Developing an Open Science Commons

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Outline

- Defining Open Science
- Defining the Open Science Commons
- Developing an Open Science Commons

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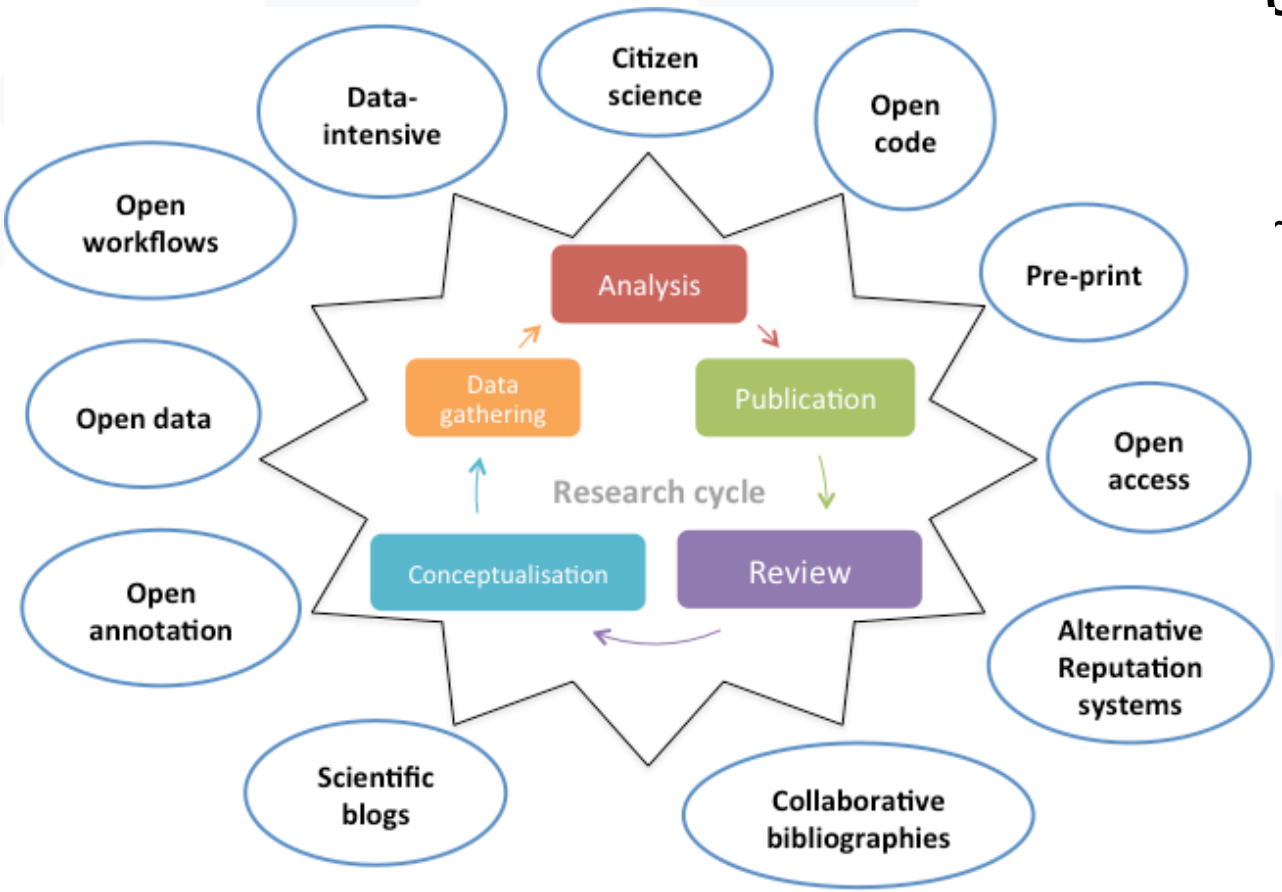
"…when the journal system was developed in the 17th and 18th centuries it was an excellent example of open science. The journals are perhaps the most open system for the dissemination of knowledge that can be constructed — if you're working with 17th century technology. But, of course, today we can do a lot better"

