EGI Operations and the Integration of ARC resources

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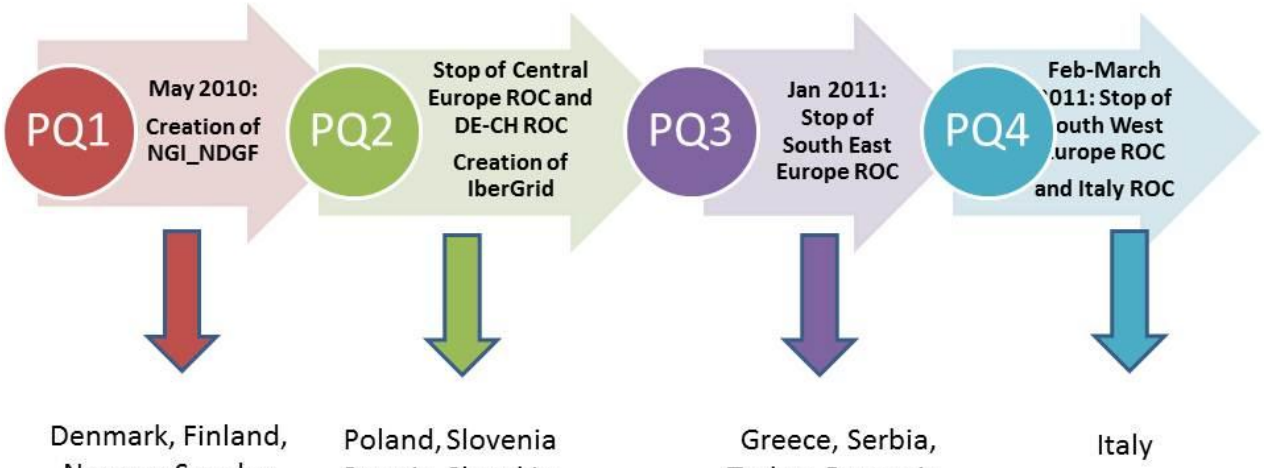
e-infrastructure

Outline

- EGI Resource Infrastructure
- ARC integration
  - Monitoring
  - Accounting
- Unified Middleware Distribution
  - Software verification and staged rollout
  - Software support
- User support and services
- Discussion

From EGEE to EGI



Denmark, Finland, Norway, Sweden Estonia, Latvia, Lithuania

Poland, Slovenia Croatia, Slovakia, Check Republic, Belarus, Hungary, Austria; Germany, Switzerland; Portugal-Spain

Greece, Serbia, Turkey, Romania, Cyprus, Georgia, FYR of Macedonia, Bosnia and H., Montenegro, Bulgaria, Armenia

Italy

Europe:

- **40 National Grid Initiatives**
- **1 EIRO (CERN)**

Total:

