Promoting data sharing and development of trust in agricultural sciences

The agINFRA Science Gateway to Grid and Cloud Infrastructures for Agricultural Sciences

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Outline

- The agINFRA project and its objectives
- The agINFRA Science Gateway architecture
- Some project applications:
  - AGROVOC Tagging
  - AGRIS XML2RDF
  - ISIS
  - AGLRTool
  - Soil Maps Browser/Annotator
- The agINFRA “social” Science Gateway
- Summary and Conclusions

Promoting data sharing and development of trust in agricultural sciences

The agINFRA Project

(www.aginfra.eu)

Project title:	A data infrastructure to support agricultural scientific communities. Promoting data sharing and development of trust in agricultural sciences
Funded by:	FP7 – Research Infrastructures, Capacities Programme Objective INFRA 2011 1.2.2: Data infrastructures for e-Science
Duration:	36 months
Start:	15/10/2011
End:	14/10/2014
Overall budget:	4.285.480 €
EC funding:	3.750.000 €

Objectives

Introduce the agricultural scientific communities into the vision of **open** and **participatory** data-intensive science

- **Scientific Goal**
  - ***Increase sharing and federation of agricultural data***
  - ***Efficient data management in the agricultural research process***

- **Technical Goal**
  - ***Deployment of robust European service infrastructure for scientific agricultural data***
  - ***High interoperability between agricultural and other data resources***

agINFRA consortium (1/3)

Partner	Country
1. UNIVERSIDAD DE ALCALA (**UAH**)	SPAIN
2. FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS FAO (**FAO**)	ITALY
3. ISTITUTO NAZIONALE DI FISICA NUCLEARE (**INFN**)	ITALY
4. SALZBURG RESEARCH FORSCHUNGSGESELLSCHAFT M.B.H. (**SRFG**)	AUSTRIA
5. INSTITUT ZA FIZIKU (**IPB**)	SERBIA
6. MAGYAR TUDOMANYOS AKADEMIA SZAMITASTECHNIKAI ES AUTOMATIZALASI KUTATO INTEZET (**SZTAKI**)	HUNGARY
7. AGRO-KNOW TECHNOLOGIES (**AK**)	GREECE

agINFRA consortium (2/3)

Partner	Country
8. 21C CONSULTANCY LIMITED (**21c**)	UK
9. CENTRO DE TRANSFERENCIA DE TECNOLOGIAS ESCUELA SUPERIOR POLITECNICA DEL LITORAL (**ESPOL**)	ECUADOR
10. AGRICULTURAL INFORMATION INSTITUTE OF CHINESE ACADEMY OF AGRICULTURAL SCIENCES (**ALL**)	CHINA
11. THE OPEN UNIVERSITY (**OU**)	UK
12. INDIAN STATISTICAL INSTITUTE (**ISI**) **-TBC**	INDIA
13. **Third party** - AGRICULTURE RESEARCH COUNCIL **(CRA)**	ITALY

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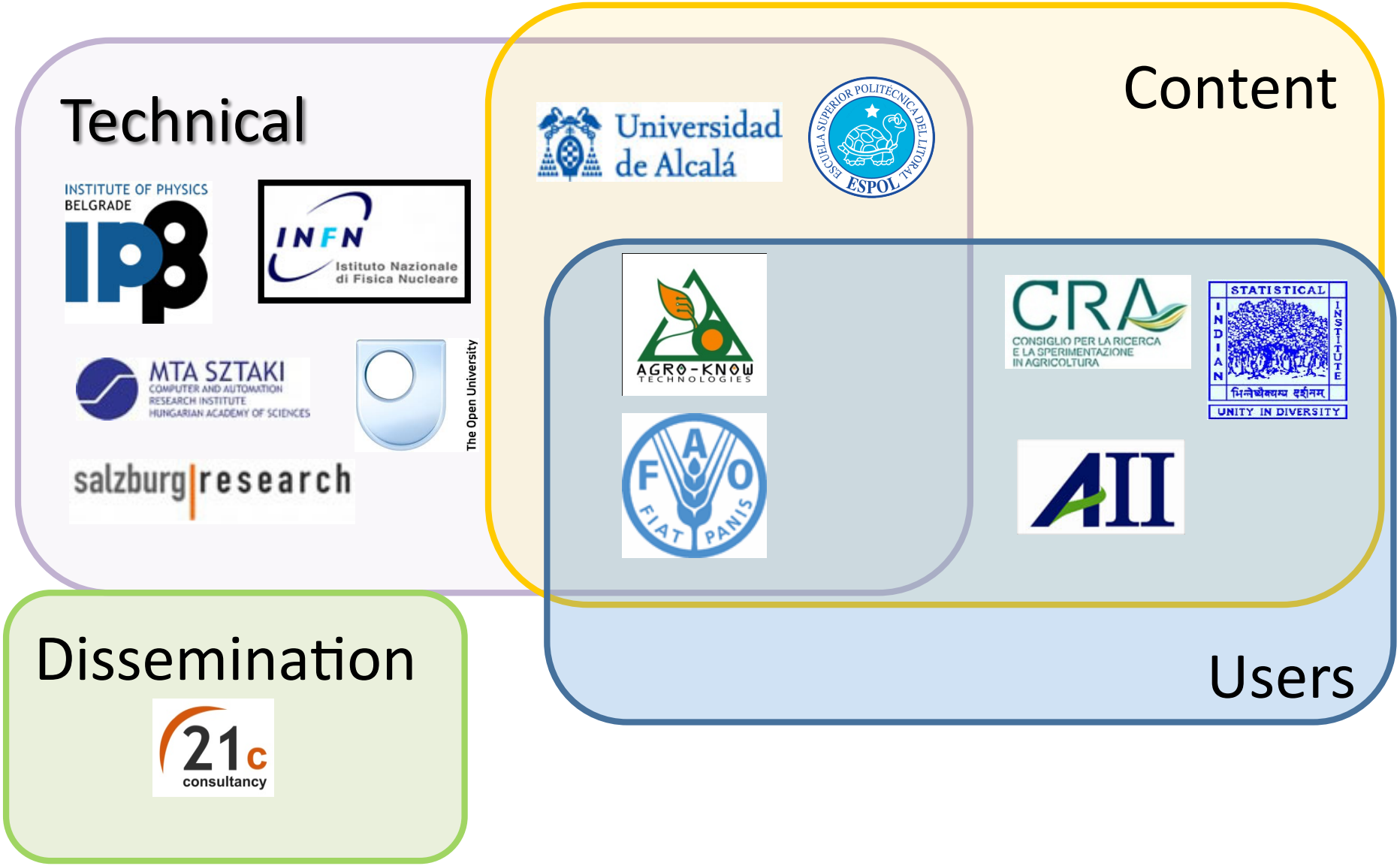
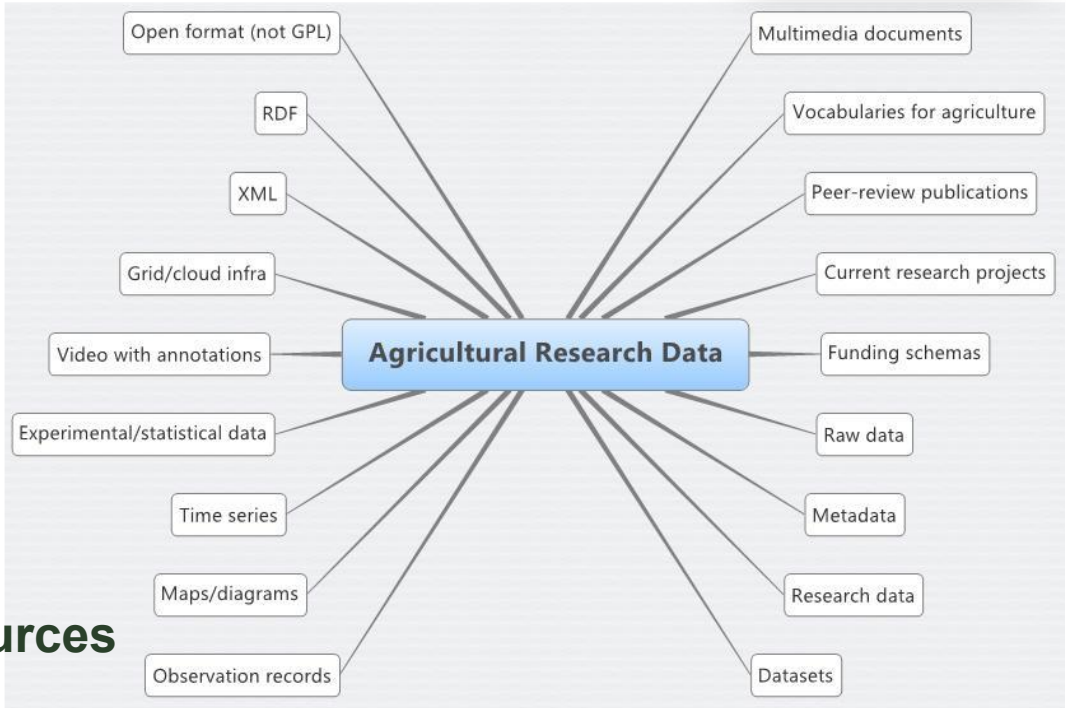
agINFRA consortium (3/3)



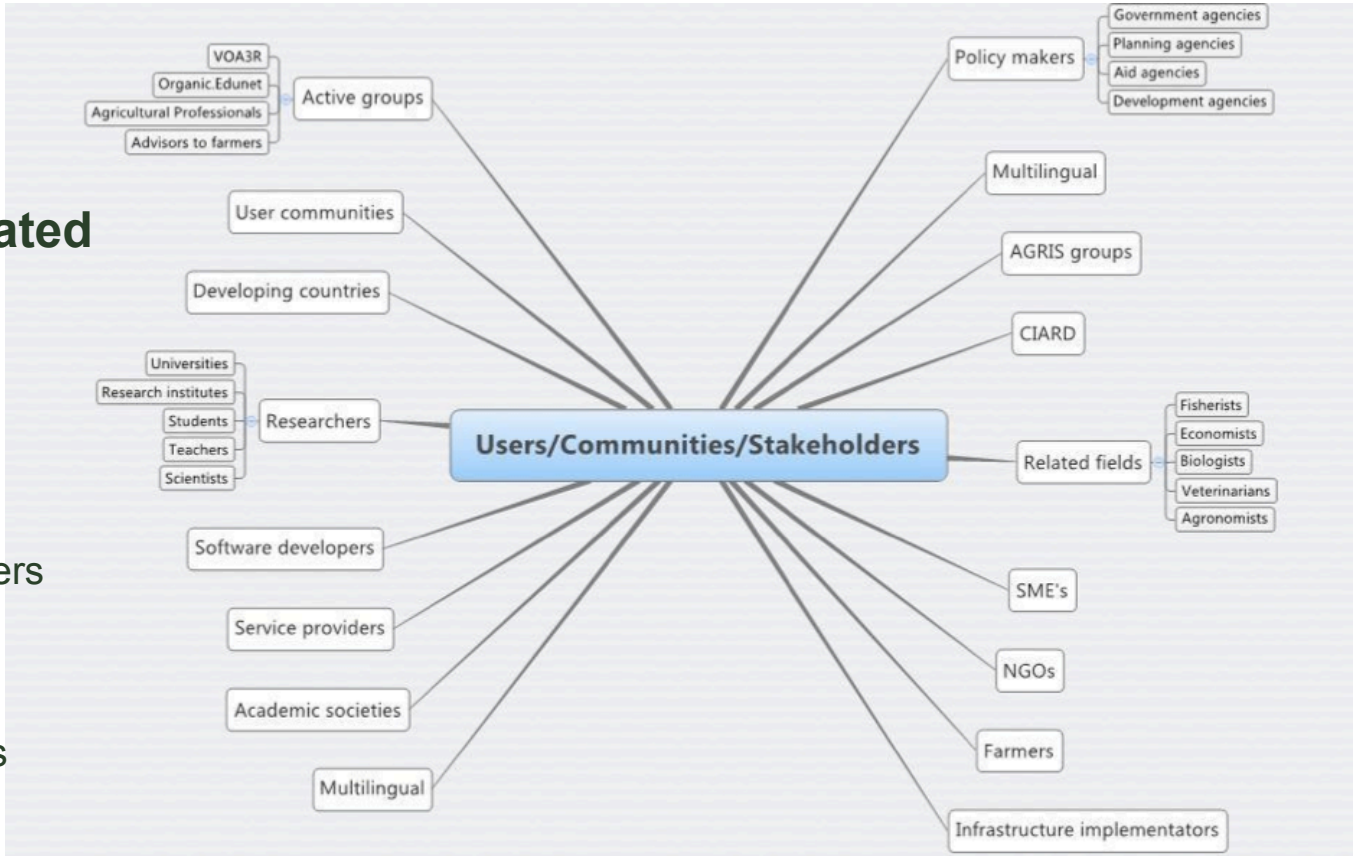
What kind of agricultural research data ?