Michael Nielsen

Author of *Reinventing Discovery: The New Era of Networked Science*

Open Science



Opening of the **creation** and **dissemination** of **scholarly knowledge** towards a multitude of stakeholders, from professional researchers to citizens

Openness

Participation

Collaboration

Sharing

Re-use

Greater social value

Source: http://goo.gl/uO9MK5

Defining Open Science: 5 Schools of Thoughts

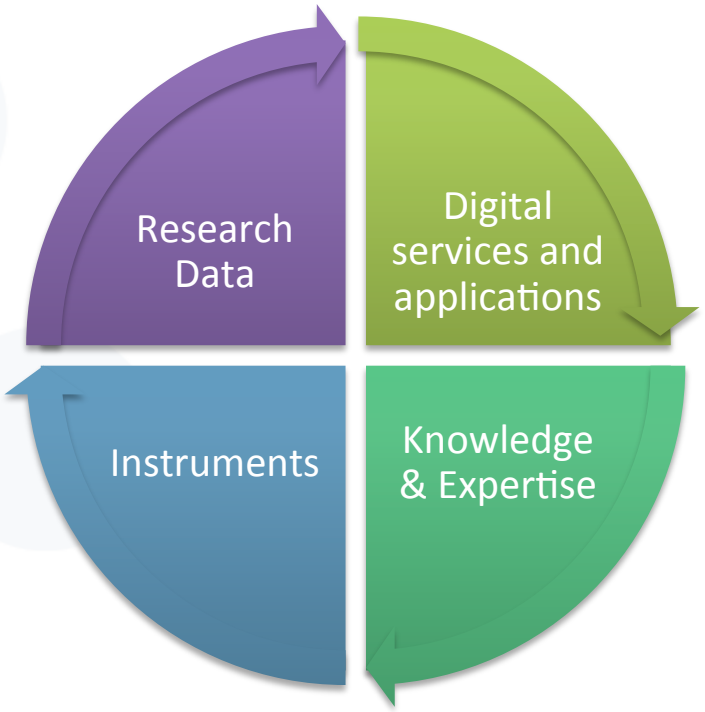
School of thought	Involved groups	Central assumption	Central Aim	Tools & Methods
Democratic	Scientists, politicians, citizens	The access to knowledge is unequally distributed	**Making knowledge freely available for everyone**	Open access, intellectual property rights, Open data, Open code
Public	Scientists & citizens	Science needs to be made accessible to the public	**Making science accessible for citizens**	Citizen Science, Science PR, Science Blogging
Infrastructure	Scientists & platform providers	Efficient research depends on the available tools, applications and shared infrastructures	**Creating openly available platforms, tools and services for scientists**	Collaboration platforms, tools, computing platforms
Pragmatic	Scientists	Knowledge creation could be more efficient if scientists collaborated	**Opening up the process of knowledge creation**	Wisdom of the crowds, network effects, Open Data, Open Code
Measurement	Scientists & politicians	Scientific contributions today need alternative impact measurements	**Developing an alternative metric system for scientific impact**	Altmetrics, peer review, citation, impact factor

In red: my additions

Source: Opening Science book, 2013

Open Science: a Complex Resource System

- Shared resources
  - Integrated, easy and fair access
- Engaged communities
  - Participating in the process
  - Culture of sharing
  - Collaborating in the management and stewardship
- Governance
  - Rules to access
  - Rules to resolve conflicts
  - Rules to balance quality vs. openness
- Financial support
  - For long-term availability



A common endeavor (EU perspective)

Commons

Institutionalised community governance of the production and/or sharing of a particular type of resource (from natural to intellectual)

GÉANT: European Communications Commons

Constructing Genome Commons

Wikipedia

...

