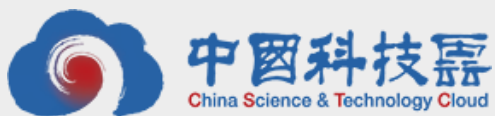


Advancing Intercontinental Connectivity and Interoperability: CSTNet, CSTCloud and GOSC Initiative

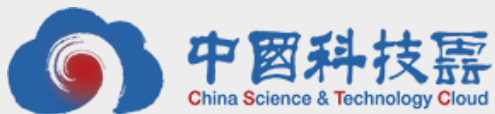


Dr. Haiming Zhang, Ms. Xueting Li
Computer Network Information Center
Chinese Academy of Sciences



Advancing Intercontinental Connectivity and Interoperability:

Part I, CSTNet & CSTCloud



Dr. Haiming Zhang

Computer Network Information Center

Chinese Academy of Sciences



History of Computer Network Information Center, CNIC

Birthplace of China's Internet: China's first router, first domain name service, **China Science and Technology Network**, China Internet Network Information Center (transferred) founded here

Pioneer of China's high-performance computing service: China's first public supercomputing service, Management Center of China National Grid

Contributor to early open data practices of the CAS: National Basic Science Data Center, Science Data Bank, General Data Center of CAS, CAS Scientific Data System, ARP, VSMC



CAS informatization organization supporting research, management and outreach, testbed for technology validation

Campus Distribution



CAS Informatization Plaza



Building at Software Park of CAS



Park at Huairou Science City

Background: CAS Research and Cooperation with the World

Data-intensive & big data driven Science

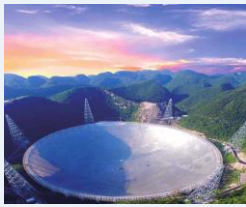
Major Research Infrastructures

National scientific data centers

Field Stations all around China

Major international cooperation projects

FAST of NAO



Wukong and Mozi of NSSC



LHC of CERN



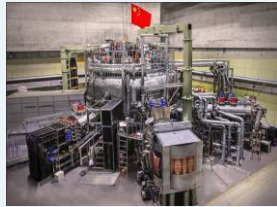
JUNO, LHASSO, CSNS of IHEP



ITER



EAST of HIPS

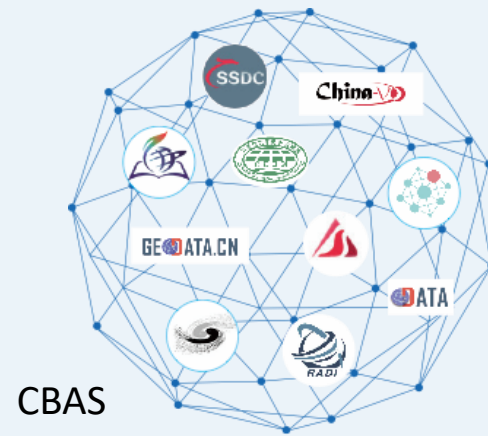


United Nations Department of Economic and Social Affairs Sustainable Development

CBAS INTERNATIONAL RESEARCH CENTER OF BIG DATA FOR SUSTAINABLE DEVELOPMENT GOALS 可持续发展大数据国际研究中心

CASEarth

SUSTAINABLE DEVELOPMENT GOALS



- Dark Matter Particle Explorer (DAMPE)
- Quantum Experiment at Space Scale (QUESS)
- ShiJian-10 (SJ-10)
- Hard X-ray Modulation Telescope (HXMT)
- Tai-jì-1
- Gravitational wave high-energy Electromagnetic Counterpart All-sky Monitor (GECAM)
- Advanced space-based Solar Observatory (ASO-S)
- Einstein Probe (EP)
- Solar wind Magnetosphere Ionosphere Link Explorer (SMILE)

CSTNet: Domestic Network



- High-speed interconnection of **140** scientific elements
- **100Gbps** programmable network
- **1000 PF** computing platform
- **100PB** data backup
- Network Innovation and validation of next-generation IT
- Global scientific collaboration

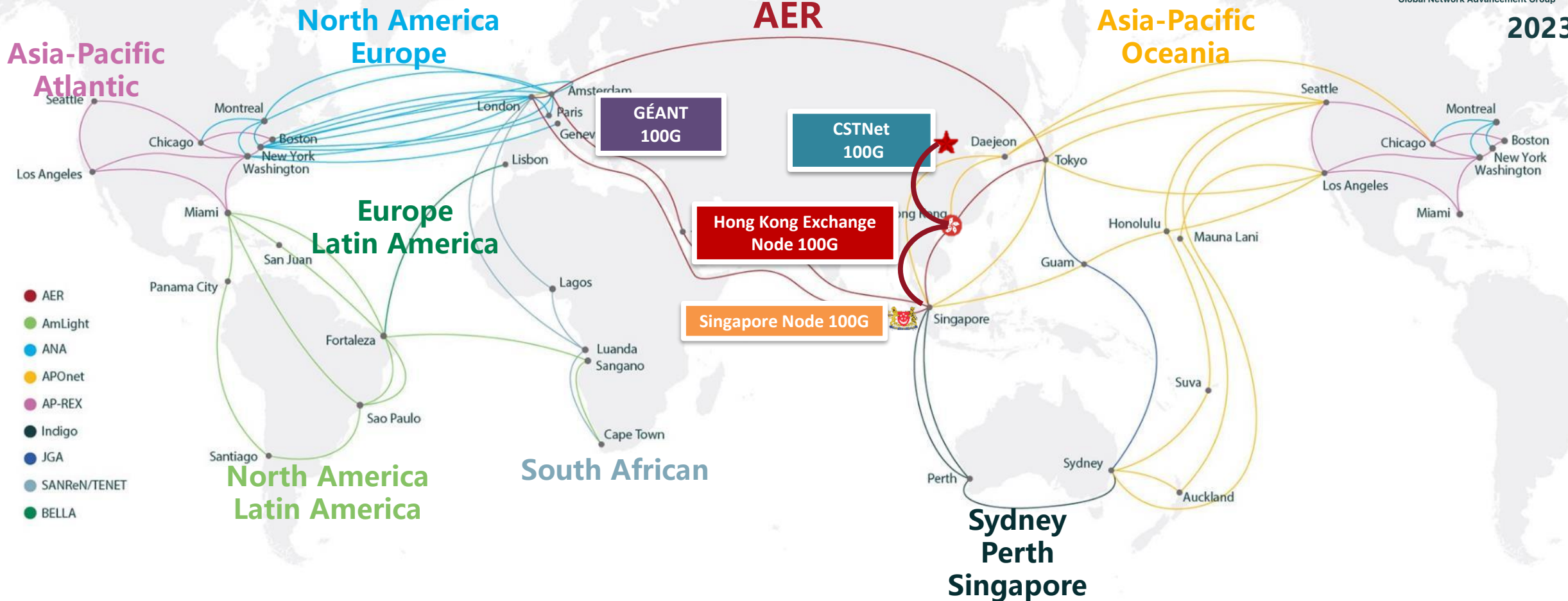
📍 综合性国家科学中心 🔴 枢纽节点 🟡 骨干节点/开放交换节点 🔵 接入节点

CSTNet: International Network Access

HKOEP → GLORIAD → Orient Plus → Central Europe Land cable 10G → SIGOEP → Central Europe 100G



