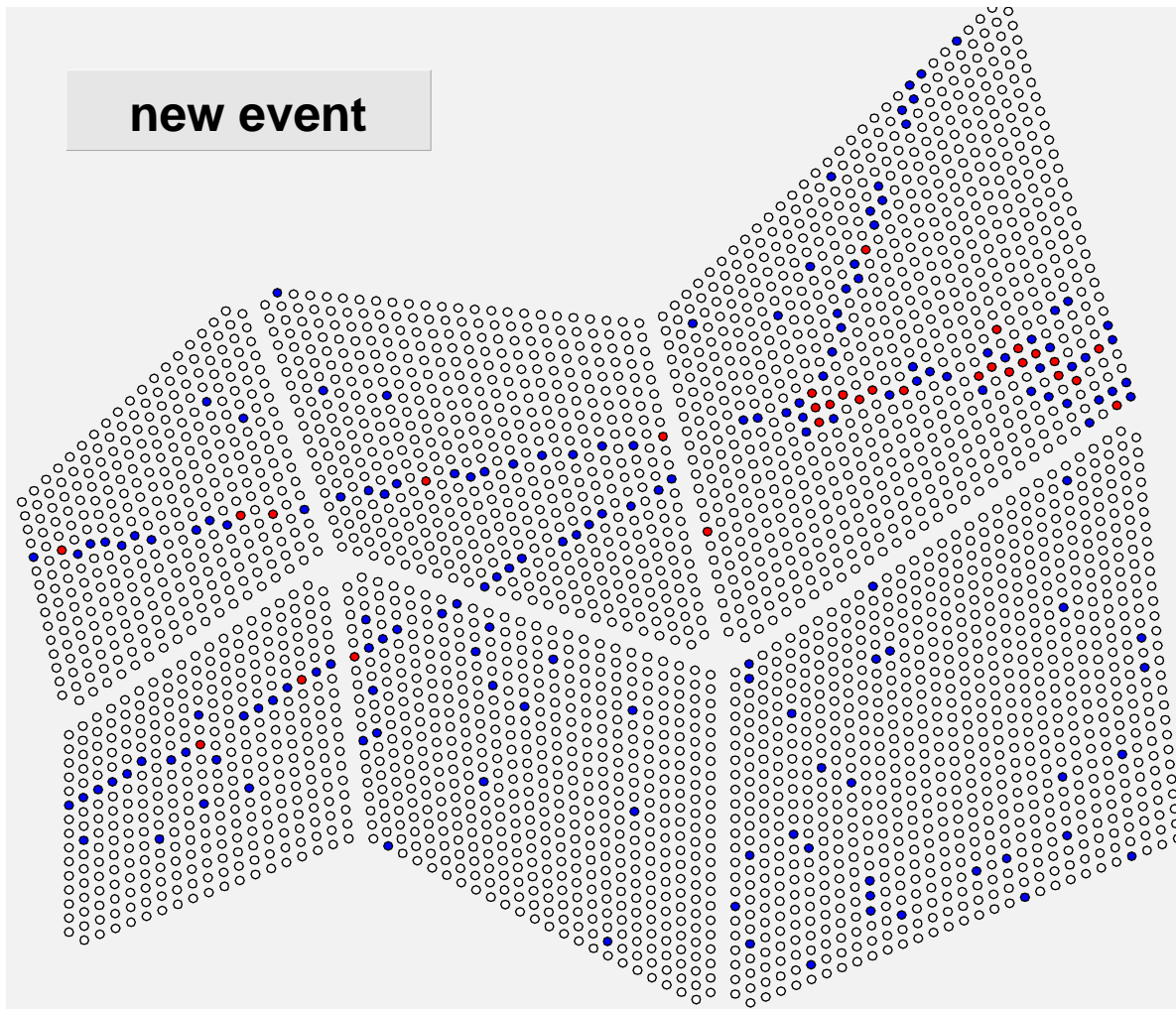
- Recently my work has been mainly coordination instead of direct coding
  - Coordinated the TRT & Inner Detector Software Effort
    - Managed the Inner Detector SW repository (librarian)
    - Coordinated the TRT Offline and Testbeam SW effort
    - Assisted coordination of the Inner Detector SW
  - Coordinated ATLAS SW release for about 6 months
    - Our librarian had passed away just before my term started, so I ended up building most of the releases until a replacement could be found
  - As a consequence of my release coordination work, I was appointed to the ATLAS Software Project Management Board and as the chair of the ATLAS Software Infrastructure Team
    - As a result, I have become interested in making the ATLAS software more user-friendly for the average physicist, especially in a distributed environment.

