#### Grids, Worldwide Computing, and ATLAS Software Development

**ATLAS Software Workshop** 

Berkeley, California

12 May 2000

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# A worldwide computing model encompasses many things Tier 0, Tier 1, Tier2, ..., regional centers: number, sizing, scope, connectivity, roles which depend upon What computing activities are expected to take place where (simulation, reconstruction, analysis, ...), and what data are moved/replicated where which depend upon What is POSSIBLE in the way of distributed computing (e.g., grid) and distributed data access National Computing Board has formed working groups (GRID, MONARC, REGIONAL CENTRES, WORLDWIDE COMPUTING MODEL) to address these issues. What does the software development effort need to do to organize itself correspondingly?

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# **Grids and the Computing Model**

- ATLAS Computing Technical Proposal was written before the term "computational grid" was coined
- Grids are a technology--one component of a strategy used to implement an ATLAS computing model
- How do grids and other developments change the computing model?
  - Are these changes fundamental, or (merely) matters of implementation?
  - Are the implementation ramifications pervasive and extensive, or matters of detail?
  - Are the implications of grids equivalent, in terms of computing models, to the implications of better networking?

# What is ATLAS saying?

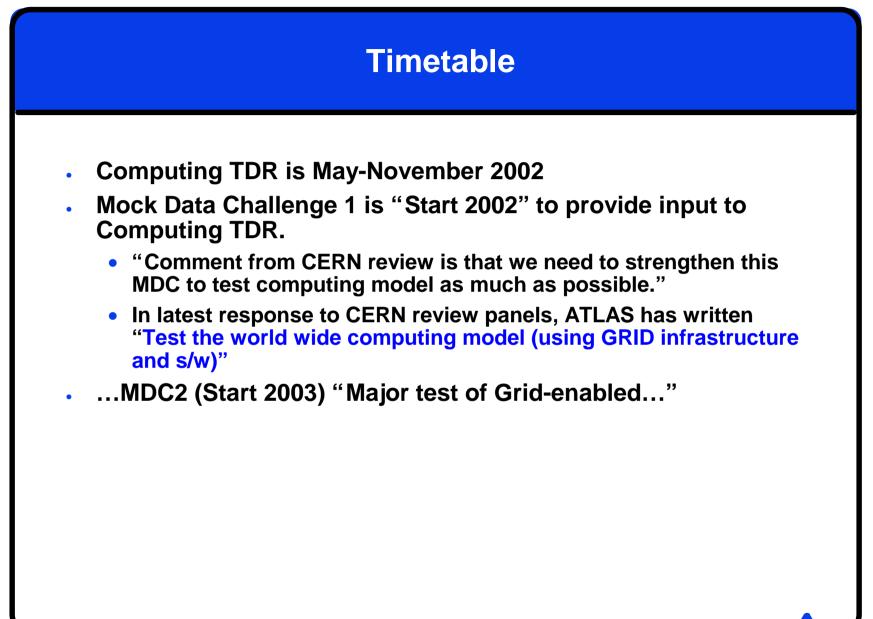
- Sizing estimates presented to review panels are still largely "classical" (based upon initial reconstruction done entirely at CERN), although...
- one relatively early grid milestone involves distributed reconstruction
- one ATLAS grid workplan submission speaks of running a distributed trigger

This is okay in an R&D phase, but we need to move toward a coherent plan.

## Timetable?

- What do we need to learn from grid R&D, and on what timetable?
- Today, offline software development and grid projects are largely disjoint.
- When do these streams need to come together?
  - What does it mean for offline software, to be grid-aware, or gridenabled, and what effort is required to make it so?

We need to understand grids well enough to define an appropriate computing model in the time frame of the TDR, and to validate that model's viability in the time frame of the Mock Data Challenges.