- **Types of resources**
  - Experimental / statistical data
  - Time series
  - Maps / diagrams
  - Observation records
  - Multimedia documents
  - Vocabularies for agriculture
  - Peer-review publications
  - Current research projects
  - Funding schemas
  - Research data
  - Datasets
- **Formats of resources**
  - Open format
  - RDF
  - XML
  - Video with annotations
  - Raw data
  - Metadata
- **Storage locations of resources**
  - **Grid & Cloud infrastructures**



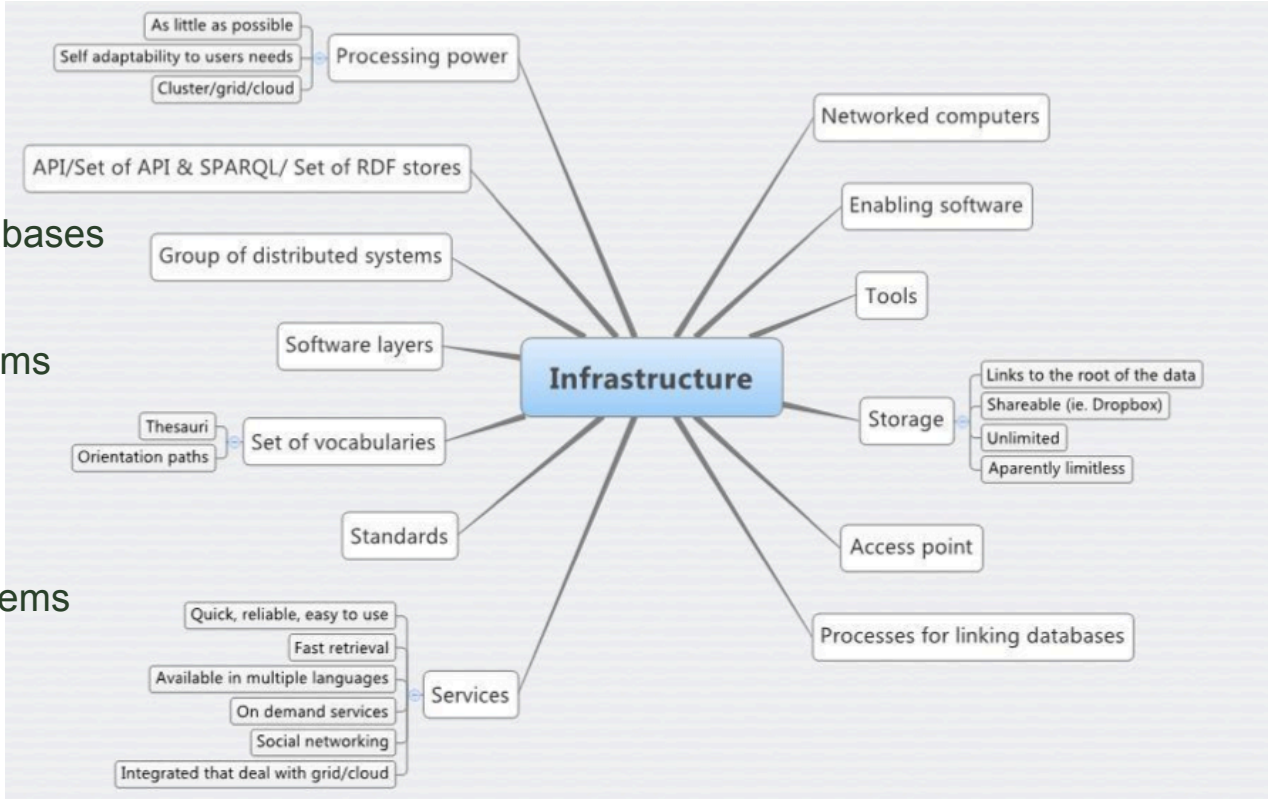
What are the communities/stakeholders agINFRA can serve ?

- **Education - related**
  - Active groups
  - Researchers
  - Academic societies
  - Related fields
- **Professionals - related**
  - Software developers
  - Service Providers
  - AGRIS groups
  - CIARD
  - SME's
  - Infrastructure providers
- **Other**
  - User communities
  - Developing countries
  - Multilingual
  - Policy makers
  - NGO's
  - Farmers



What is this infrastructure all about and looking like ?

- **Services - related**
  - API / Set of API & SPARQL / Set of RDF stores
  - Software layers
  - Set of vocabularies
  - Standards
  - Enabling software
  - Tools
  - Access points
  - Processes for linking databases
- **Computing – related**
  - Group of distributed systems
  - Networked computers
- **Storage – related**
  - Active groups
  - Groups of distributed systems
  - Networked computers
  - Storage



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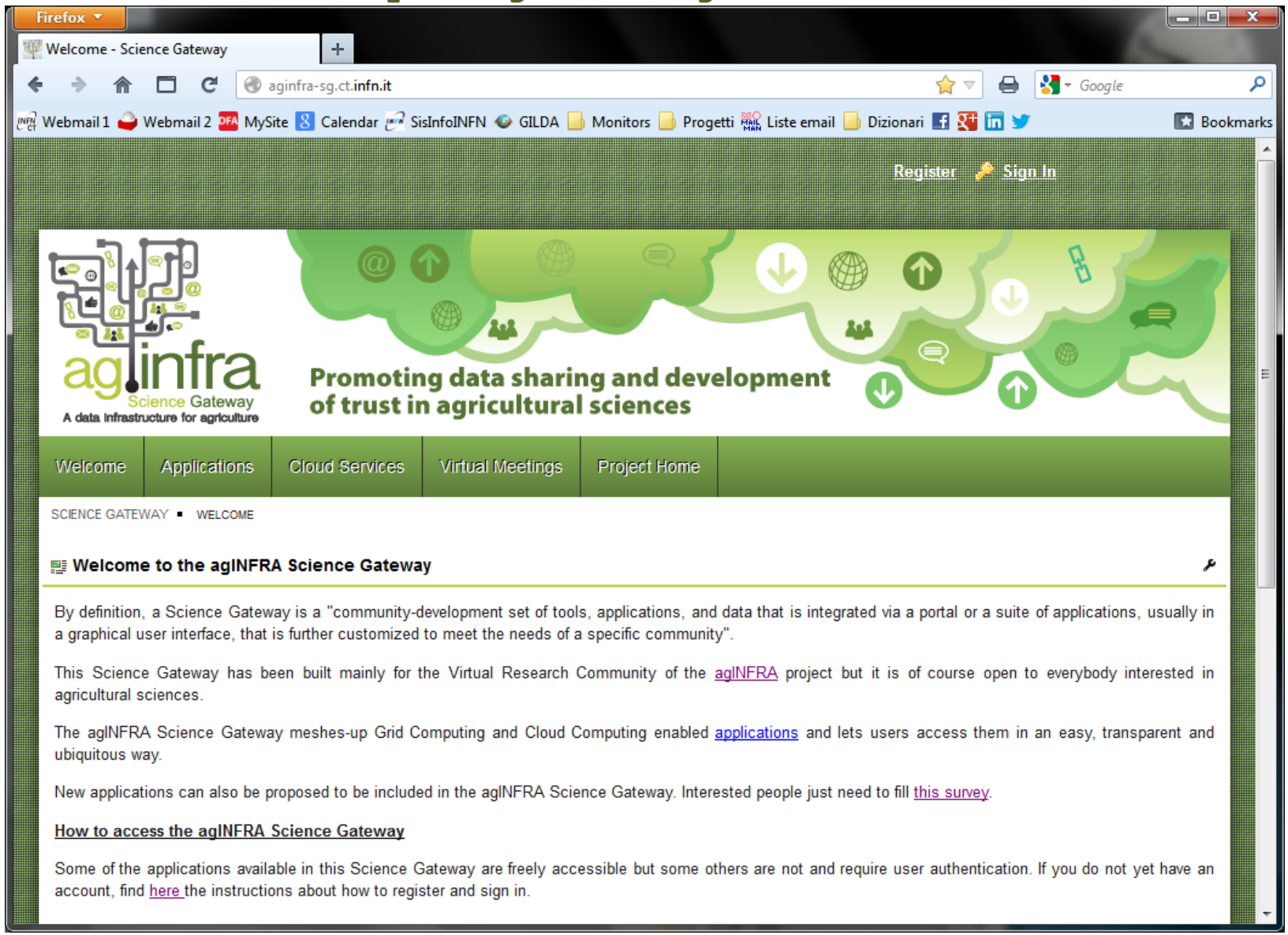
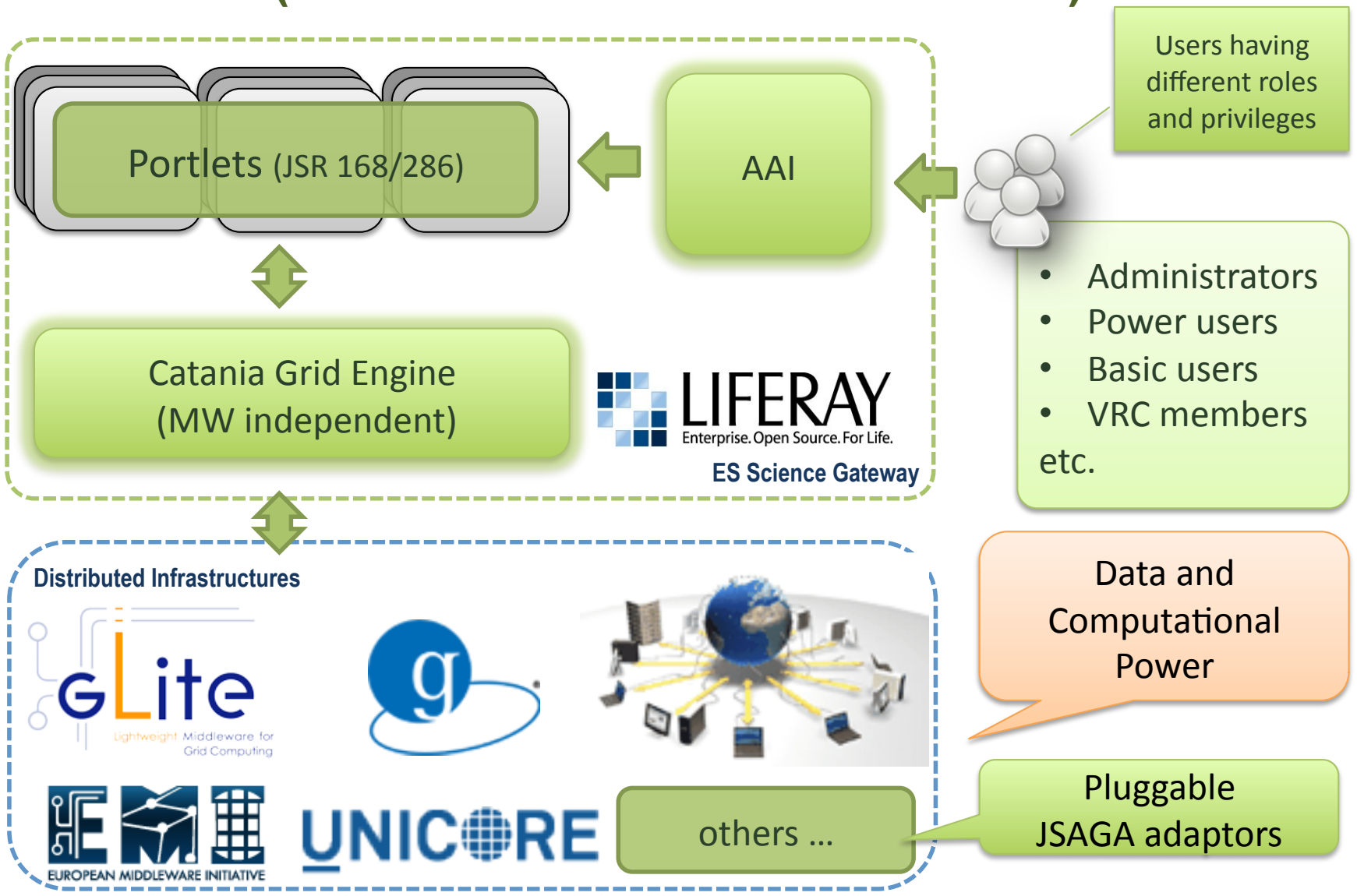
The agINFRA Science Gateway

