NII

Academic Information Infrastructure Services to Support Data-Driven Research

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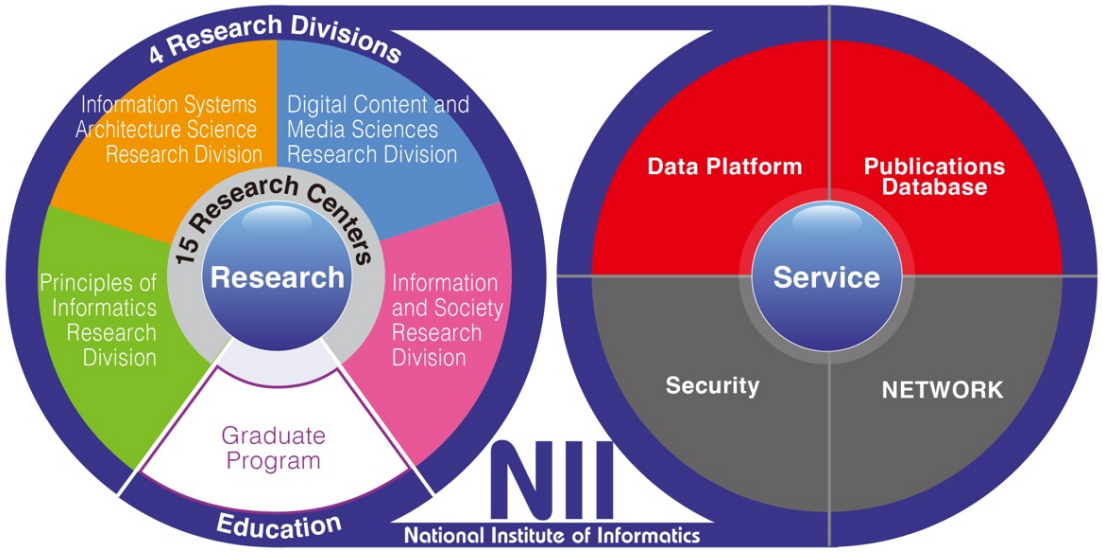
National Institute of Informatics (NII)

Research: NII seeks to advance integrated research and development activities in information-related fields, including networking, software, and digital content.

Service: NII promotes the creation of a state-of-the-art academic-information infrastructure that is essential to research and education within the broader academic community.



NII

NII Information Infrastructure Services

NII builds and operate high speed, highly reliable and multifunctional **network**. Leveraging the network, NII provides an **ID federation platform**, **cloud support**, and **scholarly communication platforms** as well as **research data cloud** to promote open science. Furthermore, **security operation collaboration services** supports national academic institutions to respond quickly to cyber security incidents and other issues.

Network

Research Data Cloud

Authentication Infrastracture

Cloud

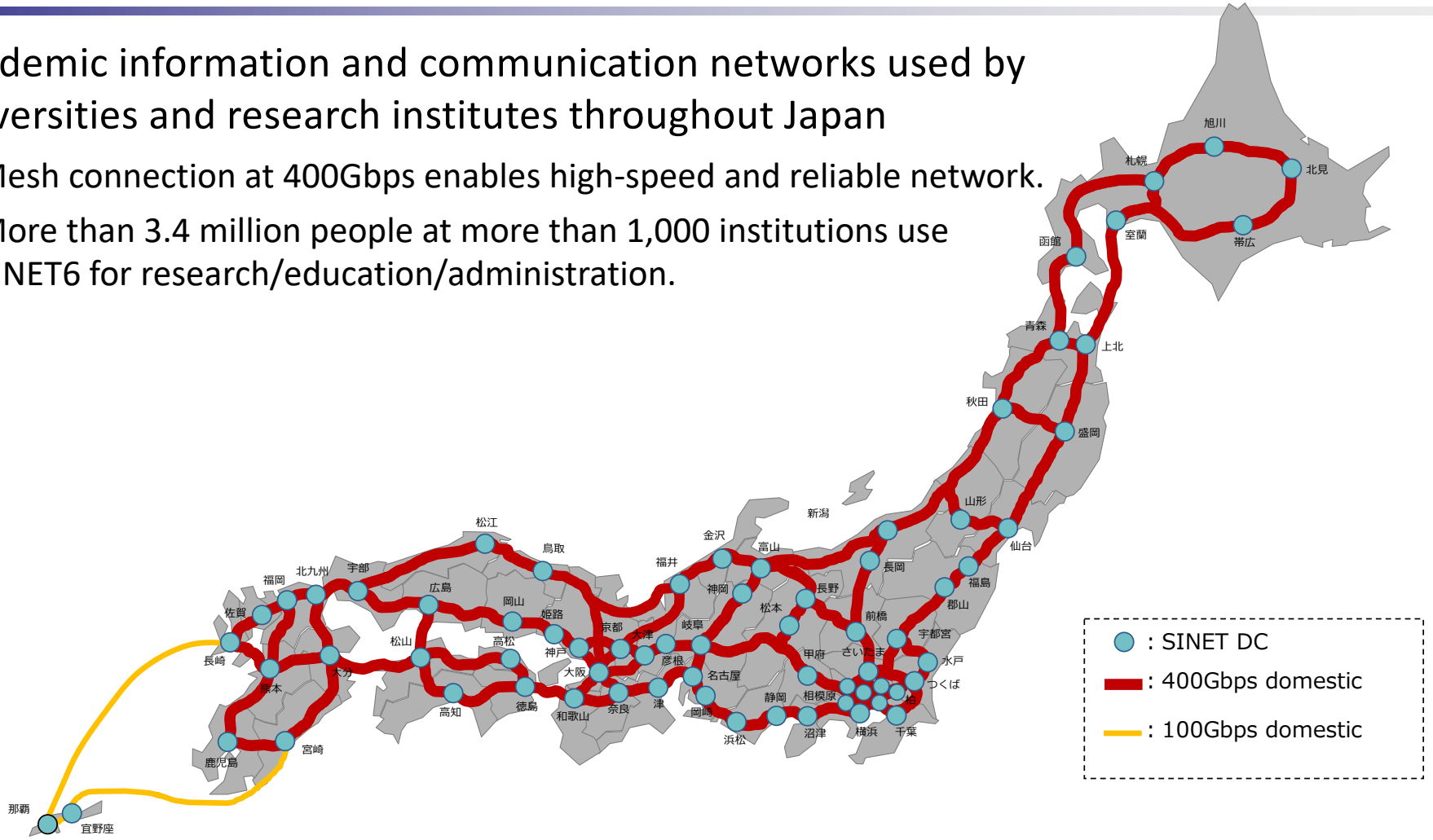
Information Security

Scholarly Communication

SINET6 (Science Information NETwork)

Academic information and communication networks used by universities and research institutes throughout Japan

