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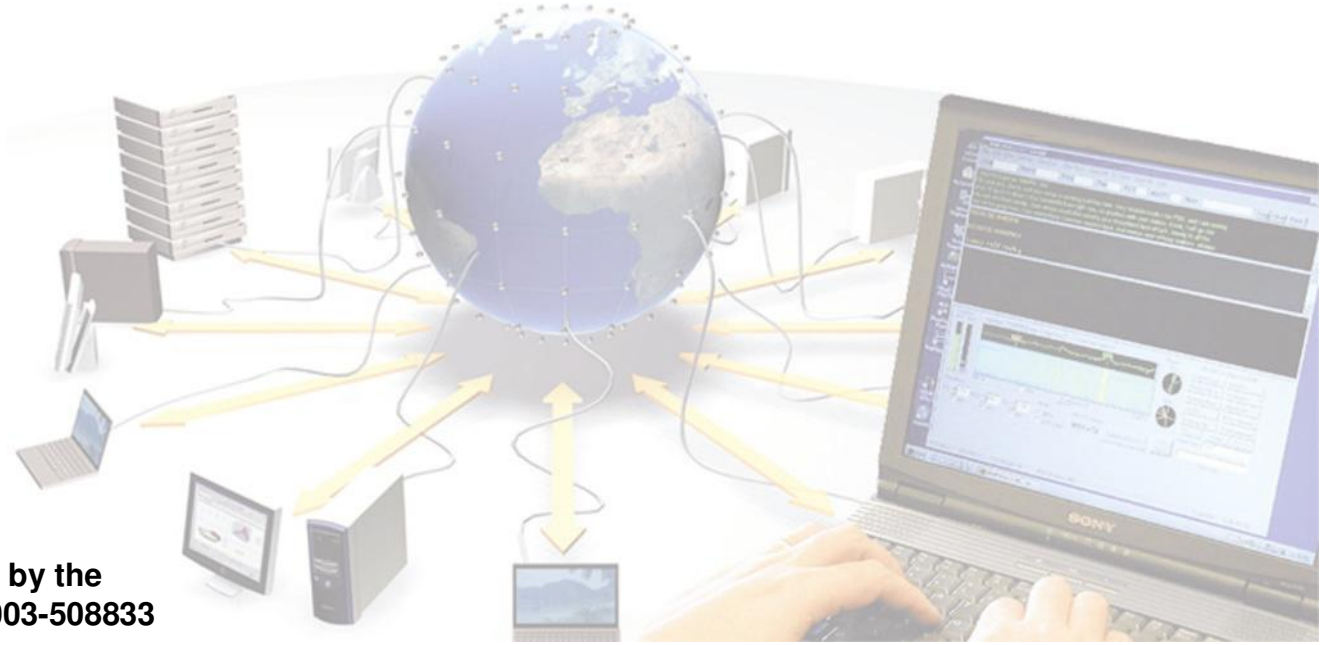
LCG PEB - 14 October 2003

