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## “ARDA status”

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**eGEE**  
Enabling Grids for  
E-science in Europe  
[www.eu-egee.org](http://www.eu-egee.org)

**LCG**  
[cern.ch/lcg](http://cern.ch/lcg)

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# ARDA in a nutshell



- ARDA is an LCG project whose main activity is to enable LHC analysis on the grid
- ARDA is coherently contributing to EGEE NA4 (using the entire CERN NA4-HEP resource)
- Use the grid software as it matures (EGEE project)
  - ARDA should be the key player in the evolution from LCG2 to the EGEE infrastructure
  - Provide early and continuous feedback (guarantee the software is what experiments expect/need)
- Use the last years experience/components both from Grid projects (LCG, VDT, EDG) and experiments middleware/tools (Alien, Dirac, GAE, Octopus, Ganga, Dial,...)
  - Help in adapting/interfacing (direct help within the experiments)
  - Every experiment has different implementations of the standard services, but:
    - Used mainly in production environments
      - Few expert users
      - Coordinated update and read actions
  - ARDA
    - Interface with the EGEE middleware
    - Verify (help to evolve to) such components to analysis environments
      - Many users (Robustness might be an issue)
      - Concurrent “read” actions (Performance will be more and more an
- One prototype per experiment
  - A Common Application Layer might emerge in future
  - ARDA emphasis is to enable each of the experiment to do its job
- Provide a forum for discussion
  - Comparison on results/experience/ideas
  - Interaction with other projects
  - ...

The experiment interfaces agree with the ARDA project leader the work plan and coordinate the activity on the experiment side (users)

# ARDA team



- Massimo Lamanna
- Birger Koblitz

- Derek Feichtinger
- Andreas Peters



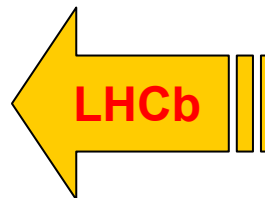
- Dietrich Liko
- Frederik Orellana



- Julia Andreeva
- Juha Herrala



- Andrew Maier
- Kuba Moscicki



- Andrey Demichev
- Viktor Pose



- Wei-Long Ueng
- Tao-Sheng Chen



## *Experiment interfaces*

**Piergiorgio Cerello (ALICE)**  
**David Adams (ATLAS)**  
**Lucia Silvestris (CMS)**  
**Ulrik Egede (LHCb)**

# Milestones (Level 1)



## *End-To-End Prototype activity*

<b>Milestone</b>	<b>Date</b>	<b>Description</b>
1.6.18	Dec 2004	E2E prototype for each experiments (4 prototypes), capable of analysis (or advanced production)
1.6.19	Dec 2005	E2E prototype for each experiments (4 prototypes), capable of analysis and production

# Milestones



## ALICE End-To-End Prototype

- 1.6.2 May 2004 *E2E ALICE prototype definition agreed with the experiment*
- Aug 2004 E2E ALICE proto available, whatever its status, on a user-accessible mini-testbed
- 1.6.6 Sep 2004 E2E ALICE prototype using basic EGEE middleware
- Nov 2004 E2E ALICE prototype improved functionality (UI config by proper Web Service)
- 1.6.14 Dec 2004 E2E prototype for ALICE, capable of analysis

## ATLAS End-To-End Prototype

- 1.6.3 May 2004 *E2E ATLAS prototype definition agreed with the experiment*
- 1.6.7 Sep 2004 E2E ATLAS prototype using basic EGEE middleware
- 1.6.15 Dec 2004 E2E prototype for ATLAS, capable of analysis

## CMS End-To-End Prototype

- 1.6.4 May 2004 *E2E CMS prototype definition agreed with the experiment*
- 1.6.8 Sep 2004 E2E CMS prototype using basic EGEE middleware
- 1.6.16 Dec 2004 E2E prototype for CMS, capable of analysis

## LHCb End-To-End Prototype

- 1.6.5 May 2004 *E2E LHCb prototype definition agreed with the experiment*
- 1.6.8 Sep 2004 E2E LHCb prototype using basic EGEE middleware
- 1.6.16 Dec 2004 E2E prototype for LHCb, capable of analysis

N.B. No formal milestones on activities like workshops, technology studies etc. (Nevertheless these activities are fundamental)

