

Introduction to the GOSC Initiative

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Global Open Science Cloud (GOSC)

- I. Motivation**
- II. Vision & Mission
- III. GOSC INITIATIVE

Motivation₁

Open science infrastructures around the world



**EUROPEAN OPEN
SCIENCE CLOUD**

European Open Science Cloud 2015



中國科技雲
China Science & Technology Cloud

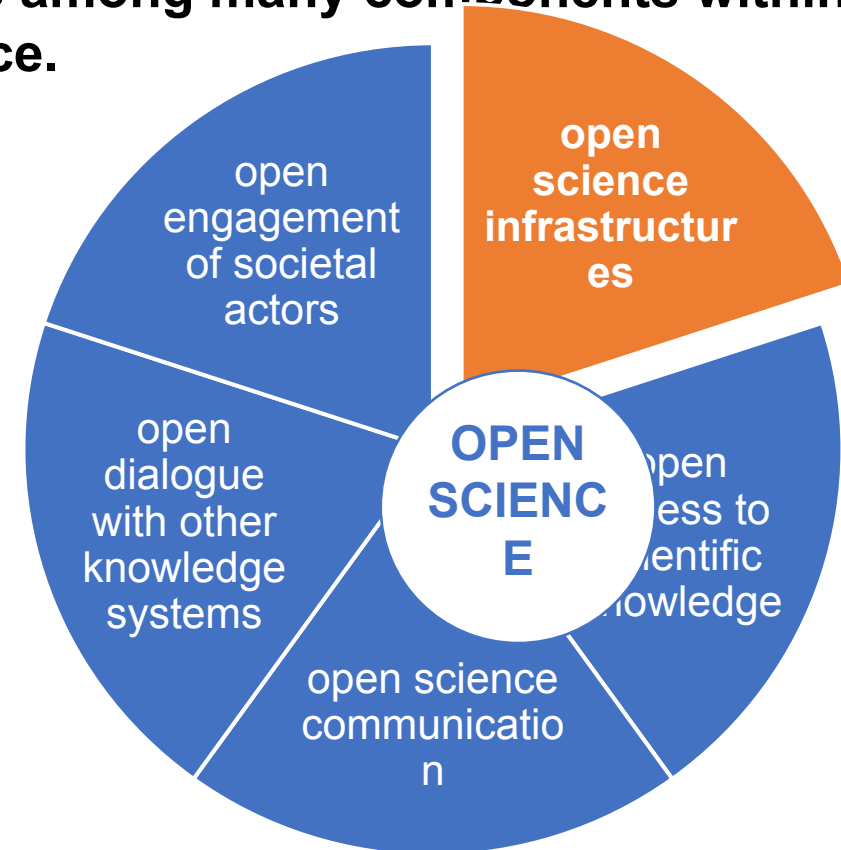
China Science & Technology Cloud 2017



African Open Science
Platform 2018



Open science infrastructure is one of the key pillars among many components within open science.



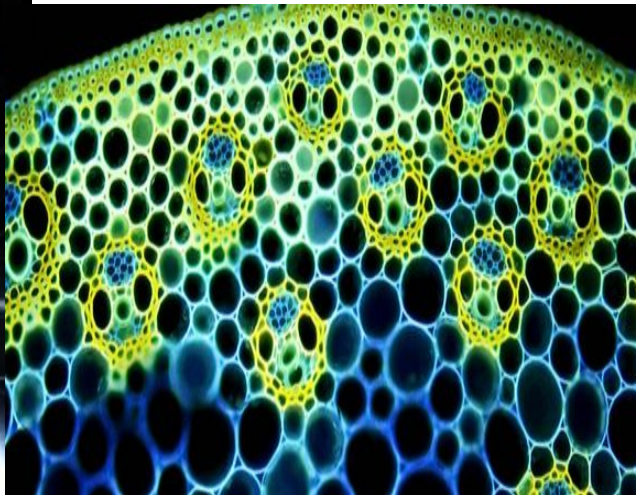
Open science key pillars

Motivation₂

Potentialities and grand challenges pulls us ahead calling for open science, open collaboration around the world.