Information Society

European Commission

Enabling Grids for E-science in Europe

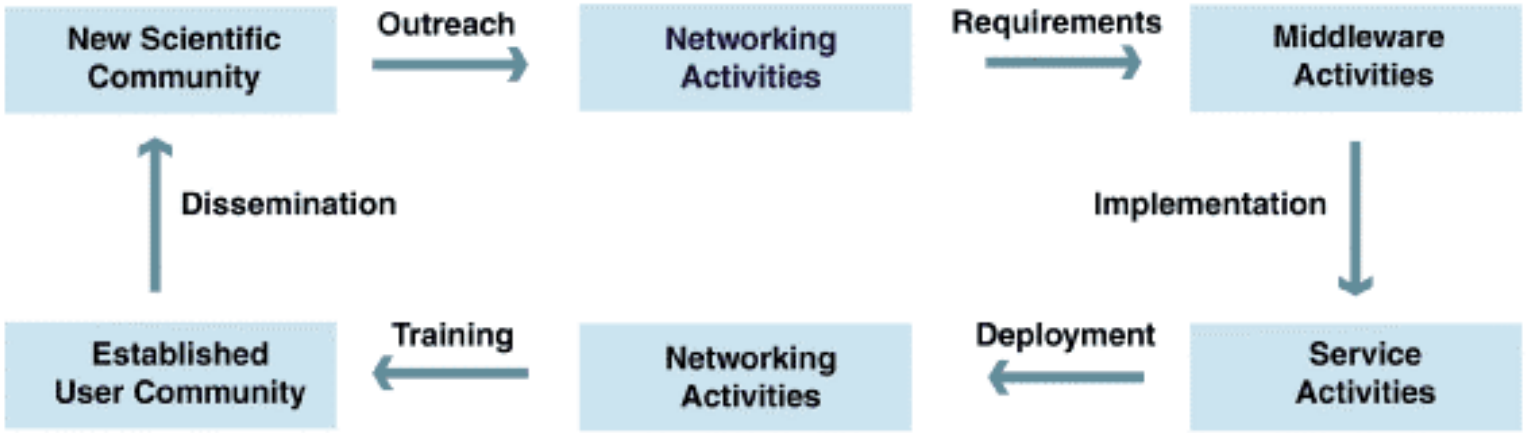
EGEE Operations Strategy



EGEE is proposed as a project funded by the European Union under contract IST-2003-508833

EGEE Activity Areas

- **Services**
  - Deliver “production level” grid services (manageable, robust, resilient to failure)
- **Middleware**
  - Grid middleware re-engineering activity in support of the production services
- **Networking**
  - Proactively market Grid services to new research communities in academia and industry
  - Provide necessary education