# Prototype



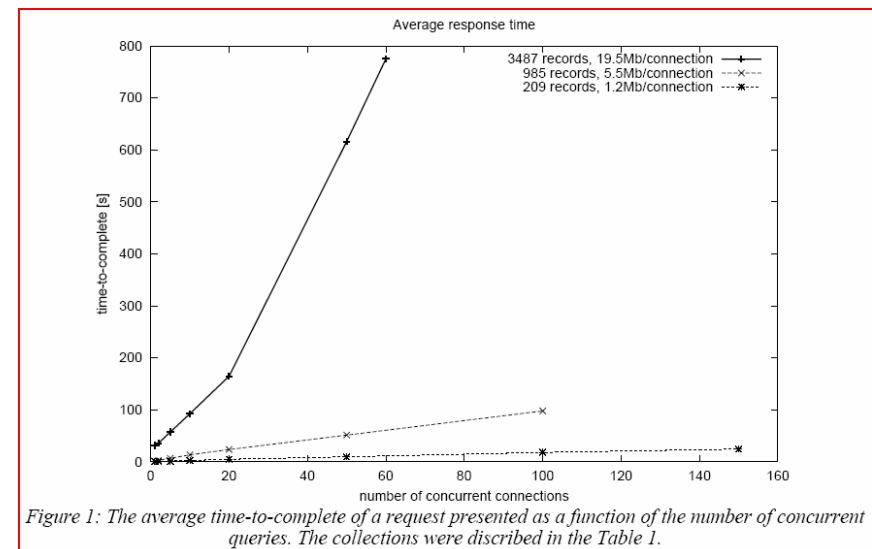
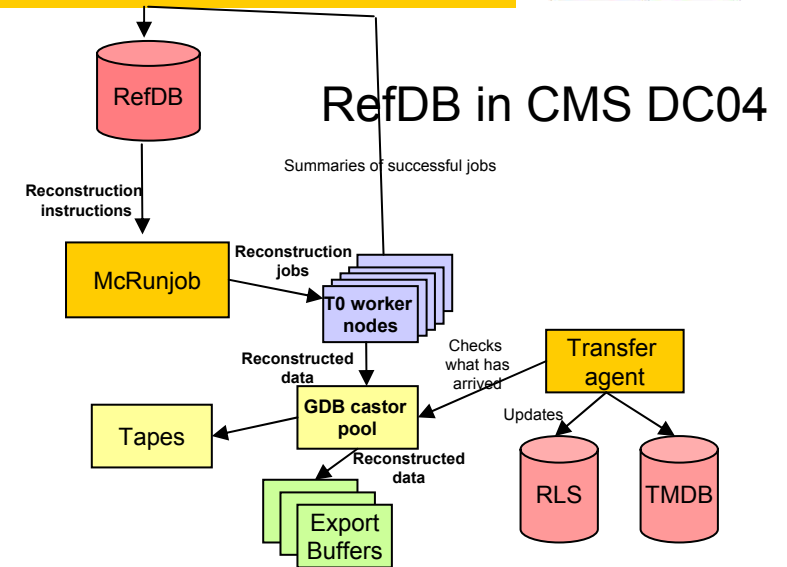
- Available for us since May 18<sup>th</sup>
- In the first month, many problems connected with the stability of the service and procedures
- A second site (Madison) available at the end of June
- At that point just a few worker nodes available
- Now the no. of CPU is increasing (50 as a target for CERN, hardware available) as well as the no. of sites
- CASTOR access to the actual data store being delivered now (essential)



- The LHCb system within ARDA uses GANGA as main component.
- The LHCb/GANGA plans:
  - enable physicists (via GANGA) to analyse the data being produced during 2004 for their studies
  - It naturally matches the ARDA mandate
  - Deploy the prototype where the LHCb data will be the essential (CERN, RAL, ...)
- At the beginning, the emphasis is to validate the tool focusing on usability, validation of the splitting and merging functionality for users jobs
- DIRAC (LHCb production grid): convergence with GANGA / components / experience
- Grid activity:
  - Use of the Glite testbed (since May 18<sup>th</sup>)
  - Simple DaVinci jobs from Ganga to Glite
  - “Regular” DaVinci jobs onto Glite
- Other contributions:
  - GANGA interface to Condor (Job submission) and Condor DAGMAN for splitting/merging and error recovery
  - GANGA Release management and software process (CVS, Savannah,...)
  - Contributions to DIRAC
  - LHCb Metadata catalogue tests
    - Performance tests
    - Collaborators in Taiwan (ARDA + local DB know-how on Oracle)