2023

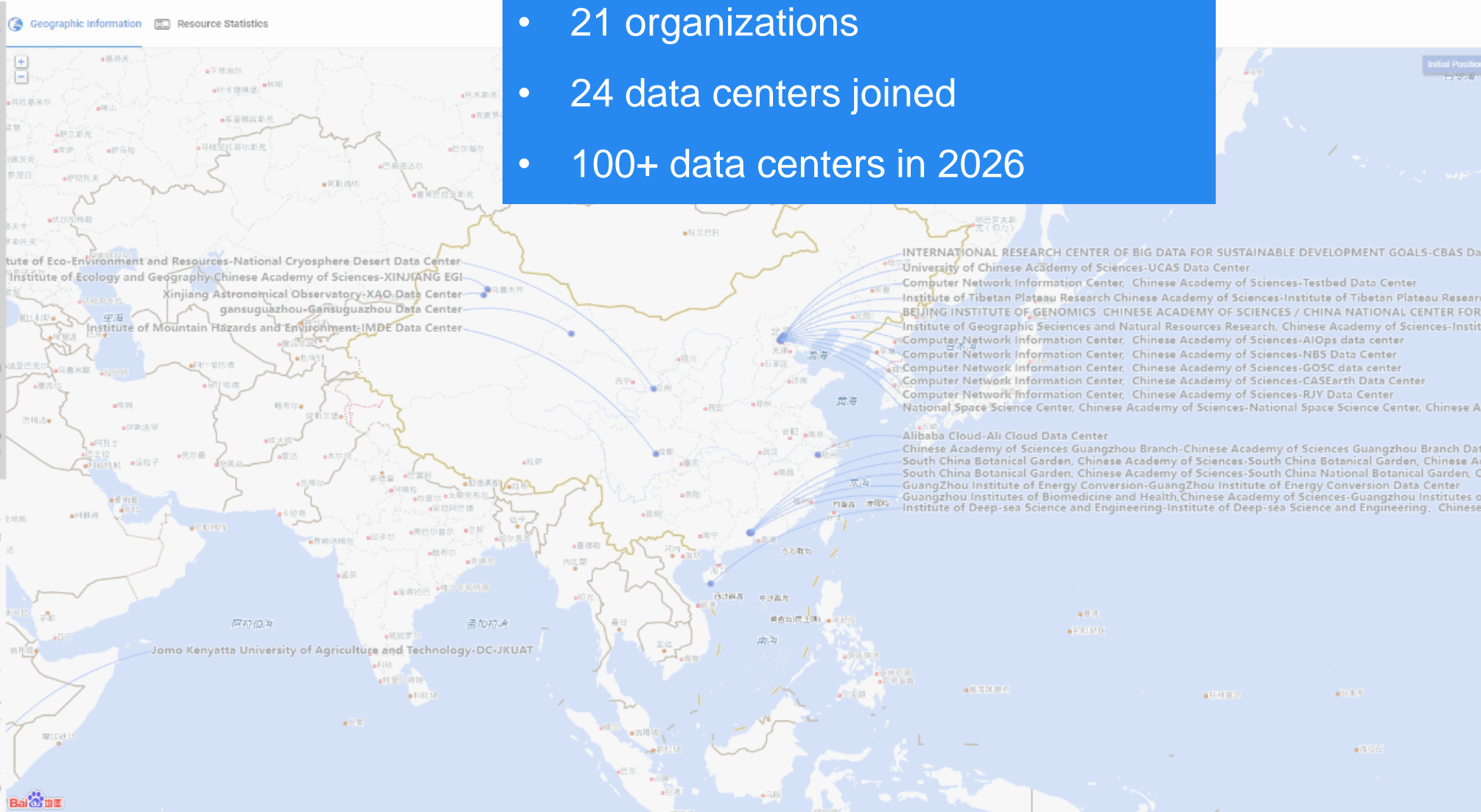


CSTCloud: Research Data Centers

Resource Aggregation

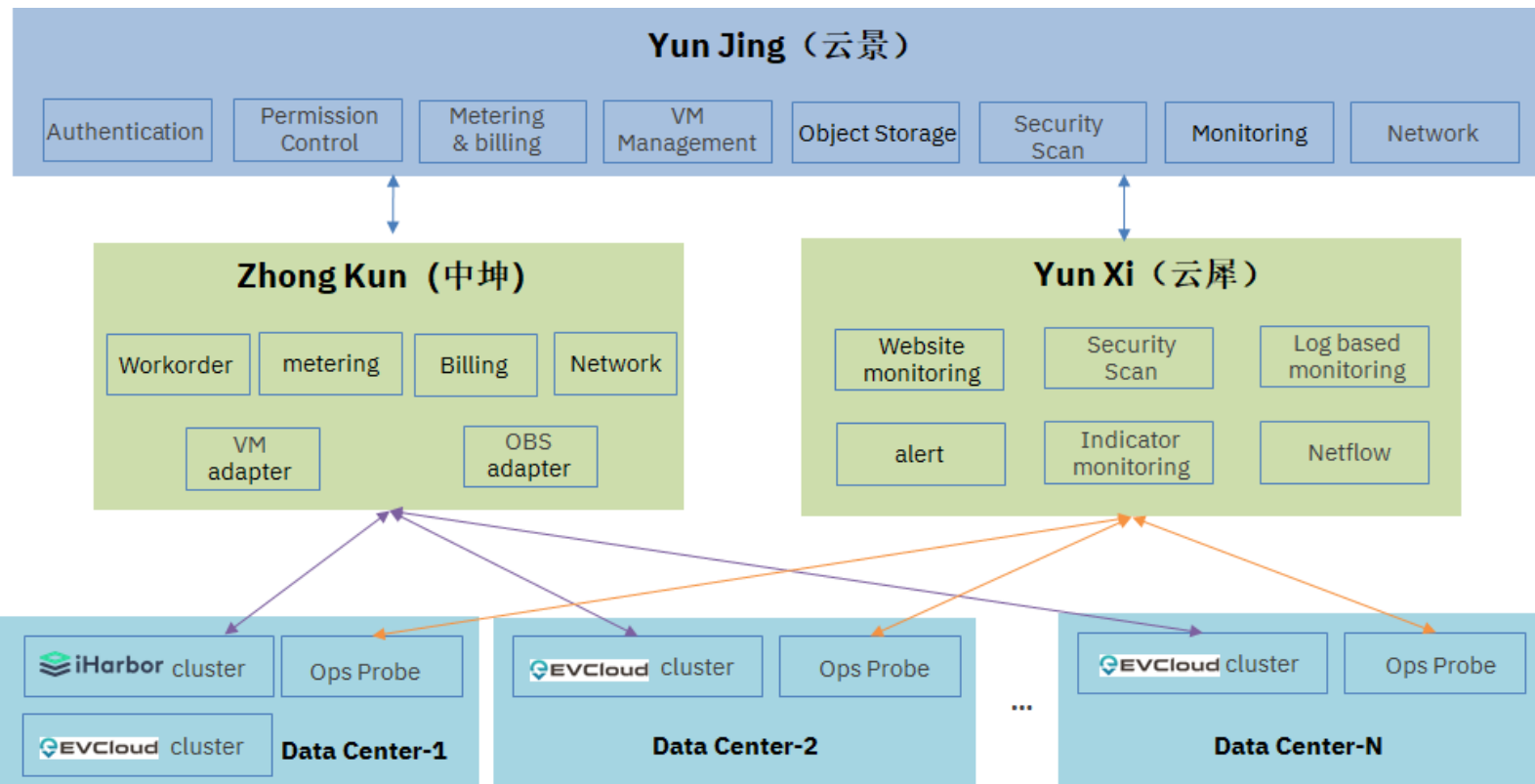
Organization **21** Server Service Unit **24** Bucket Service Unit **10**

