

Introduction of NII Research Data Management Platform and Collaborative Project with Academic Research Institutions

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Background

- University and research institution have to preserve research data of their worker for ten years in Japan because two purposes are research integrity and open science.
- So university chief information officers (CIOs) are discussing the unified application which conserves research data systematically in the national scale.
- National Institute of Informatics (NII) are providing the service of the institutional repository, scholarly search engine, high-speed network, secure authorization system and Cloud hosting as existing work.

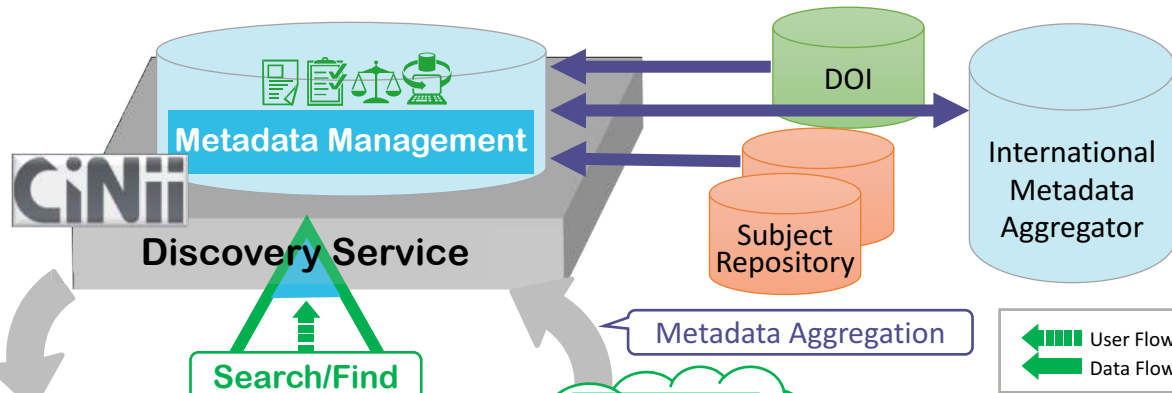
Research Data Infrastructure for Open Science

Objective

For facilitating interdisciplinary open science in Japan, national level common infrastructure is crucial. The infrastructure which allows researchers to manage and publicize their research data is designed and developed in corporation with academic communities.

Discovery Infra

- Linking Func between Article and Data
- Researcher and Research Project Identification and Management Func
- Data Exchange with International Discovery Service



Re-use

Research Data Mng

User Interface

Access Control

Metadata Mng

Research Data Management System



Management Infra

- High Speed Access using SINET5
- Data Sharing Func using Virtual NW and ID Federation
- Effective Data Storage Switcher

Search/Find

Data User



Data Depositor



Exp/Store

Archive



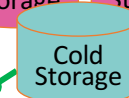
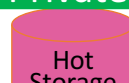
Exp Data

Article

Private

Shared

Public



Storage Area for Long-term Preservation

Journal Article



Supplemental Data

Institutional Research Data Mng

Research Data Repository



Publication Infra

- Data oriented Self-Archiving Func
- Versioning and auto-Packaging Func
- User Dependent Personal Data Pseudonym Func

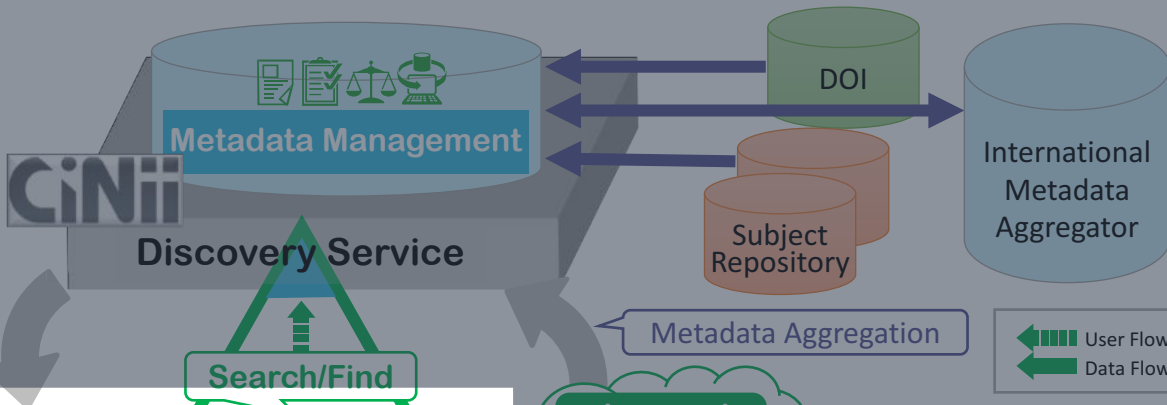
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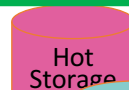
Article



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Storage Area for Long-term Preservation