- The CMS system within ARDA is still under discussion (Milestone 1.6.4 late by 3 months?)
- Provide easy access (and possibly sharing) of data for the CMS users is a key issue (Data management):
  - RefDB is the bookkeeping engine to plan and steer the production across different phases (simulation, reconstruction, to some degree into the analysis phase).
    - This service is under test
  - It contained all necessary information except file physical location (RLS) and info related to the transfer management system (TMDB)
  - The actual mechanism to provide these data to analysis users is under discussion
  - Measuring performances underway (similar philosophy as for the LHCb Metadata catalog measurements)
- Exploratory/preparatory activity
  - Successful ORCA job submission to Glite ☺. Now investigating with the package manager
  - Access to files directly from CASTOR
  - Glite file catalog



# ATLAS



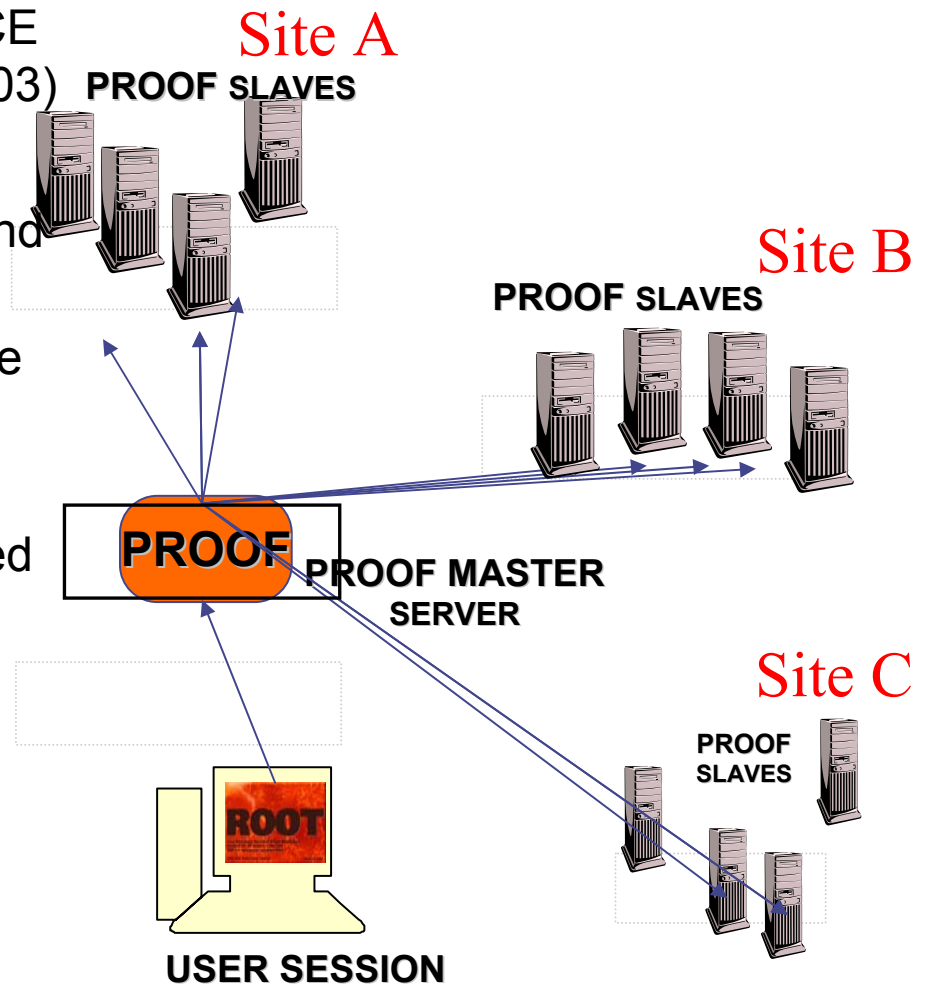
- The ATLAS system within ARDA has been agreed
  - ATLAS has a complex strategy for distributed analysis, addressing different area with specific projects ([www.usatlas.bnl.gov/ADA](http://www.usatlas.bnl.gov/ADA))
  - Starting point is: DIAL analysis model (high level web services)
- The AMI metadata catalog is a key component
  - Robustness and performance tests from ARDA
  - Very good relationship with the ATLAS Grenoble group
  - Discussions on technology (EGEE JRA1 in the loop)
- In the start up phase, ARDA provided help in developing ATLAS tools (ATCOM and CTB)