- All Institutions
 - Computer Network Information Center, Chinese Academy of Sciences
 - RJY Data Center
 - RJY Service Unit
 - CSTCloud Object Storage by Software Park
 - AIOPS data center
 - AIOPS of CSTCloud
 - AIops-obs
 - CASEarth Data Center
 - CSTCloud Object Storage
 - GOSC data center
 - CSTCloud Federation Env
 - CSTCloud Federation GPU Env
 - EGI Federation
 - VMware test
 - GOSC Object Storage System
 - Testbed Data Center
 - testbed unit
 - testbed unit
 - NBS Data Center
 - NBSDC
 - INTERNATIONAL RESEARCH CENTER OF BIG DATA FOR SUSTAINABLE DEVELOPMENT GOALS-CBAS Data Center
 - CBAS Data Center
 - SDGs
 - SDG Object Storage System
 - South China Botanical Garden, Chinese Academy of Sciences
 - South China Botanical Garden, Chinese Academy of Sciences
 - South China Botanical Garden (SCBG)
 - South China Botanical Garden (SCBG)
 - South China Botanical Garden (SCBG)
 - South China National Botanical Garden, Chinese Academy of Sciences
 - South China National Botanical Garden (Admin)
 - South China National Botanical Garden
 - scnbg obs
 - Northwest Institute of Eco-Environment and Resources
 - National Cryosphere Desert Data Center
 - NDCD EVCloud
 - NDCD obs
 - GuangZhou Institute of Energy Conversion
 - GuangZhou Institute of Energy Conversion Data Center
 - GuangZhou Institute of Energy Conversion
 - Institute of Tibetan Plateau Research, Chinese Academy of Sciences
 - itpcas EvCloud
 - Chinese Academy of Sciences Guangzhou Branch
 - Chinese Academy of Sciences Guangzhou Branch Data Center
 - Chinese Academy of Sciences Guangzhou Branch
 - Institute of Mountain Hazards and Environment



- 21 organizations
- 24 data centers joined
- 100+ data centers in 2026

Federated Cloud Solution – YunKun Software



Unified AAI

- **Unified AAI**: Based on SAML, OIDC and Oauth, the AAI has established according to the international standard and protocols
- **Yun Jing(云景)** - Micro front-end: unified service web interface
- **Zhong Kun(中坤)** – Middleware: metering, billing, monitoring, and resource metadata management
- **Yun Xi (云犀)** – AIOps: Integrated monitoring and alarm of networks, high-performance computing, cloud computing, data and applications
- **Cloud Resource Management (IaaS)** : VM - EVCloud 奔维, OBS - iharbor 港泊

Fig. Architecture of YunKun Software



<https://service.cstcloud.cn>
<https://gitee.com/cstcloud-cn>

Open Source, more than 1,200,000 lines

User Interfaces – YunKun Software



VM

Integrated Cloud Service Platform

Dashboard Server Object Storage Billing Monitoring Support Wallet More

Personal Account Balance: -69454.49Points

Personal Resource: Servers, Disks, Orders, Vouchers

Personal Server Detail: 223.19, Running, 张艳

Server Information: Initial OS Username: cnic, Server ID: 8hg06jmrq05u8s7n6hnq2vyp-i, CPU: 8 Cores, Memory: 16GB, OS: Windows-Server-2022

Organization: Computer Network Information Center, Chinese Academy of Sciences

Service Unit: AIOPS of CSTCloud

Cloud Platform: EVCloud

object storage

Object Storage: zhangyan002

Bucket: CSTCloud Object Storage - zhangyan002

Actions: Create Folder, Upload File, Delete File, Share, Batch Download, Comprehensive Retrieval

File name	Upload Time	File Size	Access Rights	Operation
02test	2/18/2024, 11:10:00 AM	-	Private	Delete Share
333	1/23/2024, 4:19:37 PM	-	Private	Delete Share
01test	1/8/2024, 2:50:06 PM	-	Private	Delete Share
test-20231221	12/21/2023, 11:23:55 AM	-	Private	Delete Share
test2	12/21/2023, 10:57:33 AM	-	Private	Delete Share
test3	12/21/2023, 2:08:26 PM	-	Private	Delete Share

Network monitoring

智能运维系统 – 云犀软件支撑

监控: 中国科技网, 科技云通行证, 网站群, 云犀服务器, Ceph, TiDB

邮件系统: 信息监控, 拓扑图, 资产管理

时间: 2024-09-27 16:38 - 2024-09-27 16:39

Datacenter monitoring

云犀支持 v1.1.9 2024-9-27 16:22:03

告警: 0 报警

核心服务器节点状态: Healthy, 233/233/233, 49TB/184TB, 27%

GOSG中国节点虚拟机-网络状态: 17, 1TB/2111TB, 0%

GOSG中国节点虚拟机Ceph集群-CEPH状态: 52/16, 6%, 118GB/141GB, 0.01TB/0.56TB, 2%

GOSG中国节点TiDB数据库-TiDB状态: 告警

云主机动态: 告警

对象存储动态: 告警

Demonstration in the Five-hundred-meter Aperture Spherical Radio Telescope (FAST)

The important progress made by FAST was selected as one of China's top ten scientific and technological progress news in 2022

- Based on CSTNet, the transmission network between FAST computing environments in Guizhou Normal University, Huairou and Zhijiang National Laboratory was constructed
- Based on CSTCloud, FAST data pipeline was deployed in the mode of data factory to support streaming computing

paper in *Nature*

[nature](#) > [articles](#) > [article](#)

Article | [Open Access](#) | [Published: 08 June 2022](#)

A repeating fast radio burst associated with a persistent radio source

[C.-H. Niu](#), [K. Aggarwal](#), [D. Li](#), [X. Zhang](#), [S. Chatterjee](#), [C.-W. Tsai](#), [W. Yu](#), [C. J. Law](#), [S. Burke-J. M. Cordes](#), [Y.-K. Zhang](#), [S. K. Ocker](#), [J.-M. Yao](#), [P. Wan](#), [Y. Feng](#), [Y. Niino](#), [C. Bochenek](#), [M. Cruces-Connor](#), [J.-A. Jiang](#), [S. Dai](#), [R. Luo](#), [G.-D. Li](#), [C.-C. Miao](#), [J.-R. Niu](#), [R. Anna-Thomas](#), [J. Sydnor](#), [D. Ste-Wang](#), [M. Yuan](#), [Y.-L. Yue](#), [D.-J. Zhou](#), [Z. Yan](#), [W.-W. Zhu](#) & [B. Zhang](#) [Show fewer authors](#)

[Nature](#) **606**, 873–877 (2022) | [Cite this article](#)

20k Accesses | 1491 Altmetric | Metrics

A repeating fast radio burst associated with a persistent radio source

key science project for supporting follow-up observations; and the FAST collaboration realfast team for their technical support. Some data presented herein were obtained at M. Keck Observatory, which is operated as a scientific partnership among the California Institute of Technology, the University of California and the National Aeronautics and Administration. The observatory was made possible by the generous financial support W. M. Keck Foundation. This study is based in part on data collected at the Subaru Telescope which is operated by the National Astronomical Observatory of Japan. The National Radio Astronomy Observatory is a facility of the National Science Foundation operated under cooperative agreement by Associated Universities, Inc. This work was supported by the Science and Technology Cloud (CSTCloud) and China Environment for Network Innovation (CENI). We thank the staff of CSTCloud/CENI for their support during data processing.

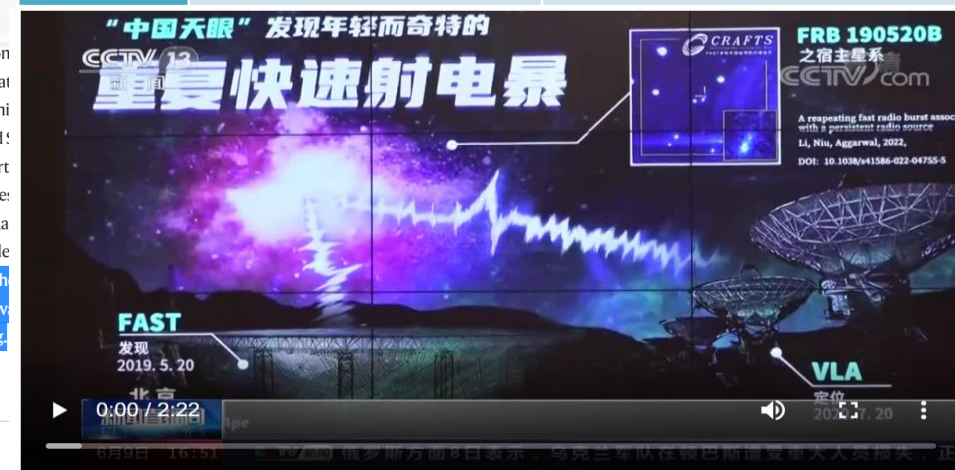
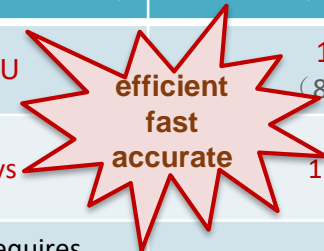
Author information