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Supplemental Data



Institutional Research Data Mng

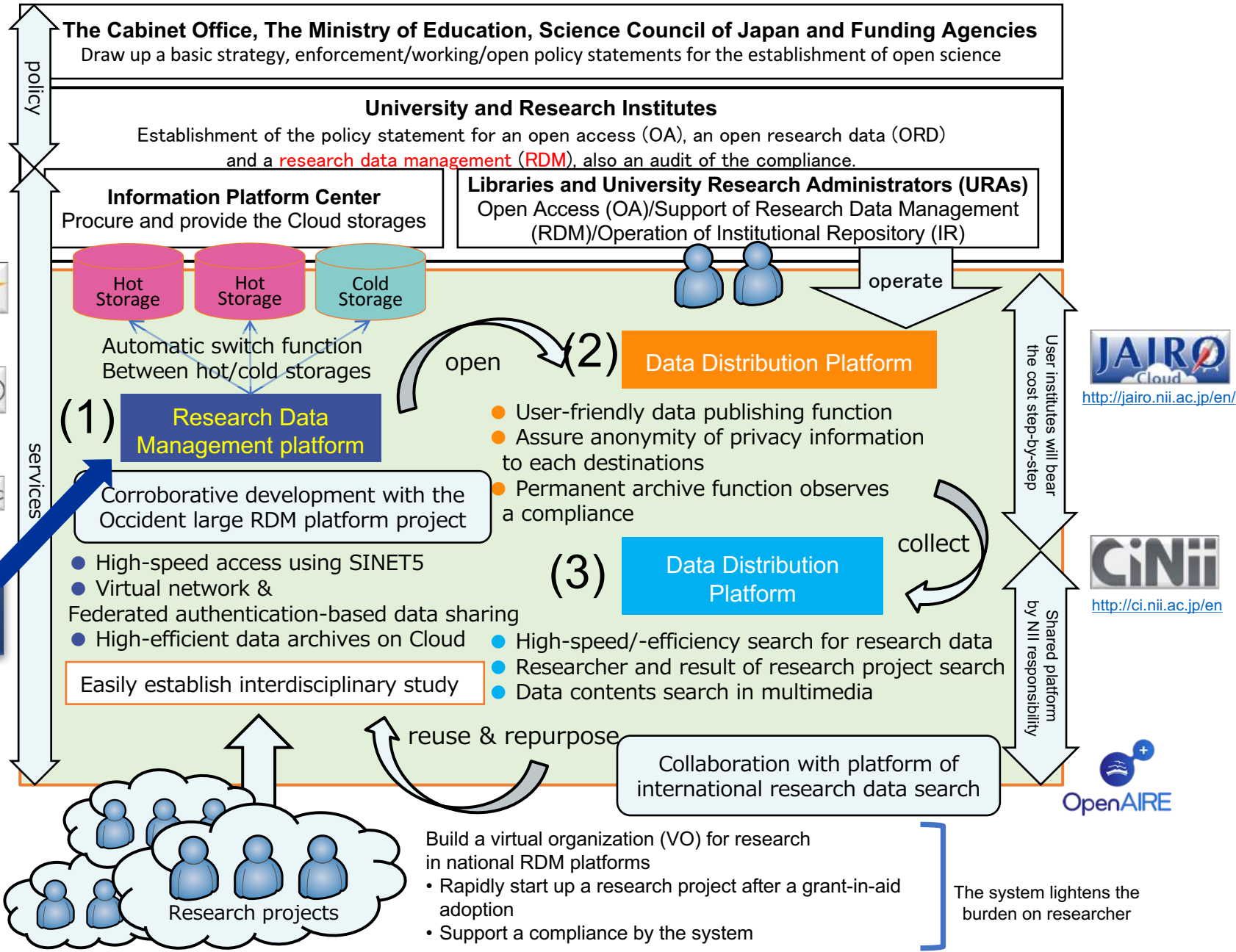
Research Data Repository



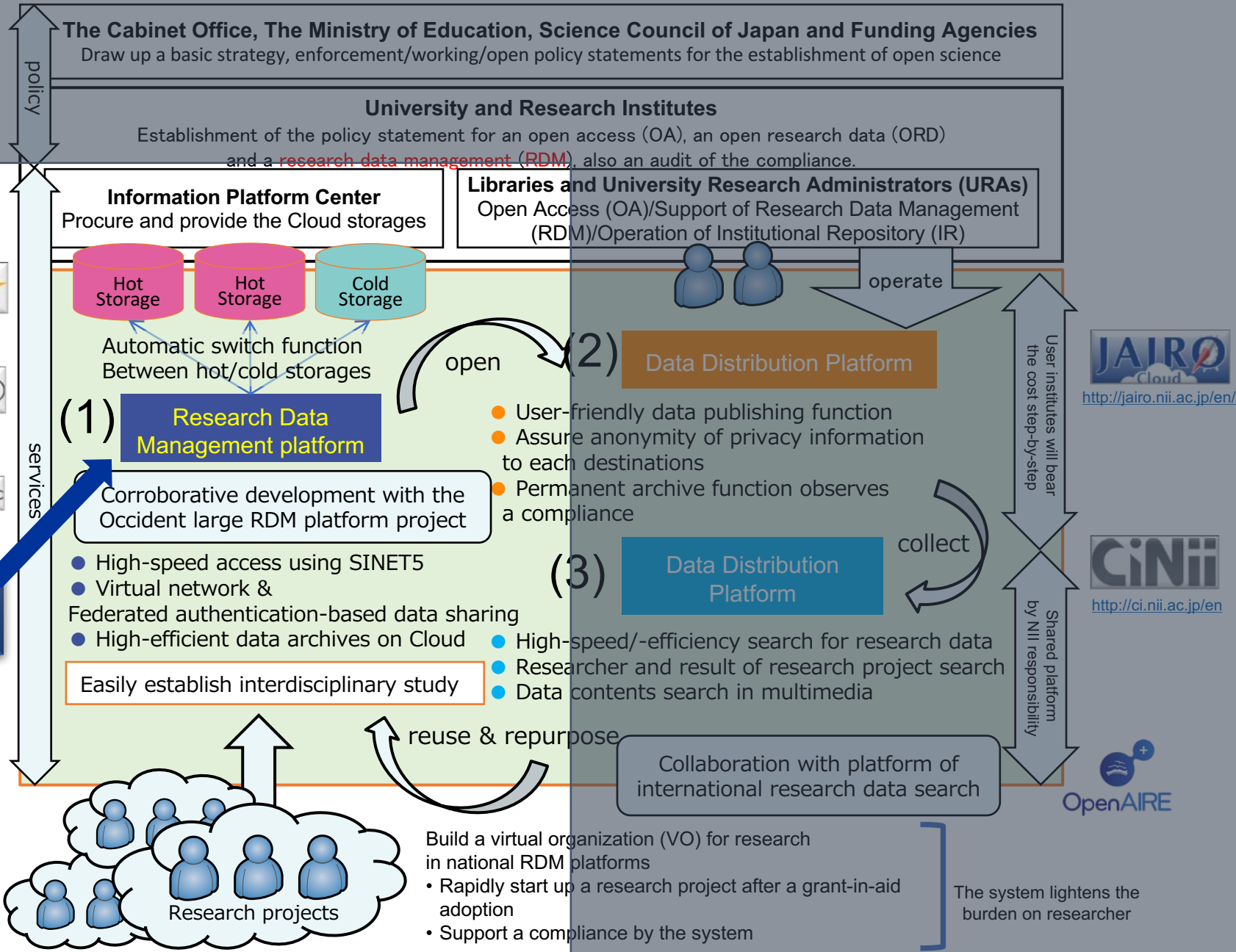
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Strategy of National RDM platform project in Japan by NII



