

# Middleware Development within the EGEE Project

LCG Workshop  
CERN  
23-24 March 2004  
Frédéric Hemmer



- EGEE Project
- EGEE Middleware activities
- EGEE, LCG & ARDA

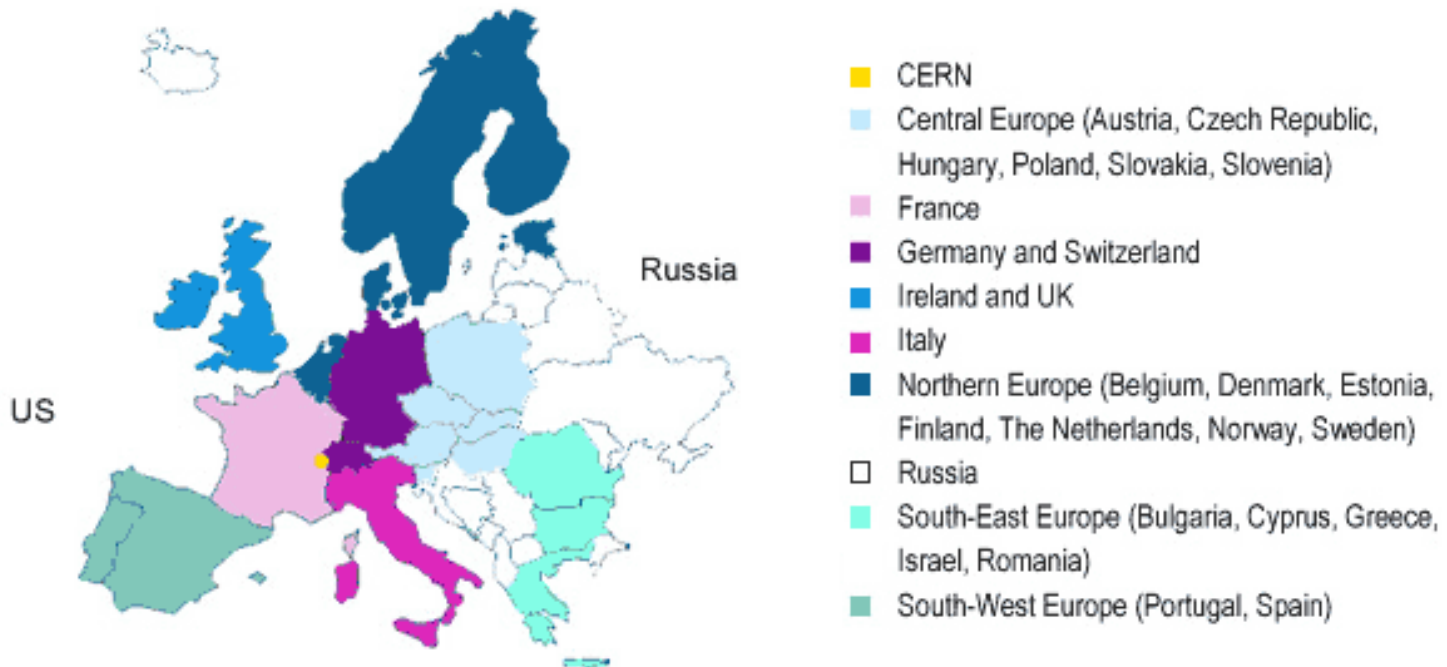
# EGEE Project



- Create a European-wide Grid **production** quality infrastructure for **multiple sciences**
- Profit from current and planned national and regional Grid programmes, building on
  - the **results of existing projects** such as DataGrid, LCG and others
  - the EU Research Network **Geant** and work closely with relevant industrial Grid developers and **NRENs**
- Support Grid computing needs common to the different communities
  - **integrate** the computing infrastructures and agree on **common access policies**
- Exploit **International connections** (US and AP)
  - Provide interoperability with other major Grid initiatives such as the US NSF Cyberinfrastructure, establishing a **worldwide Grid infrastructure**



- Leverage national resources in a more effective way for broader European benefit
- 70 leading institutions in 27 countries organised into regional federations