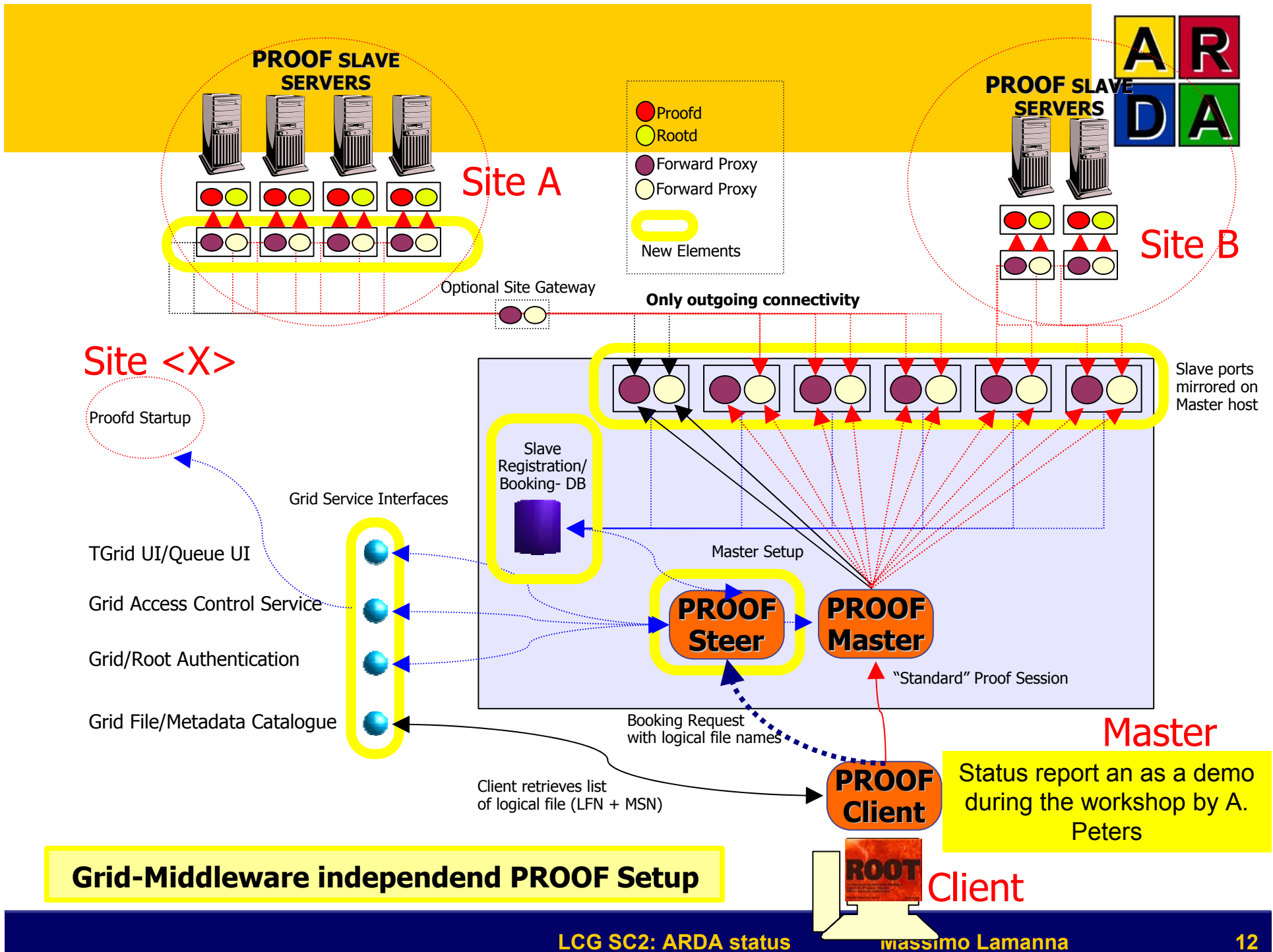
- DIAL on gLite OK (Evolution of the DIAL demo)
- ATHENA to gLite OK
- First skeleton of high level services

## AMI Tests

	Rows in Response					
Clients	5	10	20	50	100	150
1	0.22	0.27	0.35	0.87	2.49	5.26
5	0.40	0.48	0.74	2.94	10.99	27.98
10	0.67	0.75	1.74	4.77	21.99	56.17
20	1.02	1.34	2.46	9.51	41.79	timeout
30	1.42	2.36	3.10	14.21	66.61	timeout
40	1.80	2.33	4.84	19.94	timeout	timeout
50	2.32	6.43	5.02	21.43	timeout	timeout
100	9.94	9.82	SOAP-Err	SOAP-Err		
150	16.51	SOAP-Err				