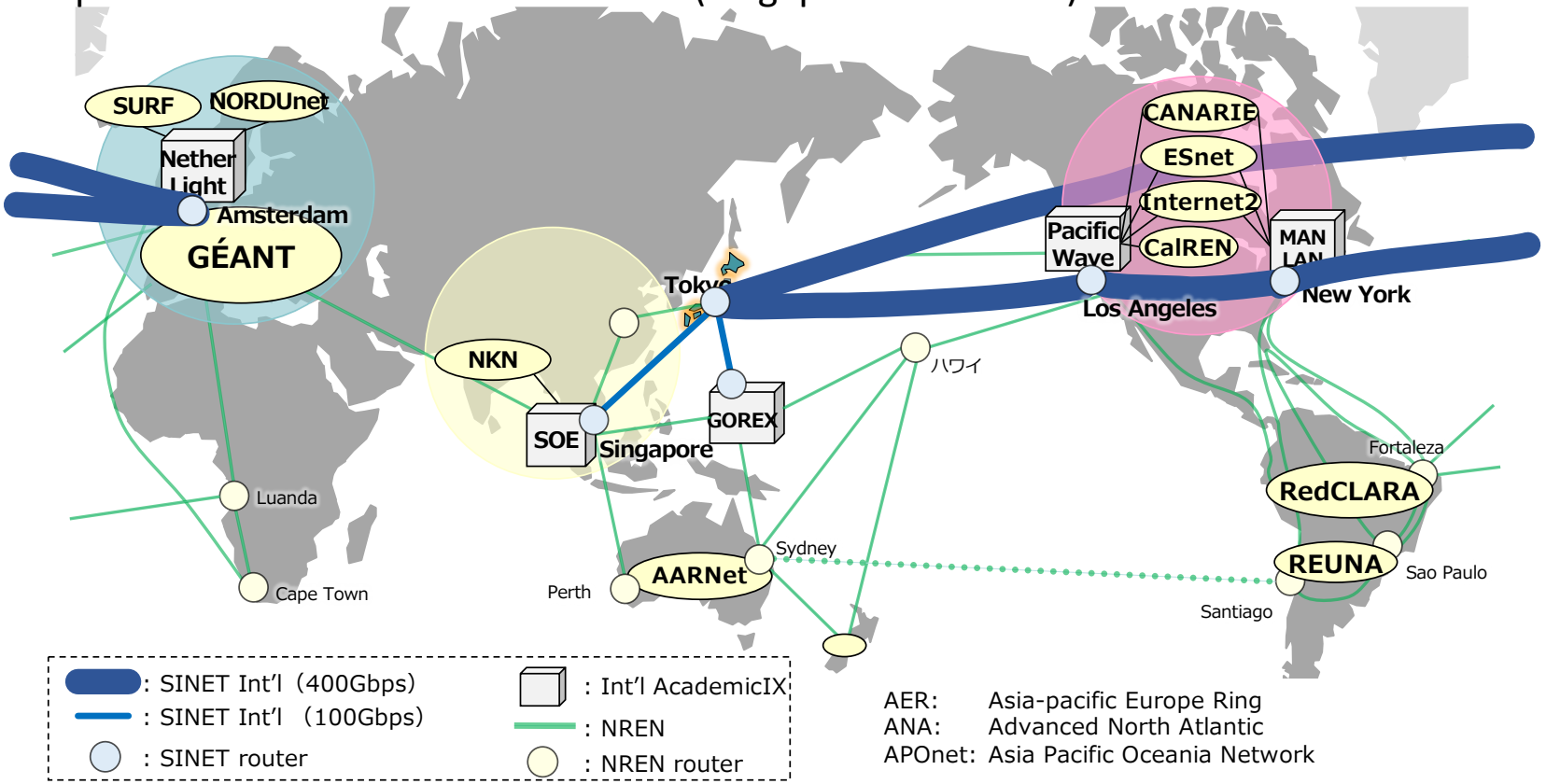
- Mesh connection at 400Gbps enables high-speed and reliable network.
- More than 3.4 million people at more than 1,000 institutions use SINET6 for research/education/administration.



International Links

SINET supports international big science projects with high-speed network.

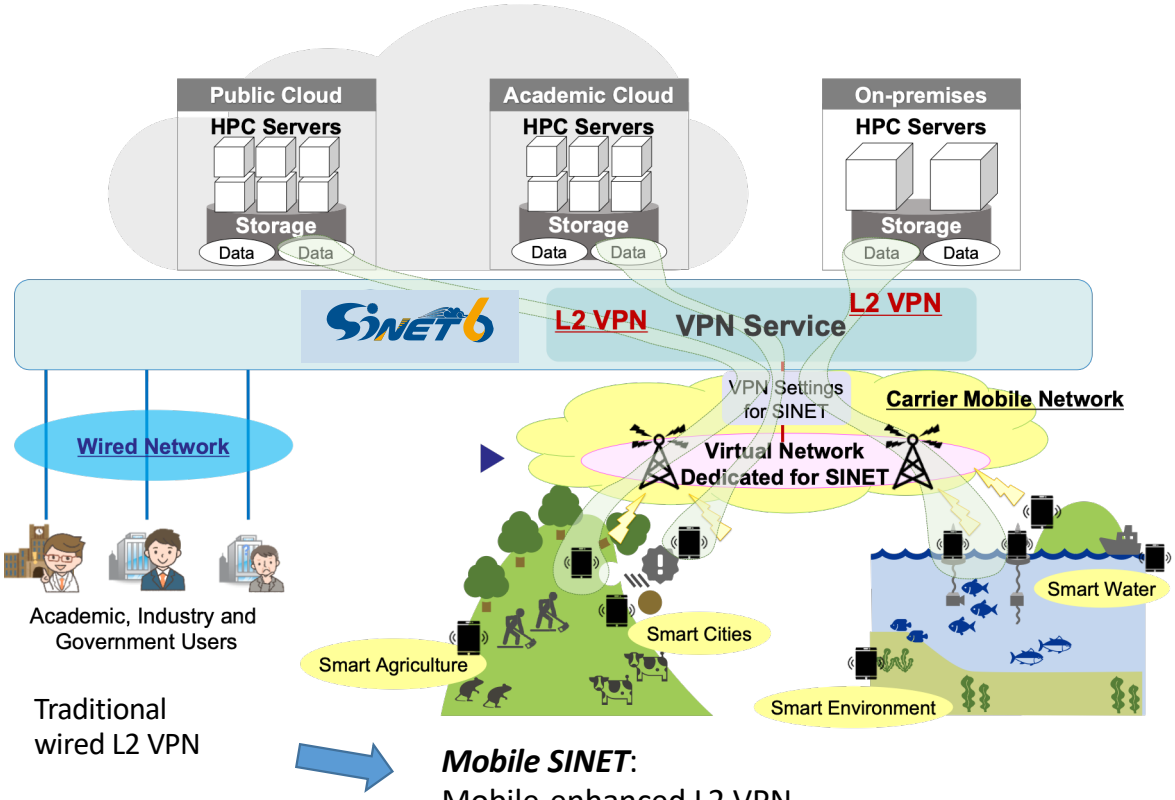
- 400 Gbps connections to Europe and US
- 100 Gbps connections to Asia and Oceania (Singapore and Guam)



Mobile Network

Mobile SINET connects research equipment located in areas with no wired connection.