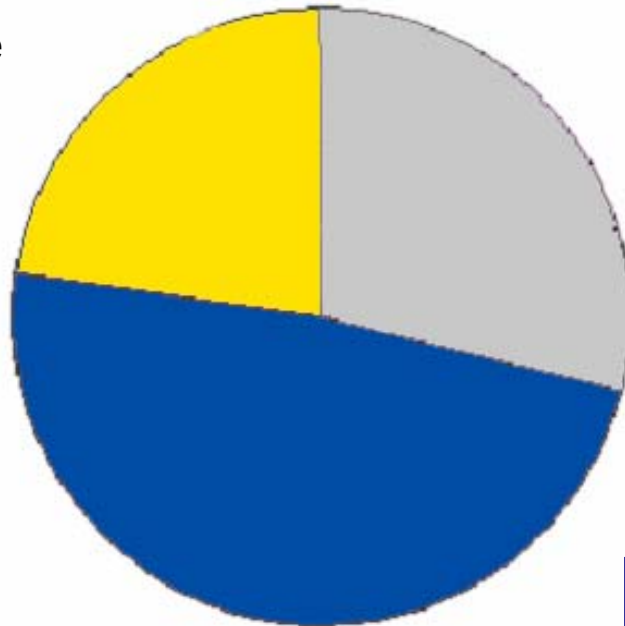
## 24% Joint Research

**JRA1: Middleware** Engineering and Integration

**JRA2: Quality Assurance**

**JRA3: Security**

**JRA4: Network Services** Development



## 48% Services

**SA1: Grid Operations**, Support and Management

**SA2: Network Resource Provision**

## 28% Networking

**NA1: Management**

**NA2: Dissemination and Outreach**

**NA3: User Training and Education**

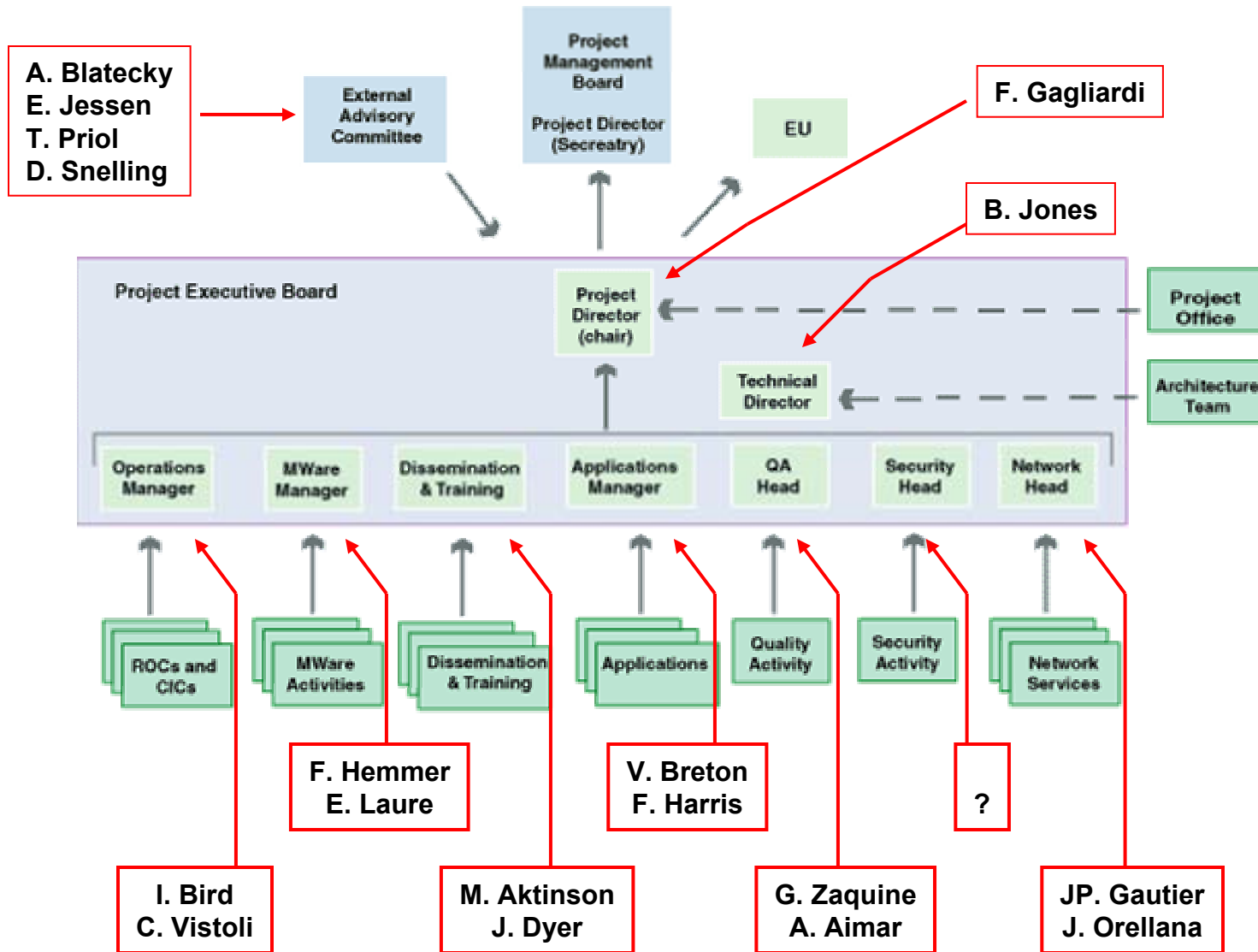
**NA4: Application Identification and Support**