These authors contributed equally: C.-H. Niu, K. Aggarwal, D. Li

FAST Data /month :

5 dataset 130 thousand files about 17.5TB

	Traditional handcrafts (Self built environment)	Fully automatic (CSTCloud)
computing	40 GPU	10 GPU (80 vGPU)
single group processing time	14 days	1.36 days
human input	Each step requires manpower	Fully automatic operation
fault tolerance support	Not Supported	Automatic fault-tolerant retry(GPU error 0.3~1.0%)
Running results	Workshop mode	Factory mode



Sustainable Development Goals Big Data Platform

- UN SDG Big Data Platform aims to integrate Big Earth Data for SDGs monitoring and prediction and provide decision support for SDGs implementation.
- The SDG Big Data Platform has explored many innovative technologies, including the unified scheduling and aggregation services of ultra-large-scale distributed computing resources, the management and computation of PB-level gridded data, and the interactive online analysis of Big Earth Data. All these will guarantee the effectiveness and efficiency of SDGs implementation progress monitoring, thus contributing to the United Nations 2030 Agenda.

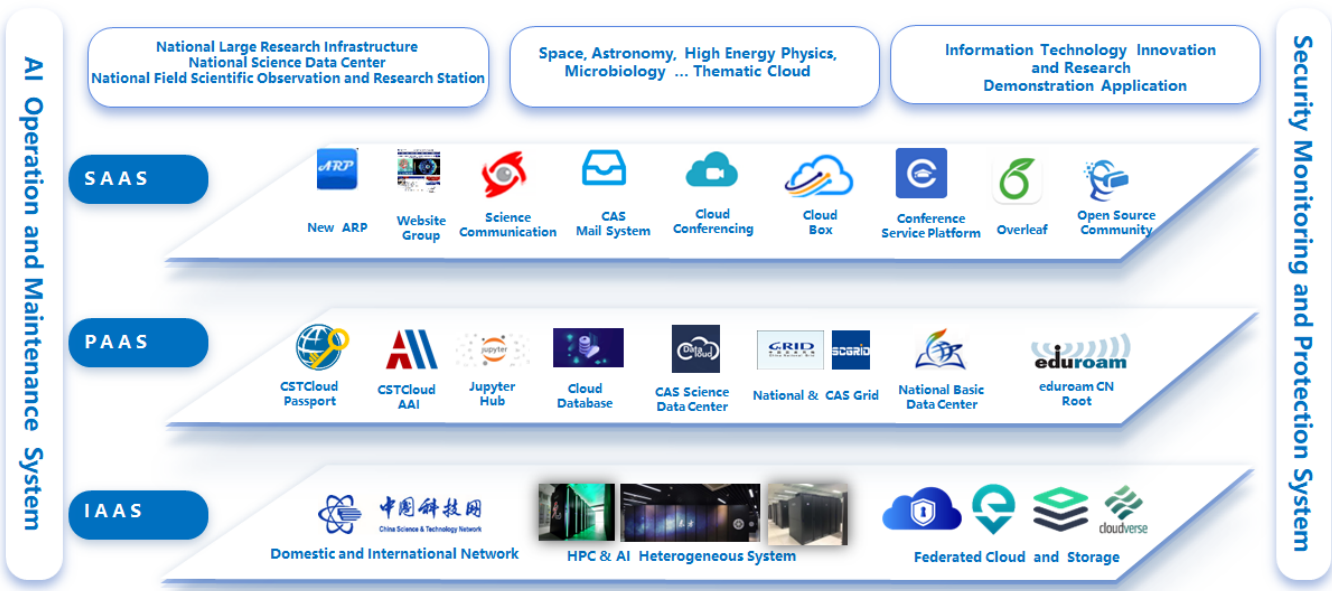


the UN General Assembly (UNGA) Csaba Körösi Visit CBAS



CSTCloud: Network, Hardware, Software, Services

- As one of the key national e-infrastructures, CSTCloud fully support multidisciplinary open scientific research with integrated cloud services for the discovery, usage and delivery of S&T resources.
- Supported by 13th,14th Five-year National informationization plans.



Over 100 types of services



CSTCloud Team



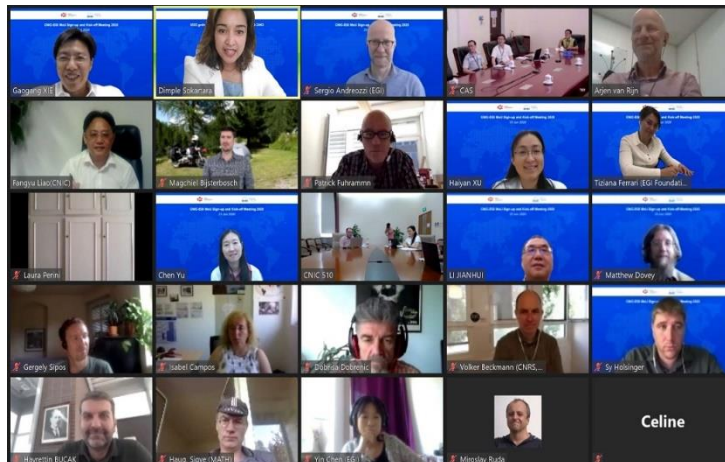
中國科技網
China Science & Technology Network

中國科技雲
China Science & Technology Cloud

Intercontinental Connectivity Cooperation



Launch of Cooperation with GEANT



Launch of Cooperation with EGI



Support Academic Activities with GOSC partners



Launch of Cooperation with African Open Science Platform East Node

GOSC Partners and CNIC:

Advancing Global Connectivity and Interoperability:

Part II, GOSC Initiative & Future Envisions

Ms. Xueting Li

Computer Network Information Center

Chinese Academy of Sciences



Trend of Open Science Movement

UNESCO
The Open Science movement

UNESCO

2015



SCIENCE | BUSINESS
Going global: connecting
the clouds

2020.2



UNESCO
Draft Recommendation
on Open Science

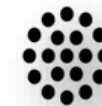
2021.5

2012
Science as an open
enterprise

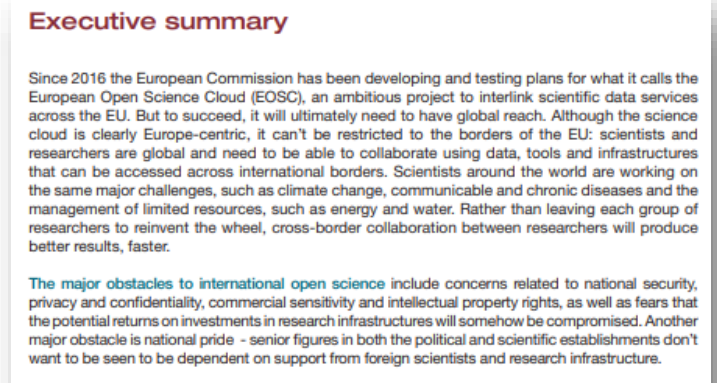
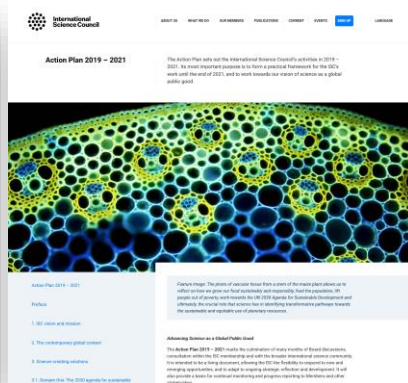
2019
UNESCO
Global open science roadmap