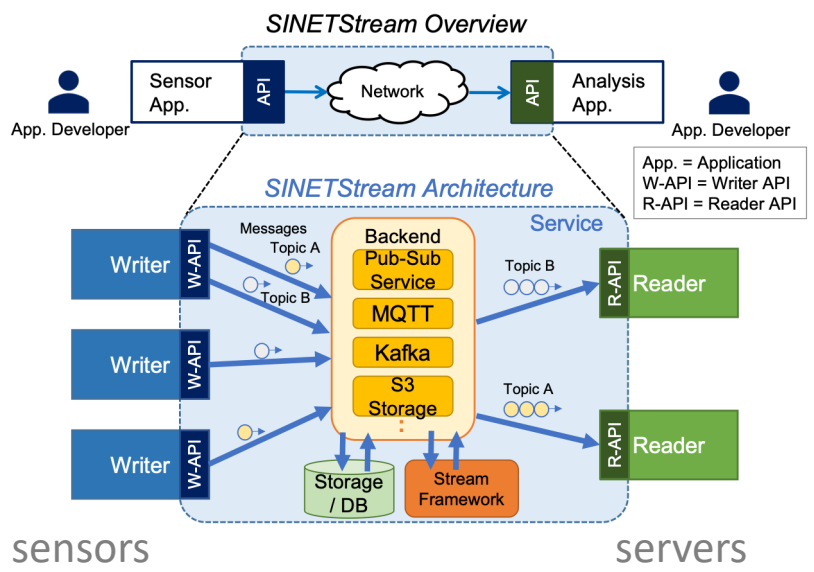
- isolated end-to-end IoT system over the VPN
- secure L2 VPN services over wired and mobile networks



SINETStream

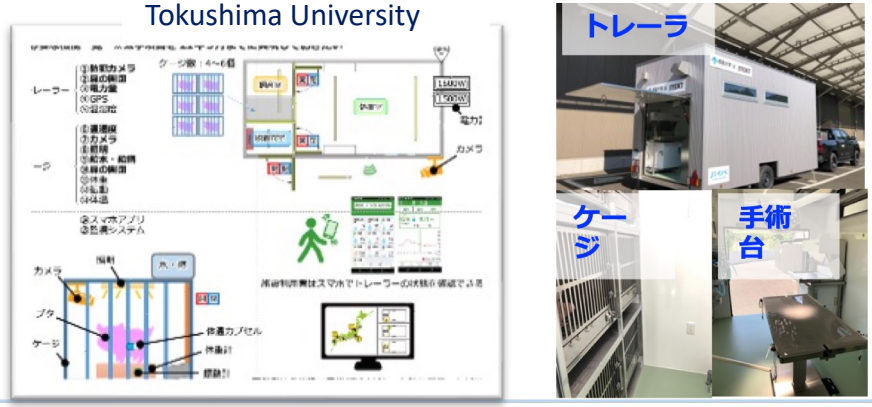
Software Library for IoT Application Development

- Publish/Subscribe model
- Functions for IoT data collection/archive/analysis with APIs ((Java, Python, Android)
- sample applications and use-cases