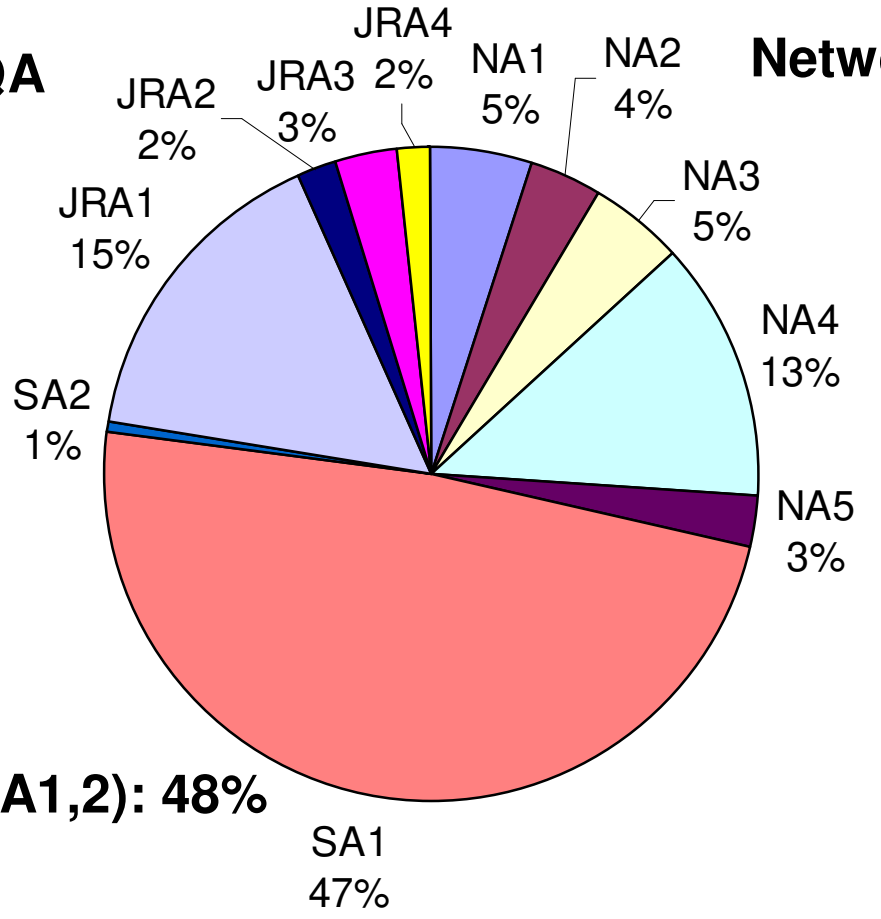


EGEE Activities

- **EGEE includes 11 activities**
- **Services**
  - **SA1**: Grid Operations, Support and Management
  - **SA2**: Network Resource Provision
- **Joint Research**
  - **JRA1**: Middleware Engineering and Integration
  - **JRA2**: Quality Assurance
  - **JRA3**: Security
  - **JRA4**: Network Services Development
- **Networking**
  - **NA1**: Management
  - **NA2**: Dissemination and Outreach
  - **NA3**: User Training and Education
  - **NA4**: Application Identification and Support
  - **NA5**: Policy and International Cooperation