http://aginfra-sg.ct.infn.it/

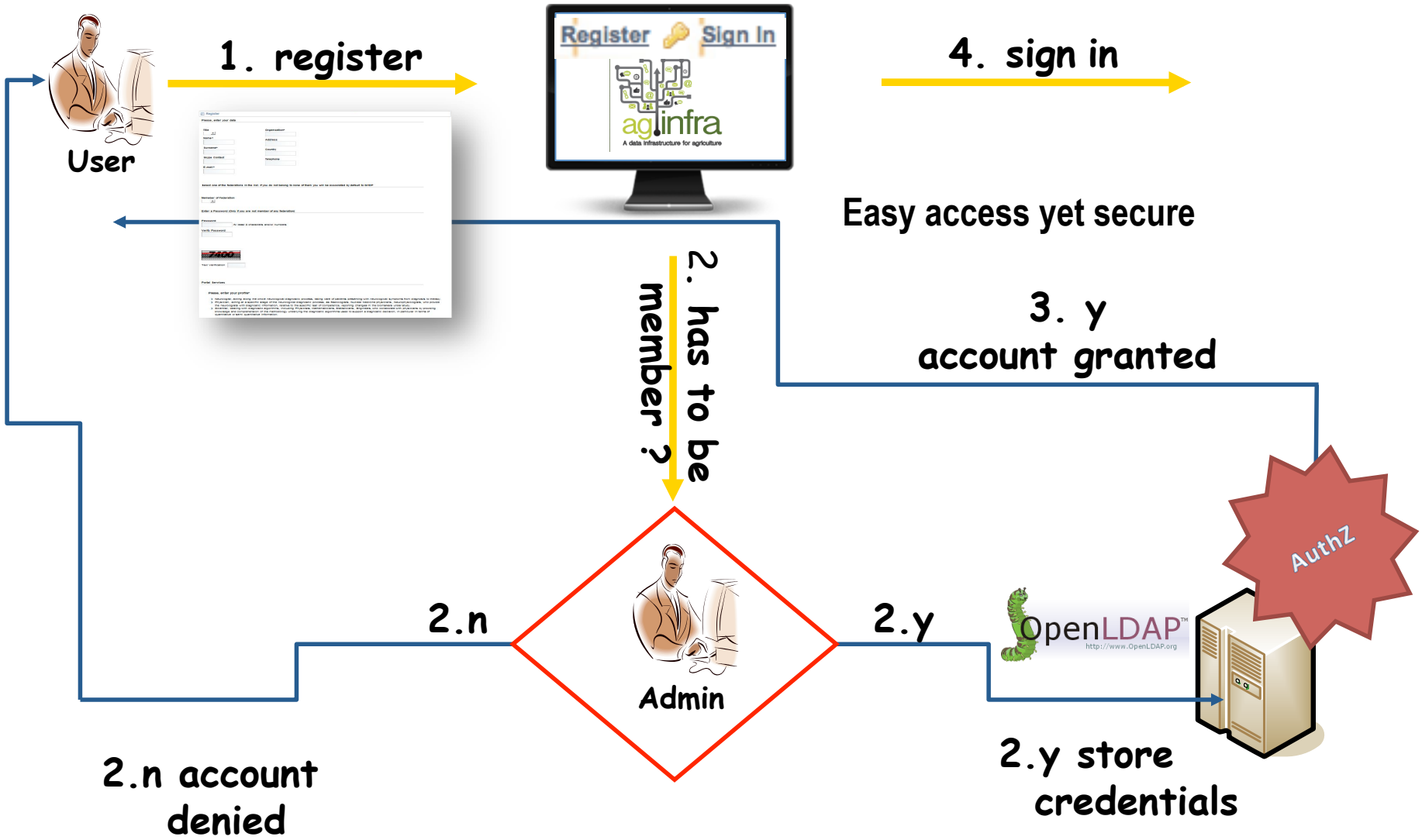


SG Architecture

(Based on the Catania SG Framework)



Register and Sign In



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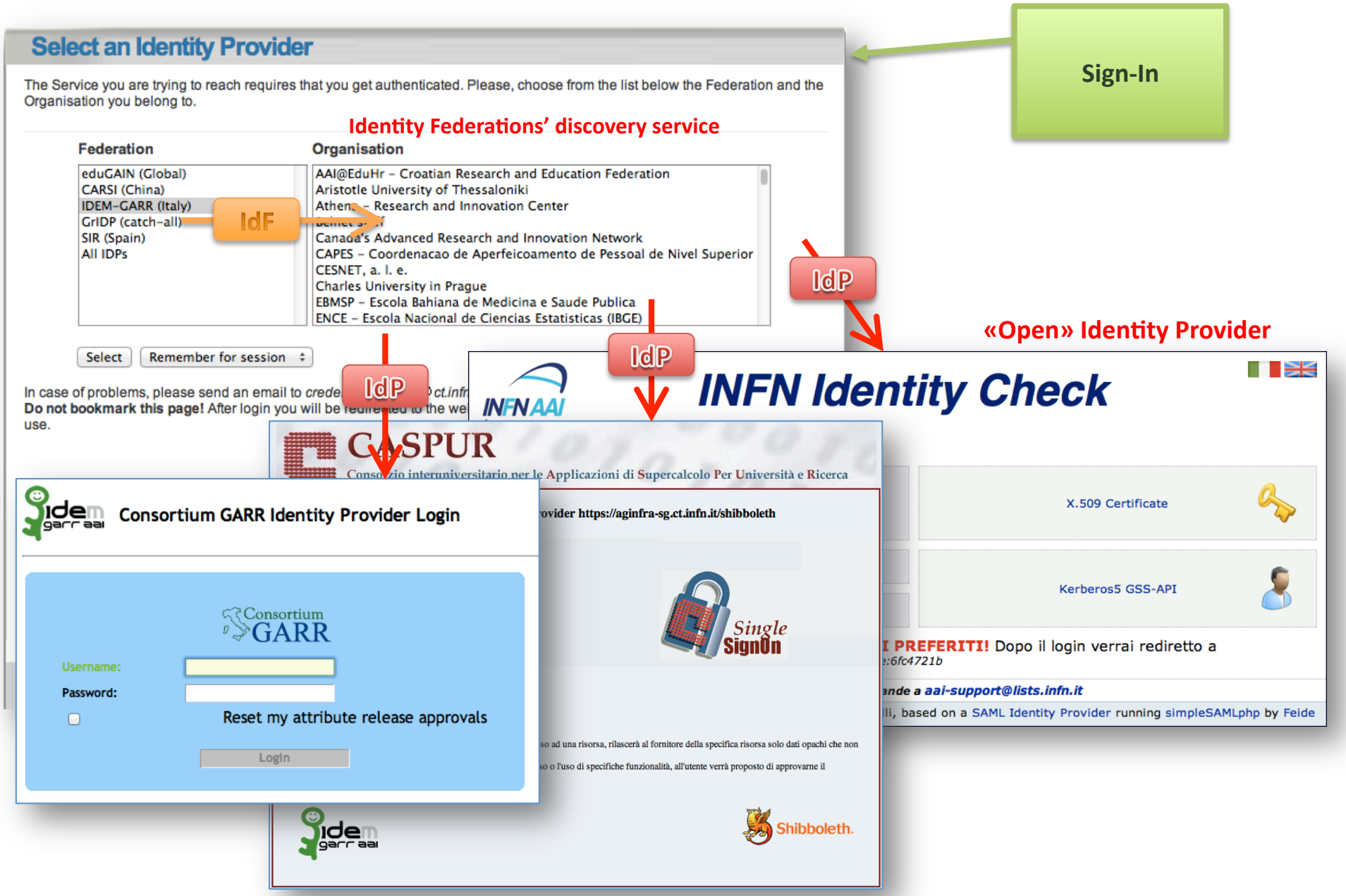
Authentication procedure