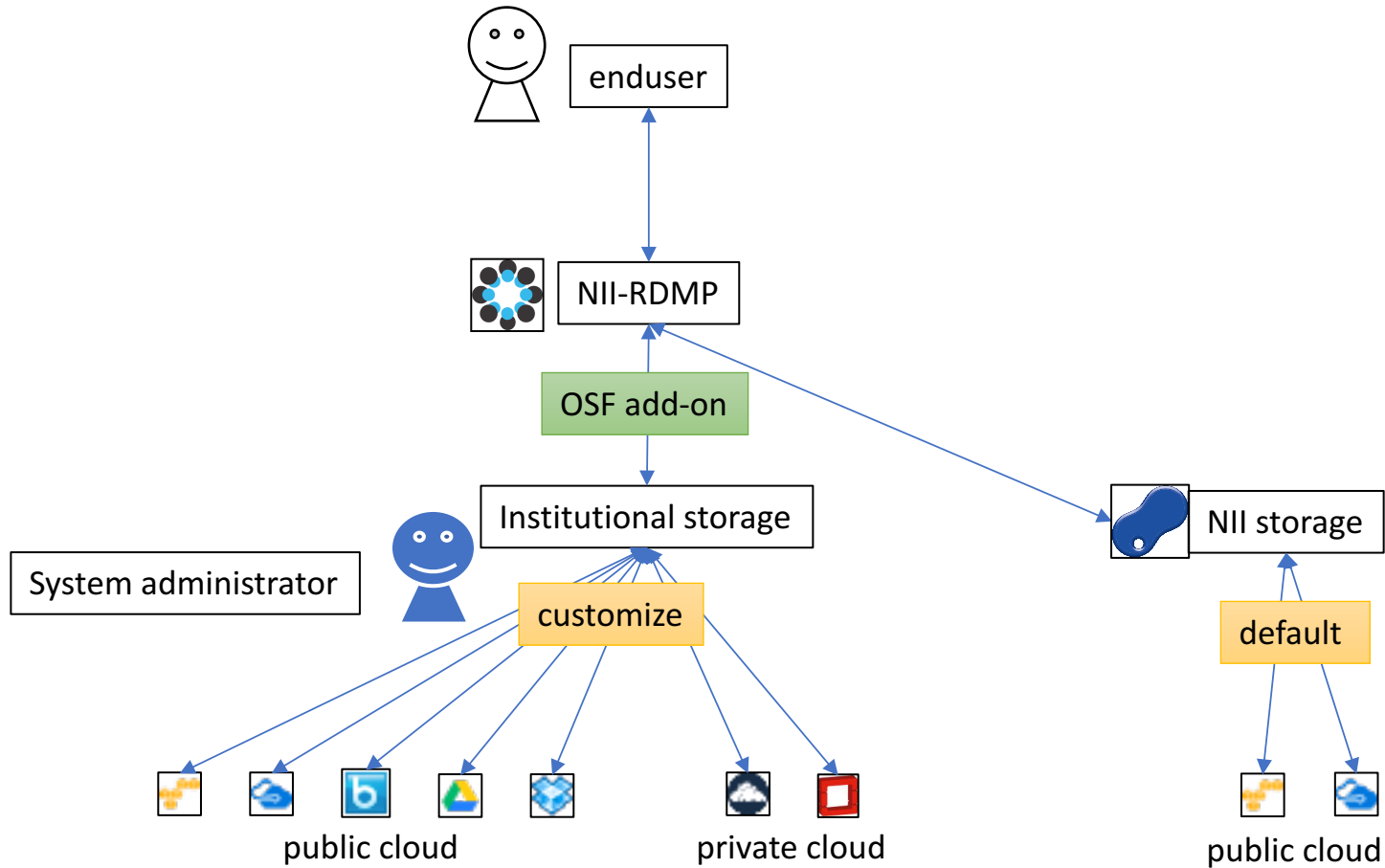
Strategy of National RDM platform project in Japan by NII



Purpose

- **NII-RDMP: NII Research Data Management Platform**
- NII newly develops the research data management platform (RDMP) for a researcher in universities and research institutions on the current NII service. It is also utilized for the improvement in a service of a library and funding agency.
- Additionally, new service will supply efficient metadata to a service of university libraries or funding agencies.
- First, the service aims at helping various disciplines with long tail data, and second we will customize the RDMP to domain situations.

Concept of NII-RDMP



Ex. (XXXX Univ. Storage)

Material and Methods

System Development of NII-RDMP

Current NII services

Collaboration and Promotion in Research and Education

Resource

- ◆ Promotion of academic information circulation and open access
- ◆ Collaborative promotion of institutional repository expansion



Federation

- ◆ Collaborative enhancement of authentication between universities



Cloud

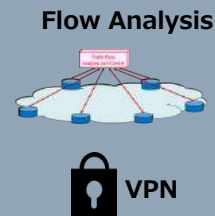
- ◆ Dramatic cost reduction and enhancement of research and education environment by tailored cloud services



GakuNin-Cloud
Direct Connection

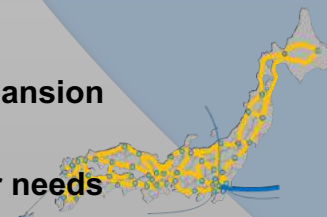
Security

- ◆ Network flow analysis and dynamic control
- ◆ Raise of security level for SINET users



Network

- ◆ Nationwide 100-Gbps backbone network and scalable network expansion
- ◆ High-speed direct international lines to USA, Europe, and Asia
- ◆ Introduction of new technologies such as SDN in response to user needs