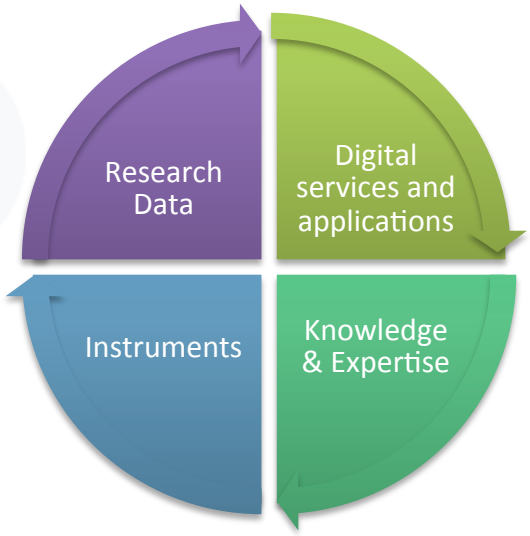
e-Infrastructure Commons

Linux

Internet

Open Science Commons: Definition

- A set of interrelated resource systems governed as commons that support the open creation and dissemination of scholarly knowledge
- An area of study in the commons theory applied to open science



website: www.opensciencecommons.org - paper: http://go.egi.eu/osc

Open Science Commons: When implemented…

Researchers from all disciplines
have easy, integrated and open access
to the advanced digital services, scientific instruments, data, knowledge and expertise
they need to collaborate and achieve
excellence in science, research and innovation.

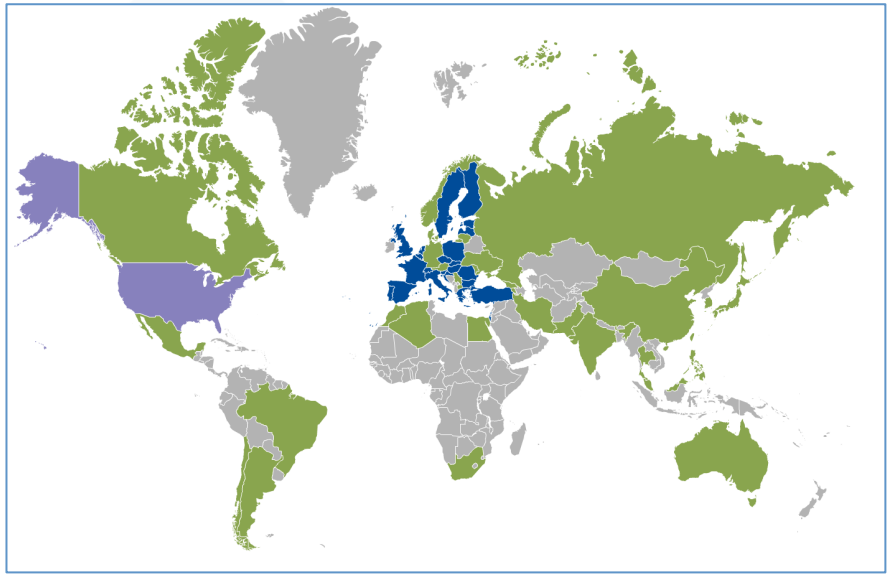
They feel engaged in governing, managing and preserving these resources for everyone's benefit, with the support of all stakeholders.

Key aspects in Open Science

Principles of the Commons	What it means to the Open Science Commons
Shared community resources	Research data, scientific instruments, digital services, software, scientific publications, educational and training, expertise
Community-based rules and procedures with incentives for sharing and responsible use	Access modes are well defined and non-discriminatory (e.g. see charter for open access to RIs)
Governance: the community is part	Governance model with multiple stakeholders, it should include the users of the resources
Long-term, persistent care of resources	Long-term support of funding agencies for stability and sustainability Community committed to manage, preserve

Commoning in EGI

- **Types of shared resources**
  - Large-scale computing/storage/cloud IaaS-PaaS-SaaS/data services
  - Applications, tools, science gateways
  - Knowledge, expertise, training
- **Rules**
  - Various types of access modes
  - e.g., policy-based, excellence-driven, membership-based
    - Not yet fully harmonized across Member States
- **Governance**
  - Mainly service providers at the moment
  - Evolving to include research infrastructures
  - Advisory board for user communities
- **Funding**
  - National funding agencies, EC, service providers, user communities



Developing an OSC (1): Governance structure and funding models

- Analyse governance structure of existing infrastructure/ knowledge resource systems in open science
  - Identify best practices and patterns for commoning
  - Develop guidelines

- Define a multi-level governance – European and national – bringing together the different stakeholders including communities