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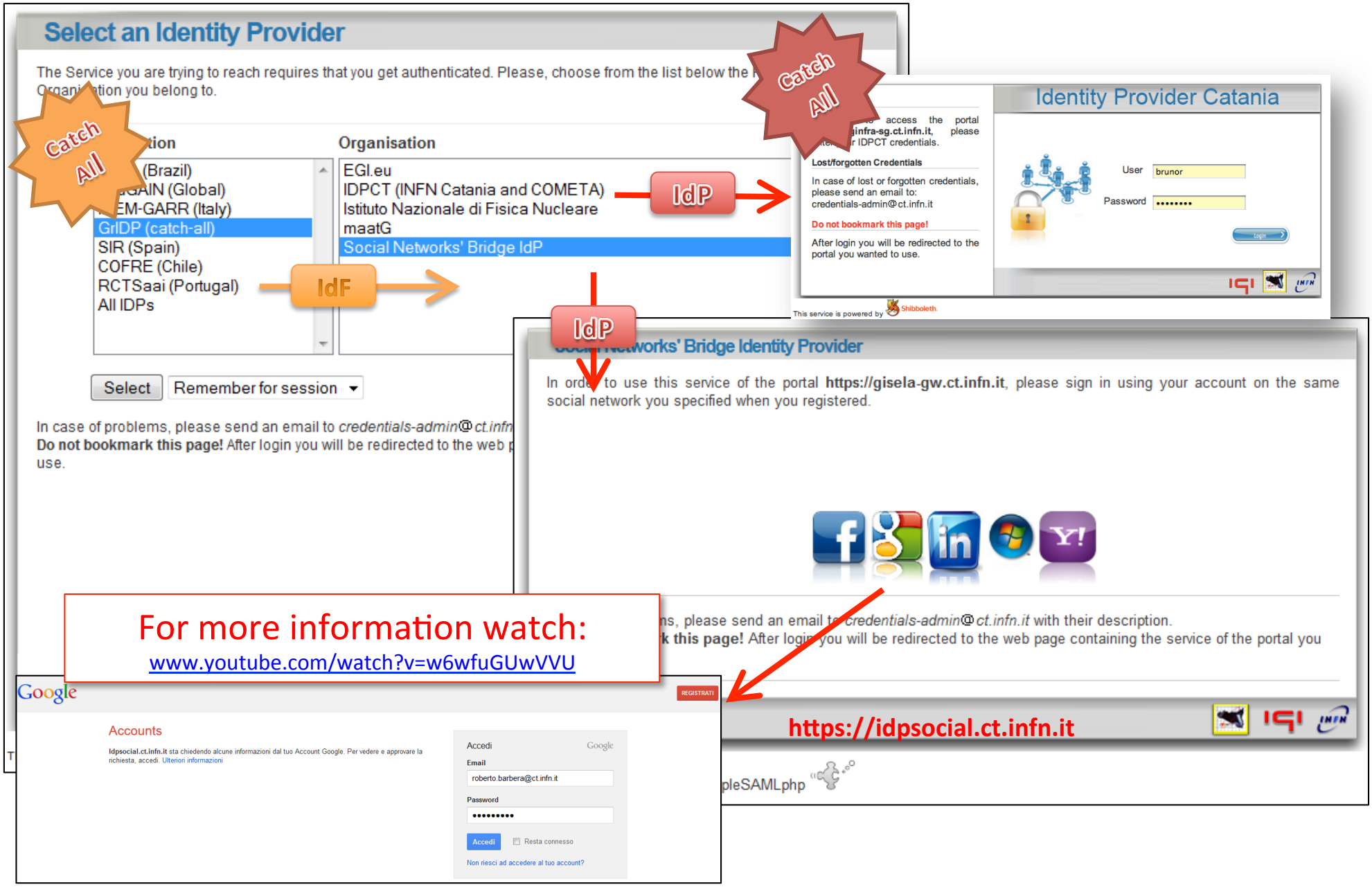
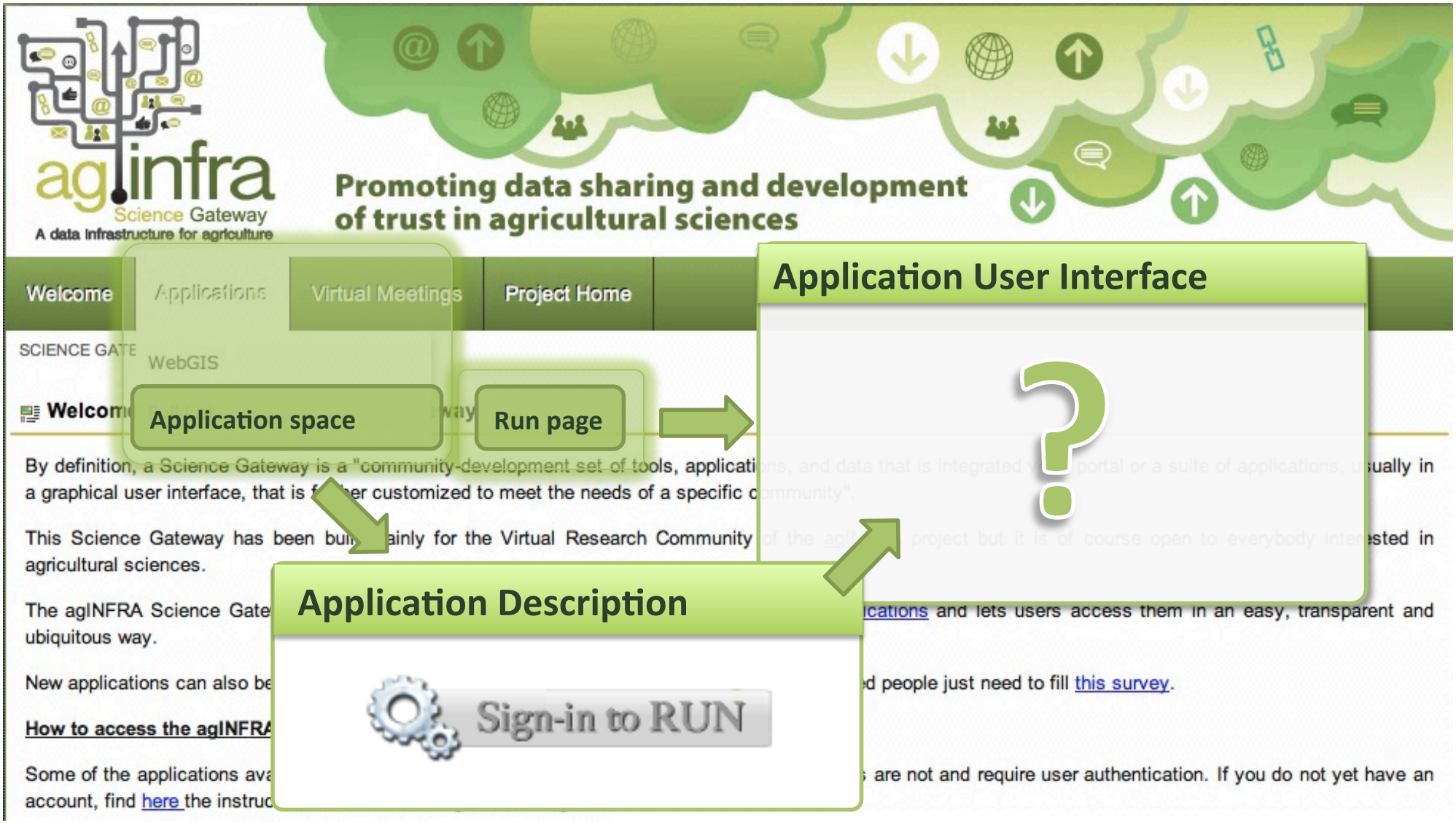
GrIDP - IDPCT and the Social Bridge IdP



Application Space



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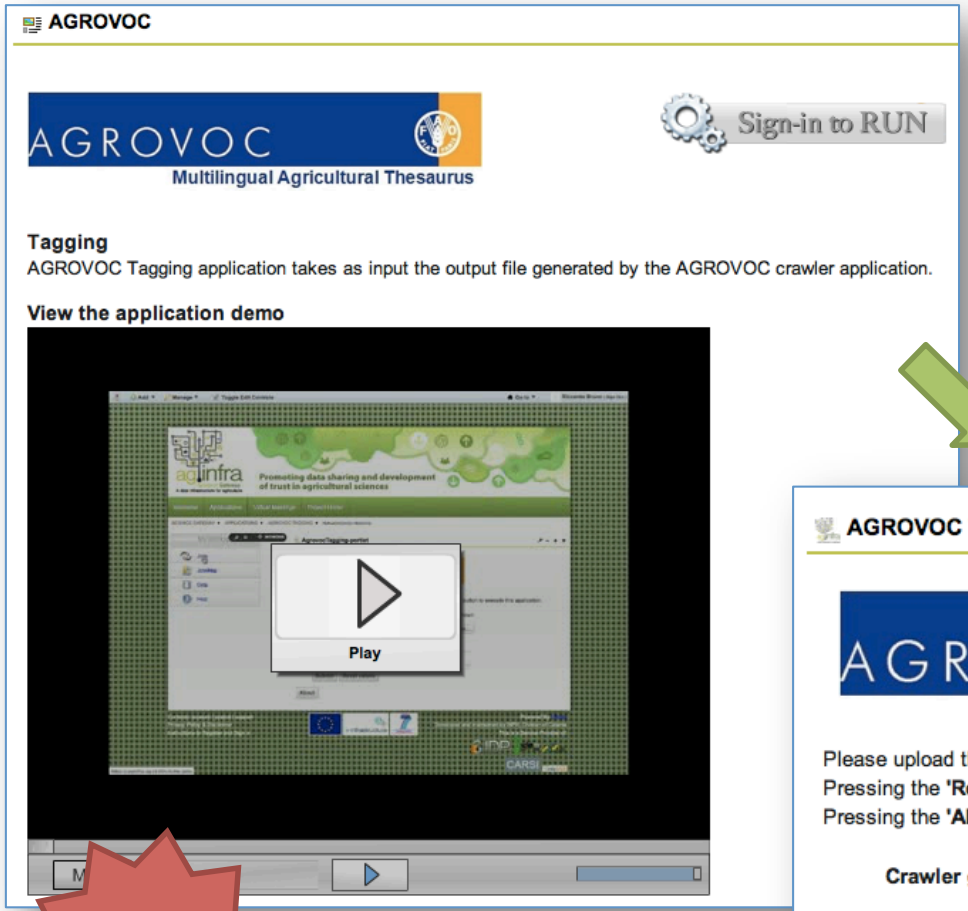
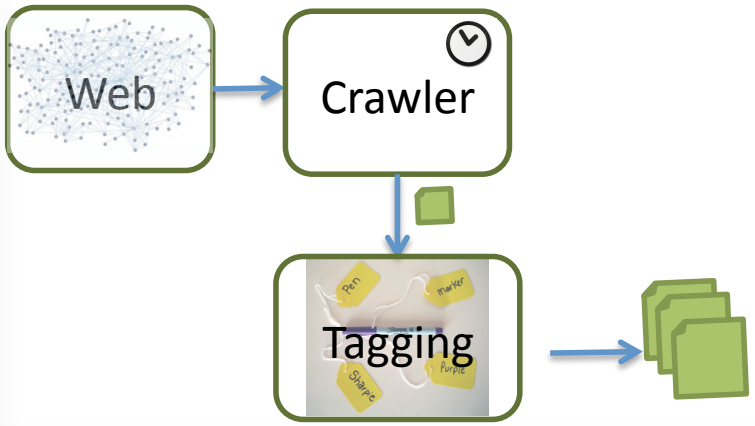
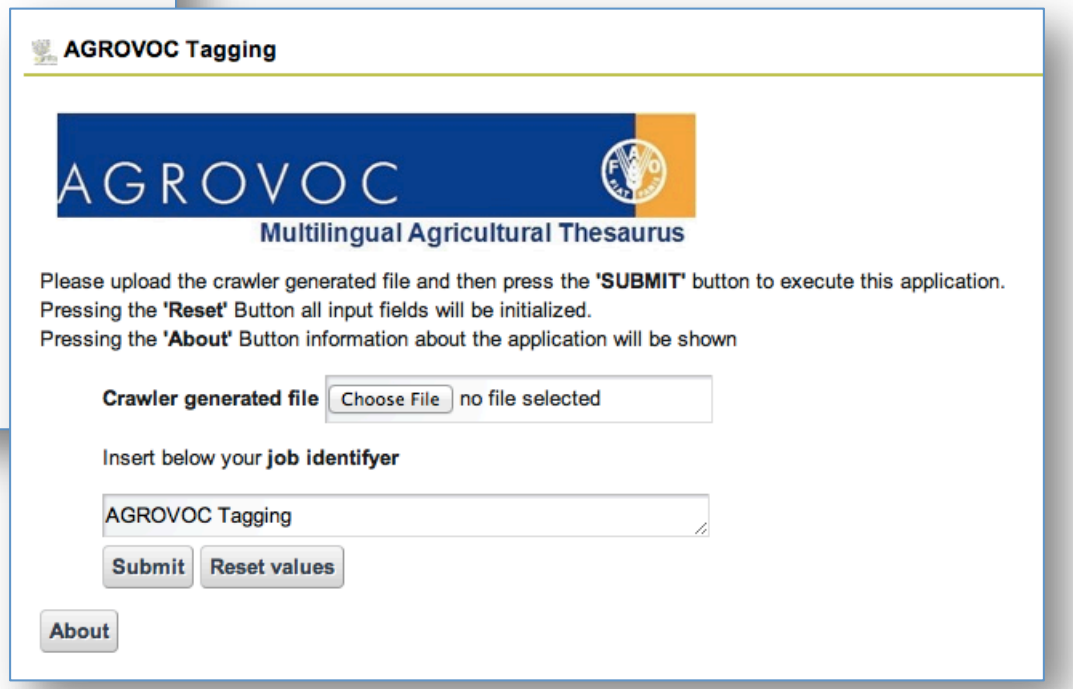
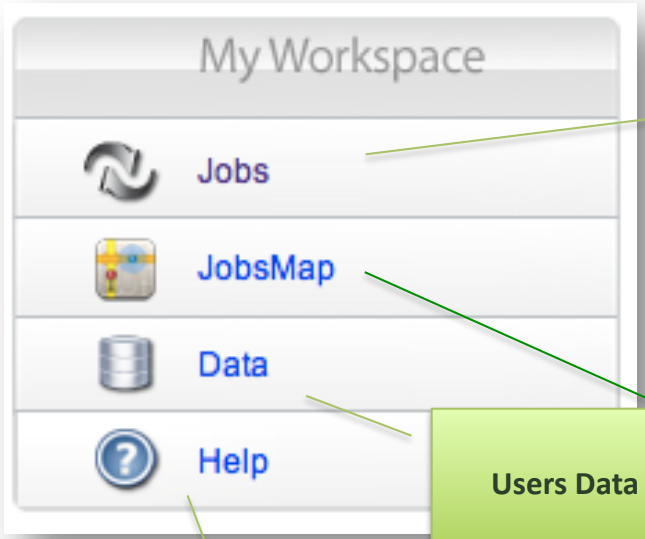
AGROVOC Tagging