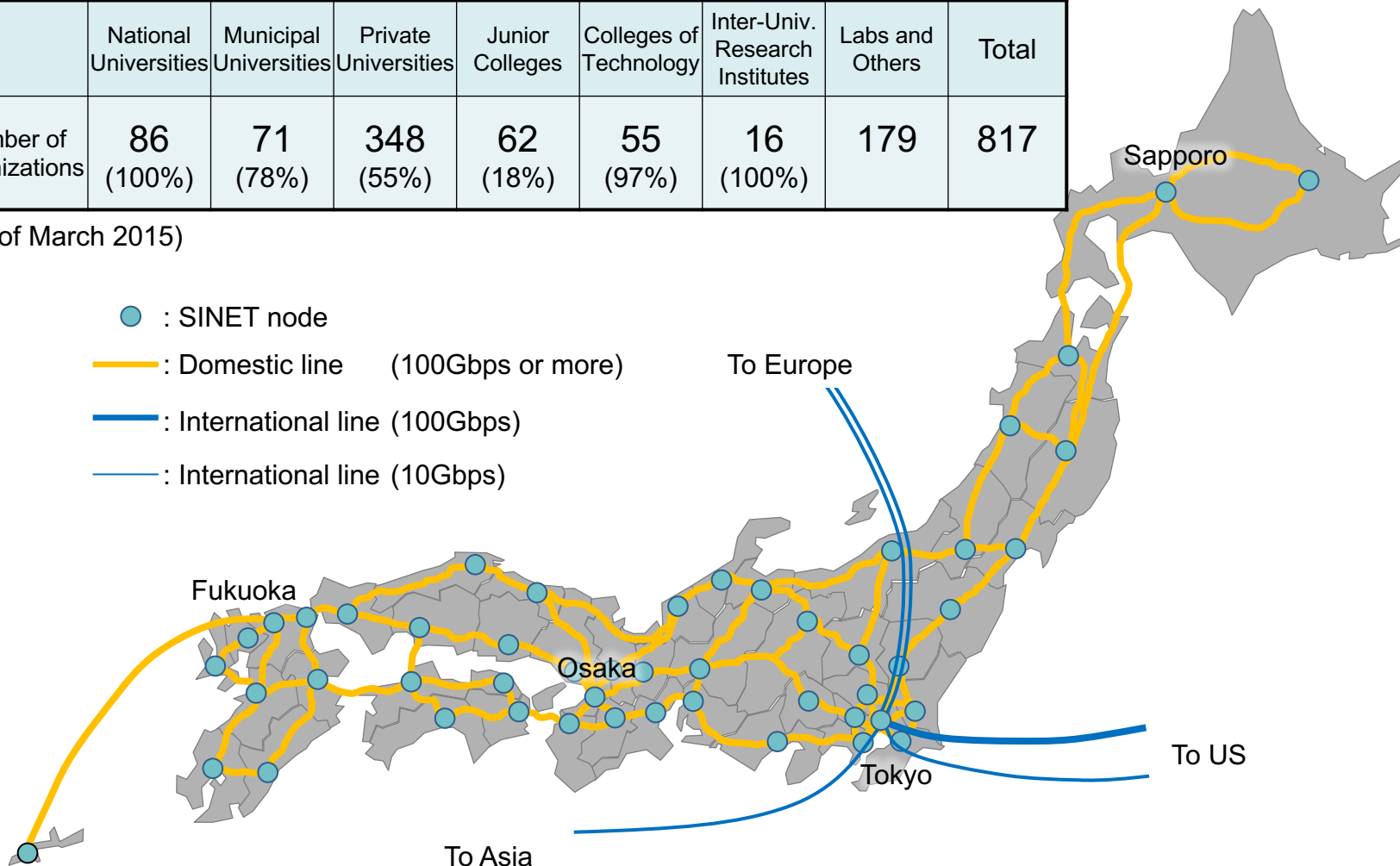
Science Information Network (SINET)



- SINET is a Japanese academic backbone network for more than 800 universities and research institutions, and for about 3 million users.
 - SINET covers 100% of national, 78% of municipal, and 55% of private universities.

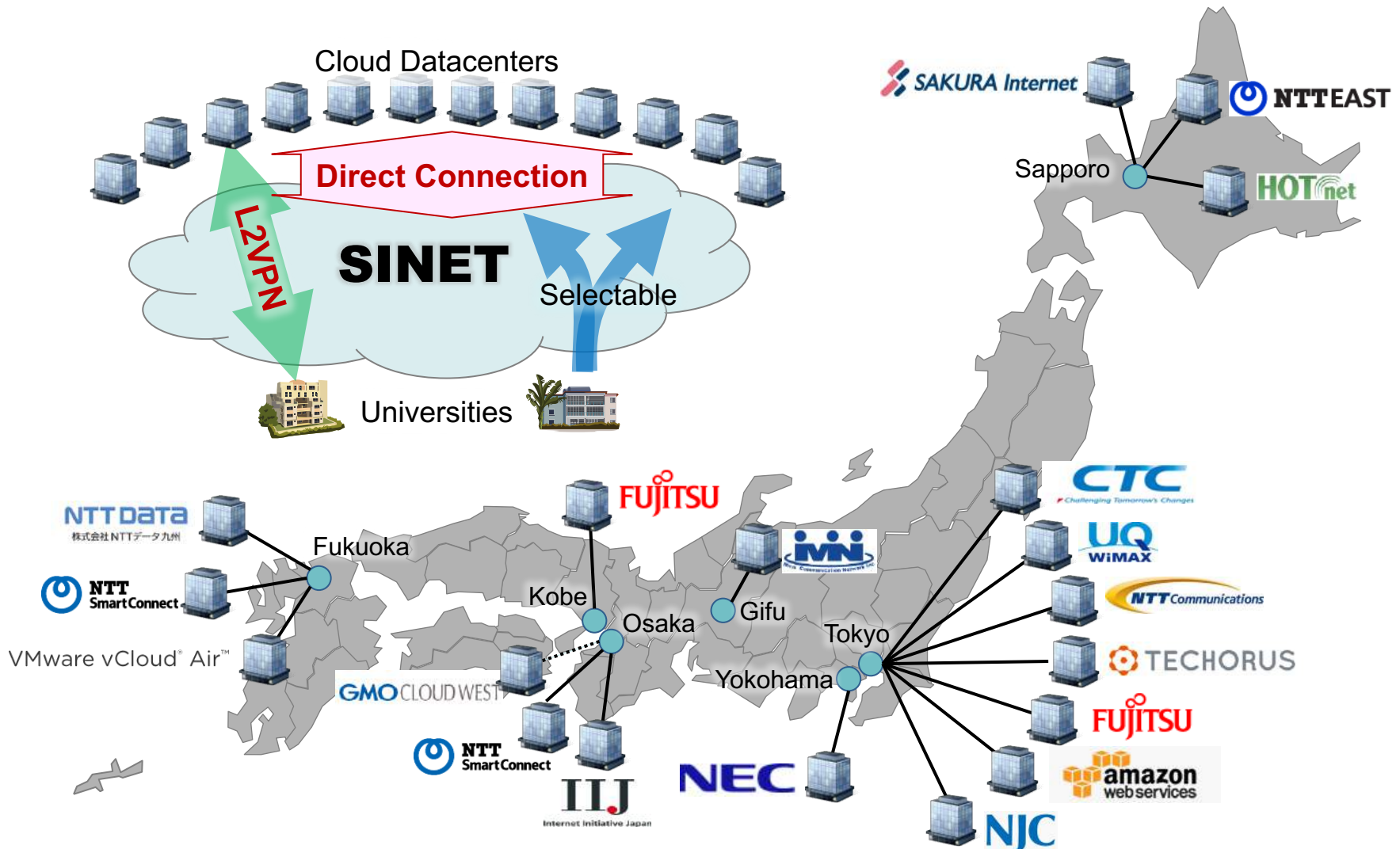
	National Universities	Municipal Universities	Private Universities	Junior Colleges	Colleges of Technology	Inter-Univ. Research Institutes	Labs and Others	Total
Number of Organizations	86 (100%)	71 (78%)	348 (55%)	62 (18%)	55 (97%)	16 (100%)	179	817