- Identify funding models for sustainability and capacity building

Developing an OSC (2): Open Science Backbone

- The set of standardised generic ICT capabilities across countries and communities offering
  - Compute/Data intensive capabilities
  - Easy discovery, access, use and reuse of open data
  - Shared capacity for RIs and long tail
- Supporting open standards (both API and data formats)
- Complemented by community-specific and community-managed services
  - Research Infrastructures

Developing an OSC (2): Open Science Backbone

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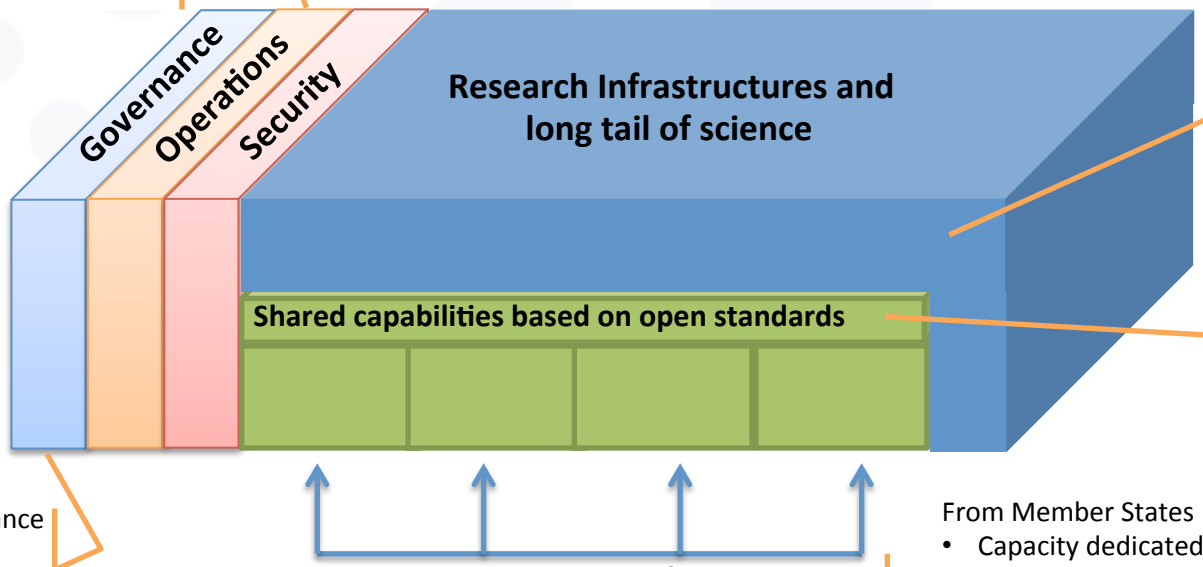
Federated operations and support
- Service desk
- Monitoring and accounting
- Capacity management
- Service level management

- Network of CSIRT
- Federated IdPs, Auth and Authz
- Management of different levels of assurance



- Research platform built on top of shared capabilities plus community owned resources
- Data products, tools, scientific gateways, virtual labs

Core capabilities
- Open Science Cloud (e.g., VM management, Data storage/access/ discovery)
- PID
- Service registry and marketplace

Multi-level governance with community participation
- Local
- National
- European

From Member States
- Capacity dedicated to large RIs
- Free pools for long tail researchers
- Both pubicly funded and commercial providers (all supporting open standards and no lock-in)