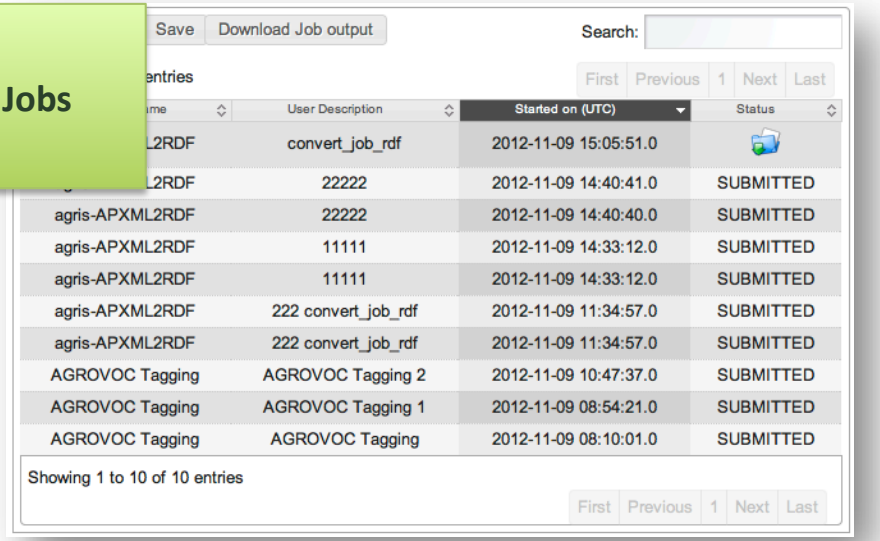




My Workspace

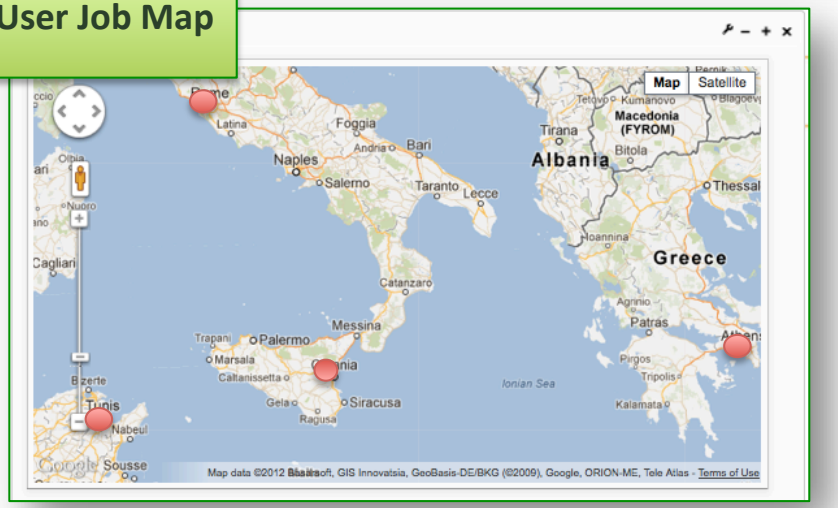


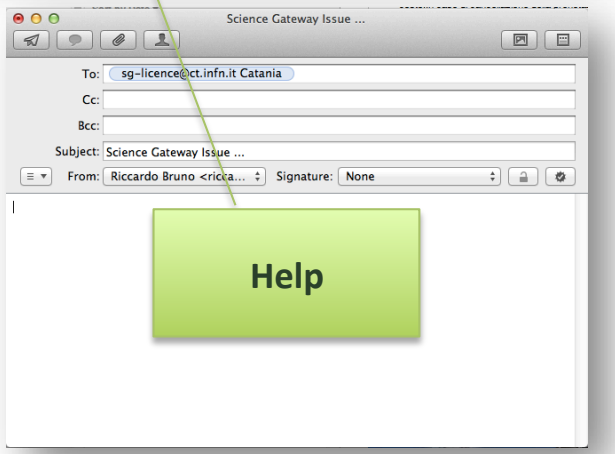
User Jobs



Users Data

User Job Map





Help

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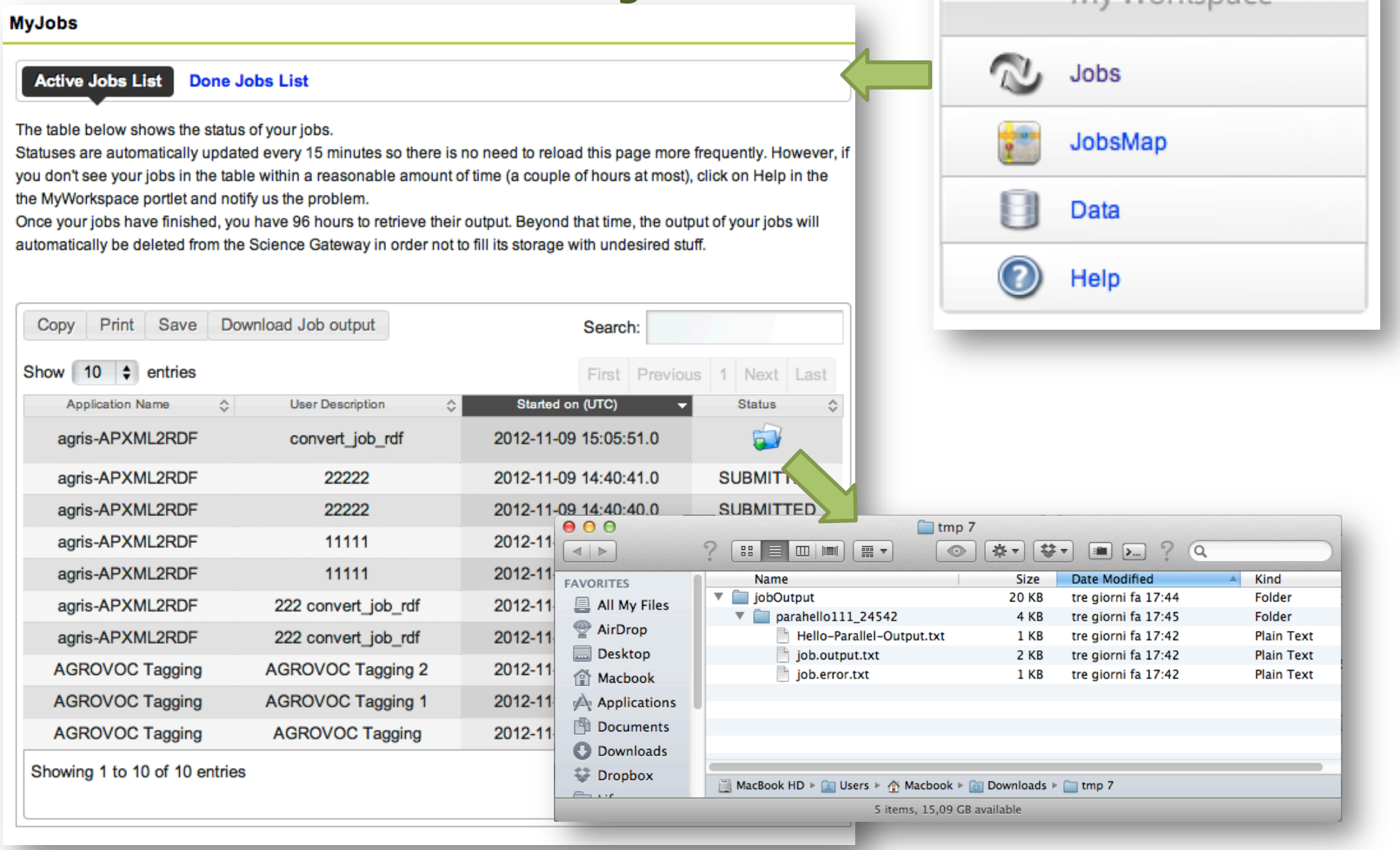
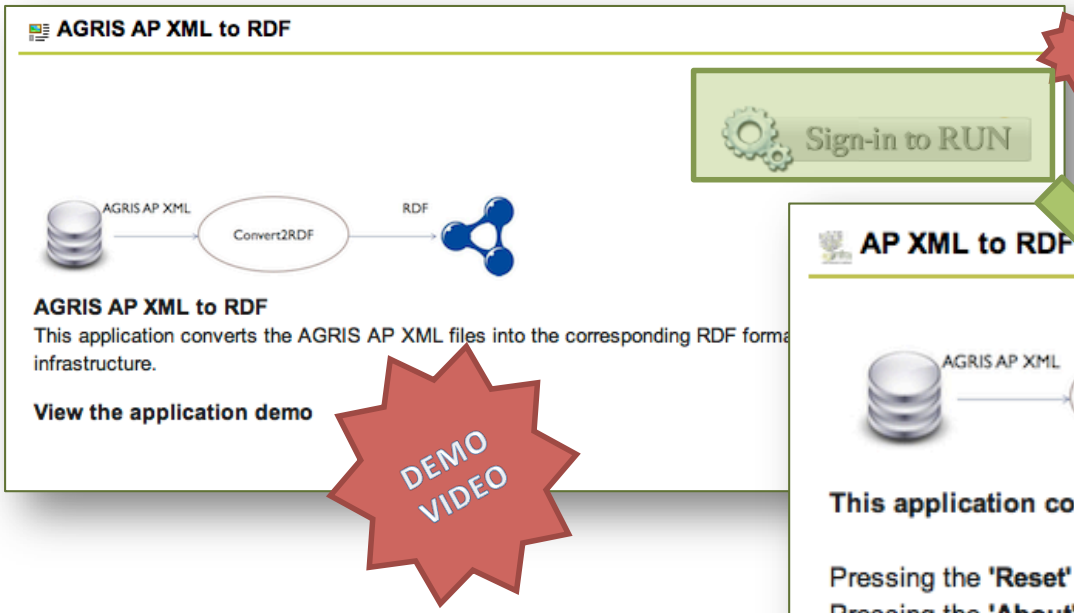
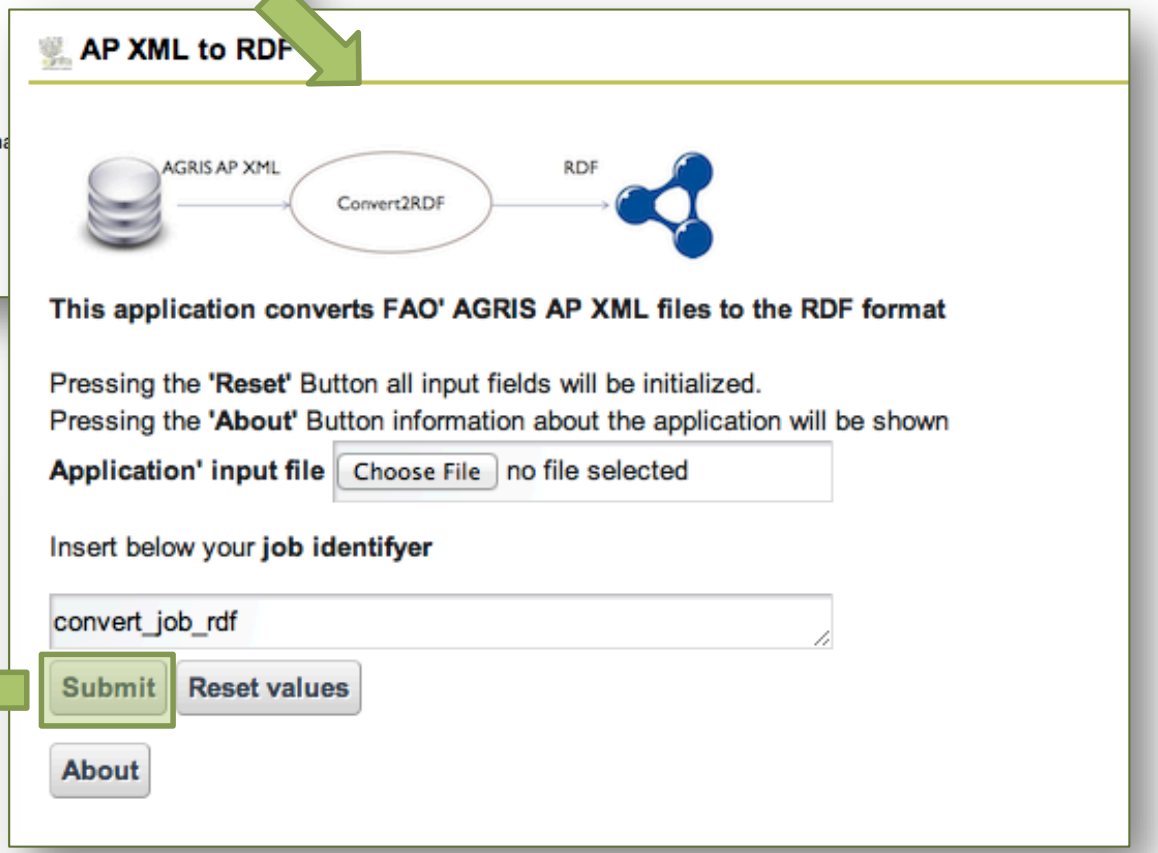
MyJobs

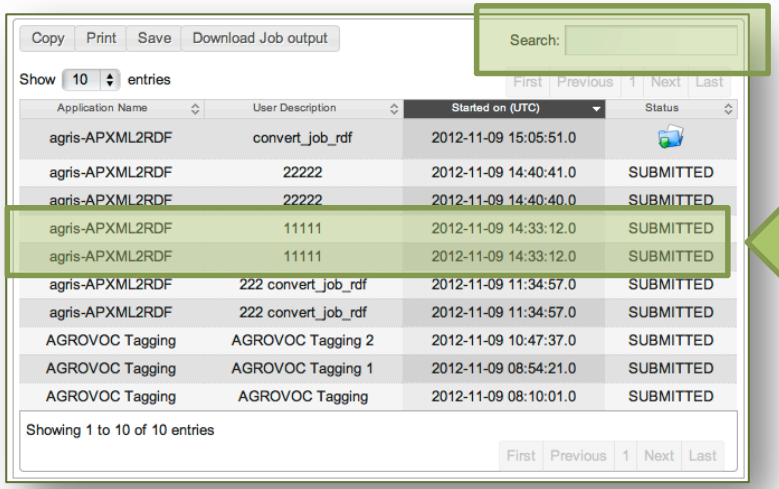


AGRIS XML2RDF



Application developed during the 1st agINFRA Training Event held di Belgrade (1-3/10/2012)





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Italian Soil Information System (ISIS)

Italian Soil Information System (ISIS)

Welcome to the ISIS service

The WebGIS and Cloud Computing enabled ISIS service is running for online Italian soil data consultation. ISIS is made up of a hierarchy of geo-databases which include soil regions and aim at correlating the soils of Italy with those of other European countries with respect to soil typological units (STUs), at national level, and soil sub-systems, at regional level.

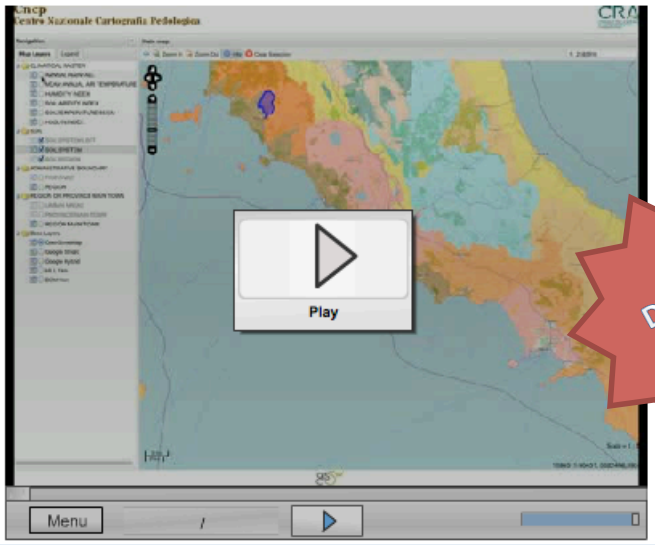
This service offers two different operational modes:

Demo Access — A reduced set of ISIS services will be freely accessible

Full Access — The full set of services, including the possibility to query the geo-databases to get information on the sites stored therein, can be accessed by this link. This requires user authentication and authorisation. If you do not yet have an account, find here the instructions about how to **register** and **sign in**.

The full set of services, including the possibility to query the geo-databases to get information on the sites stored therein, can be accessed by this link. This requires user authentication and authorisation. If you do not yet have an account, find here the instructions about how to register and sign in.

Watch the demo



Science Gateway
A data infrastructure for agriculture

Welcome | Applications | Virtual Meetings | Project Home

WebGIS → ISIS

Full List

Welcome

By definition, a Science Gateway is a "community-development set of tools, appl... a graphical user interface, that is further customized to meet the needs of a speci...

This Science Gateway has been built mainly for the Virtual Research Commu... agricultural sciences.