ISC
Action Plan 2019 – 2021

2021
ISC
Statement of Open
Science



International
Science Council



- I. 2012. Science as an open enterprise. The Royal Society Science Policy Centre report 02/12, <https://royalsociety.org/topics-policy/projects/science-public-enterprise/report/>
- II. Science Business. 2020. Going global: connecting the clouds. Available at: <https://sciencebusiness.net/report/going-global-connecting-clouds>
- III. International Science Council. The Action Plan 2019-2021. <https://council.science/actionplan/>
- IV. CODATA. Making Data Work for Cross-Domain Grand Challenges: the CODATA Decadal Programme. <https://codata.org/initiatives/decadal-programme2/>
- V. UNESCO. 2021. Draft recommendation on open science. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000378841/PDF/378841eng.pdf.multi>

The leading lights in open science are Northern European and Latin American countries, according to a 2018 paper⁷ by the OECD, which cites research from 2015. Like the EU, most of the world's advanced economies, including Japan, South Korea, Australia, Canada, China and the U.S., are looking to open up their research to some extent. For example, the Chinese Academy of Sciences is leading an effort to develop 20 national data centres, covering all types of research data, which will feed into an overarching cloud infrastructure called CSTCloud, similar to the EOSC, according to a report⁸ by Varsha Khodiyar of Springer Nature. The Chinese Academy of Sciences envisions that the CSTCloud may one day be interconnected with the EOSC, and eventually to other similar regional initiatives as they are developed, creating a truly global network for research data, according to Khodiyar's report.

Open Science and Open Science Infrastructures

Open science infrastructures around the world



EUROPEAN OPEN SCIENCE CLOUD

European Open Science Cloud 2015

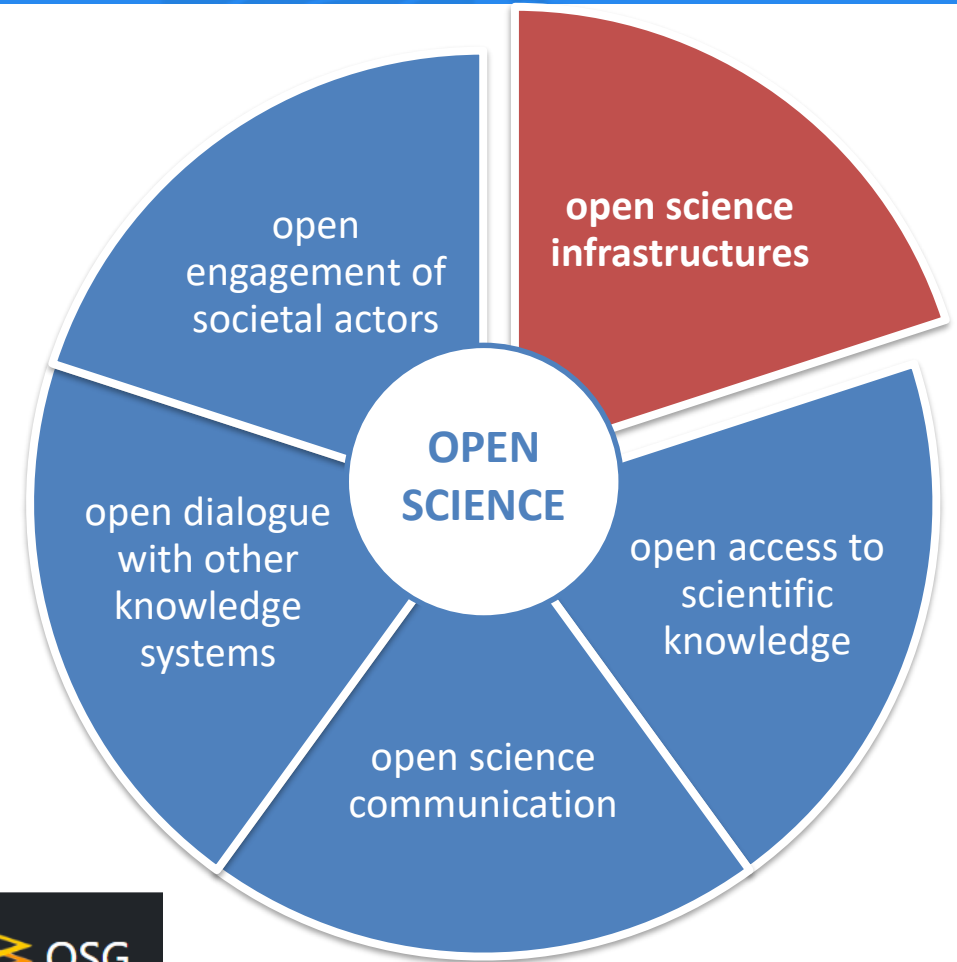


中國科技雲
China Science & Technology Cloud

China Science & Technology Cloud 2017



African Open Science Platform 2018



Open science key pillars



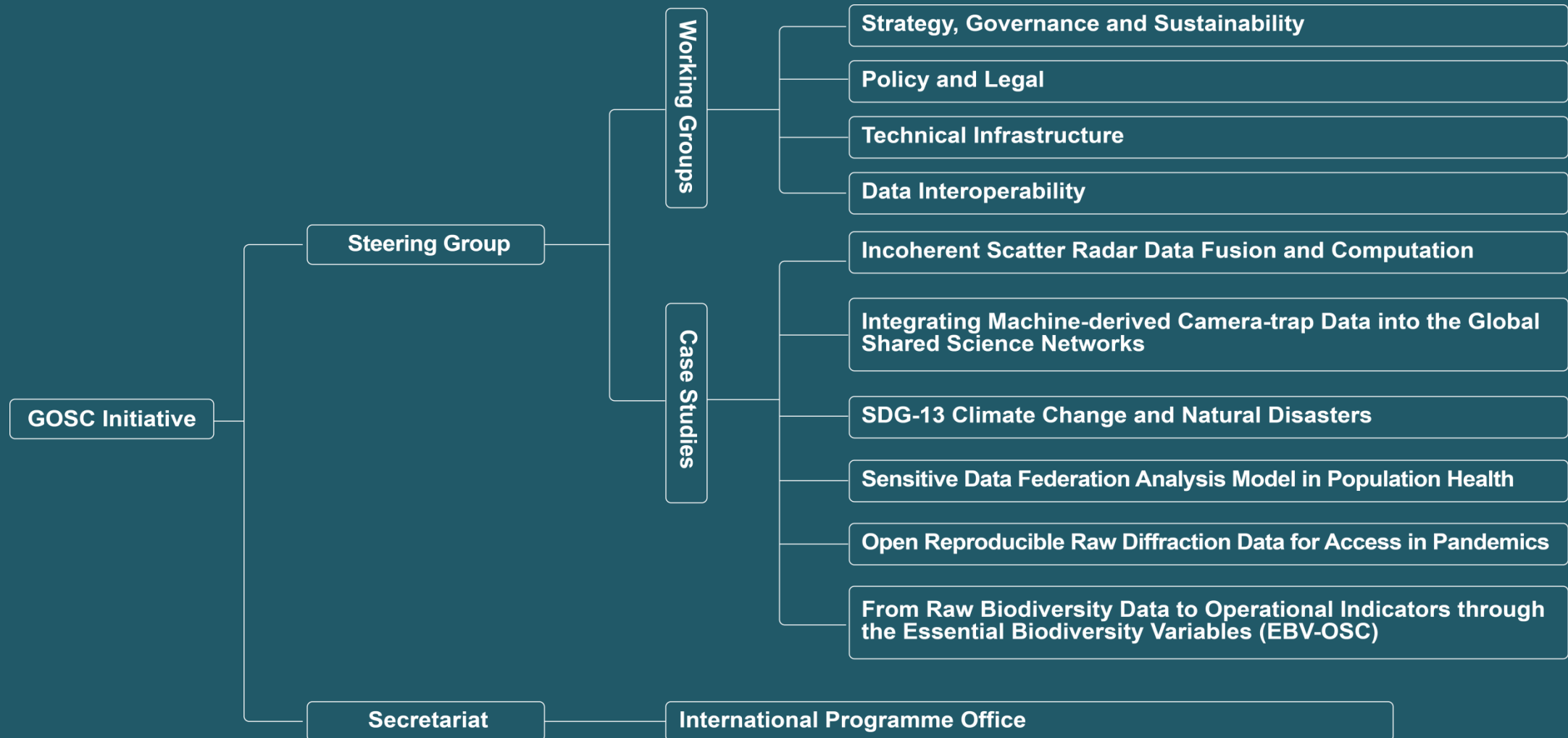
.....
It is urgent to break down open science silos and promote OSI connectivity and interoperability in order to address grand human challenges.