Animal Telemedicine in Mobile Trailor House

Tokushima University

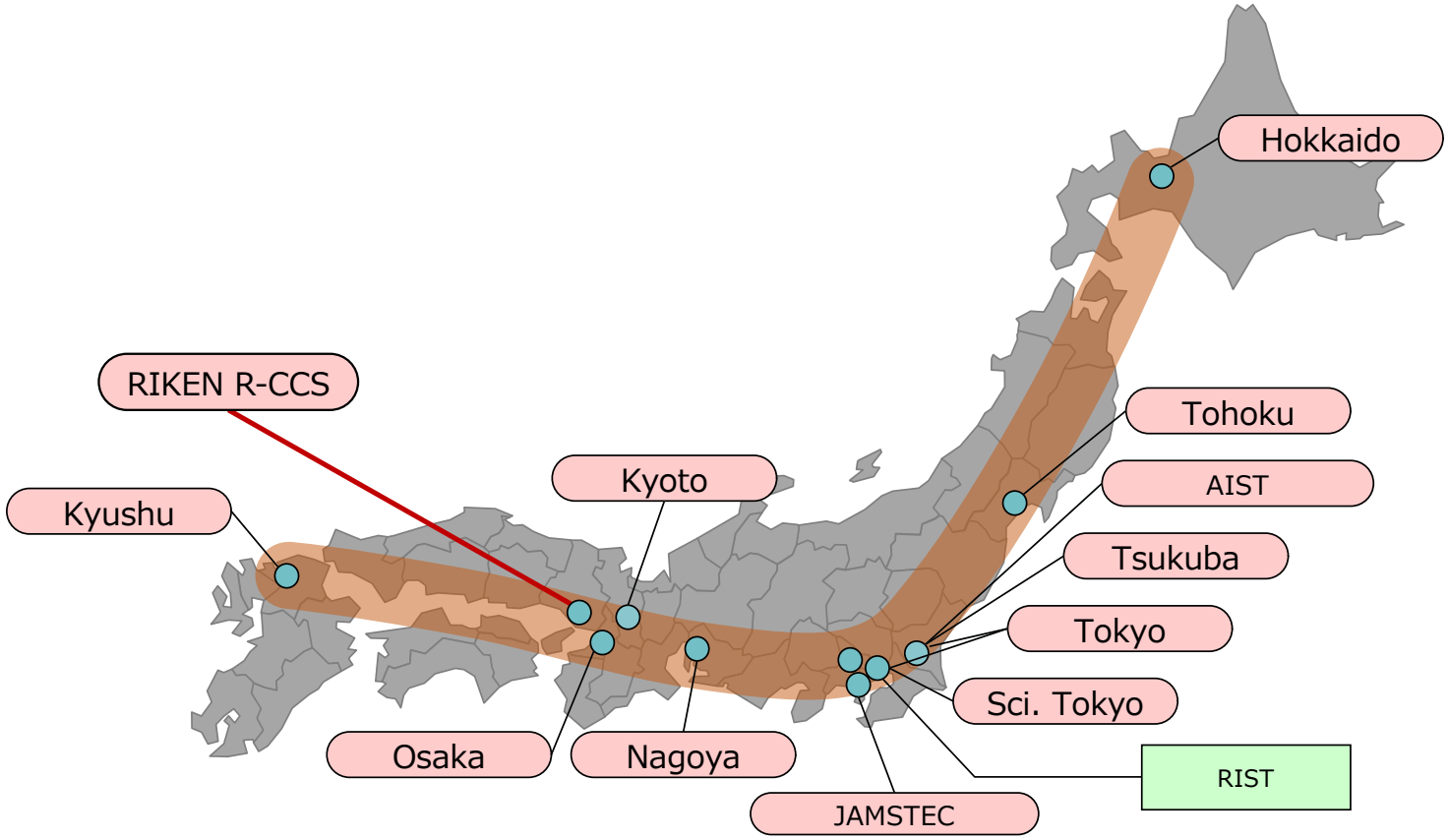


Data Collection with Smartphone on Ships at Sea

Tokyo University of Marine Science and Technology

SINET in HPC

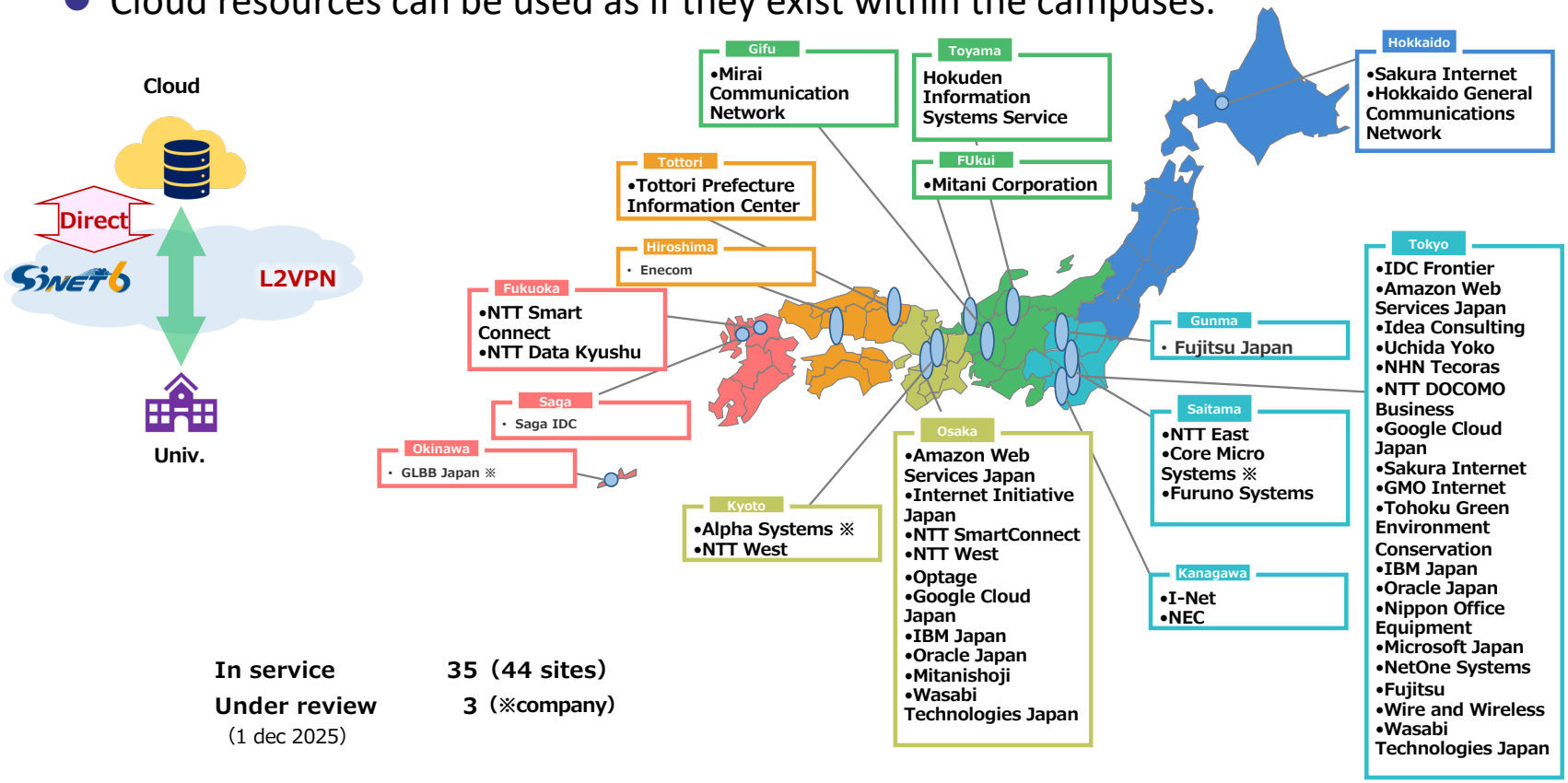
SINET connects distributed supercomputers and high-performance storages via high-speed network.



Direct Cloud connect Service

SINET directly connects commercial cloud services (35 providers, 44 locations) to academic institutions (571 member institutions).

- Cloud resources can be used as if they exist within the campuses.



In service	35 (44 sites)
Under review	3 (※company)

(1 dec 2025)

Cloud Service Checklist

NII supports universities and research institutes to select suitable cloud services.

- The checklist comprehensively includes items, which should be considered at the time of cloud adoption of universities and research institutes.
- NII collects responses from cloud service providers (>40) and share the responses among universities/research institutes.

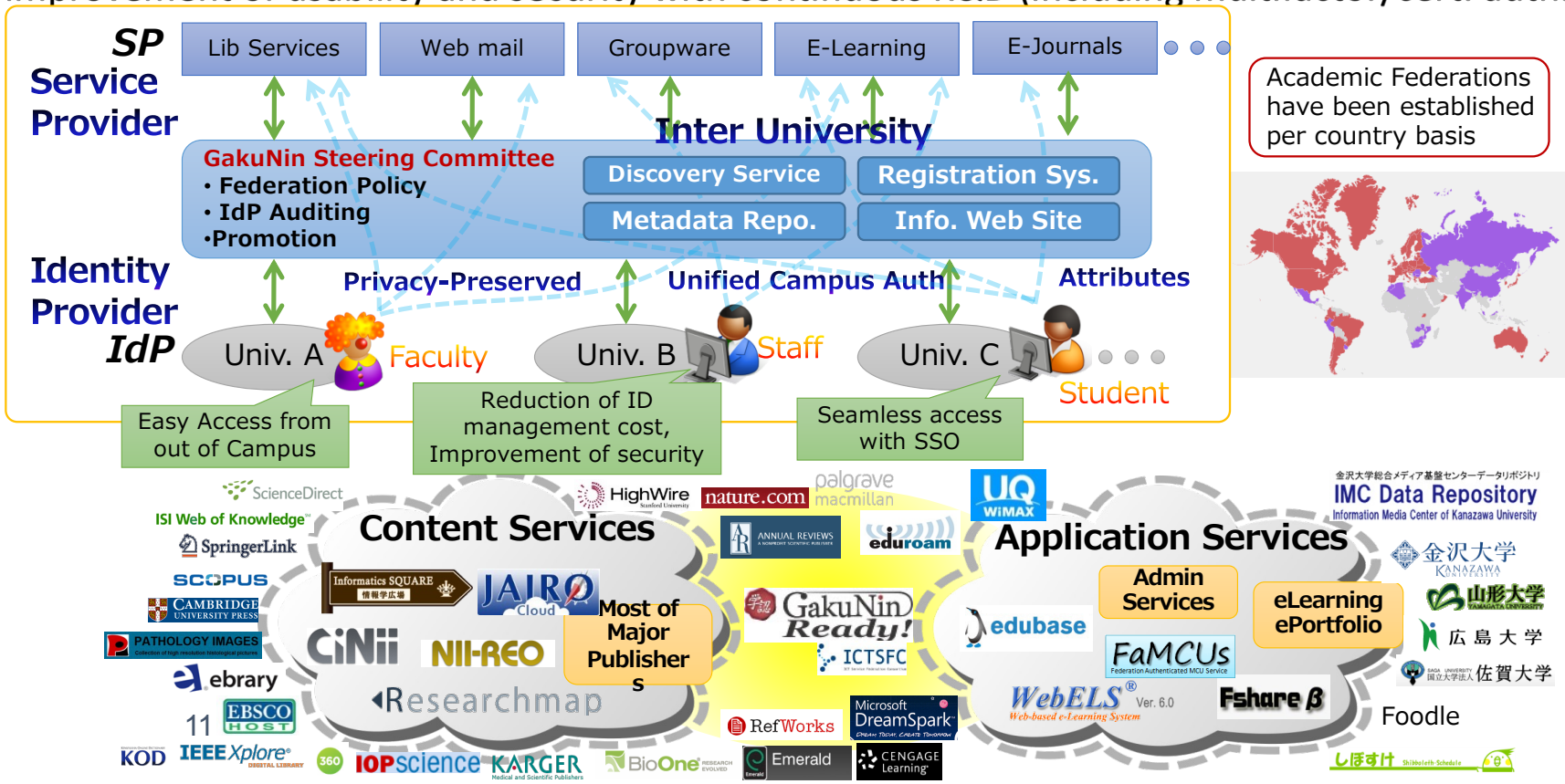
	items	#detailed items
A	Overview	4
B	Historical records	2
C	Contracts	8
D	Authorization/authentication	3
E	Availability/reliability	4
F	Customer support	5
G	Network and communication	9
H	Management functions	12
I	Software environment	4
J	Scalability	5

	items	#detailed items
K	Data center	7
L	Security	11
M	Data management	9
N	Backup	6
O	Trustworthiness of provider	6
P	Terms and conditions	6
Q	Data administration	3
R	Data migration	4
S	Certification	4

GakuNin Academic Identity Federation in Japan

GakuNin builds ICT infrastructure to support R&E based on SSO technologies.