(As of March 2015)



SINET-Cloud directly-connected services

- SINET has been promoting directly-connected cloud datacenters in collaboration with service providers in order to provide users with high-performance, secure, and inexpensive cloud services. 68 universities utilize this type of cloud services through SINET L2VPNs.



Gakunin Cloud

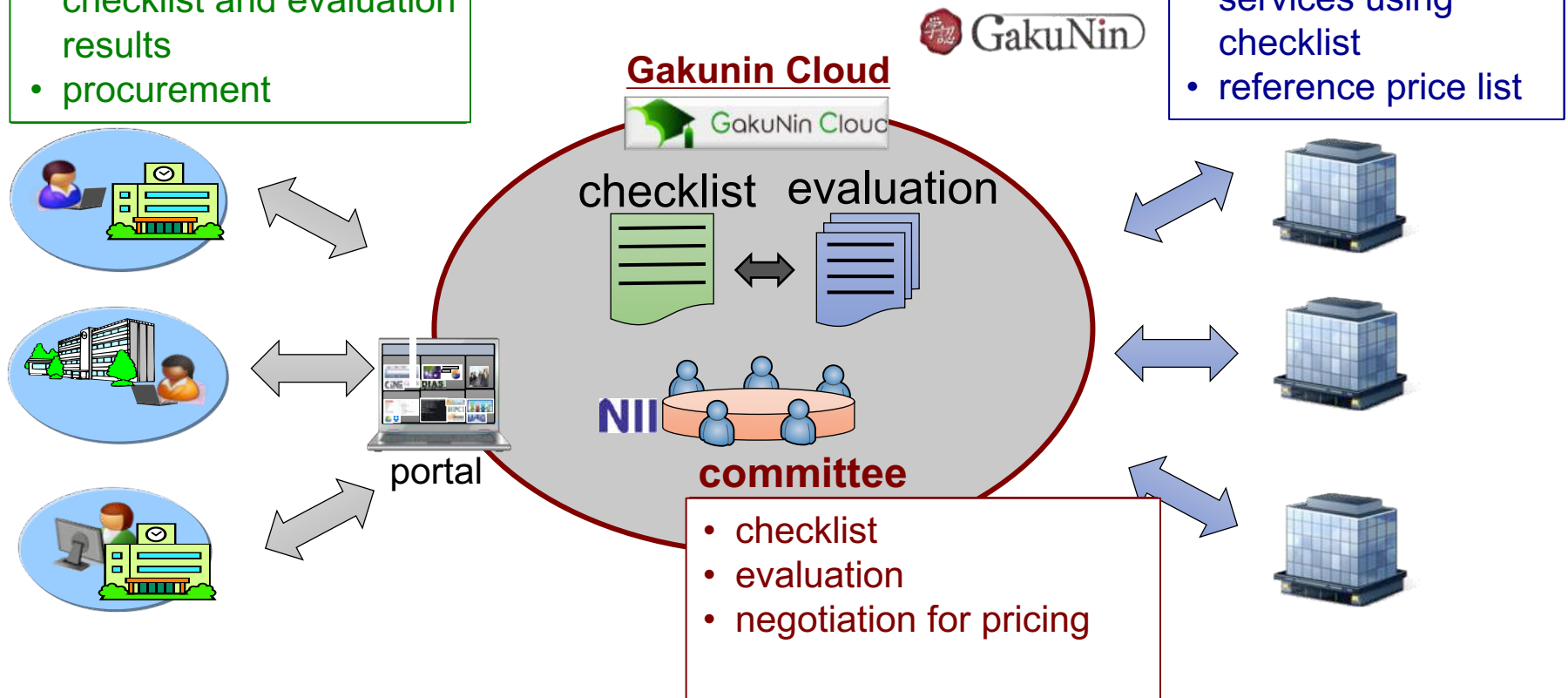
- NII helps universities/research institutes start to use cloud services:
 - checklist for cloud services and evaluation using the checklist
 - negotiation for pricing