2019 CODATA Conference



Vision: The GOSC vision is of a global Open Science environment that connects trusted research e-Infrastructures to enable innovative scientific discovery.

Mission: The GOSC mission is to encourage cooperation, alignment and ultimately interoperability among Open Science research clouds/platforms. We aim to help connect various institutional, national, and regional initiatives, laying the foundations for cross-continental, federated, Open Science and FAIR infrastructure, and virtual research environments.



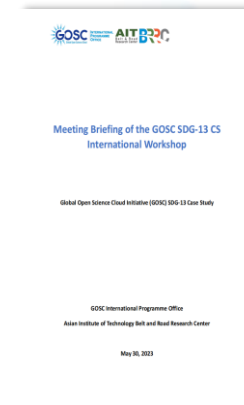
GOSC Progress: Policy and Governance



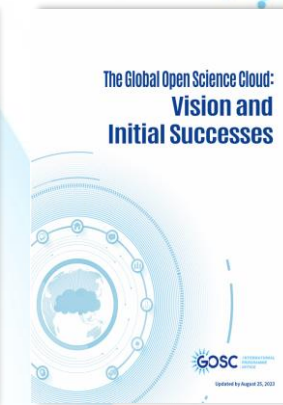
- [The Global Open Science Cloud: Vision and Initial Successes](#) offers comprehensive insights into the current progress and future directions for the GOSC Initiative.
- [The Global Open Science Cloud Landscape](#) discusses the concept and landscape of GOSC, aiming to review the existing work, examine the available resources, and identify collaboration opportunities.
- [The GOSC SDG-13 Bangkok Workshop Meeting Briefing](#) captures the essence of cross-disciplinary research and collaboration toward UN SDG-13 on climate change.
- [The Global Open Science Cloud \(GOSC\) Flyer 2023](#) offers a concise introduction to the general GOSC framework.
- [The Open Science Cloud \(GOSC\) Annual Report 2022](#) outlines the significant achievements and milestones the GOSC Initiative has accomplished in 2022.
- Li J, Wu C, and Piao Y, et al. 2023. How can we support the UN Sustainable Development Goals when open data is stagnant? Science Bulletin (Beijing), 68(12), 1216–1218. DOI: 10.1016/j.scib.2023.05.021
- Zhang L, Li J, and Uhlir P, et al. 2023. Research e-infrastructures for open science: The national example of CSTCloud in China. Data Intelligence, 5(2), 355–369. DOI: 10.1162/dint_a_00196
- Li Y, Zhang H, Zhang L, et al. 2023. P2P broker model based Open Science federated cloud system framework (In Chinese). High Technology Letter, 33(12):1233~1243



GOSC Landscape 2021.10



GOSC SDG-13 Meeting Briefing 2023.05



GOSC White Paper 2023.08



GOSC Report 2022 2023.08

Background

The UNESCO Recommendation on Open Science affirms the importance of Open Infrastructure as one of the key pillars of Open Science. The Recommendation calls for the development of multinational, regional, and national Open Science platforms, as integrated and federated e-infrastructures, and urges stakeholders to ensure that no one is left behind. The idea to bring together partners to co-design and co-build the Global Open Science Cloud (GOSC) originated at the CODATA 2019 Beijing conference. Launched in 2021, the GOSC Initiative is now an important component of the ISC-CODATA Decadal Programme Making Data Work for Cross-Domain Grand Challenges, in the International Science Council's Action Plan, and is supported by seed funding from the Chinese Academy of Science (CAS), CODATA and the Computer Network Information Center (CNIC). CAS work together to coordinate and support the international collaborations around GOSC.

What is GOSC?

The GOSC Initiative aims to connect worldwide research e-infrastructures and stakeholders to enable innovative scientific discovery to address global challenges such as the UN SDGs, in a dynamically evolving global open science environment.

Vision

The GOSC vision is of a global Open Science environment connecting trusted research e-infrastructures to enable innovative scientific discoveries.

Mission

The GOSC mission is to facilitate accessibility, interoperability, interoperability, and inclusiveness of worldwide research e-infrastructures for Open Science and international research collaborations.

GOSC International Programme Office (GOSC IPO)

Co-sponsored by CODATA and CNIC, CAS, the GOSC International Programme Office (GOSC IPO) was established in early 2022, serving as a coordinating and facilitating body to support science communication and stakeholder engagement within the GOSC Initiative.

Governance

A steering group (SG), four working groups (WGs), and an initial set of six case studies (CSs) have been formed to support the implementation and dissemination of the GOSC Initiative. In addition, the GOSC Secretariat has been established to coordinate the internal bodies within GOSC.

1 SG: provides strategic guidance for project management and supports the routine work of other groups.

4 WGs: work on harmonized policies, interoperable protocols, transparent services, and sustained mechanisms for the design, development, and deployment of GOSC.

Strategy, Governance, and Sustainability
Through information exchanges and experiences sharing, the WG seeks to leverage the governance models of worldwide CSC initiatives and select the best fit for GOSC while coordinating action steps to implement it.

Policy and Legal
Based on a review of Open Science products and practices as the context of operational platforms, the WG aims to develop practices among existing guidelines, seek potential alignment on policy and legal interoperability among CSCs, and get implemented in the selected case studies.

Technical Infrastructure
The WG focuses on achieving technical connectivity and interoperability among worldwide infrastructures by leveraging and improving existing location capabilities and interoperability frameworks to support international research collaborations.

Data Interoperability
Based on the FAIR processes (Findable, Accessible, Interoperable, and Reusable), this WG seeks to break down the silos among CSCs that may inhibit data sharing and promote collaboration and alignment in the area of data interoperability.

GOSC Flyer 2023.08

6 CSs:

were initially selected for demonstration and validation, providing a concrete grounding and exemplars for the above topics.

Innovative Scatter Radar Data Fusion and Computation

This CS supports the international collaboration of the radar community, particularly with a focus on data and technical interoperability. The management of large-scale radar data provides an excellent scenario to validate the technical maturity of the GOSC testbed.

Integrating Machine-derived Camera-trap Data into the Global Shared Science Networks

Through a collaborative platform for global camera-trap data sharing and analysis service, this CS will contribute to global biodiversity research, especially focusing on distributed big data management, intelligent analysis, and cloud computing for high-quality integration and optimization for camera-trap data management.

SDG-13 Climate Change and Natural Disasters

CASCeM for Sustainable Development Goals (CASCeM-SDGs) is a platform system of data sharing and online computing, measuring, and evaluating SDG indicators. Supported by this system, the CS mainly focuses on climate change and natural disasters in the SDG-13 field, addressing technical, semantic, and policy interoperability to support decision-making.

Sensitive Data Federation Analysis Model in Population Health

This CS seeks to demonstrate better ways of sensitive data sharing. Consensus agreed FAIR experimental profiles will be created based on the FAIR data points established in various GOSC regions. The feasibility of distributed analysis over datasets held in various regions will be explored and demonstrated. Commonly accepted standards will be used throughout to facilitate the implementation of the CS.

Open Reproducible Raw Diffraction Data for Access in Pandemics

This CS would lead to single, definitive, proven results derived from the raw diffraction data sets, which is important to the crystallographic community and the broader research community for drug discovery, especially for the pandemic crises that COVID-19 poses for society.

From Raw Biodiversity Data to Operational Indicators through the Essential Biodiversity Variables (EBV-GSC)

The objective of this CS is to operationalize EBV indicators by targeting the highest levels of FAIRness (Findable, Accessible, Interoperability, Reusable) for both data and source code implementation, so that data and tools can be widely shared and reused.

GOSC Progress: Testbed Prototype



We want to supply key components on network connectivity, secure AAI, computing federation, FAIR data and policy alignment.