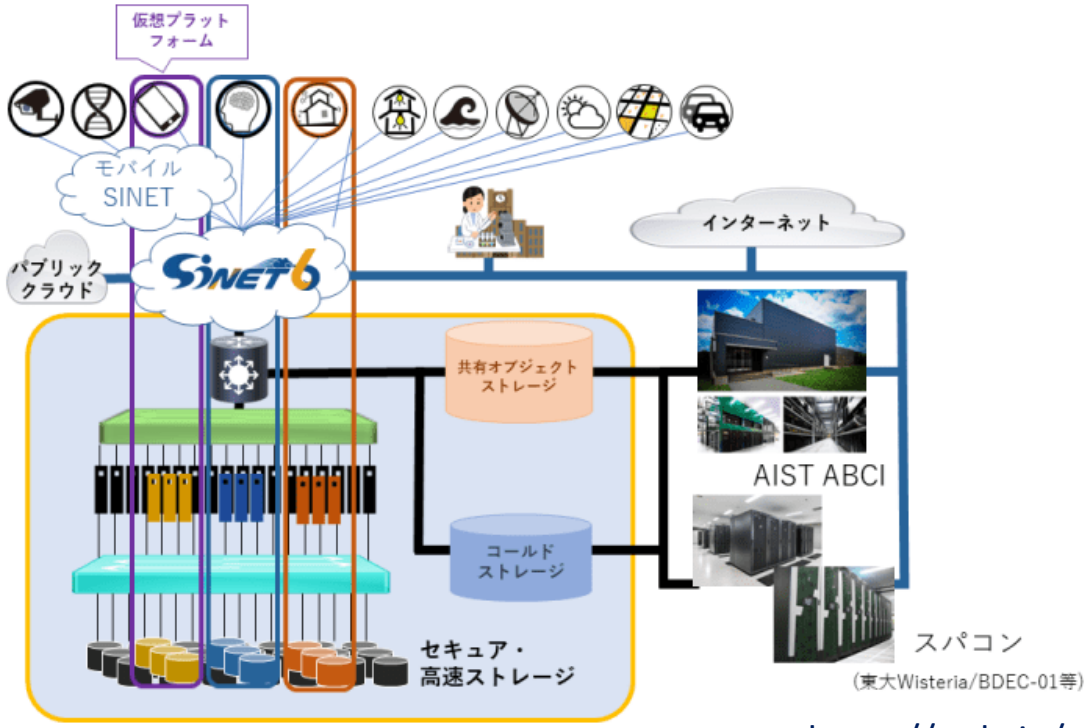
- trust framework (technologies, policies and assessment)
- improvement of usability and security with continuous R&D (including multifactor/cert. auth.)



Access mdx through GakuNin

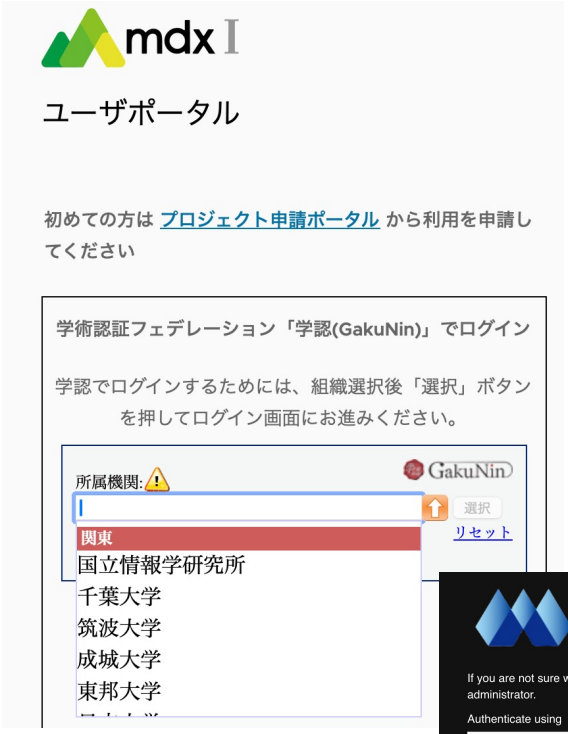
mdx

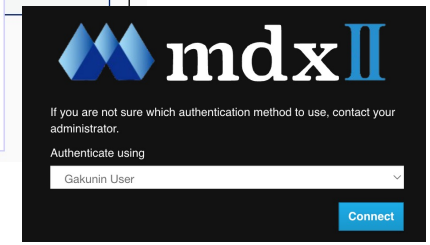
provides a private computing environment isolated for each project using virtualization technology