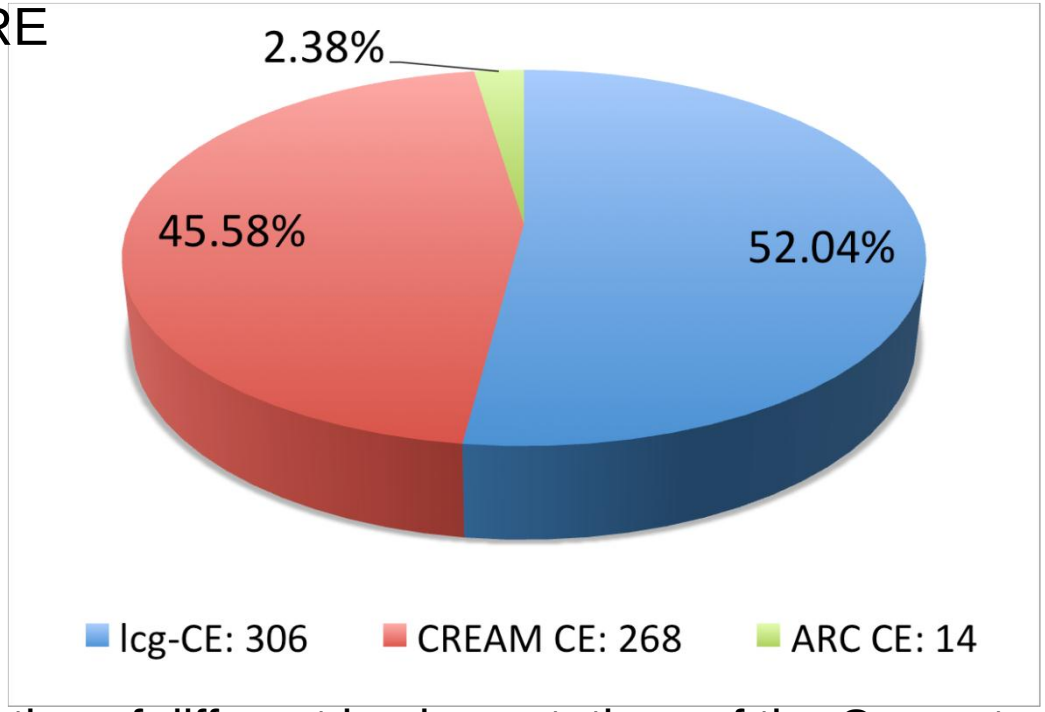
- **332 Resource Centres**
- **58 Counties**

EGI in Numbers (March 2011)

- Estimated resource capacity
  - 207,200 CPU cores (+7.9 % since April 2010), 1.98 M HEP-SPEC 06
  - 308,583 CPU cores including Canada, Latin America, OSG, South Africa
  - 101 PB disk, 80 PB tape
- 90 Resource Centres supporting MPI, 54 HPC clusters
- 39 Resource Centres participating to staged rollout of software
- Availability/Reliability: 90.7%, 91.9%
- 13,319 users and 186 VOs
- 339 core services (135 WMS, 45 LFC, 118 top-BDII, 41 VOMS)

Deployed Middleware

- ARC, gLite, UNICORE
- More ARC and UNICORE installations expected in 2011
- Germany, Poland, Romania, The Netherlands integrating GLOBUS and/or UNICORE