VIEW OUR SERVICES

CSTNET

International resources are the dominant feature of CSTNET. We have successfully supported a number of international cooperation projects...

CSTCloud AAI

China Science and Technology Cloud Authentication and Authorization Information (CSTCloud AAI) which provides advanced and complete...

CSTCloud Federation

Magna comitudo condequar: est sanctus extra covering: sedibus: sociis: ut: tenetur: que: conetur: ut: dicitur: Sed: conetur:...

Resources Explorer

A comprehensive and open dataset of research information covering publications, research ideas, research software and service system links...

Policies & Training

What if we can have an open science cloud connecting more and more existing research facilities around the globe?

Cloud Native DevOps CI/CD

Drone is a modern continuous integration platform that enables busy teams to automate their build, test, and release workflows.

Use in Virtual Collaboration

Data-Repo-Lake

DataRL brings software engineering best practices and applies them to data engineering.

Use in Virtual Collaboration

FaaS Service

FAAS Service is a serverless service built on Kubernetes where you can create and host serverless function apps.

Use in Virtual Collaboration

Code Server

Code on any device with a consistent development environment. Self-hosted developer workspaces.

Use in Virtual Collaboration

Gitea

This project is to provide the easiest, fastest, and most painless way of setting up a self-hosted Git service.

Use in Virtual Collaboration

Code Run

Build, test, and discover front-end code online, like Codepen.

Use in Virtual Collaboration

Draw.io

Draw.io is a configurable diagramming/whiteboarding visualization application.

Use in Virtual Collaboration

RAW Graphs

RAWGraphs is an open web tool to create custom vector-based visualizations on top of the amazing d3.js library.

Use in Virtual Collaboration

JSON Visual

JSON Visual is a tool that generates graph diagrams from JSON objects.

Use in Virtual Collaboration

Jupyter

JupyterLab is the latest web-based interactive development environment for notebooks, code, and data.

Use in Virtual Collaboration

MySQL

Provides cloud-native MySQL database, users can pre-configure through a visual interface.

Use in Virtual Collaboration

MongoDB

Provides cloud-native MongoDB database, users can pre-configure through a visual interface.

Use in Virtual Collaboration

PostgreSQL

Provides cloud-native PostgreSQL database, users can pre-configure through a visual interface.

Use in Virtual Collaboration

H2Oai

H2Oai is a fully open source, distributed in-memory machine learning platform with linear scalability.

Use in Virtual Collaboration

Jupyter with Spark on K8S

JupyterLab in Kubernetes and run a Spark application in client mode. It will release the resources automatically.

Use in Virtual Collaboration

IT-Tools

IT Tools is a free and open-source collection of handy online tools for developers & people working in IT.

Use in Virtual Collaboration

Virtual Collaborative Community

Data Management by Coding

NAME	ORGANIZATION	CREATED TIME	ROLE	OPERATION
sdg13	sdg13@cnrc.gov.cn	2023-10-23 03:35:43	Manager	Go to use
sdg4everity	sdg4everity@cnrc.gov.cn	2023-10-24 09:10:12	Manager	Go to use
sdg4ai	sdg4ai@cnrc.gov.cn	2023-10-24 09:10:12	Manager	Go to use

Data Reuse by Least Effort



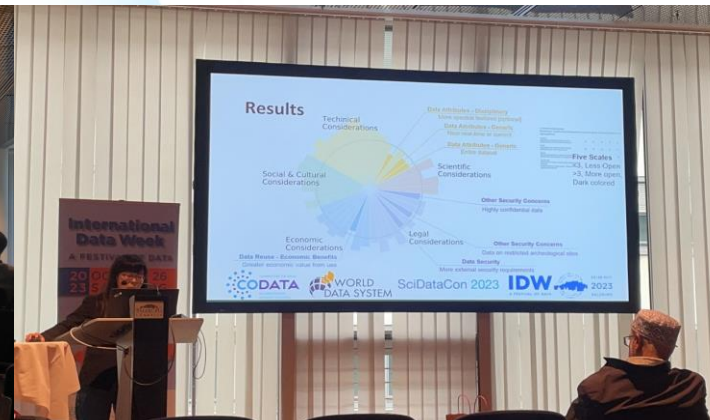
GOSC Progress: Global Impact



25+ international academic conferences, and around **160** regular online international exchange meeting, with over **1,700** attendees (2021-2024).



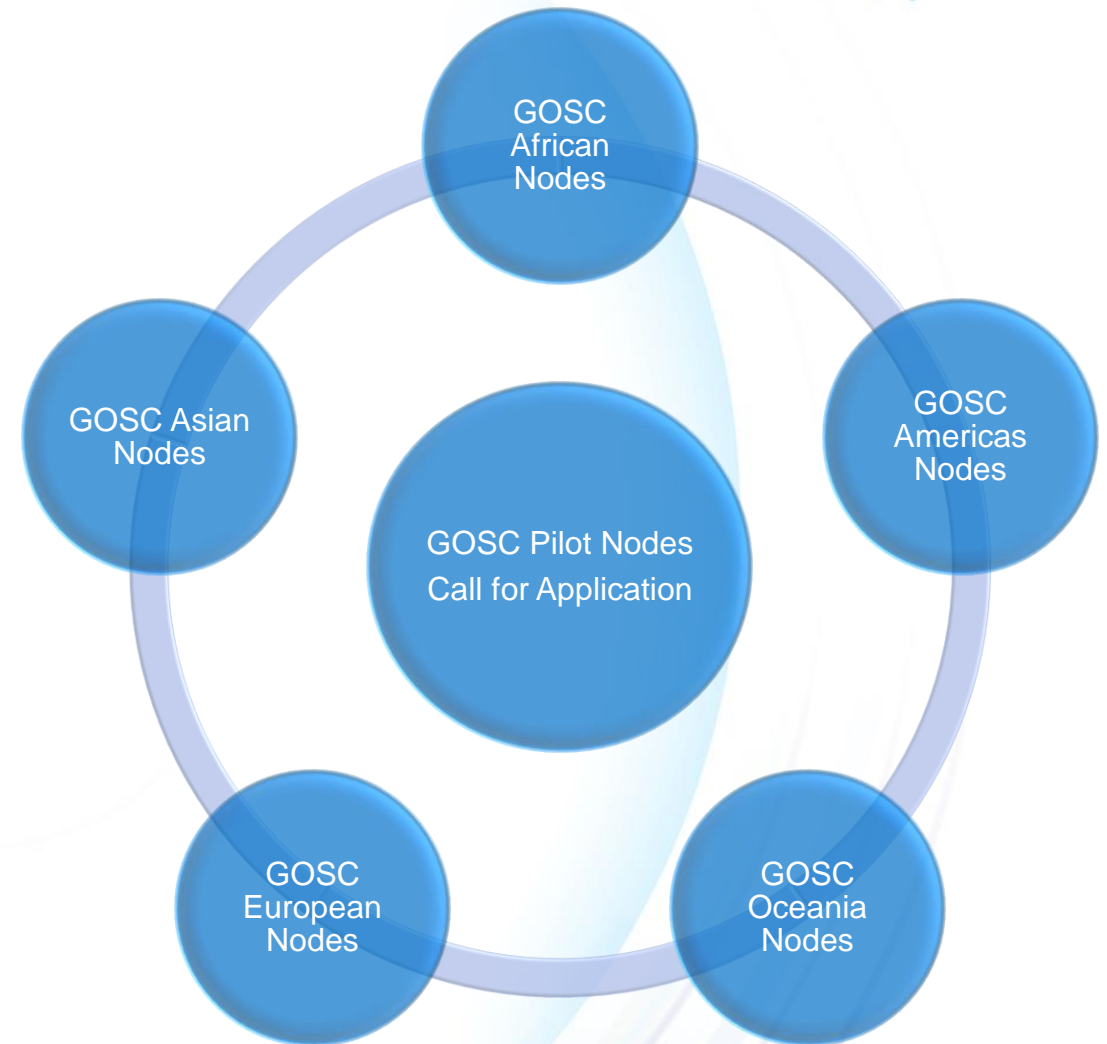
Workshop Co-chairs
From the left to the right are: Professor Jianhui Li from CNIC, CAS, Professor Gensuo JIA from IAP



