

Grid4All

**Self-* Grid: Dynamic Virtual
Organizations for
Schools, Families, and All**



European Commission



Information Society

Facts

- Full name: Self-* Grid - Dynamic Virtual Organizations for families, schools, and all
- FP6 IST Project
- 8 partners from 4 countries
- Duration: June 2006 – November 2008
- Budget: € 2.900.000

Grid4All Partners

Partner	Country
FT : France Telecom (coordinator)	France
INRIA : Institut National de Recherche en Informatique et en Automatique	France
KTH : The Royal Institute of Technology	Sweden
SICS : Swedish Institute of Computer Science	Sweden
ICCS : Institute of Communication and Computer Systems	Greece
UPRC : University of Piraeus	Greece
UPC : Universitat Politecnica de Catalunya	Spain
Antares	Spain

Scenario

- High school teacher plans scientific project involving many schools



- How can he set up necessary IT organisation?

Vision

- ***Democratic Grid***

A ubiquitous utility that allows domestic users, small organisations (e.g. schools) and enterprises

- to aggregate their own resources and draw on resources on the Internet

- without having to individually invest and manage IT resources.

Objectives and Motivations

- Target new user groups (schools, families, small businesses)
 - Not “big-iron” scenarios
- Ease of use and administration
- Tolerate volatile, *unfriendly* environment
- Support flexible collaborative scenarios

Important aspects

- Non-professional users
- Social behaviours with churn and high volatility
- Need for incentives to make the system spread and thrive
- Need for support for different styles of collaboration

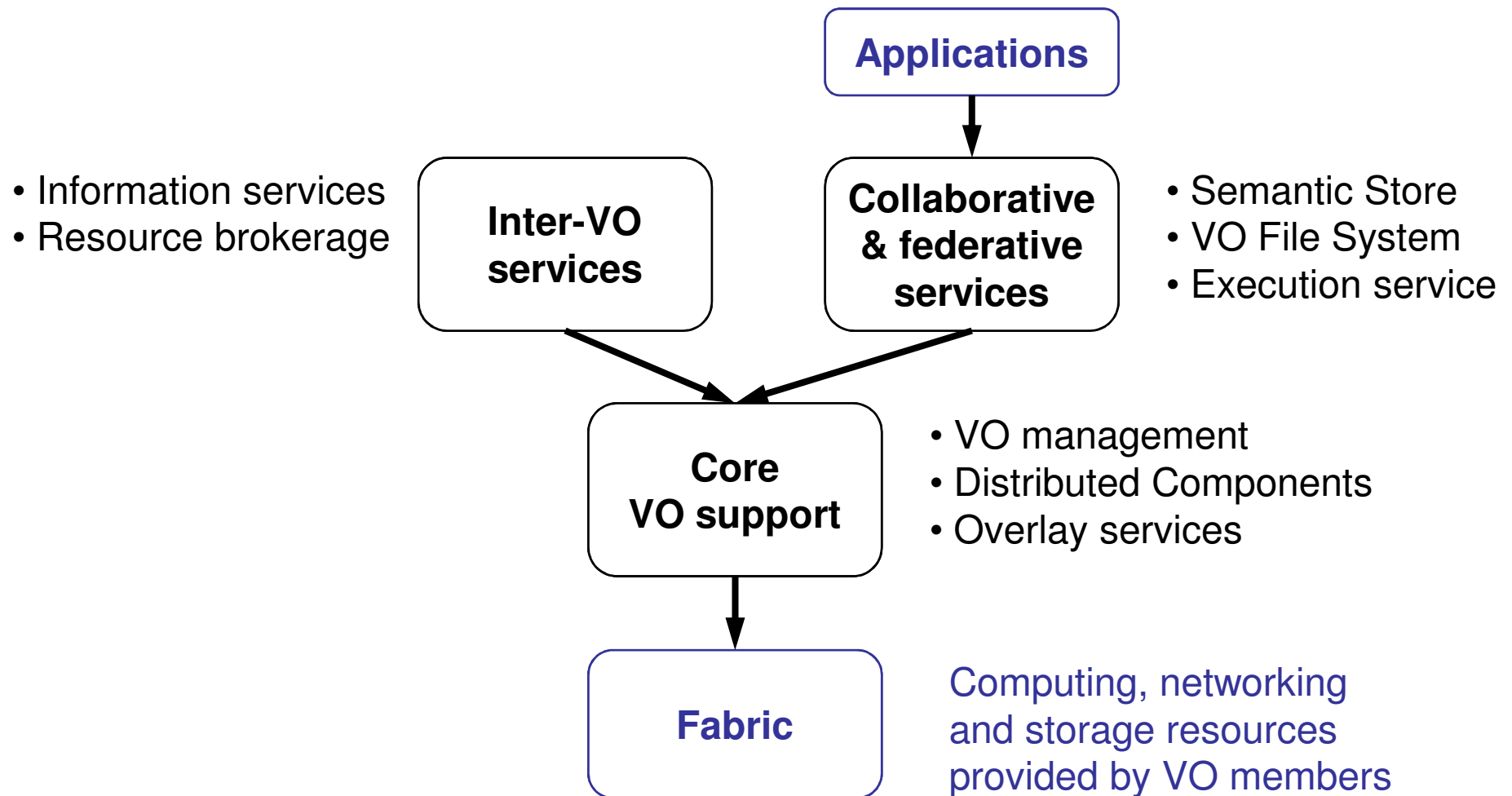
Our approach

- Self-configuring overlay infrastructure
- Support for self-management
- Pricing-based allocation of resources
- Flexible access to shared mutable data in volatile environments

Expected Results

- Architectural principles, approaches, and methods for building Democratic Grids
- Prototype to build Democratic Grid (middleware, framework, services, tools)
- Demonstrator applications
 - Groups of schools set up virtual e-learning environments
 - Domestic users lease/provide Internet resources

High-level architecture



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Self-management foundation

- **Overlay Services**

- DHT with replication, pub/sub event dissemination, name-based communication
- Based on DKS structured overlay

- **Distributed Component Management System**

- Framework for building self-managing services and applications
- Based on Fractal component model
- *Demonstrator*: self-managing storage system

Core VO Support

- **VO membership and security components**
 - LDAP-based VOMS; single sign-on; certificate-based authentication, XACML policy-based authorization
 - *Demonstrator*: Access control in VO-aware file system
- Resource discovery, deployment, and allocation

Collaborative/ Federative services

- **VO-aware File System (VOFS)**
 - Allows aggregating files and storage; disconnected operation
 - Supports shared workspaces
 - *Demonstrator*: a mountable VOFS
- **Semantic Store**
 - Telex middleware takes application semantics into account and leverages VOFS for persistency.
 - *Demonstrator*: shared calendar application
- **Execution service**
 - Scheduling and managing to completion work units
 - *Demonstrator*: a “work farm” movie format convertor

Inter-VO Services

- **Information services**
 - Discovering services using ontologies
- **Auction-based markets for resources**
 - Finding and negotiating external resources traded at marketplaces
 - Framework for developing new market mechanisms
 - Includes market information service and currency management system

Summary

- ***Democratize the Grid***
- Main features
 - Autonomic management using P2P technology
 - Flexible collaborative services
 - Extensible discovery and market services
- Implementation
 - Initial prototypes released; mature versions in the end of 2008

<http://www.grid4all.eu/>

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