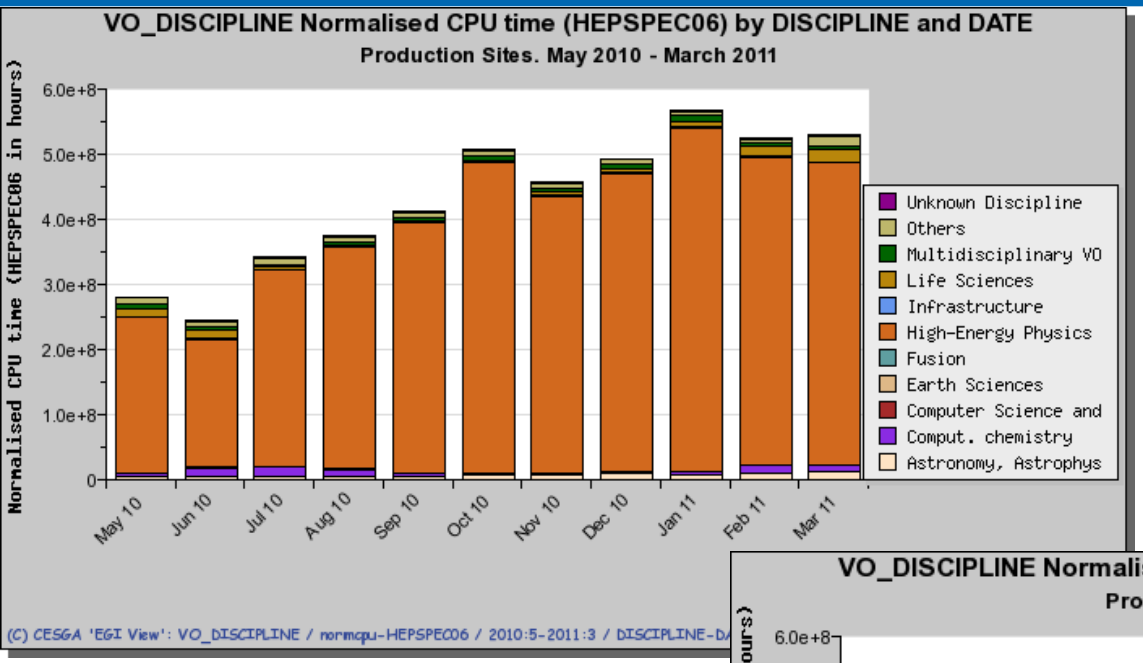


Distribution of different implementations of the Compute Capability (ARC CE, CREAM CE and lcg-CE) across the EGI-InSPIRE partners and the integrated Resource Infrastructure Providers – March 2011

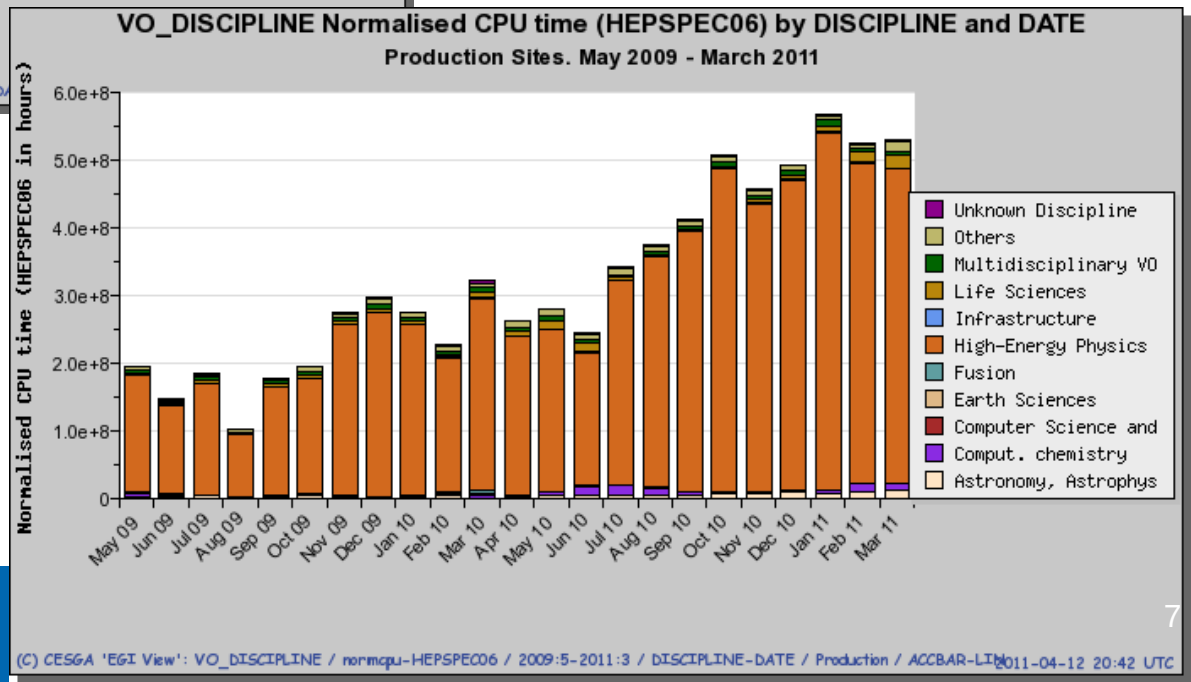
Usage (Number of Jobs)