Next Step: GOSC Pilot Nodes Implementation¹



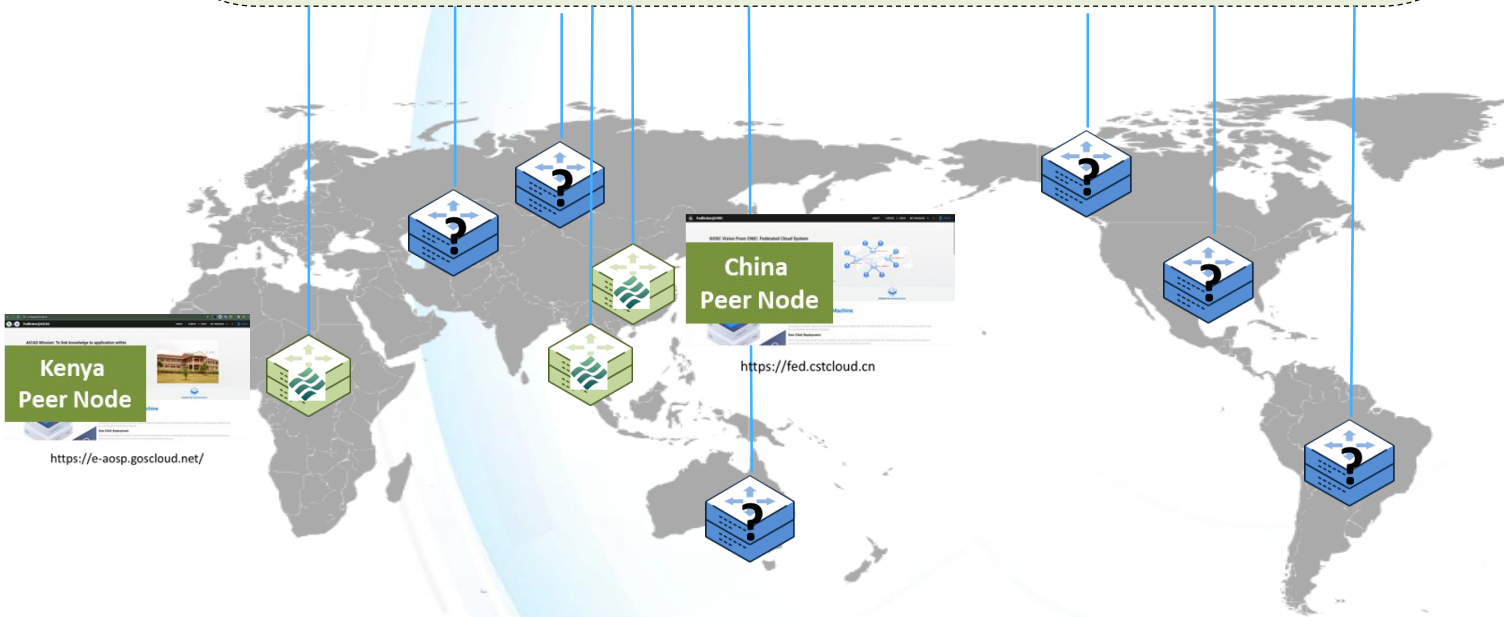
- **GOSC Testbed:** Supporting the first round of pilot nodes to facilitate seamless resource sharing and collaboration among research e-infrastructures through advanced network and scheduling services.
- **GOSC Demonstrations:** Focusing on 5-6 key domains, such as agriculture, climate change, population health, and disaster risk reduction, to showcase how global data and computing resources within GOSC can address urgent global challenges.
- **GOSC Capacity Building:** Supporting open science and SDGs training programs to enhance researchers' skills worldwide, particularly in underrepresented regions, fostering the equitable growth of open science.



Next Step: GOSC Pilot Nodes Implementation₂



GOSC Resource Sharing Blockchain



Overall Planning of the GOSC Pilot Nodes



GOSC-Kenya Partnership



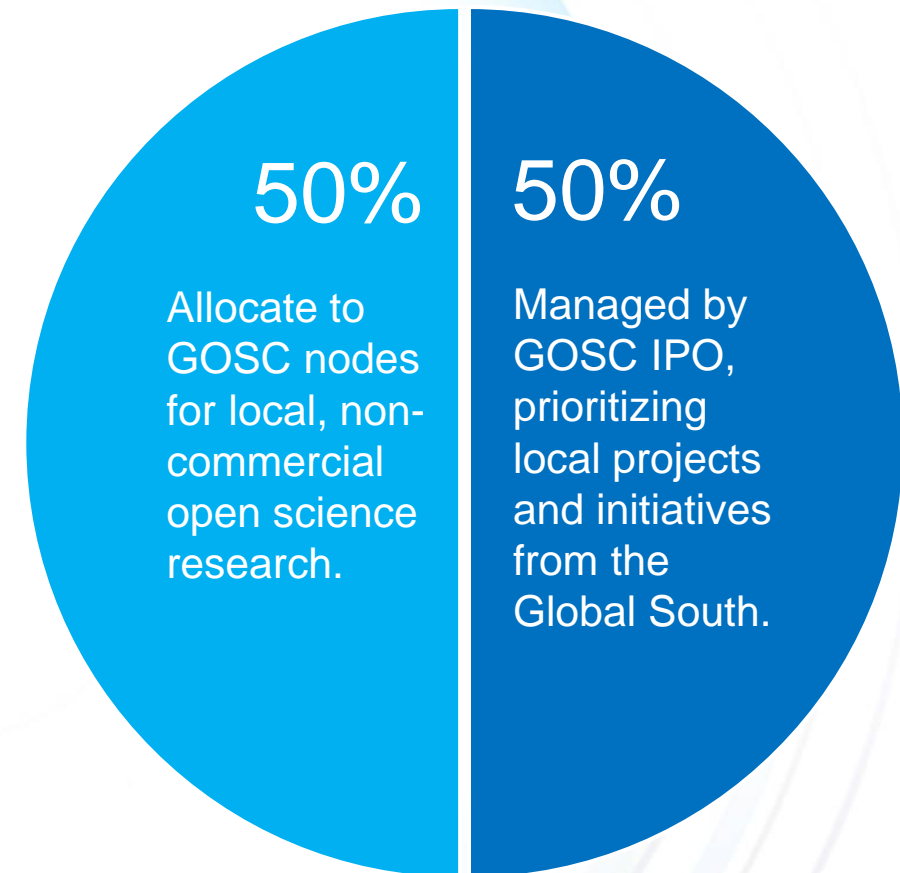
GOSC-Thailand Partnership

Next Step: GOSC Pilot Nodes Implementation³



Resource Allocation Plan

- **Hardware:** Three physical servers with over 150 CPU cores, 1.5TB RAM, and 600TB storage.
- **Software:** Open-source Yunkun software (EVCloud VM, iHarbor OBS, AIOps...)
- **Capacity Building:** Onsite or online technical training on cloud federation technology and application.



GOSC resources must be used exclusively for open science projects, ensuring accessibility to researchers worldwide, while safeguarding the interests of local research communities.

Potential Cooperation

Join the GOSC community

GOSC has more than 200 registered members coming from 41 international, regional, and national research organizations, platforms, initiatives, universities, and companies. Now, the figure has been steadily growing with a broader global impact of GOSC.

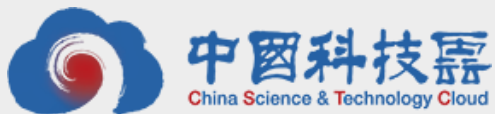
Join us to make science more accessible and inclusive for all!

Sign up to join GOSC at: <https://bit.ly/GOSC-Sign-Up>

More collaboration opportunities?

Please contact GOSC IPO: Ms. Xueting Li xtli@cnic.cn

Thanks for your attention!



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