https://mdx.jp/

access the mdx user portal through **GakuNin**



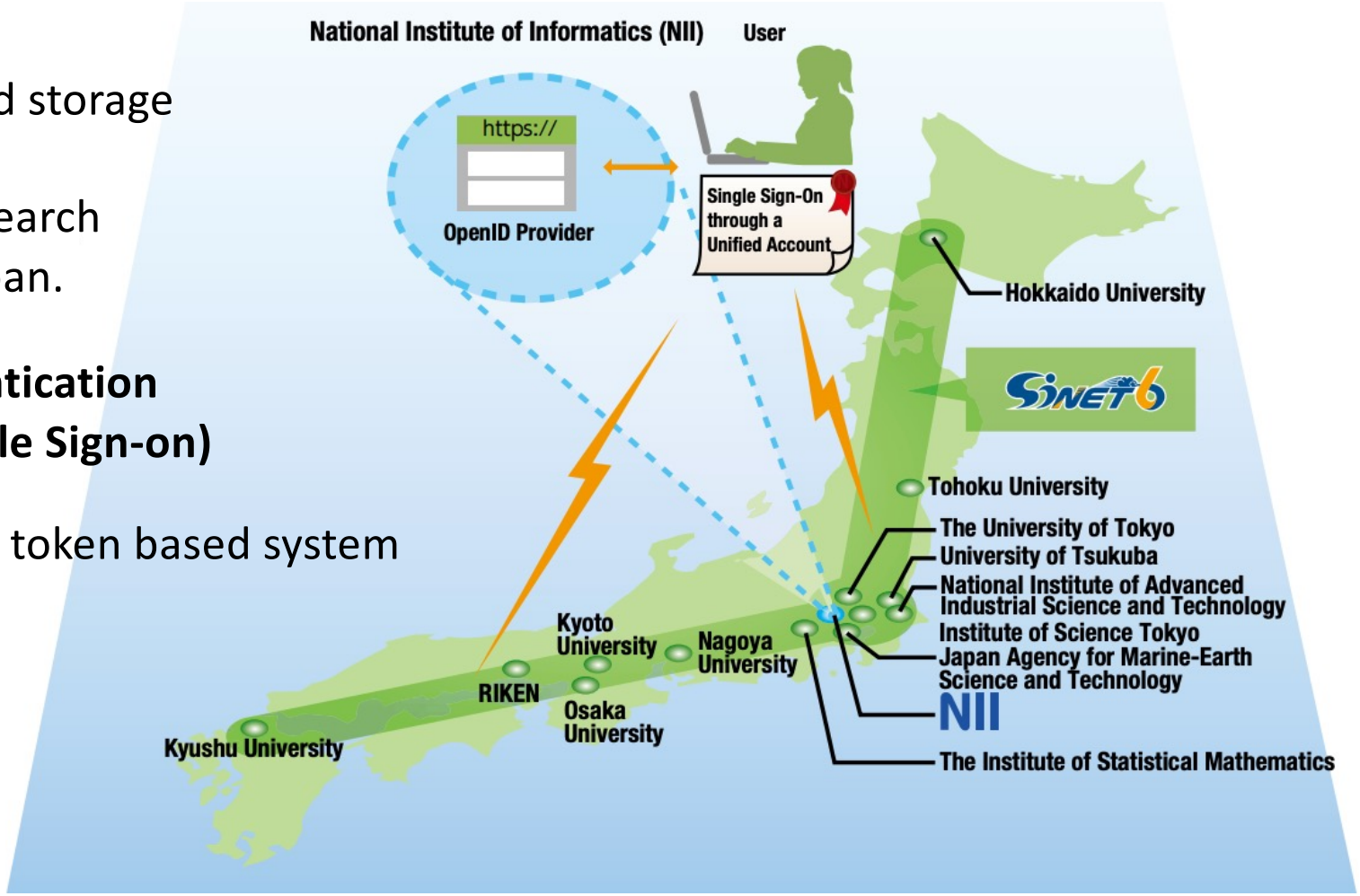


Access HPCI resources via Single Sign-on

HPCI connects supercomputers and storage systems installed at universities and research institutes across Japan.