EGEE activities' relative sizes

Mware/security/QA (JRA1-4): 22%

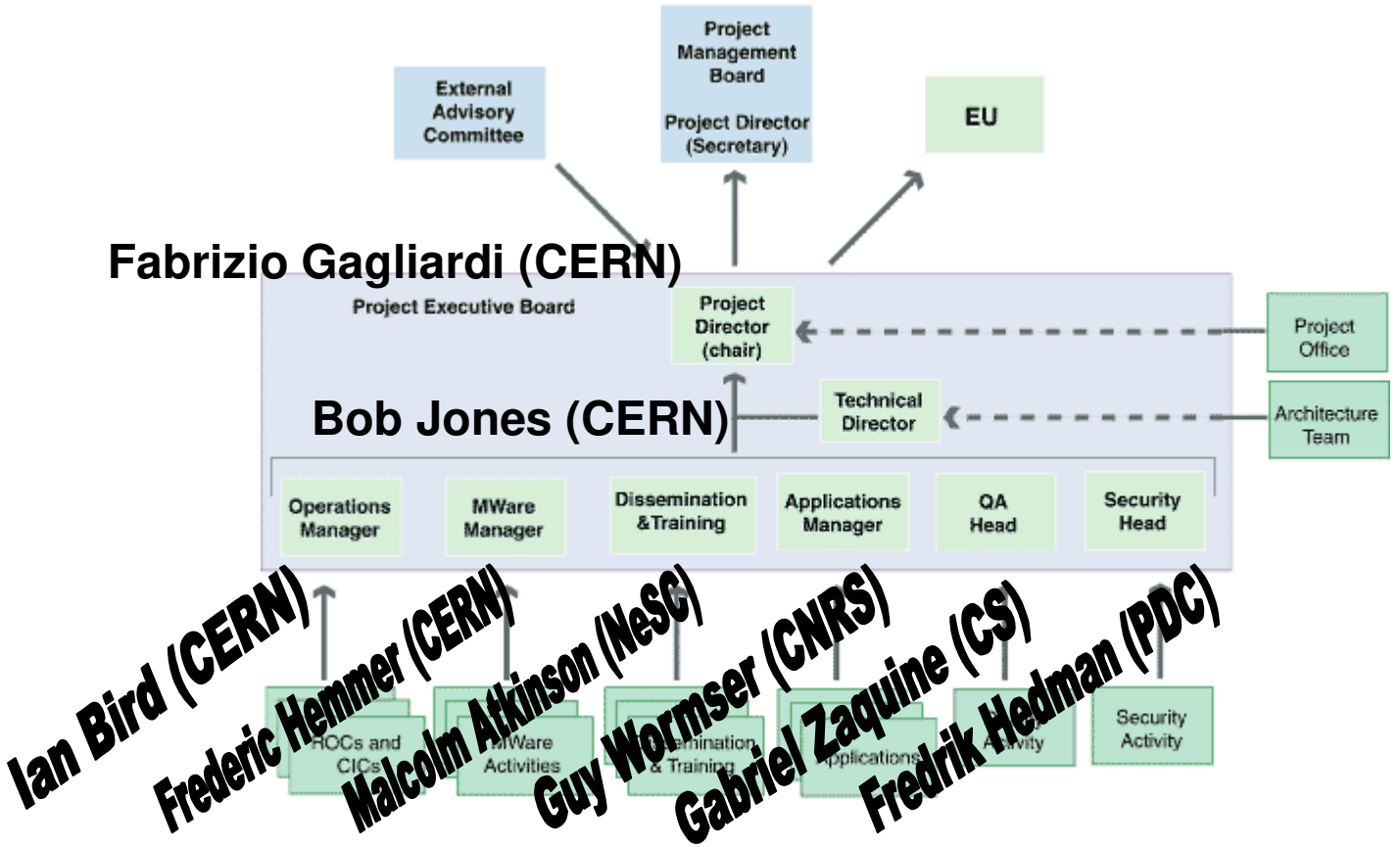


Networking (NA1-5): 30%

Grid operations (SA1,2): 48%

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

Project Management



EGEE Service Activity (SA1)

- Create, operate, support and manage a production quality infrastructure
- Structure:
  - EGEE Operations Management at CERN
  - EGEE Core Infrastructure Centres in the UK, France, Italy, Germany and CERN (leveraging LCG at the start), responsible for managing the overall Grid infrastructure
  - Regional Operations Centres, responsible for coordinating regional resources, regional deployment and support of services in all other countries
- Offered services:
  - Middleware deployment and installation
  - Software and documentation repository
  - Grid monitoring and problem tracking
  - Bug reporting and knowledge database
  - VO services
  - Grid management services

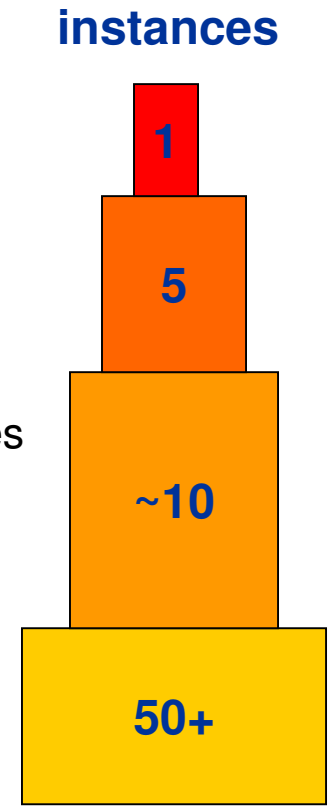
EGEE Operations – key objectives

- **Core Infrastructure services:**
  - Operate essential grid services
- **Grid monitoring and control:**
  - Proactively monitor the operational state and performance,
  - Initiate corrective action
- **Middleware deployment and resource induction:**
  - Validate and deploy middleware releases
  - Set up operational procedures for new resources
- **Resource provider and user support:**
  - Coordinate the resolution of problems from both Resource Centres and users
  - Filter and aggregate problems, providing or obtaining solutions
- **Grid management:**
  - Coordinate Regional Operations Centres (ROC) and Core Infrastructure Centres (CIC)
  - Manage the relationships with resource providers via service-level agreements.
- **International collaboration:**
  - Drive collaboration with peer organisations in the U.S. and in Asia-Pacific
  - Ensure interoperability of grid infrastructures and services for cross-domain VO's
  - Participate in liaison and standards bodies in wider grid community

Operations Structure

- Implement the objectives to provide
  - Access to resources
  - Operation of EGEE as a reliable service
  - Deploy new middleware and resources
  - Support resource providers and users