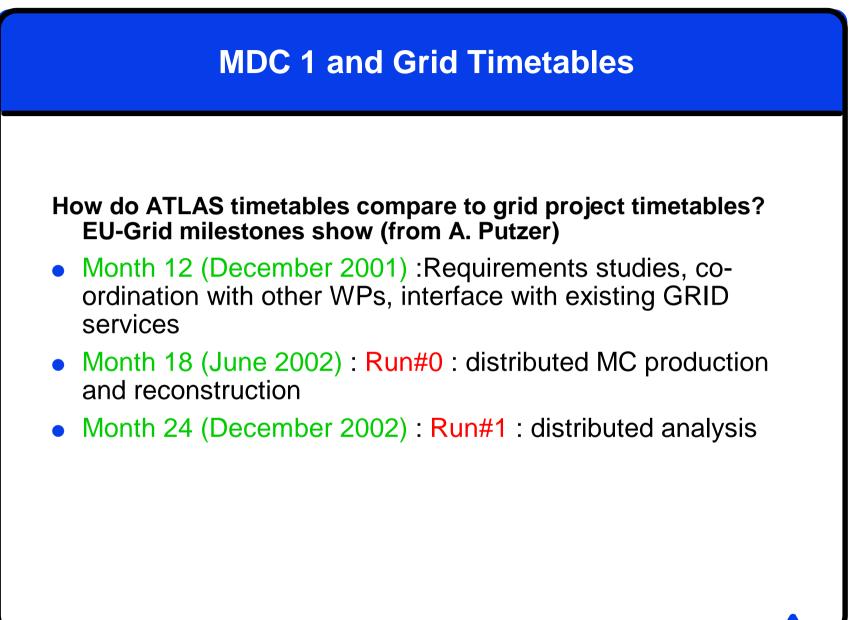
### MDC 1 and Grids

- MDC 1 timing implies that enough grid software to allow ATLAS to elaborate an appropriate computing model for its TDR must be available BEFORE the start of 2002.
  - Implication is that grid software must be far enough advanced in 2001 to allow ATLAS to build implementations in 2001.
  - Grid experience to date suggests that making software gridenabled takes a nontrivial amount of time and effort.

This is why the ATLAS database work plan shows modest gridrelated milestones (related to data replication and distribution) IN THE CURRENT YEAR.

Can we be EXPLICIT about what grid software (MUCH more than Globus) is required by ATLAS for MDC1, and on what timetable?

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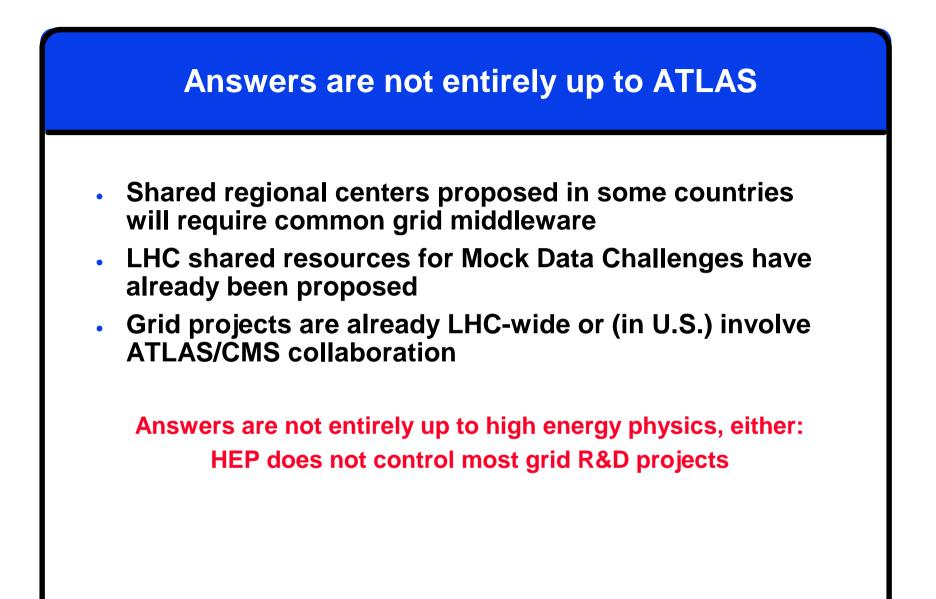
### Are these timetables in sync?

- EU-Grid Month 18 milestone may be
  - a bit too little (GRID as wide-area batch queue? Insufficient to evaluate grid's role in computing model?)
  - a bit too late,
- but
  - a more aggressive schedule may not be realistic given the state of grid R&D
  - ATLAS EU-Grid proposers have worked to keep the project milestones at least CLOSE to what ATLAS needs
- EU-Grid should not be singled out: other grid projects trigger the same timing concerns

### **Grids and ATLAS Software**

What are the implications of a distributed computing model and grids for:

- The database domain?
  - Extensive in almost any case
- The control framework?
  - Depends upon the model (e.g., distributed data sources versus distributing executables versus distributed execution)
- Other ATLAS software infrastructure?



## What next?

How do we organize ourselves to connect

the ATLAS software development effort

to

the NCB working group efforts

to

- the several grid initiatives in which ATLAS is involved?
- Can we be EXPLICIT about what grid software is required by ATLAS, on what timetable, and about how and when we will integrate grid middleware into ATLAS mainstream software development?

If ATLAS has a plan, we can have a strong voice in many of these grid projects.

#### The balance of this session

- ATLAS participation in other grid projects
  - GriPhyN (Rob Gardner)
  - PPDG (Ed May)
- MONARC (Models Of Networked Architectures for Regional Centres) (Krzysztof Sliwa)