Metric	VOs	May 2010 - March 2011	May 2009 – April 2010
AVG number of job/day	All VOs	933,000	442,000
	No-HEP VOs	55,200	48,750
AVG number of Million job/month	All VOs	25.70	13.43
	No-HEP VOs	1.52	0.97

Usage (Normalized CPU Time HEP-SPEC 06 hours)



May 2010-March 2011



May 2009-March 2011

Monitoring 1/2

- Old Service Availability Monitoring Framework (SAM)
  - instance dedicated to ARC probes, run by NDGF
  - results used for Availability and Reliability calculation
- Step 1. transition from old SAM to Nagios
  - Development of new ARC Nagios probes (NorduGrid → ARC Product Team)
  - Integration started in July 2010 and completed with the SAM Update 07 in November 2010
- Step 2. Integration with the Operations Dashboard (April 2011)
  - To raise alarms to operators and sites in case of failure
- Step 3. Availability and Reliability statistics based on the ARC Nagios probes
- Step 4. Decommissioning of the old SAM instance (April 2011)

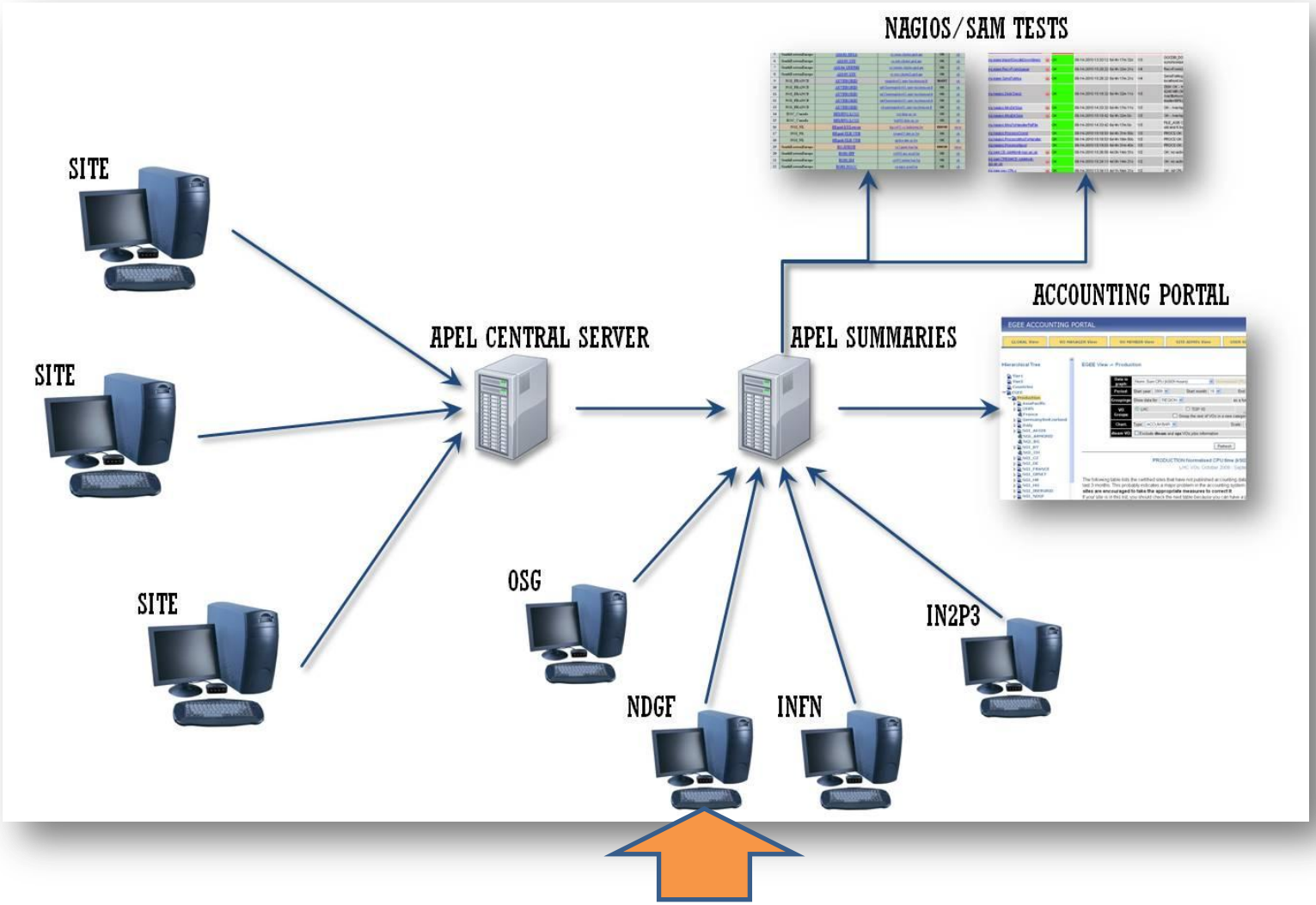
Monitoring 2/2

- The ARC probes currently use a standalone ARC client
  - Step 5. Transition to EMI 1.0 UI
    - clients for all stacks: ARC, gLite and UNICORE

Accounting Architecture 1/2

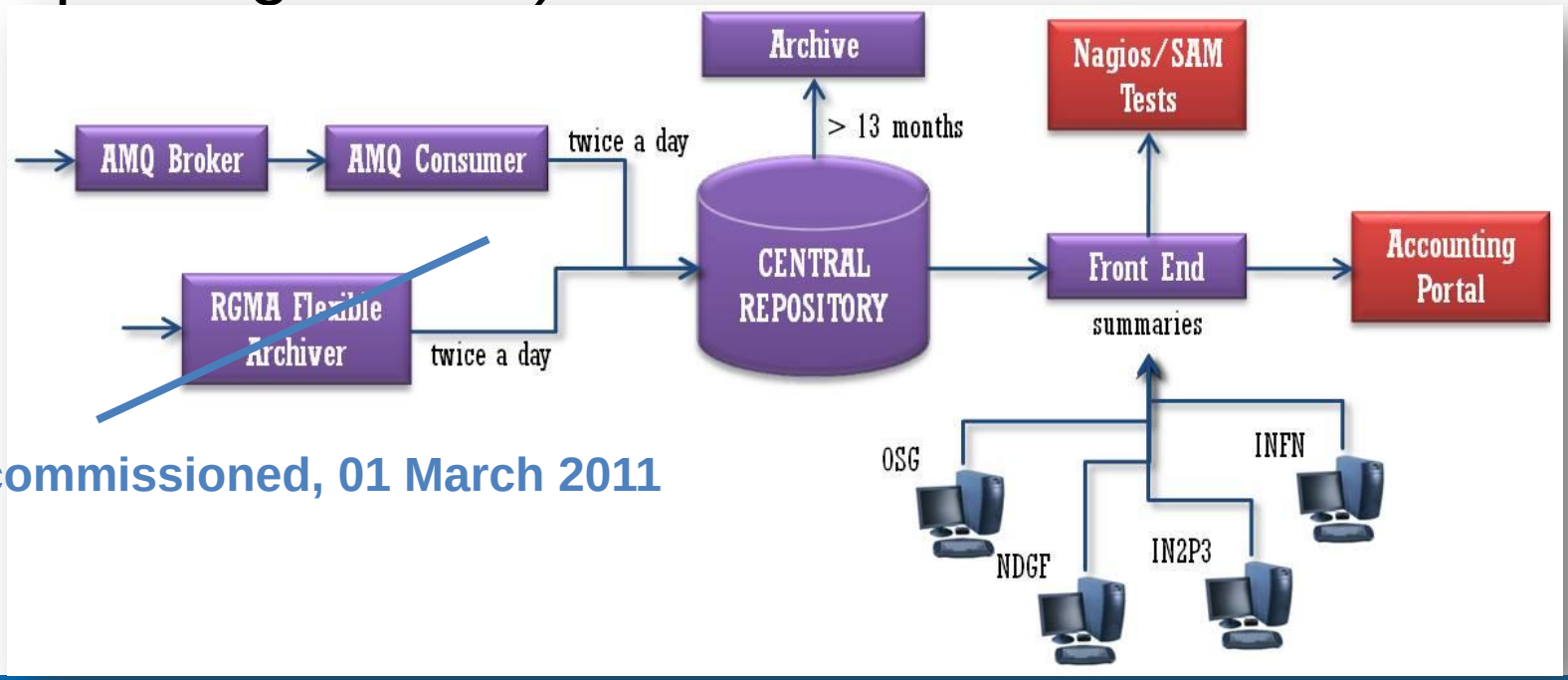
- Records added to central database twice a day
- The central repository contains all individual records (13 months only), older records are archived
- Summaries of data created twice a day
  - Encryption/decryption of UserDNs
  - Normalisation of CPU/WallClock time
  - Anonymous summary: per site, VO, month and year
  - User summary: per site, VO, user, role, group, month and year