**Far in the galaxy
(by SKA)**



**Close to the micro
ecosystem (by ISC)**



**The pandemic and post
pandemic**



**Stressing human needs
for a better world
(UN SDGs)**

Photos from:

<https://www.skatelescope.org/science/>

<https://council.science/actionplan/>

<https://www.mediaite.com/news/breaking-world-health-organization-officially-designates-coronavirus-as-a-pandemic/>

<https://www.finchandbeak.com/beelden/SDGs-GlobalGoalsForSustainableDevelopment-05.jpg>

Events and Consensus

Consensus has been building up **to co-design and co-develop a globalized trusted research ecosystem.** Such ecosystem should bridge institutional, regional, national research e-infrastructures for open science in a sustained manner.



IDW 2018
talk particular on
infrastructures and
repositories facilitating open
data practices

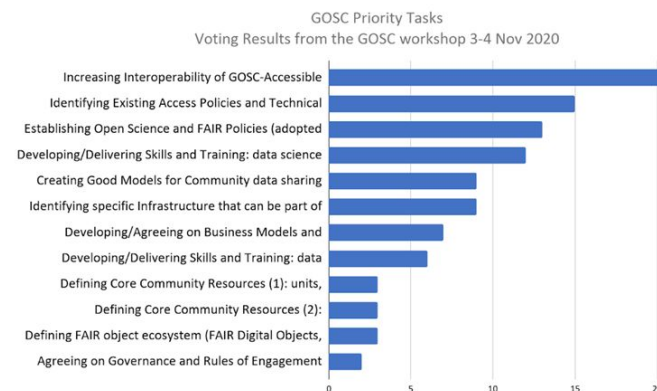


CODATA Beijing Conference 2019
particular in

- Géant-CSTnet session
- CASEarth session
- Coordinating Global Open Science Commons Initiatives



Global Open Science Cloud (GOSC) workshop



International FAIR Convergence Symposium 2020

- Convergence for Global Open Science Infrastructures
- Mobilizing the Global Open Science Cloud (GOSC) Initiative: Priority, Progress and Partnership

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GOSC Vision

- **Open science infrastructure features: Federated, accessible, internationally interconnected, interoperable (UNESCO, 2021).**
- **Cooperation and alignment between Global Open Science Cloud activities in a robust network of trusted research e-infrastructures to connect research resources and all stakeholders to enable innovative science discovery in the dynamically evolving global open science environment.**

GOSC Mission and Objectives

- Encourage cooperation, and ultimately alignment and interoperability between Open Science/Research Clouds/Platforms.
- Help connect various institutional, national, and regional initiatives, laying the foundations for cross-continental, federated, Open Science and FAIR infrastructure, and virtual research environments.
- **GOSC Framework:** suggestions and examples of areas and topics for discussion, cooperation, exchange of ideas.

GOSC Framework - Global Research & Education Network



Objectives:

A fully scalable, end-to-end, software-based global research & education network infrastructure providing networking connectivity for global open science cloud.

Key issues:

1. Concept, techniques and primitives for federated intra- and inter-cloud networking
2. Application- and service-aware virtual networking, going beyond offering it as a pure infrastructure service
3. Creating homogeneous overlay networks on-demand over heterogeneous clouds

GOSC Framework – Cloud Federation



Objectives:

Enhancing open science cloud infrastructures and services by cloud federation. Providing a more flexible, dynamic environment for scientists, and enhance existing computing infrastructure and services with “Cloud” paradigms

Key issues:

1. Scalability based on demand:
Infrastructure aggregation and sharing across sites
2. Dynamic configuration, provisioning, and orchestration of cloud resources
3. Interoperability and Portability
4. Trust, authorization and identification across sites
5. Minimize cost and energy consumption

GOSC Framework – Global Open Data Fabric



Objectives:

Global open data fabric will offer optimal solutions to data management problems, and will increase the ability to generate value from effective big data analytics, which delivers valuable science insights.