- With a clear layered structure
  - **Operations Management Centre** (CERN)
    - Overall grid operations coordination
  - **Core Infrastructure Centres**
    - CERN, France, Italy, UK, Russia (from M12)
    - Operate core grid services
  - **Regional Operations Centres**
    - One in each federation, in some cases these are distributed centres
    - Provide front-line support to users and resource centres
    - Support new resource centres joining EGEE in the regions
    - Support deployment to the resource centres
  - **Resource Centres**
    - Many in each federation of varying sizes and levels of service
    - Not funded by EGEE directly



Operations Management Centre - OMC

- Manager + deputy
- Coordinator for CICs (at CERN)
- Coordinator for ROCs (Italy)
- Team to oversee operations –
  - problems resolved, performance targets, etc.
- Operations Advisory Group to advise on policy issues, etc.
- Responsibilities include:
  - Resource management
  - Delivery of operational service and its improvement and development
  - Enable cooperation and access agreements with user communities, virtual organisations and existing national and regional Grid infrastructures
  - Approve service level agreements negotiated between the Resource Centres and the ROCs
  - Approve connection of new Resource Centres once they have correctly installed the necessary middleware and operational tools
  - Promote the development of cross-trust agreements between the various existing Certification Authorities (CAs) operating within the EGEE Grid community and encourage the establishment of new CAs where necessary
  - Liaise with user communities and virtual organisations to monitor their developing requirements
  - Interface to international grid efforts: Standards, interoperability, collaborative projects

Core Infrastructure Centres - CIC

- Originally 4 (5 with Russia after M12)
- Operate core grid services
- Function as a single distributed entity
  - Each may have specialist expertise
- Day-to-day operation – implement operational policies defined by OMC
  - Monitor state – initiate corrective actions
- Eventual 24x7 operation of grid infrastructure
  - Does not imply that RCs must be 24x7 – specify in SLAs with ROCs
- Provide resource and usage accounting
- Provide security incident response coordination
- Ensure recovery procedures
- Operations management, performance tuning, etc. tools
  - build or commission

Regional Operations Centres – ROC

- Provide front-line support to users and resource centres
- Support new resource centres joining EGEE in the regions
- Support deployment to the resource centres
- Responsibilities include:
  - Middleware validation
  - User and administrator Support:
    - Operate call centres and problem tracking system
    - Refer operational problems to the layer II Core Infrastructure Centres
    - Refer middleware problems to the middleware activity
    - Provide Grid Operations training for staff at Resource Centres
  - Middleware and service deployment
    - Develop deployment procedures and documentation
    - Distribute approved middleware releases to Resource Centres
    - Assist Resource Centres to deploy Grid middleware and to develop the technical and operational procedures to become part of the Grid
    - Distribute operational monitoring, authorisation, accounting tools to Resource Centres;
  - General:
    - Collaborate in producing release notes for the services and middleware
    - Collaborate in producing the cook-books to be used by new participants as part of a strategy of building a long-lasting infrastructure
    - Work with CICs and OMC to improve the Grid infrastructure.

User Support

- Initial filtering by VO support experts
  - Essential – VO specific knowledge, diverse applications and grid usage
- Report problems to ROC
- May escalate to CIC
- CIC coordinates reporting to external sources
  - Middleware developers, other projects, other grid operators, network operators
- OMC together with CIC, ROC, VOs
  - Develop procedures and policies including response targets, etc
- Support coordinator (oversees problem resolution)
  - Nominated from the CICs