NII operates **authentication infrastructure (Single Sign-on)**

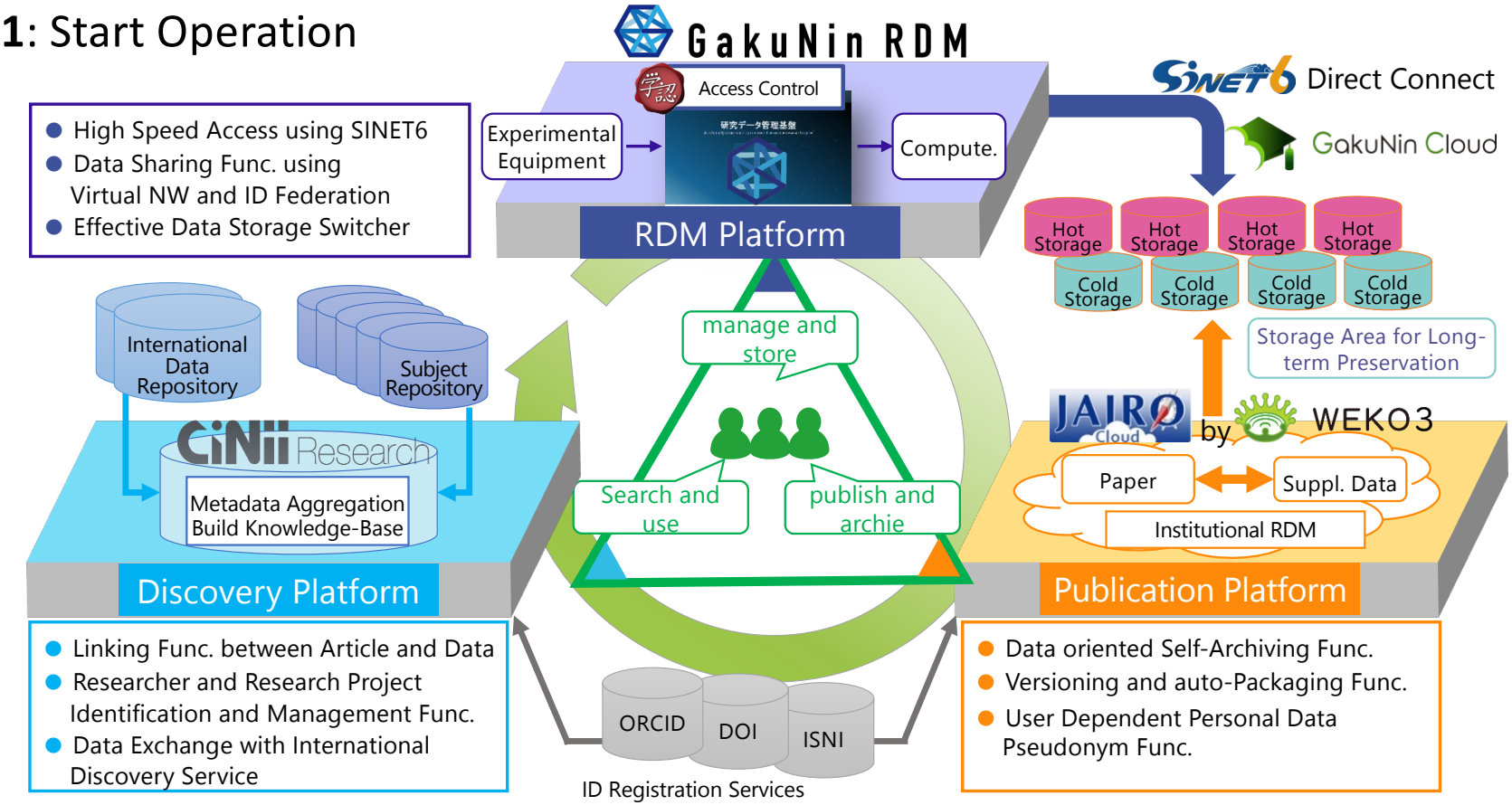
PKI based system -> token based system



NII Research Data Cloud

Platform to enable research data management, publication and discovery

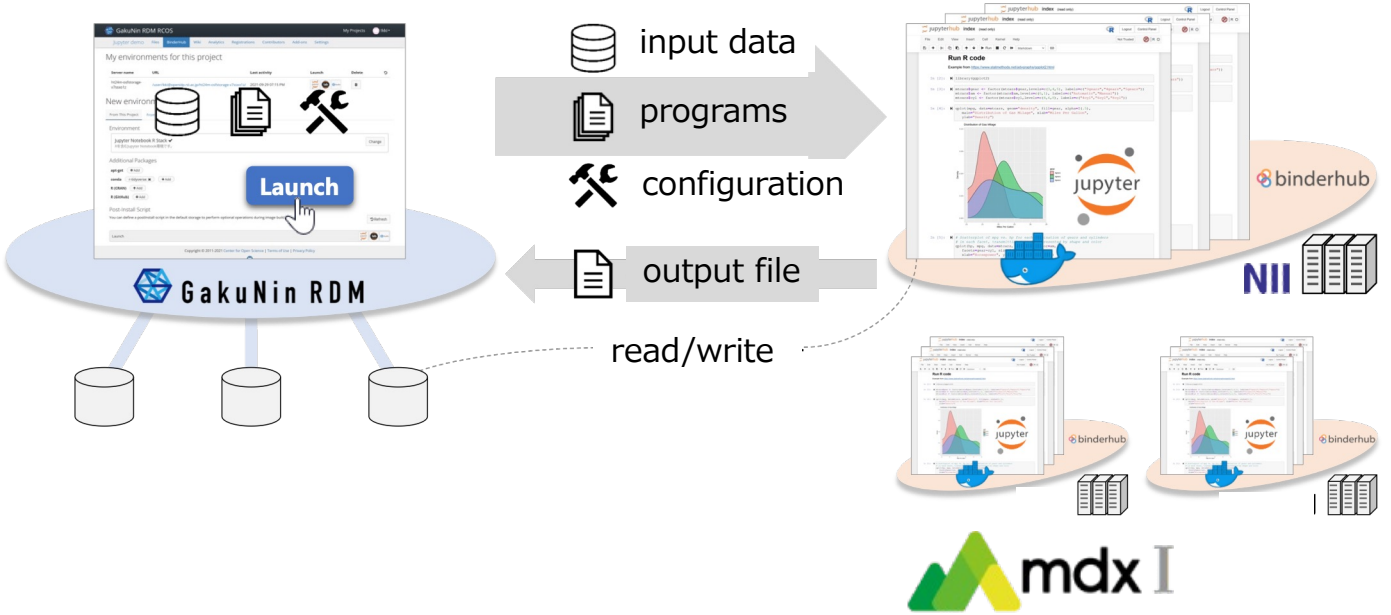
2021: Start Operation

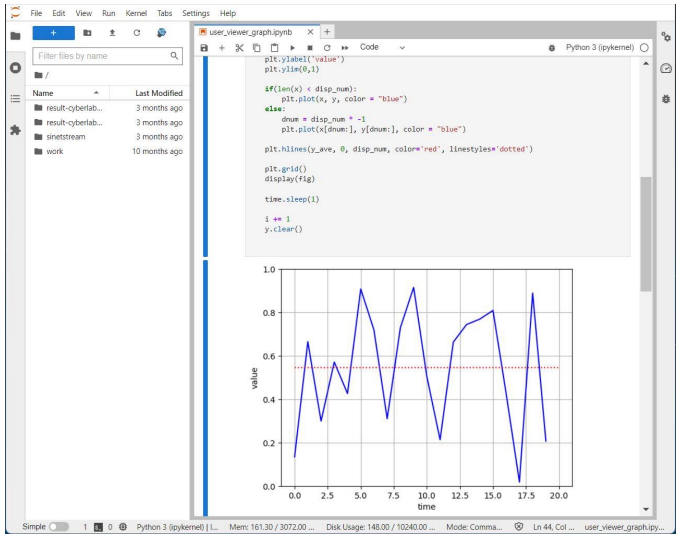


Data Analysis in GakuNin RDM

JupyterLab to analyze research data managed in GakuNin RDM

- enabling researchers share not only data but also **reproducible** computer analysis processes
- analysis leveraging computing resources in academic communities (clouds, HPC…)



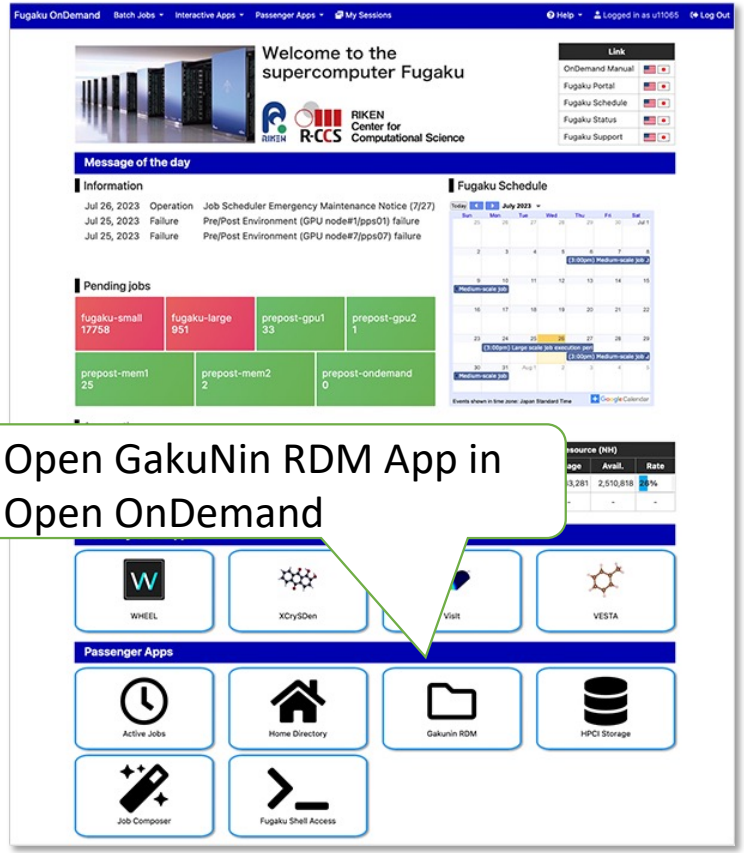


Data Transfer between Fugaku and GakuNin RDM

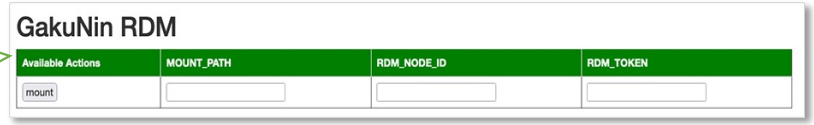
Access research data on GakuNin RDM through web portal (Open OnDemand) on Fugaku