Key issues:

1. FAIR Guiding Principles for scientific data management and stewardship
2. CARE Principles for Indigenous data governance
3. Data security and privacy management
4. Trust and sharing policy and mechanism
5. Global open data fabric architecture

GOSC Framework – Cloud Services for Science Community



Objectives:

Design, build and operate a multi-site cloud-based facility and resources to support research across applications, services and systems targeting services research community.

Key issues:

1. Develop once deploy everywhere
2. SLA-based cloud service/application management and QoS monitoring
3. Automatic discovery and composition of services
4. Automatic API Alignment and Software-defined everything
5. Cross-layer cloud service negotiation

GOSC Framework – Global Research Collaboration



Objectives:

Transparent combination of tailored services as a virtual research environment or domain-specific problem-solving environment. Promoting global research collaboration on GOSC.

Key issues:

1. Research requirements to IT alignment
2. Cross-layer and scalable multi-cloud workflow and application adaptation
3. Novel Orchestration and placement methods for tailored cloud service
4. Bilateral or multilateral cooperation mechanism and policy
5. Flexible cost models

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GOSC Initiative

- Initial funding from CAS Program of fostering international cooperation mega-science.
- Support from CODATA to encourage cooperation, alignment and co-design of Case Studies and cross-border testbeds. Initial secretariat support from CODATA and CNIC.
- **Invite participation, support and effort in kind from Open Science programmes for a truly global initiative.**

Key Actions

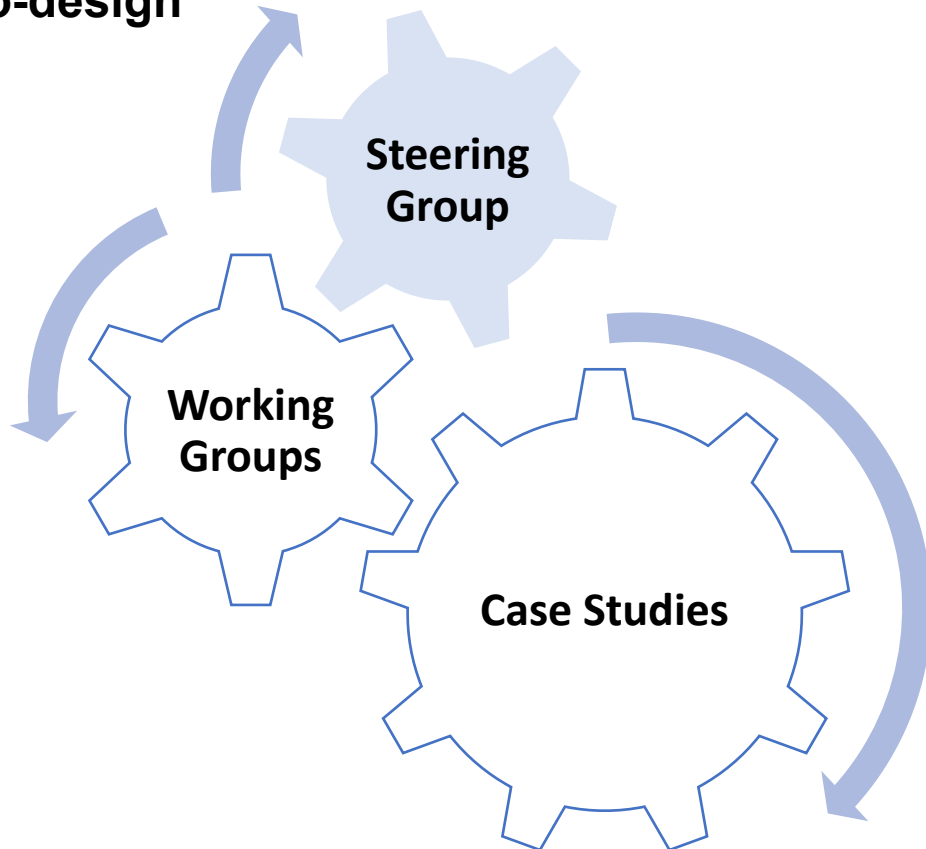
- **Communication Platform**
International Symposium on Open Science Cloud.
- **Policies**
Explore governance rules and sustainable operation mechanism.
Harmonize policies for cross-border sharing of data, resources and services.
- **Implementation technology**
Key Protocols & tool kits for interoperability.
- **Testbed and demonstrations**