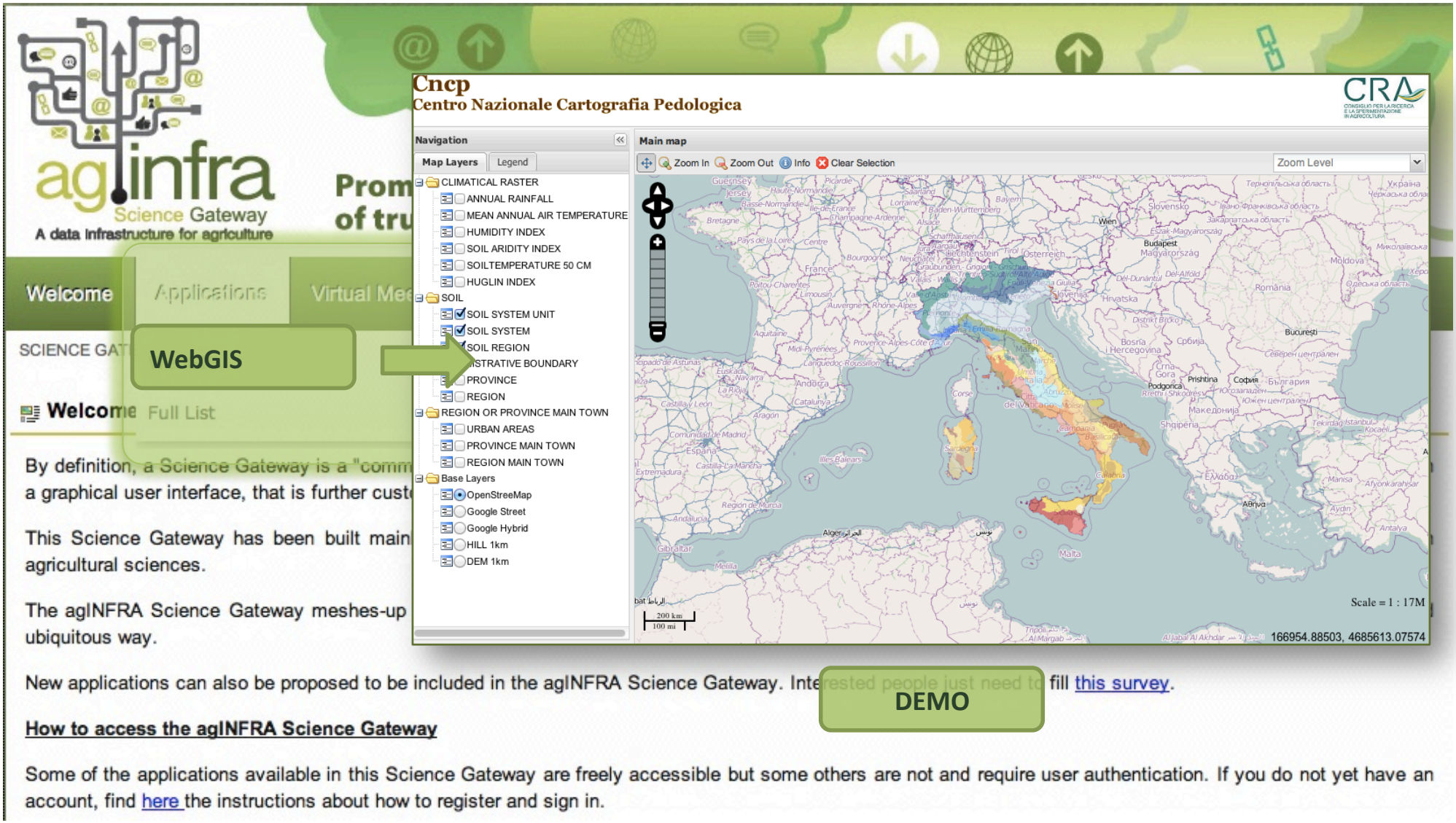
The agINFRA Science Gateway meshes-up Grid Computing and Cloud Computi... ubiquitous way.

New applications can also be proposed to be included in the agINFRA Science Ga...

How to access the agINFRA Science Gateway

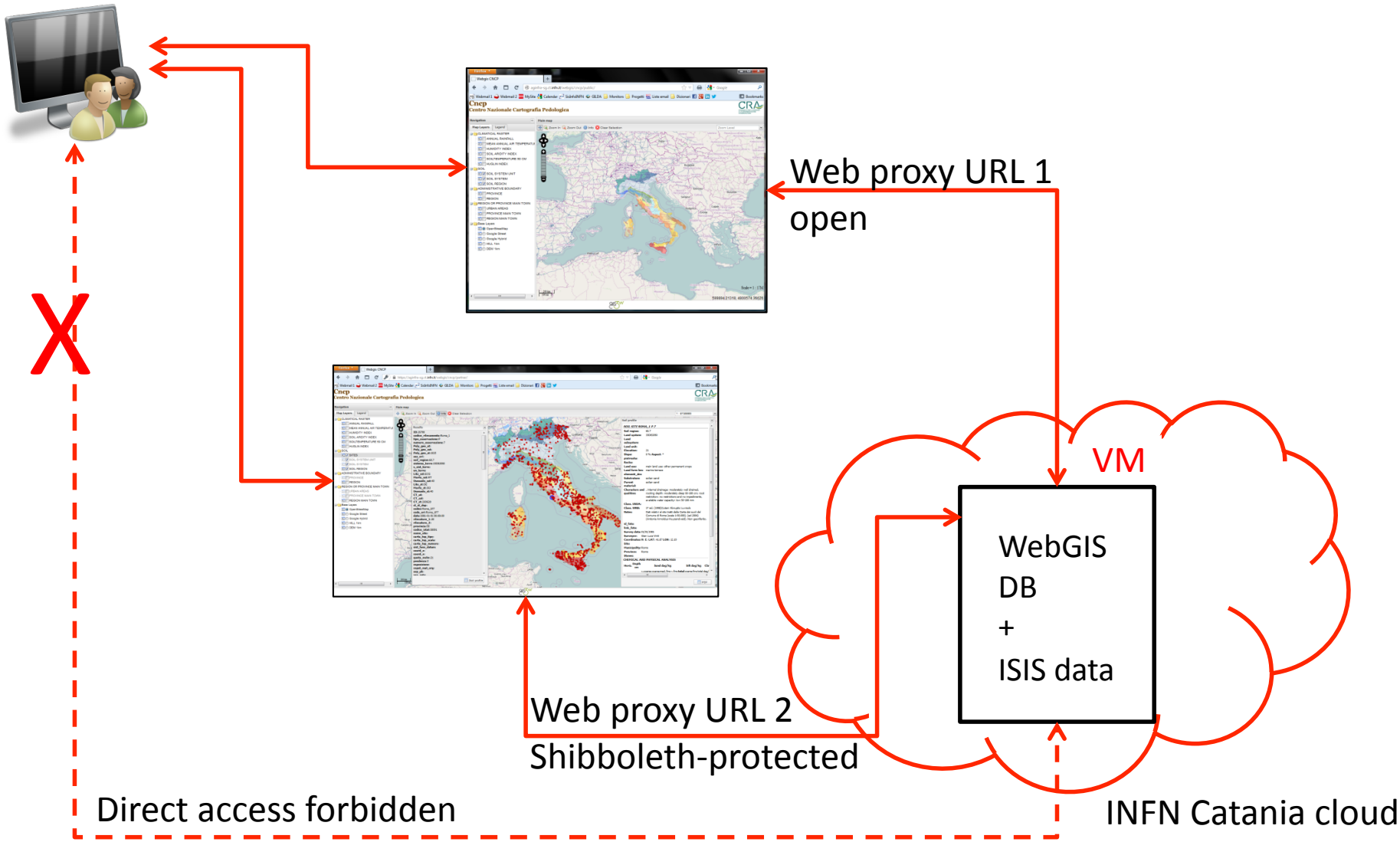
Some of the applications available in this Science Gateway are freely accessible... account, find here the instructions about how to register and sign in.

ISIS is developed by CRA – Demo version



ISIS - Full version

ISIS integration architecture (reusable!)

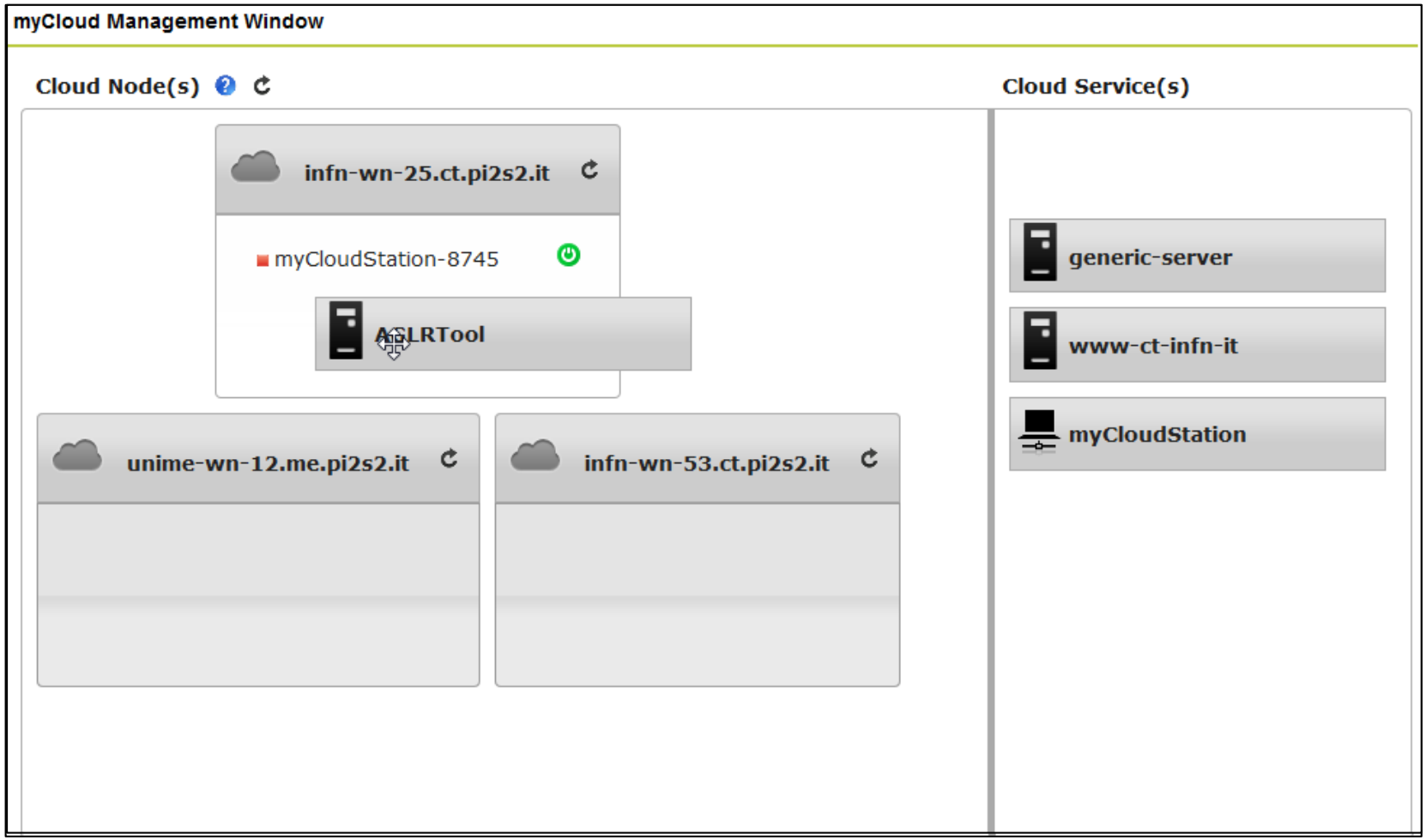


CLEVER: a Virtual Infrastructure Manager

- CLEVER: A CLoud-Enabled Virtual EnviRonment
  - developed by Univ. of Messina in collaboration with INFN Catania):
- Simplifies the access and management of private/hybrid clouds
- Provides simple and easily accessible interfaces to interact with different “interconnected” clouds, deploying Virtual Machines and performing load balancing through migration

AgLR Tool (MyCloud service)

- MyCloud allows intuitive access to and management of the resources on the INFN Catania cloud powered by CLEVER
  - CloudManagers can deploy services on the cloud by simply dragging them on available nodes