Implementation plans

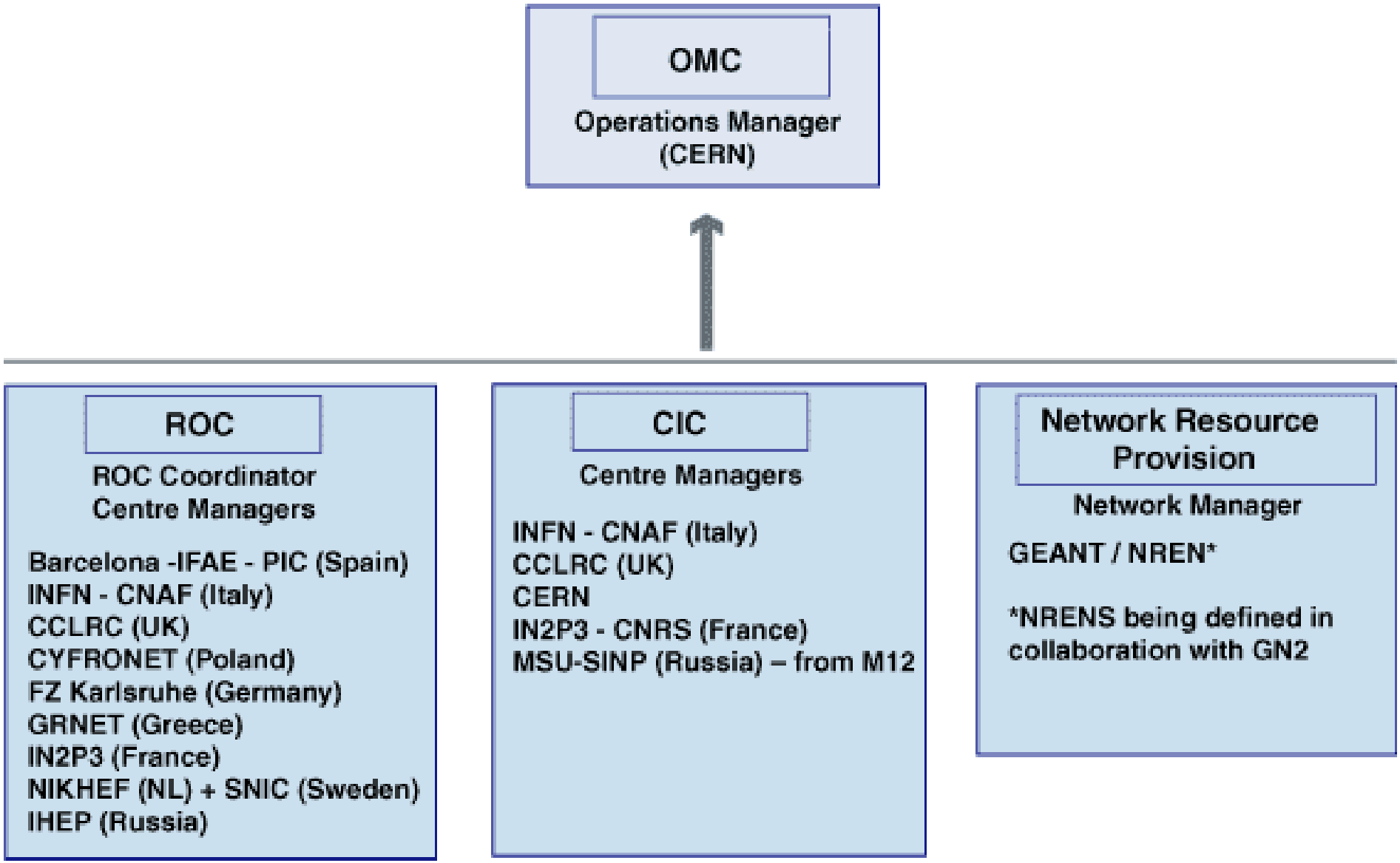
- Initial service will be based on the LCG infrastructure
  - This will be the production service, most resources allocated here
- In parallel must deploy as soon as possible a development service
  - Based on EGEE m/w – even a basic framework
  - This is where functionality is validated before going to production, apps do β-testing, etc.
  - Must be treated as an operational service
  - Needs enough resources – runs at sub-set of production sites, additional resources for scaling tests on request
- Also will need a test-bed system
  - Parallel to production system to debug and resolve problems,
  - Requires sufficient support and resources