Accounting Architecture 2/2



From R-GMA to Messaging

- glite-APEL
  - released into production in June 2010
  - Transport of records based on ActiveMQ (replacing RGMA)



Decommissioned, 01 March 2011

From mySQL to Messaging

- Summary job records currently published by SGAS directly into the APEL central accounting repository (like DGAS and OSG)
  - All regions to publish via AMQ/APEL publisher – remove MySQL direct insertion
  - OGF-RUS interface – standard interface for publishing into the APEL database

Future Work (2011)

- Publisher (EMI) and Consumer (EGI-InSPIRE JRA1)
  - Design of regional APEL system has necessitated several redesigns
    - Schema
      - Simplification – removed unused or duplicate fields
      - Add new fields for MPI
      - Rename fields to align with OGF UR
      - new RecordID
    - Message Format and Infrastructure
      - Use STOMP on production infrastructure (EMI 1.0)
      - Requires a new encryption and authorisation model.

Unified Middleware Distribution

- Unified Middleware Distribution (UMD)
  - UMD the integrated set of software components that EGI makes available from Technology Providers according to users and operations needs
- UMD Roadmap
  - describes the capabilities of the software within UMD and how the functionality within each capability will evolve to the requirements from the community
  - reviewed every 6 months

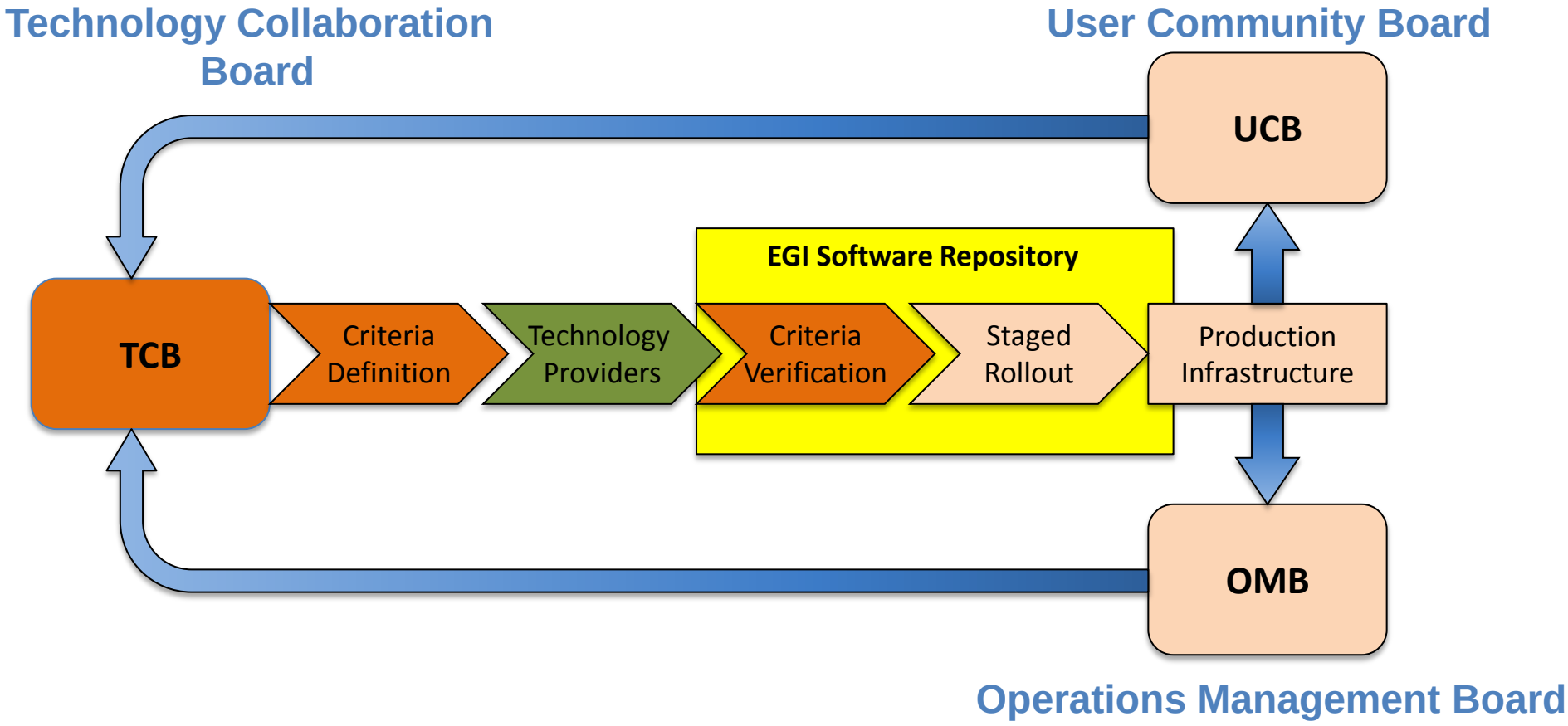
UMD Capabilities and Products

- UMD is categorised by Capabilities
  - E.g. Compute Job, Information System
- UMD is populated with Products
  - Products satisfy these Capabilities
  - E.g. GRAM5, BDII