- Strategy:
  - The ALICE/ARDA will evolve the ALICE analysis system (SuperComputing 2003)
- Where to improve:
  - Strong requests on networking (inbound connectivity)
  - Heavily connected with the middleware services
  - “Inflexible” configuration
  - No chance to use PROOF on federated grids like LCG in AliEn
  - User libraries distribution
- Activity on PROOF
  - Robustness and Error recovery
- Grid activity:
  - C++ access library on Glite ☺
  - IO library contributions





# “The first 30 days of the EGEE middleware” ARDA workshop



- **1<sup>st</sup> ARDA workshop (January 2004 at CERN; open)**
- **2<sup>nd</sup> ARDA workshop (June 21-23 at CERN; by invitation)**
  - “The first 30 days of EGEE middleware”
  - **Main focus on LHC experiments and EGEE JRA1 (Glite)**
- NA4 meeting mid July
  - NA4/JRA1 and NA4/SA1 sessions organised by M. Lamanna and F. Harris
  - EGEE/LCG operations new ingredient!
- **3<sup>rd</sup> ARDA workshop (September 2004; open)**
  - “The LCG ARDA prototypes”
- EGEE Conference meeting mid November
  - NA4/JRA1 and NA4/SA1 sessions organised by M. Lamanna and F. Harris

# “The first 30 days of the EGEE middleware” ARDA workshop



- Effectively, this is the 2<sup>nd</sup> workshop (January '04 workshop)
- Given the new situation:
  - Glite middleware becoming available
  - LCG ARDA project started
  - Experience + need of technical discussions
- New format:
  - “Small” (30 participants vs 150 in January)
  - To have it small, by invitation only...
  - ARDA team + experiments interfaces
  - EGEE Glite team (selected persons)
  - Experiments technical key persons
  - Technology experts
  - NA4/EGEE links (4 persons)
  - EGEE PTF chair
- Info on the web:
  - URL:[http://lcg.web.cern.ch/LCG/peb/arda/LCG\\_ARDA\\_Workshops.htm](http://lcg.web.cern.ch/LCG/peb/arda/LCG_ARDA_Workshops.htm)

# Workshop executive summary



- By invitation
  - + positive technical discussions
  - - not everybody could be invited
- Emphasis on experiments
  - + expose status and plans
  - - missing a detailed description of Glite
    - MW architecture document available
    - Better than a presentation
- Important messages from ARDA
  - Resources
    - Boxes and sites
  - Procedure
    - Registration as an example
  - Stability
    - Service crashes
- Next workshop
  - Open!
  - October 20-21
- Important messages from the workshop
  - Prototype approach OK (iterate!)
  - Priority on new functionality
  - Prepare larger infrastructure
  - Expose the API of all services
  - GAS useful as long it is a “transparent” stub
  - DB vs WebServices
    - Unclear
  - File Catalogue
    - Read-only files
  - Metadata catalogues
    - Unclear convergence path
    - Many projects already active
  - Data Management tools
    - Can TMdb be implemented with Glite?
  - Package management
    - Interesting but unclear priority

## Points from the template (from Matthias)



- ✓ Presentation of requirements
- ✓ Presentation of work plan, milestones
- ✓ Presentation of manpower situation
- Open questions → Q Report feedback
- ✓ Achievements
- ✓ Constraints from experiments, project partners
- Relation EGEE - LCG, deliverables to each
- Concerns and risks
- ✓ Present what was written in the last status report
- ✓ Indicate what will be written in the next status report



## Q Report feedback (Jim and Tony)



1. The four Prototypes: Is there an attempt at commonality among the prototypes? Do the 4 teams have common meetings? Are there common people on different teams?