**NA5: Policy and International Cooperation**

Emphasis in EGEE is on operating a production grid and supporting the end-users

**Starts 1<sup>st</sup> April 2004 for 2 years (1st phase) with EU funding of ~32M€**

# EGEE management



# EGEE Middleware Activity





- Provide robust, supportable middleware components
  - Select, re-engineer, integrate identified Grid Services
  - Evolve towards Services Oriented Architecture
  - Adopt emerging OGSI standards\*
  - Multiple platforms
- Selection of Middleware based on requirements of
  - The applications (Bio & HEP)
    - In particular requirements are expected from LCG's ARDA & HepCALII
  - The Operations
    - E.g. deployment, updates, packaging, etc..
- Support and evolve of the middleware components
  - Evolution towards OGSI\*
  - Define a re-engineering process
  - Address multiplatform, multiple implementations and interoperability issues
  - Define defect handling processes and responsibilities

\*: Now sort of obsolete given the WSRF announcement on January 20, 2004. The strategy is to use plain Web Services and review the situation towards the end of the year.

Location	Activity JRA1	Total Effort (FTE)	Total Effort (PM)	1st Year Effort (PM)
CERN	CERN	32	768	384
Italy	INFN	16	384	192
Italy	Datamat S.p.A.	6	144	72
Czech Republic	CESNET	4	96	48
United Kingdom	CCLRC	8	192	120
France	CNRS	2	48	24
USA	UChicago	0	0	0
USA	USC	0	0	0
USA	UW-Madison	0	0	0
	<b>Total</b>	68	1632	840

Issue: American involvement still being clarified



- Hardening and re-engineering of existing middleware functionality, leveraging the experience of partners
- Activity concentrated in few major centers and organized in “Software clusters”
- Key services:
  - Data Management (CERN)
  - Information Collection (UK)
  - Resource Brokering, Accounting (Italy-Czech Republic)
  - Quality Assurance (France)
  - Grid Security (Northern Europe)
  - Middleware Integration (CERN)
  - Middleware Testing (CERN)



- Middleware Integration and Testing Centre
- Middleware Re-engineering Centre
- Quality and Security Centres



Month	Month	Deliverables & Milestones	Item
<b>M03</b>	June'04	MJRA1.1	Tools for middleware engineering and integration deployed
<b>M03</b>	June'04	DJRA1.1	(Document) Architecture and Planning (Release 1)
<b>M03</b>	June'04	MJRA1.2	Software cluster development and testing infrastructure available
<b>M05</b>	August'04	MJRA1.3	Integration and testing infrastructure in place including test plans (Release 1)
<b>M05</b>	August'04	DJRA1.2	(Document) Design of grid services (Release 1)
<b>M09</b>	December'04	MJRA1.4	Software for the Release Candidate 1
<b>M10</b>	January'05	MJRA1.5	Integrated Release Candidate 1 enters testing and validation period (Release 1)
<b>M12</b>	March'05	DJRA1.3	(Software) Software and associated documentation (Release 1)