- Middleware will be initially deployed on development service
  - Be validated by VOs, operations groups, etc.
- Will move to production service
  - Incremental functional improvements, avoid “big-bang” upgrades

Roles and staffing

Federation	Services provided	FTE Requested	FTE Unfunded	Financing Requested
CERN	OMC, CIC, Resource Centre	9.5	9.5	1900
UK+Ireland	CIC, 2 ROCs, 5 Resource Centres	10.5	10.5	2064
France	CIC, ROC, 3 Resource Centres	9.55	11	1817
Italy	CIC, ROC, ROC Coordinator, 4 Resource Centres	10.5	10.5	2059
Northern Europe	2 ROCs, 7 Resource Centres	6	6	1190
Germany + Switzerland	ROC, Support centres, 4 Resource Centres	6	7	1186
South East Europe	distributed ROC, 5 Resource Centres	6	6	1184.5
Central Europe	distributed ROC, 5 Resource Centres	6	6	1184.5
South West Europe	distributed ROC, 5 Resource Centres	8.85	8.85	1185
Russia	CIC, distributed ROC, 8 Resource Centres	7.15	22.75	551.5
Totals		**80.05**	**98.1**	**14321.5 k€**

Grid Operations Management Structure



LCG and EGEE Operations

- The core infrastructure of the LCG and EGEE grids will be operated as a single service, will grow out of LCG service
  - LCG includes US and Asia, EGEE includes other sciences
  - Substantial part of infrastructure common to both
- The ROCs provide local support for Resource Centres and applications
  - Similar to LCG primary sites
  - Some ROCs and LCG primary sites will be merged
- LCG Deployment Manager will be the EGEE Operations Manager
  - Will be member of PEB of both projects
  - ROCs will be coordinated by Italy, outside of CERN (which has no ROC)

Expected Computing Resources

Region	CPU nodes Month 1	Disk (TB) Month 1	CPU Nodes Month 15	Disk (TB) Month 15
CERN	900	140	1800	310
UK + Ireland	100	25	2200	300
France	400	15	895	50
Italy	553	60.6	679	67.2
North	200	20	2000	50
South West	250	10	250	10
Germany + Switzerland	100	2	400	67
South East	146	7	322	14
Central Europe	385	15	730	32
Russia	50	7	152	36
Totals	3084	302	8768	936

resource centres	10	20	50

Month 24

Resource Allocation Policy

- The EGEE infrastructure is intended to support and provide resources to many virtual organisations
  - Initially HEP (4 LHC experiments) + Biomedical
  - Each RC supports many VOs and several application domains – situation now for centres in LCG, EDG, EDT
- Initially must balance resources contributed by the application domains and those that they consume
  - Maybe specifically funded for one application
  - In 1st 6 months sufficient resources are committed to cover requirements
- Allocation across multiple sites will be made at the VO level.
  - EGEE will establish inter-VO allocation guidelines
    - E.g. High Energy Physics experiments have agreed to make no restrictions on resource usage by physicists from different institutions
- Resource centres may have specific allocation policies
  - E.g. due to funding agency attribution by science or by project
  - Expect a level of peer review within application domains to inform the allocation process

Resource allocation – 2

- New VOs and Resource centres will be required to satisfy minimum requirements
  - Commit to bring a level of additional resources consistent with their requirements
  - The project must demonstrate that on balance this level of commitment is less than that required for the user community to perform the same work outside the grid
  - The difference will come from the access to idle resources of other VOs and resource centres
  - This is the essence of a grid infrastructure
- All compute resources made available to EGEE will be connected to the grid infrastructure.
  - Significant potential for sites to have additional resources
  - A small number of nodes at each site will be dedicated to operating the grid infrastructure services
- Requirement on JRA1 to provide mechanisms to implement/enforce quotas, etc
- Selection of new VO/RC via NA4
  - In accordance with policies designed and proposed by the Grid Policy forum (NA5)