- Products are delivered by Technology Providers (e.g. EMI, IGE, …)

Benefits

- Quality criteria to define the expected characteristics of the products delivered
- Validation and staged rollout (2 days – 2 weeks)
  - ARC CE, ARC clients, ARC Info Sys (5 sites)
- 1st and 2nd line support to users and site administrators, 3rd line support is from the Technology Providers
- Integration of products from different Providers
- Requirements gathering from all communities

EGI quality process



NGI User Support Teams

- Consultancy
- Training
- Providing access to grid and software services
- Porting applications
- Developing and operating software services
- Collecting feedback
- Documentation
- Helpdesk

Tools and services for NGIs *and* their clients

- Provided by a few NGIs **for the whole community**
  - To facilitate the work of NGI support teams
  - To improve communication among NGIs, among users and with users
- Tools, services:
  1. EGI Application Database
     - Domain specific application – for scientific end users
     - Reusable toolkits and services – for NGI support teams
  2. Services for VOs
     - Tools, manuals, assistance for VO setup and management
  3. Training Marketplace
     - Repository of events and materials
     - Place to request and provide NGI training services
  4. Requirement Tracker
     - To capture needs
     - To offer solutions from NGIs

Discussion

- Information Discovery system for ARC resources
  - for service discovery
  - for collection of information on installed capacity and its distribution
- What level of integration between the ARC Info Sys and top-BDII until EMI 2.0?
- Publishing of sub-cluster information in ARC?