- Main components:
  - Middleware Re-engineering
    - Workload Management, CE
    - Data Management
    - Information Services
    - Authentication/Authorization
    - Accounting
  - Integration
  - Testing



- A few more components need to be worked at, such as:
  - Access Services
  - Authentication/Authorization
    - Involvement of the Security cluster
  - Common Services
    - Messaging
    - Error Handling
    - Logging
    - WS Containers
  - Some of these components do not have a clear mapping in the current EGEE middleware software cluster organization

## EGEE, LCG and ARDA



- ARDA RTAG has influenced considerably the EGEE Middleware activity
  - Reference included in the Technical Annex
  - Group of Middleware providers met as of December 2003
  - Goal to define and provide Middleware components as described in the RTAG
  - Participants from AliEn, EDG, VDT
- ARDA Project has been established
  - It is a distinct project, focus on the usage of the Middleware within the experiment
  - Providing resources to HEP to help delivering end to end analysis prototypes
  - Providing an organization to discuss and agree on Middleware components

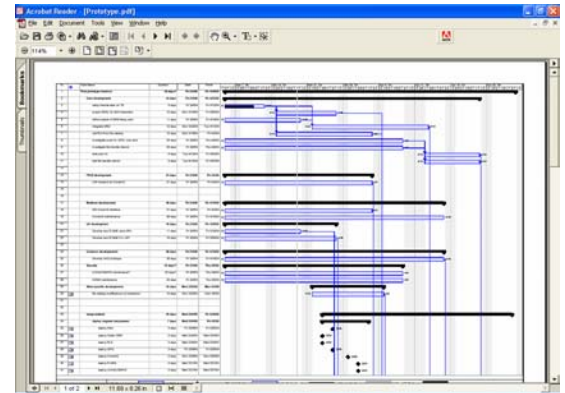




- LCG-2 middleware package strongly supported and evolved
  - Demonstrating a base solution for LHC start-up
  - Supported until overtaken by EGEE Middleware
- EGEE Middleware –
  - Re-engineered *generic* middleware package
  - Incorporating experience from AliEn, EDG, ....., VDT
  - Architected for scale and performance requirements of LCG
  - “batch” and “analysis”
- Fast prototyping approach – with clear end-to-end goals
  - Short update cycles to give LHC experiments the chance to influence and give feedback



- Gathered a set of Middleware providers
  - AliEn, EDG, VDT, ...
- Meetings so far
  - December 3-4, 2003
    - Workload Management System, CE
  - ARDA Workshop January 21-22, 2004
    - Setting up ARDA project
  - February 24-27, 2004
    - File catalogs, replica management, SE
  - *March 24-April 1, 2004*
    - Information system
    - Security
- A *working* document
  - Overall design & API's
  - <http://cern.ch/erwin/ARDA-WD.0.16.zip>
- Real prototype being discussed
  - Aim at end of April 2004 for a first (incomplete) version