1 issue personal access token on GakuNin RDM

2 Open GakuNin RDM App in Open OnDemand



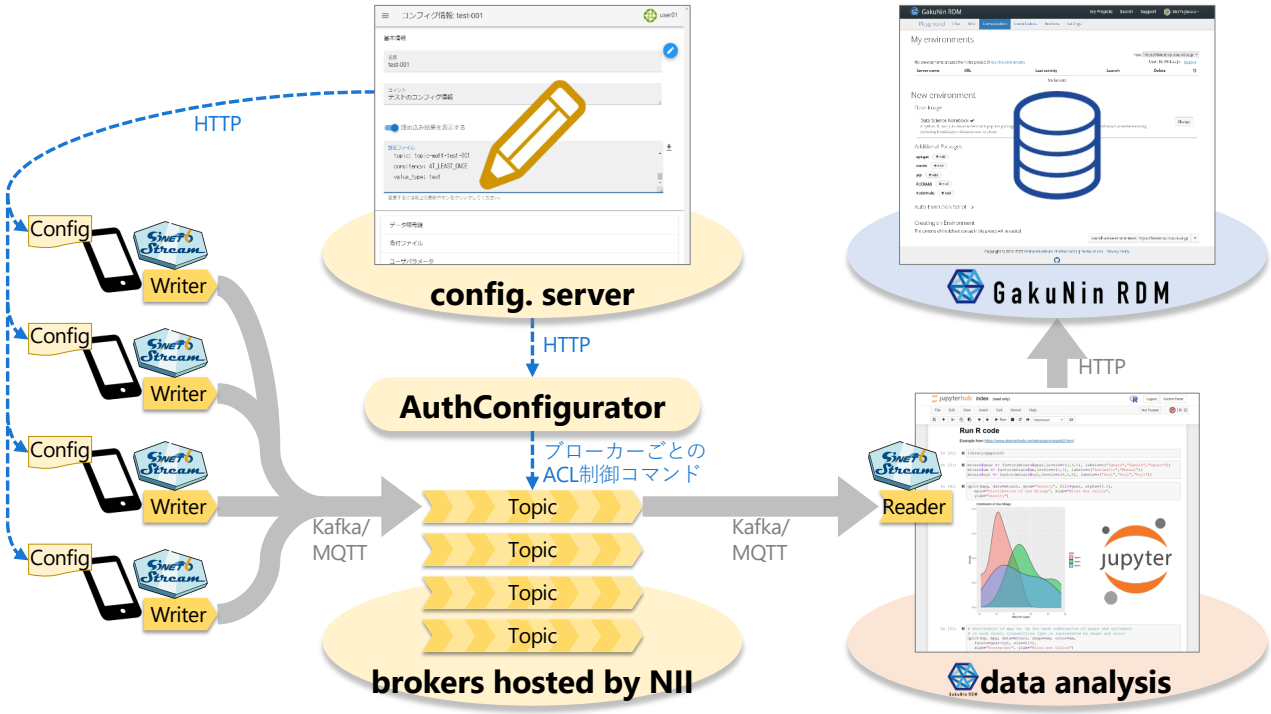
3 Set the personal access token



https://www.r-ccs.riken.jp/outreach/topics/20230726-1/

Real-time Analysis of IoT Data

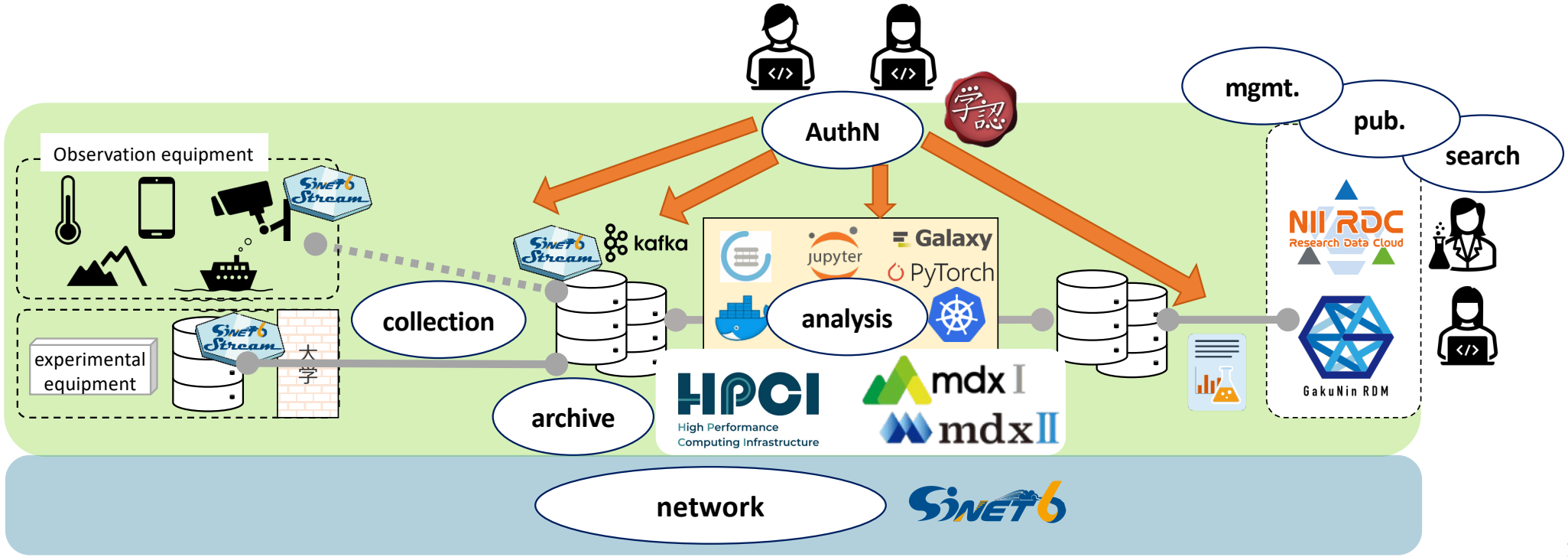
- Real-time analysis of data collected by SINETStream, sharing and utilization of analysis results in GakuNin RDM
- NII provides shared brokers as SaaS → no need for researchers to build



Support Data-Driven Research

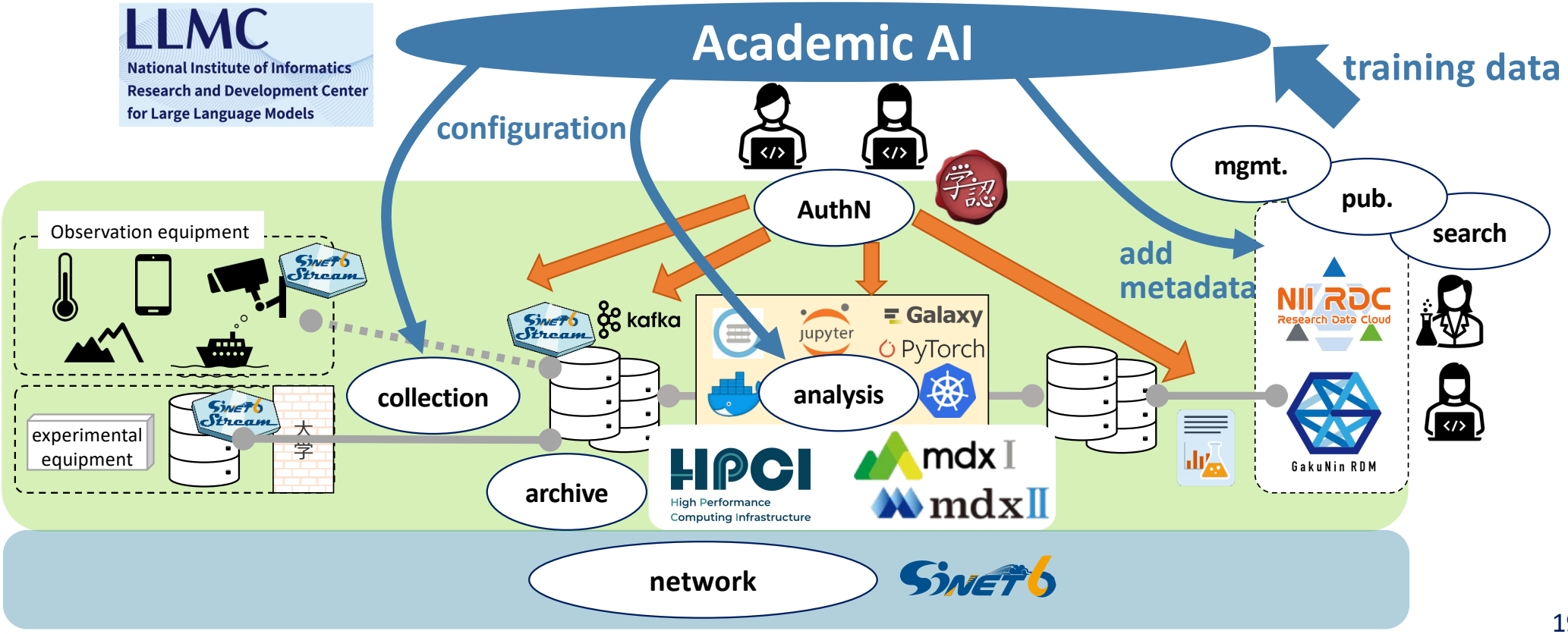
Accelerating data-driven research by information infrastructure

- network, ID federation, cloud support and research data cloud
- federation with HPC and clouds



Support Data-Driven Research with AI

- academic AI trained with research data in NII RDC
- Optimization of data collection, analysis and management using academic AI



https://www.nii.ac.jp/en/service/