Milestones

Milestones and expected result		
MSA1.1	M6	Initial pilot Grid infrastructure operational.
MSA1.2	M9	First review
MSA1.3	M14	Full production Grid infrastructure (20 Resource Centres) operational.
MSA1.4	M18	Second review
MSA1.5	M24	Third review and expanded production Grid infrastructure (50 Resource Centres) operational.

Deliverables

Deliverables		
DSA1.1	M3	Detailed execution plan for first 15 months of infrastructure operation.
DSA1.2	M6	Release notes corresponding to MSA1.1
DSA1.3	M9	Accounting and reporting web site publicly available
DSA1.4	M12	Assessment of initial infrastructure operation and plan for next 12 months
DSA1.5	M14	First release of EGEE Infrastructure Planning Guide (“cook-book”).
DSA1.6	M14	Release notes corresponding to MSA1.3.
DSA1.7	M22	Updated EGEE Infrastructure Planning Guide.
DSA1.8	M24	Assessment of production infrastructure operation and outline of how sustained operation of EGEE might be addressed.
DSA1.9	M24	Release notes corresponding to MSA1.5

DSA1.1 – execution plan – this must be started now, based on use-cases, scenarios, etc. The CIC and ROC managers must contribute to this.

Network provision (SA2)
Goals, Objectives and Approach

- Goals and objectives
  - Define of a scalable methodology for requirements capture, aggregation and modelling, and the generation of service specifications and agreements.
  - Perform operational and management interactions with GEANT and the NRENs for ensuring service provision.
  - Define and build an operational model for interactions between EGEE GOCs (OMC, CICs, ROCs) and NOCs (GEANT, NRENS and local networks used)
- Overall approach of the work
  - Definition of network services through standard modelling process :
    - Filling of SLRs (Service Level Request) by end users and applications
    - Definition of SLSs (Service Level Specification) by SA2, to be implemented by GEANT and the NRENs, in conjunction with JRA4 activity
    - Signature of SLAs (Service Level Agreement) between applications, SA2 and GEANT/NRENs
  - NOC operational procedure study on GEANT and selected NRENS and incremental integration with EGEE GOCs.

SA2 Milestones and deliverables

PM	Deliverable or Milestone	Item
M3	**Milestone** MSA2.1	First meeting of EGEE-GEANT/NRENS Liaison Board
M6	**Deliverable** DSA2.1	Survey of pilot application requirements on networks, initial SLRs and service classes.
M9	**Milestone** MSA2.2	Initial requirements aggregation model, specification of services as SLSs on the networks,
M12	**Milestone** MSA2.3	Operational interface between EGEE and GEANT/NRENs.
M12	**Deliverable** DSA2.2	Institution of SLAs and appropriate policies.
M24	**Deliverable** DSA2.3	Revised SLAs and policies.

SA2 Management Structure and partners

- UREC will manage SA2 and oversee both SA2 and JRA4 activities, and will be responsible for DANTE and the NRENs liaison

Participant	Description of Role	FTE (EU funded + unfunded)
CNRS/UREC	Network Co-ordinator overseeing both service (SA2) and research activities (JRA4); responsible for DANTE and the NRENs liaison. Network resource provision requirements SLR/SLS/SLA definitions Operational model	1+1
RCC KI	Network resource provision requirements SLR/SLS/SLA definitions Operational interface between RDIG, Russian network providers and EGEE.	1+1
	Total (FTEs)	**2+2**

Summary

- Having a running LCG service is crucial to the start up of EGEE
- EGEE should be operating the European grid infrastructure on behalf of LCG by end 2004
- Much work to do to set up operations infrastructure and define implementation plan – needs to begin now