universities/research institutes

- making spec. using the checklist and evaluation results
- procurement

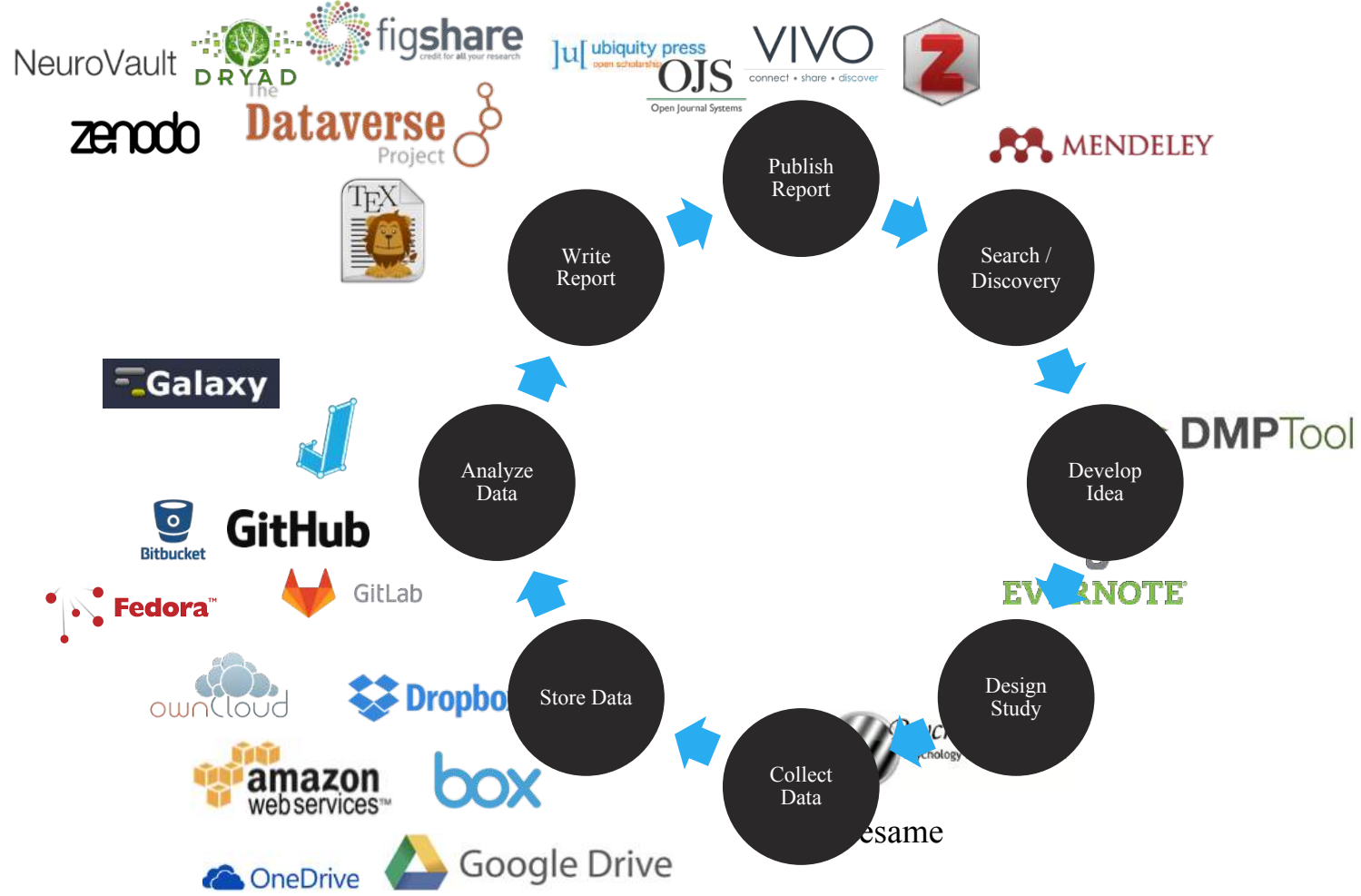
cloud providers

- evaluation of services using checklist
- reference price list



Open Science Framework

Open Science Framework is an open source software for research data management by Center for Open Science in US.



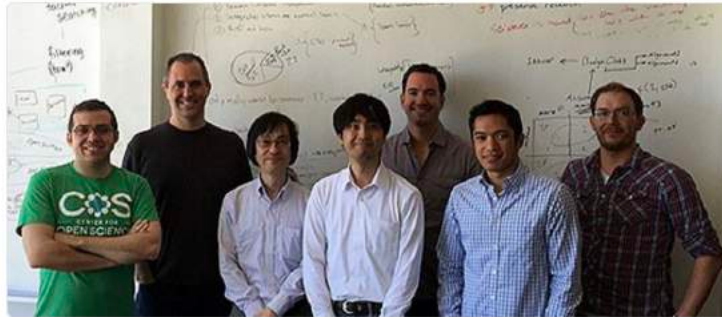
29 grants to develop open tools and services: <https://cos.io/pr/2015-09-24/>

Communication with Center for Open Science

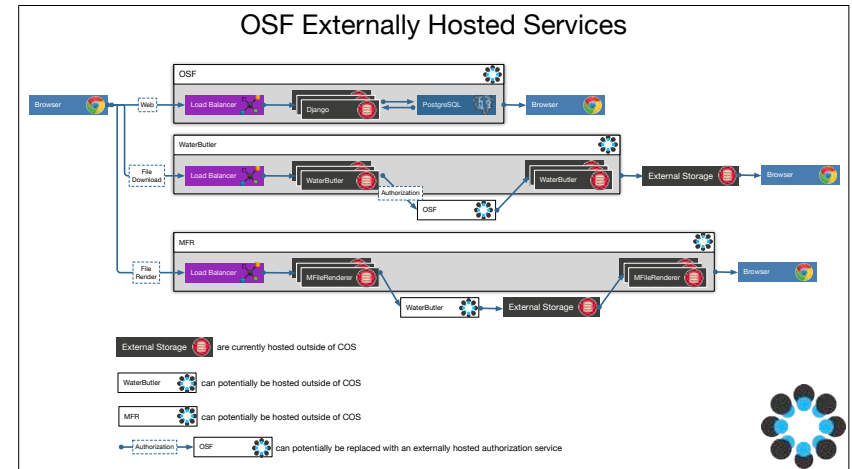
Site visit



CenterForOpenScience @OSFramework · Sep 14
Great visit yesterday from @takechan2000 and @YusukeKomiya
from NII Japan nii.ac.jp/en/ Thank you!