*The commonality is not imposed but emerging from the experience. The ARDA team is actually one, with subgroups tasked to each experiments (plus ~2 FTE not strongly related to a single experiment). ARDA has regular weekly meetings and more important we are sharing the same office space with frequent interchanges of opinions and help. From the beginning, the concept of 4 prototypes was proposed because I do not believe in "imposing" common solution but at least we can benefit from this mutual exchanges I have just mentioned*

2. Alice: The boundary between GLite and the Alice Arda prototype is not clear (probably for obvious reasons!). In particular, what parts of the worked mentioned in this section can be used by the other ARDA prototype developers.  
*The C++ access library is a truly generic piece of software. It will become "specific" when used to steer ROOT-based ALICE programs. On the other hand it is very likely this will be re-used by ATLAS (at least) for their DIAL system.*

## Q Report feedback (Jim and Tony)



3. ATLAS: In general, the EGEE test bed is not yet ready for stress or performance testing. Will the fulfillment of Milestone 1.5.2.10 satisfy this? DIAL, AtCom, AMI, Combined Test Beam are all mentioned: Is the team focused enough on the short term goal of providing a prototype? Does GANGA fit into this plan?

*a) I apologize, my writing in the report is ambiguous: the only problem with the prototype was the lack of large memory machines. The status of the DIAL/gLite interaction was such it was premature to try to make real performance measurements (I will submit an errata to Les)*

*b) ATCOM and CTB are mentioned because one team member had already commitments with ATLAS (taken before the ARDA project started) and they have been phased out progressively. AMI tests were initiated and performed mostly during the phase ARDA and ATLAS were discussing about the project (but AMI is a central component of ATLAS DA and it will be used by the ATLAS/ARDA system).*

*c) Finally DIAL is the distributed analysis model chosen by ATLAS has ARDA starting point. This does not rule out contacts with Ganga for example, but our focus is what ATLAS defined.*

## Q Report feedback (Jim and Tony)



4. CMS: Registering DC04 data in the gLite file catalog: I hope the other experiments can benefit from the feedback and experience here.

*Yes, for example, at a very early stage some limitations have been found, submitted to the gLite team, discussed, fixed (by them) and validated (by us). A related example is the file access of CASTOR files.*

5. LHCb: Is it hopeless that "bookkeeping service", ATLAS's AMI, CMS file catalog work can all be unified into one joint effort? There seems to be a lot of overlap even beyond the lower-level GLite effort.

*ARDA is helping all projects to improve (testing, discussing -see for example the ARDA workshop session on metadata-, investigating (other) technologies, providing oracle testbed etc...). For the moment this is a very delicate issue: another project on metadata catalog across HEP experiment exists but the contacts with them are still in its infancy (due to lack of time).*

## Q Report feedback (Jim and Tony)



### 6. Role of other technologies and possible convergence (Metadata services)

*-In some cases ARDA has been asked to provide technology “advice” and some activity is going on (e.g. AMI project: tests developed, discussions, Oracle back end and DB design advice –Taiwanese colleagues-, involvement in contacts with IBM, special session in the workshop...).*

*-Some technology evaluation was performed (but no real effort available for this).*

*-Finally the contacts with the gridPP metadata group should be improved (still early days because lack of time): we would like to contribute experience in existing initiatives.*

- JRA1 (gLite)
  - Constructive collaboration (Prototype made available in a very early stage, hands-on tutorial, excellent collaborative attitude)
  - Excellent feedback on the day-by-day issues
  - We should try to improve on the more “high level” input from the experiment (the discussions on the JRA1 design document should help)
  - Clearly the prototype is an extra load for them (not foreseen in the project preparation), but essential for the success of the whole project
- NA4 (Applications)
  - Useful interchange
  - Load on ARDA to a minimum (F. Harris taking most of the EGEE project “overhead”: it is an essential role)
  - Using the EGEE events like interim ARDA workshop (and to a less extent, the ARDA workshop complement the EGEE NA4 events)

## Concern and risk (verbatim for the Q report + comments)



- Stability of the gLite prototype
- Availability of significant resources (o(100) CPU sites, at least 3 sites connected) to attract serious users
  - 2 users per experiments?
  - Each ARDA sub-team consists of 2 potential “mentors”
- Effective data access to significant fraction of the experiments data store (e.g. CASTOR storage element not yet available)
  - After June the 30<sup>th</sup>, some access has been granted (still under test and evolution)
  - gLite should be installed where the data “are”...
- Coherent software distribution mechanism for the experiment software
  - After June the 30<sup>th</sup>, under test and evolution

# Conclusions



- Up and running
  - Since April the 1<sup>st</sup> (actually before of that) preparing the ground for the experiments prototypes
    - Definition of the detailed programme of work
    - Contributions in the experiment-specific domain
  - Prototype activity started
    - CMS prototype definition late (“preliminary” activity going on)
- Next important steps
  - **(More) real users**
  - **Need of more hardware resources**
  - **Both needed for December 2004 milestone**
- Stay tuned 😊