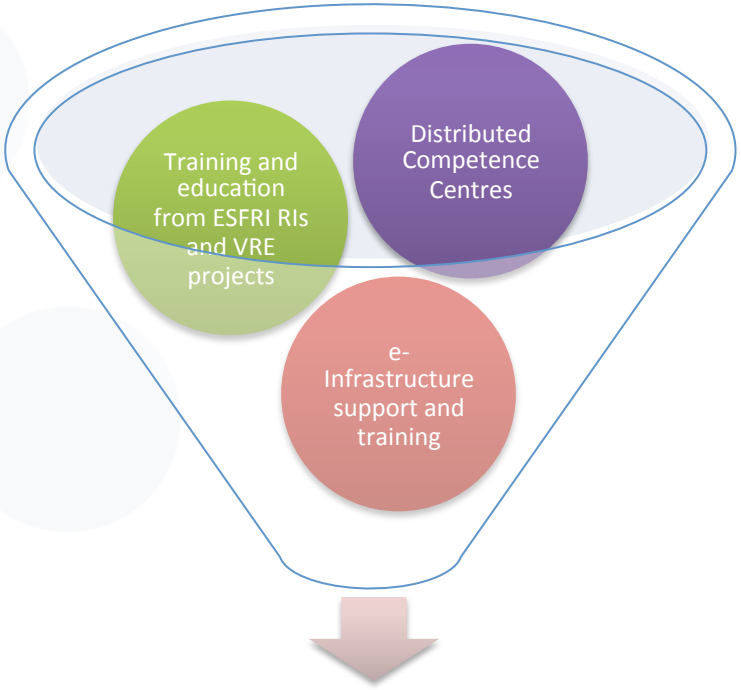
Developing an OSC (3): Research data

- Stimulate the creation of public repositories of open research data
- Stimulate a culture of sharing and the right incentives to contribute and maintain
- Address legal and policy issues
  - Prefer minimal IPR or non-exclusive licensing
  - Many initiatives exist (e.g. RDA, CODATA)

Developing an OSC (4): European open knowledge hubs

A *coordinated* network of competence centers

- Offering knowledge and expertise for scientific software, applications, tools
  - Knowledge and expertise from a network of European training and education centres
  - Scientific software is open, documented, discoverable, supported
  - Support to access different capabilities (HTC, HPC, cloud, open research data, tools, applications, software…)



Open Knowledge Hub

How EC could contribute

- Fund a design study to develop guidelines and best practices on "commoning" resources (infrastructure, data, people) for science
- Coordinate with Member States to include e-Infrastructures into national roadmaps for contributing to an open science infrastructure backbone
- Stimulate the development of digital capabilities that are based on open standards and certified
  - Avoid proprietary enclosures

How Member States could contribute

- Prioritise investment to further develop and operate e-Infrastructures (as already done for ESFRI)
  - Contributing to the open science infrastructure backbone
  - Includes capacity building
- Stimulate sharing of infrastructure and knowledge resources
- Develop various access policies for different research segments including the long tail
  - Excellence drive, policy based, market based, …

How Research and e-Infrastructures could contribute

- Open by design
  - Open API, open formats, open licenses, open tools, …
- Strengthen collaboration via joint strategies, events, common roadmaps and working groups
- Design a governance according to the commons principles
- Ensure an healthy development of shared capabilities (e.g., open innovation processes)

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Future steps

- Broaden the dialogue on OSC to more stakeholders
- Establish a framework of discussion that encourages participation and contribution
- Identify/analyse other key building blocks that need development

Open Science Commons Workshop - Today

- Session 1
  - Digital Science and Open Knowledge, J. Cotta, EC
  - European Open Science Cloud Initiative, W. Lusoli, EC
  - CERN View on Open Science and Infrastructures, S. Bertolucci, CERN
- Session 2
  - The e-Infrastructure Commons, S. Holgrem, e-IRG
  - EPOS integration plan: community building for open science, M. Cocco, EPOS
  - Finnish Open Science and Research Initiative 2014–2017, S. Niinimäki, Ministry of Education and Culture, Finland
- Session 3
  - National integrated cyberinfrastructure system as an open commons in South Africa, B. Becker, SA Grid
  - Panel discussion, summary, wrap-up

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Conclusion

- Open Science
  - Needs a complex resource system of shared infrastructure and knowledge resources
  - Needs a ‘whole’ approach
- Open Science Commons
  - Developing a commons-oriented approach when designing systems
  - Ensuring maximization of return from public investment
  - Initial elements for Europe
    - An open science infrastructure backbone for network, computing and data
    - Stimulating research data as commons
    - Networks of knowledge hubs for skills development, innovation and expert support

OSC OpenScience Commons

https://www.opensciencecommons.org/getinvolved/

Thank you for your attention.

Questions?

www.egi.eu