# Next steps



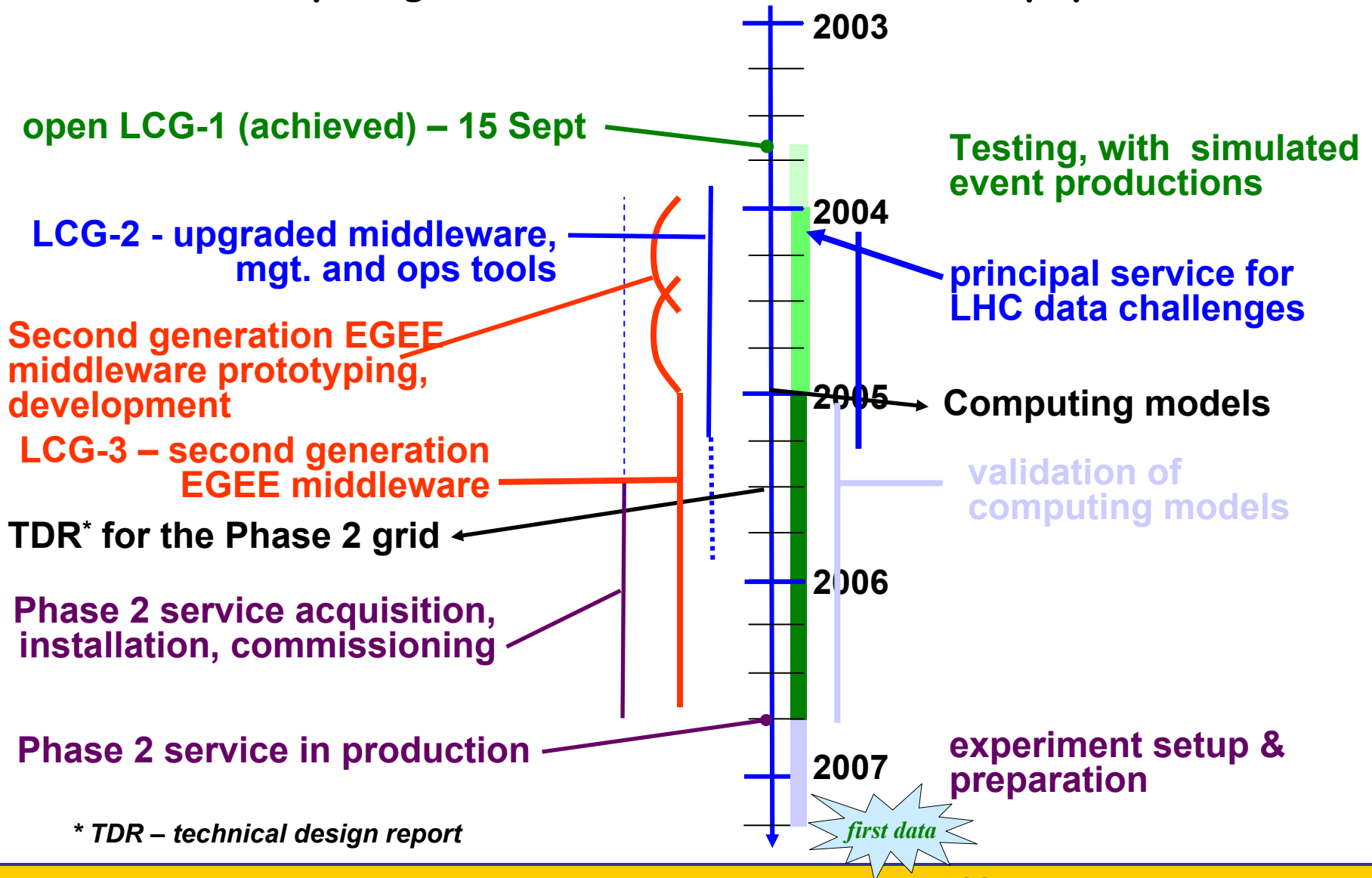
- Find a new name
  - In order not to confuse Generic Middleware and ARDA project
  - Suggestions welcomed
- Consolidate (working) Interface document
  - Architecture & Design
  - API's
  - Services Interfaces
- Exercise interface with the ARDA project
  - Interface experiments frameworks
  - Agree on interfaces/API's
  - And iterate through prototype versions
- Get documented requirements from Deployment
  - Implement in prototype
- Use the prototype to validate Integration & Testing plans
  - Nightly builds
  - Savannah Portal/CVS repositories
  - Software Configuration Management plans
  - SPI tools

# LCG Service Time-line



**computing service**

**physics**



\* TDR – technical design report



- LCG Project Leader in EGEE Project Management Board
- EGEE Project Director in LCG POB
- Cross technical management relations between LCG and EGEE established (Middleware and Operations Managers in common between LCG and EGEE PEBs)
- EGEE Technical director in LCG PEB
- EGEE HEP applications hosted at CERN and core resource of the LCG ARDA prototype



- EGEE Middleware Engineering effort is being used to provide next generation Middleware for LCG and others
  - For “batch” and “analysis”
  - According to the ARDA RTAG
  - Leveraging experience from AliEn, EDG & VDT
- Complying with the requested
  - Quality from both EGEE & LCG point of view
  - Deployment requirements gathered through LCG- $\{1,2\}$  experiences
- Defining API's and WS Interfaces
  - Allowing for alternative implementations
- Ensuring LHC Experiments (and other sciences) requirements are met
  - Through rapid prototyping and short release cycles
  - Through Analysis prototypes built from the ARDA project