# It Works!



Actual Testbeam  
Event

# Busy Testbeam Event



# Simulation & Core SW Plans

- Continued work on the Data Challenges
  - Coordination of TRT and Inner Detector Software
  - Work on reconstruction in pile-up
- Start to become involved in analysis
  - Member of Midwest Analysis Group
    - Hosting Midwest Analysis meeting next month
  - Member of Analysis Support Group
  - Level 3 US Manager for Application SW (includes analysis)
- Begin to work with new postdoc on analysis
- Extensive work with new Research Associate on making ATLAS framework (Athena) easier to use by the average physicist
- Working with others on Physics SW will be very nice

# GRID / iVDGL

- The IU GRID work was directed by Rob Gardner who has taken a position at the University of Chicago.
  - Much of his GRID-related funding transferred with him
    - All the GriPhyN and Grid Telemetry funding transfers to UC.
  - Substantial iVDGL funding (\$811k) from NSF remains at IU
    - Just over half the funding transfers.
  - Rob and I plan to work closely on the iVDGL project.
- I have inherited Rob's funding for:
  - Some hardware at the prototype Tier 2 Center.
    - This is about \$77k (no more funding after first year).
  - All of the funding for iVDGL Grid Operations Center (iGOC).
    - Over the 5 years of the grant the total NSF iGOC funding is ~\$744k.
  - IU is providing substantial contributions to the project:
    - IU is covering the cost 0.5-1.0 FTEs for the iGOC during the project.
    - IU is returning 25% of the indirects.

# GRID Work Last Year at IU

- Prototype Tier 2 Center operation
  - Grid middleware updates
  - Participation in Grid3 / Super Computing 2003 & Atlas DC2
  - Co-use by SDSS and CMS
  - Beaucoup d'events generated
- Prototype grid operations work
  - The iVDGL Grid Operations Center (iGOC) has handled several hundred trouble tickets (including DC2 tickets)
    - Monitoring of BNL and UTA servers for DC2
  - IU (Leigh) is responsible for all of the Grid3 installation testing, instructions, and debugging
  - IU also runs the various monitoring servers (Ganglia and MonaLisa) and the RLS servers for Grid3
  - IU works on Virtual Organization issues and VOMS

# Prototype Tier 2 Center Work

- The prototype Tier 2 Center is now split between IU and UC (which recently installed their first big cluster).
- The IU Part of the Tier 2 Cluster is co-located at the IU computer center on the AVIDD cluster.
  - AVIDD funded by an MRI grant justified partly by iVDGL
  - We have a total of 32 nodes / 64 CPUs available
  - We have about 9.5 TB of storage
    - 1.5 TB fiber channel
    - 8.0 TB NAS
  - Very good connection to Abilene
- The selection process for the first 3-4 permanent Tier 2 sites is just about to start.
  - Plan a joint bid with UC/EFI (Rob Gardner & Jim Pilcher)

# iVDGL GRID Operations Work

- We continue to learn how to manage a Grid using Grid3 as our test case
  - We are becoming the iVDGL Registration Authority (RA).
  - We will continue to investigate tools to monitor the grid from an operator's (not a developer's) point of view.
  - Currently we are dealing with the consequences of the exponentially increasing number of trouble tickets
  - We hope to have an additional fractional FTE match from IU to work on managing storage on the grid
    - We have already had some difficulties in assigning and controlling storage at the sites participating in Grid3.
  - We will continue to be responsible for the installation procedures for new versions of Grid3 software.
  - We are trying to understand how to communicate with the grid users effectively.

# Open Science Grid

- We have been, and plan to continue, investigating participation in Open Science Grid
  - To this point our interests have been in security and operations.
  - We are having a video conference on OSG with the Fermilab operations people tomorrow.
    - This meeting was organized by Ruth Pordes.