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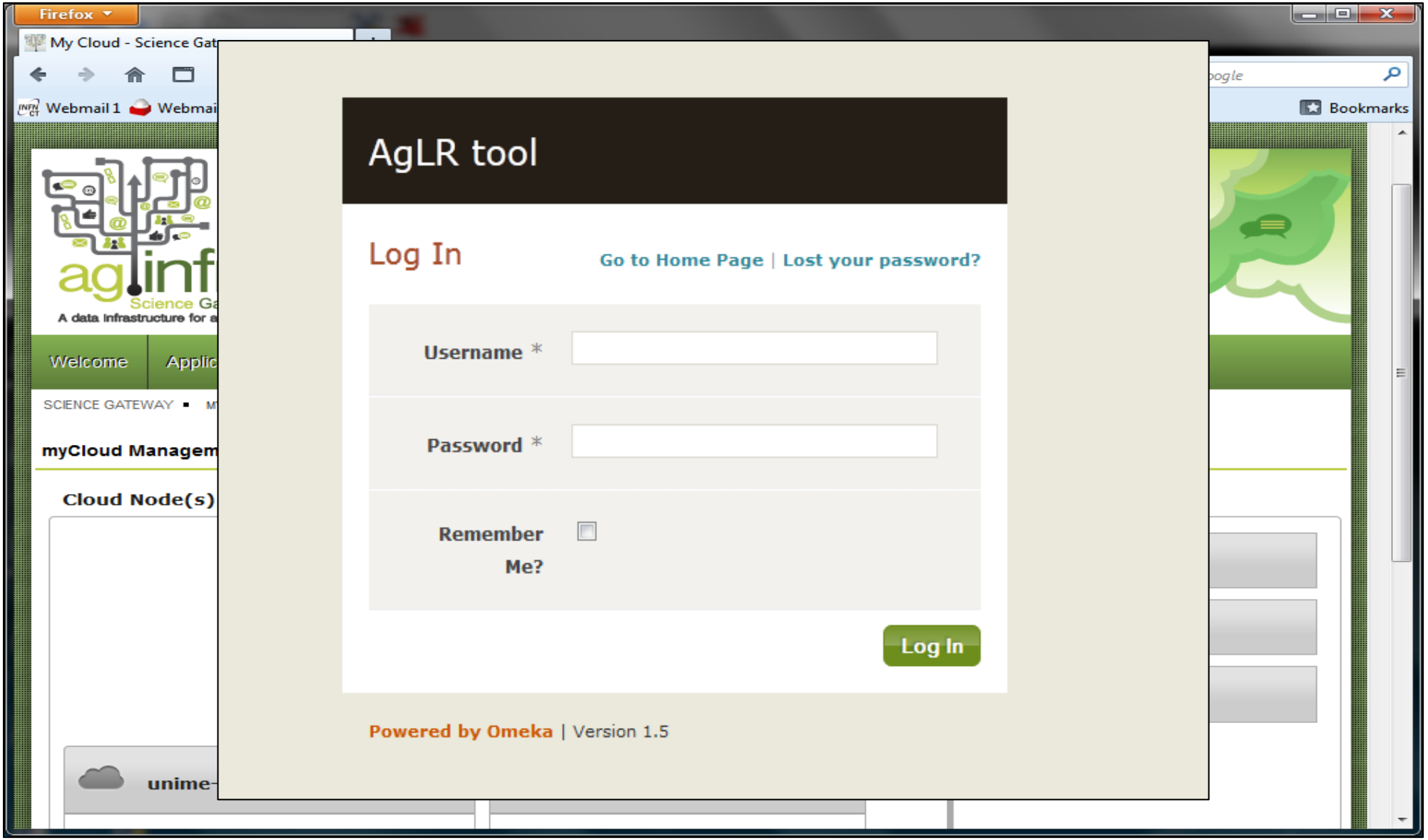
AgLR Tool (MyCloud service)



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Soil Maps Browser/Annotator

agINFRA
A data infrastructure for agriculture

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gLibrary

Science Gateways

LIFERAY
Enterprise. Open Source. For Life.

gLibrary REST API

Repo 1

Repo 2

Repo 3

Discovery Service Rest API

Metadata Services

Storage Services

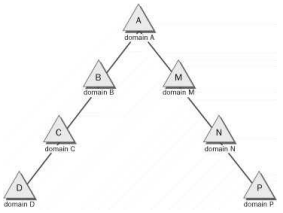
Grid Auth Service

AuthN/AuthZ Services

Databases

Storage resources

eToken Server



Identity Federations

Some considerations

- About 1 billion people have accounts on the existing Social Networks (many of the researchers we are targeting with e-Infrastructures are among them)
- Web-based social networking accounts for more than 10-15% of the total time spent online in the whole world
- Social Networks' are by far the most used (liked) virtual environments in the world

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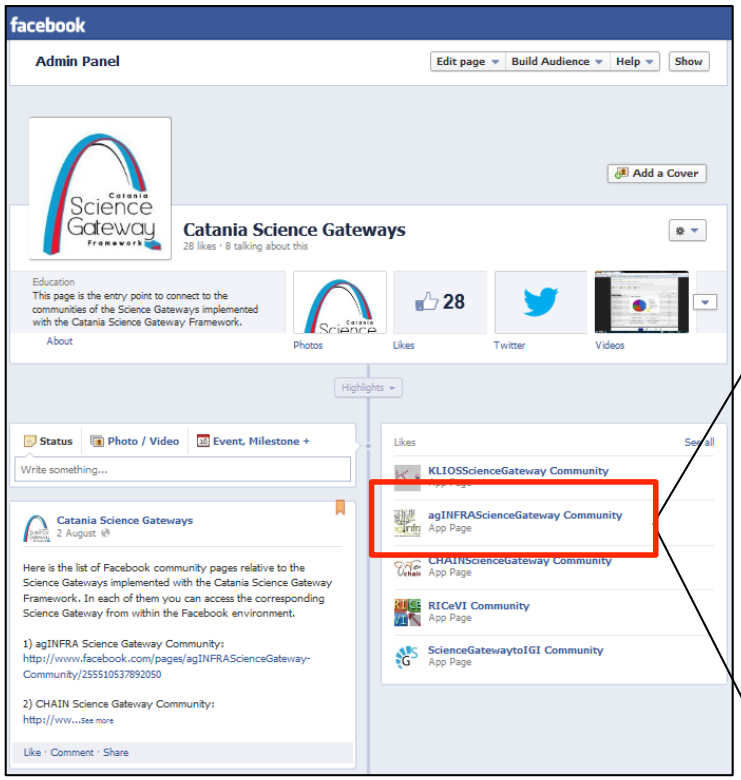
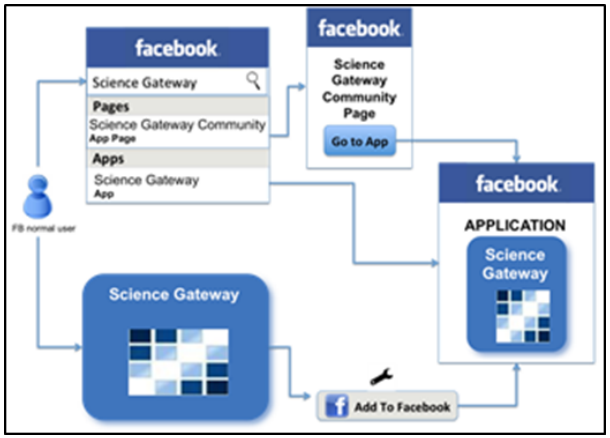
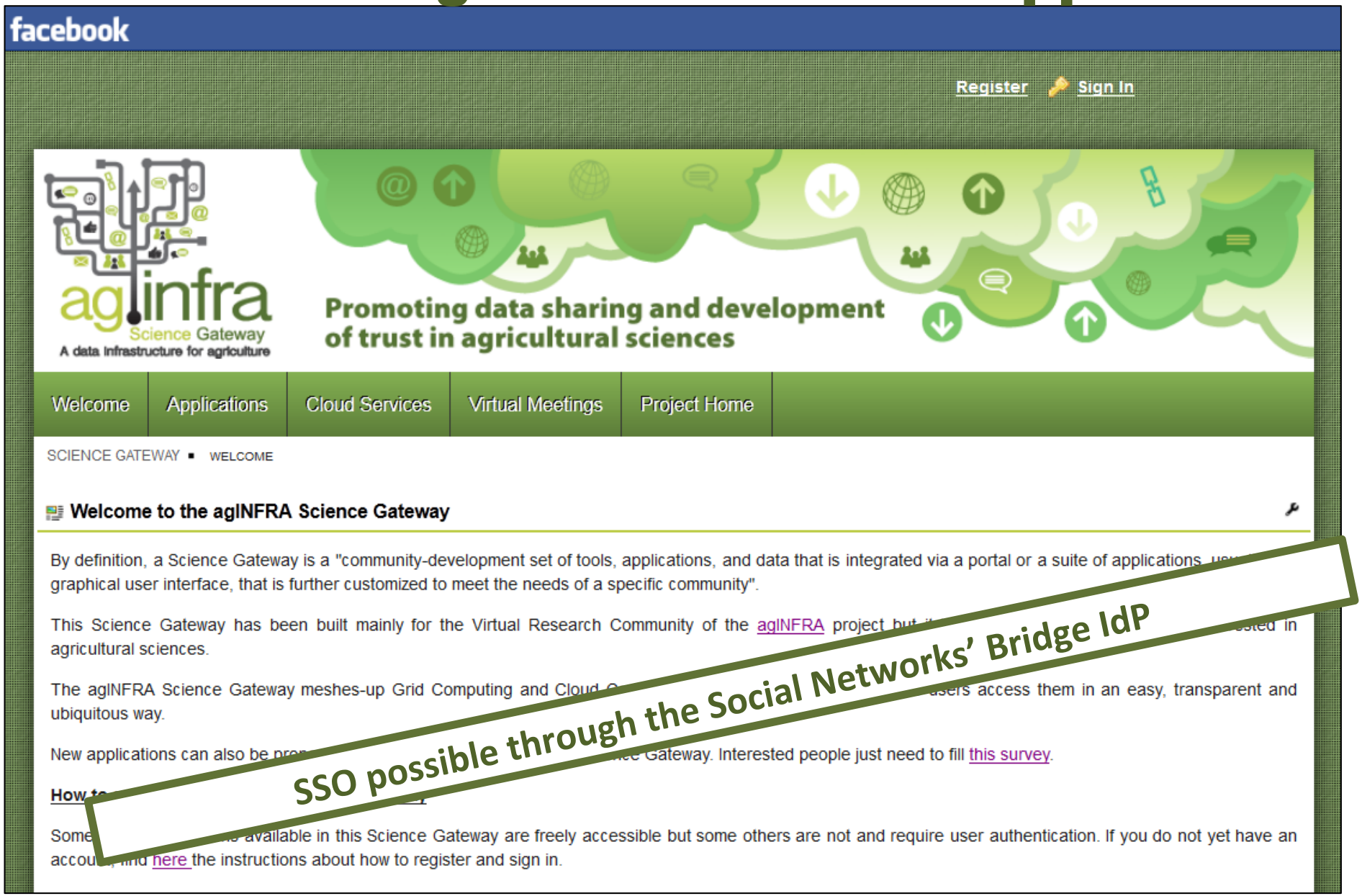
“Social” Science Gateways

(http://www.facebook.com/pages/Catania-Science-Gateways/220075701389624)





The agInfra SG as a FB app



Summary and conclusions

- agINFRA is only at project month 13 (out of 36) but thanks to the adoption of the SG paradigm, Grid and Cloud access has been made easy for the community
- Several applications already deployed, many others planned to be integrated
- ISIS cloud-based approach replicable for many other service providers
- A good level of dissemination ensured by the inclusion of the SG as an app of the most famous social network
- Sustainability of the SG guaranteed by the adoption of well known standards (JSR286, SAGA, etc.)