Anticipated Outputs

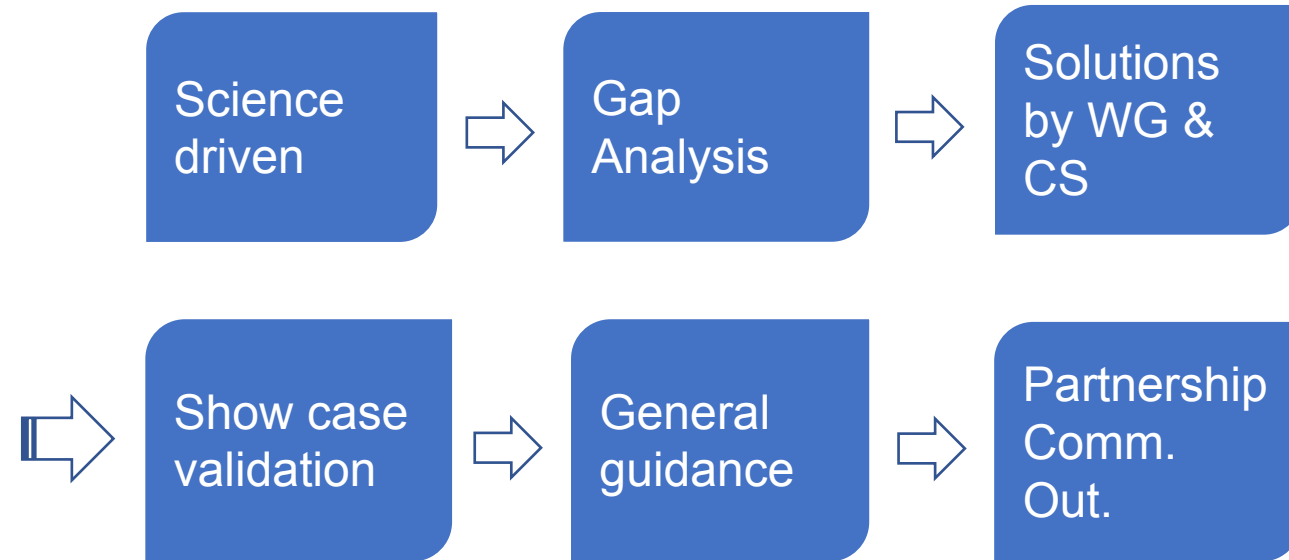
- Consensus & global collaboration network
- Framework for GOSC policy and technics
- Cross-border testbed to demonstrate for global science collaboration & open science
- **Launch one Big Science Program for GOSC (2025-)**

GOSC Co-development Approach

3 Groups building the GOSC cooperation and co-design



6 steps towards GOSC co-development



Progress and Plan

GOSC idea

The GOSC idea proposed during the CODATA Beijing Conference 2019

GOSC cooperation

- Initial cooperation around WGs and Case Studies
- Sharing ideas, scoping issues.
- Recommendations and agreements.

Future GOSC

Sustainable partnerships supporting big science programs in the long run.

2019

2021

2022-2023

2024-2025

Future

GOSC Initiative

- GOSC testbed
- GOSC steering group
- GOSC Thematic Working group and case studies plan

GOSC co-development

- Initial demonstrators and testbeds in technical WGs and Case Studies
- Recommendations and agreements.

Call for International Partnerships

- Open mind, open framework, open collaboration for open data & open science.
- **Coming together is a beginning. Keeping together is progress. Working together is success.** *Henry Ford (1863 – 1947, American industrialist)*



Thank you for your attention!