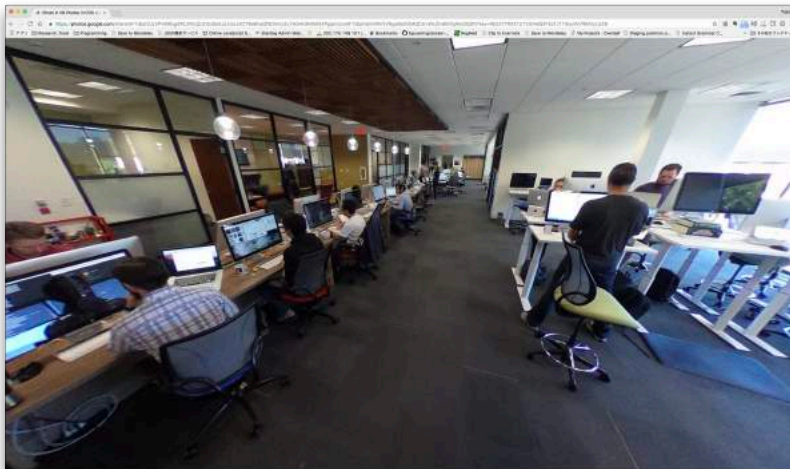


Technical corroboration

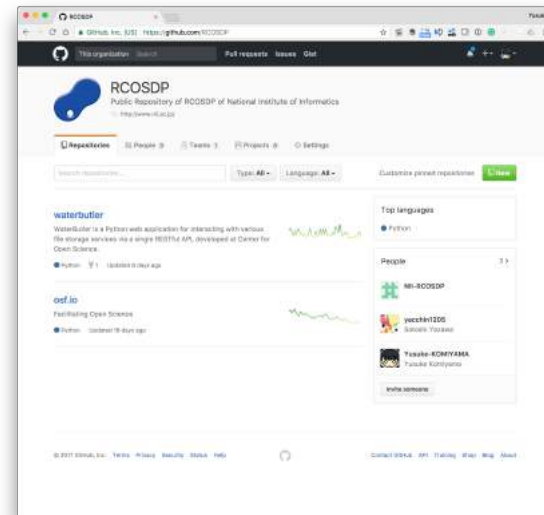


Source code sharing from NII

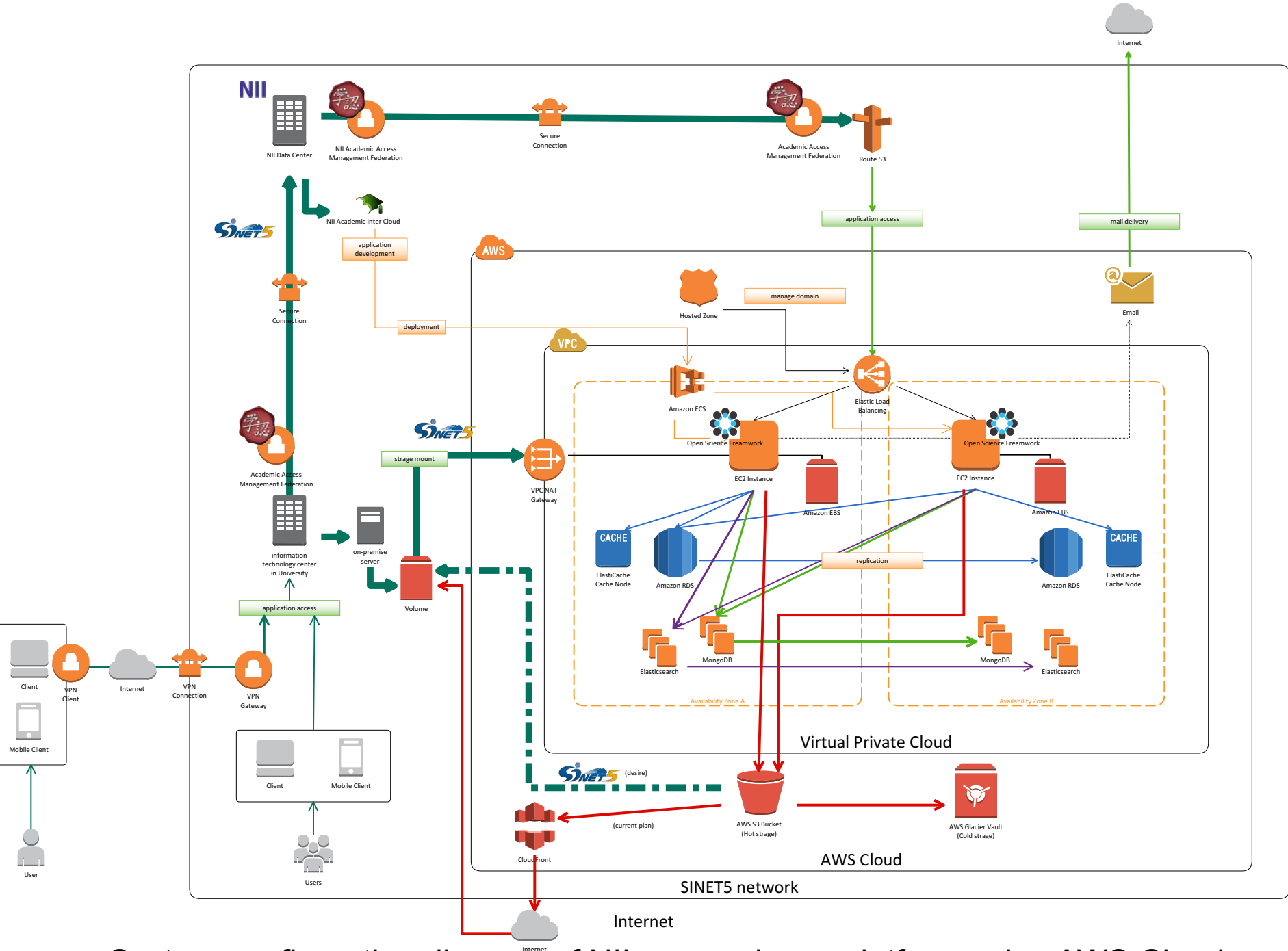
COS office



<https://goo.gl/photos/WmoHMs3s7ouDbBN9>



<https://github.com/RCOSDP>



System configuration diagram of NII open science platform using AWS Cloud.

Results and Discussion 1

User Interface of NII-RDMP

OSF | hoge

https://osf.nii.ac.jp/bwdmg/

Open Science Framework

hoge Files Wiki Analytics Registratio

hoge

Contributors: Yusuke Komiyama

Date created: 2016-09-29 06:20 PM | Last Updated: 2016-11-09 02:42 PM

Category: Project

Description: hoge

License: No license

Wiki

テスト 1

Files

Click on a storage provi

Name	
hoge	
- OSF Storage	
+ hoge	
- Amazon S3: hoehos-osf-hoge (Tokyo)	
dummy_hoge.txt	2016-08-22 01:37

WARN

- NII original domain,
- Stable/sustainable service in Japan
 - using SINET5 and NII Cloud
 - Forked service of OSF
 - SSL server certification

Yusuke

Yusuke Komiyama

Make Private Public

1 Share

- Original OSF add-ons for Japanese academia by NII,
- NII Storage (default)
 - Open Stack Swift
 - Microsoft Azure Blob Storage
 - WEKO (push direct a research data to JAIRO Cloud from OSF)

Open Science Framework

Settings

Configure Add-on Accounts

Amazon S3	Connect Account
Box	Connect Account
Dataverse	Connect Account
Dropbox	Connect Account
figshare	Connect Account
GitHub	Connect Account
Google Drive	Connect Account
Mendeley	Connect Account
NII Swift	Connect Account
ownCloud	Connect Account
WEKO	Connect Account
	Disconnect Account

Management screen of project repository

OSF | My Projects

https://osf.nii.ac.jp/myprojects/

Open Science Framework

Yusuke Komiyama

My Projects Browse and organize all your projects

Create Project

All my projects

Filter displayed projects

Collections	Name	Contributors	Modified
All my projects	hoge	Komiyama	4 days ago
All my registrations	OSF	Komiyama	11 days ago
Bookmarks (0)	yazawa-test	Yazawa, Komiyama	16 days ago
Contributors	hoge2	Komiyama	16 days ago
Satoshi Yazawa	Fork of Fork of hoge	Komiyama	17 days ago
Tags	Fork of hoge	Komiyama	17 days ago
nii			
osf			
hoge			
国立情報学研究所			

hoge

Information Activity

Visibility : Public
Category: Project
Permission: Admin
Last Modified on: 2016-11-09 02:42 PM

hoge

Tags

nii osf hoge 国立情報学研究所

OSF

Center for Open Science

Socialize

WARNING: This site is running in development mode.

OSF | hoge Settings

https://osf.nii.ac.jp/bwdmg/settings/

Open Science Framework

Dashboard My Projects Browse Q Yusuke Komiyama

hoge Files Wiki Analytics Registrations Forks Contributors Settings

Project

Select Add-ons

Configure Add-ons

Wiki

Commenting

Email Notifications

Configure Add-ons

Amazon S3 authorized by Yusuke Komiyama

Current Bucket: hoehos-osf-hoge (Tokyo)

Change Create bucket

Box Connect Account

Dataverse Connect Account

Dropbox Connect Account

figshare Connect Account

GitHub Connect Account

Google Drive Connect Account

Mendeley Connect Account

Zotero Connect Account

Wiki

Enable the wiki in hoge.

Configure

Control who can edit the wiki of hoge

- hoge

WARNING: This site is running in development mode.

Various add-ons in configure screen

- public cloud
- source cord
- figure/table
- reference management

OSF | hoge Files Yusuke

https://osf.nii.ac.jp/bwdmg/files/

Open Science Framework Dashboard My Projects Browse 🔍 Yusuke Komiyama

hoge **Files** Wiki Analytics Registrations Forks Contributors Settings

Click on a storage provider or drag and drop to upload

Upload Create Folder Delete Folder Download as zip Rename Filter i

Name	Size	Version	Download...	Modified
hoge				
OSF Storage				
hoge				
スクリーンショット 2016-11-13 19.0...				
04_gakkou_20141027.csv	13.1 kB	1	0	2016-10-31 09:18 AM
16739950.mol	10.1 kB	1	0	2016-11-02 10:01 AM
5jq0.fasta.txt	295 B	1	0	2016-10-25 03:43 AM
5JQ0.pdb	427.2 kB	1	0	2016-10-25 03:43 AM
5jq0.txt	294 B	5	6	2016-10-28 12:30 PM
cos_news.png	1.7 MB	1	1	2016-10-11 08:09 AM
rec-16-003-cloud-communication_bitly.jpg		1	0	2016-10-11 08:10 AM
SOP_sample_final_CC_BY_NC.docx				
スクリーンショット 2016-11-13 19.10...				
込山悠介_01.pdf				
Amazon S3: hoehos-osf-hoge (Tokyo)				
dummy_hoge.txt				

Web file uploader

- Drag and drop
- High speed upload/download with SINET5
- Hybrid clouds (private, public cloud and NII storage)

WARNING: This site is running in development mode.

04_gakkou_20141027.csv (Version: 1)

Delete Check out Share Download Toggle view: View Edit Revisions

- OSF Storage
- hoge
- 04_gakkou_20141027.csv
- 16739950.mol
- 5jq0.fasta.txt
- 5JQ0.pdb
- 5jq0.txt
- cos_news.png
- rec-16-003-cloud-commu...
- SOP_sample_final_CC_BY...
- 込山悠介_01.pdf
- Amazon S3: hoehos-osf-hoge (T...
- dummy_hoge.txt

Sheet_1

Show rows with cells including:

施設名	郵便番号
環境情報センター	〒252-0236
相模川ビレッジ若あゆ...	〒252-0135
城山学校給食センター	〒252-0111
青少年学習センター	〒252-0207
青少年相談センター	〒252-0239
清新学校給食センター	〒252-0217
総合学習センター	〒252-0239
津久井学校給食センター	〒252-0153
津久井生涯学習センター	〒252-0159
ふじの体験の森やませ...	〒252-0182
相原小学校	〒252-0141
相原中学校	〒252-0143
青根小学校	〒252-0162
青根中学校	〒252-0162
青野原小学校	〒252-0181
青野原中学校	〒252-0161
青葉小学校	〒252-0228
旭小学校	〒252-0143

File management screen

- Smart version control
- Rapid preview



SOP#A0017-ver2

Total RNA preparation protocol V2-150420ed (miRNA mini kit; Q Company #123456),

Extract and purify total RNA including miRNA

Generally, you can purify total RNA from animal tissues of 50 mg or cultured cells of 1×10^7 cells without DNase1. In handling RNA, all procedure should be done in RNase-free environment.

- Cultured Cells: Collect cells according to Step-1a or 1b.**
 - 1a) Floating cell (upto 1×10^7 cells. Avoid excessive amount.)**
Count cell numbers, and centrifuged at $300 \times g$ in a tube for 5 minutes to form cell pellet. Carefully remove supernatant completely, and proceed to Step-2.
 - 1b) Monolayer cells (upto 1×10^7 cells. Avoid excessive amount)**
After trypsinization count cell numbers, and centrifuged at $300 \times g$ in a tube for 5 minutes to form cell pellet. Carefully remove supernatant completely, proceed to Step-2.
- Add the Lysis Reagent (XXX company) of 700 μ L, and suspend the cells by vortex mixer. Incubate it for minutes at room temperature (20-30 $^{\circ}$ C).**
(If the cell pellet is hardened, tap the tube gently to loosen the particles before adding Lysis Reagent.)
NOTICE1: Lysis Reagent should keep in cold dark space.
NOTICE2: As Lysis Reagent contains toxic chemicals including phenol and guanidine thiocyanate, keep it away from skins.
- Add chloroform of 140 μ L and immediately vortex hardly 15 seconds (phase separation). After that incubate it 2-3 minutes at room temperature (20-30 $^{\circ}$ C)**

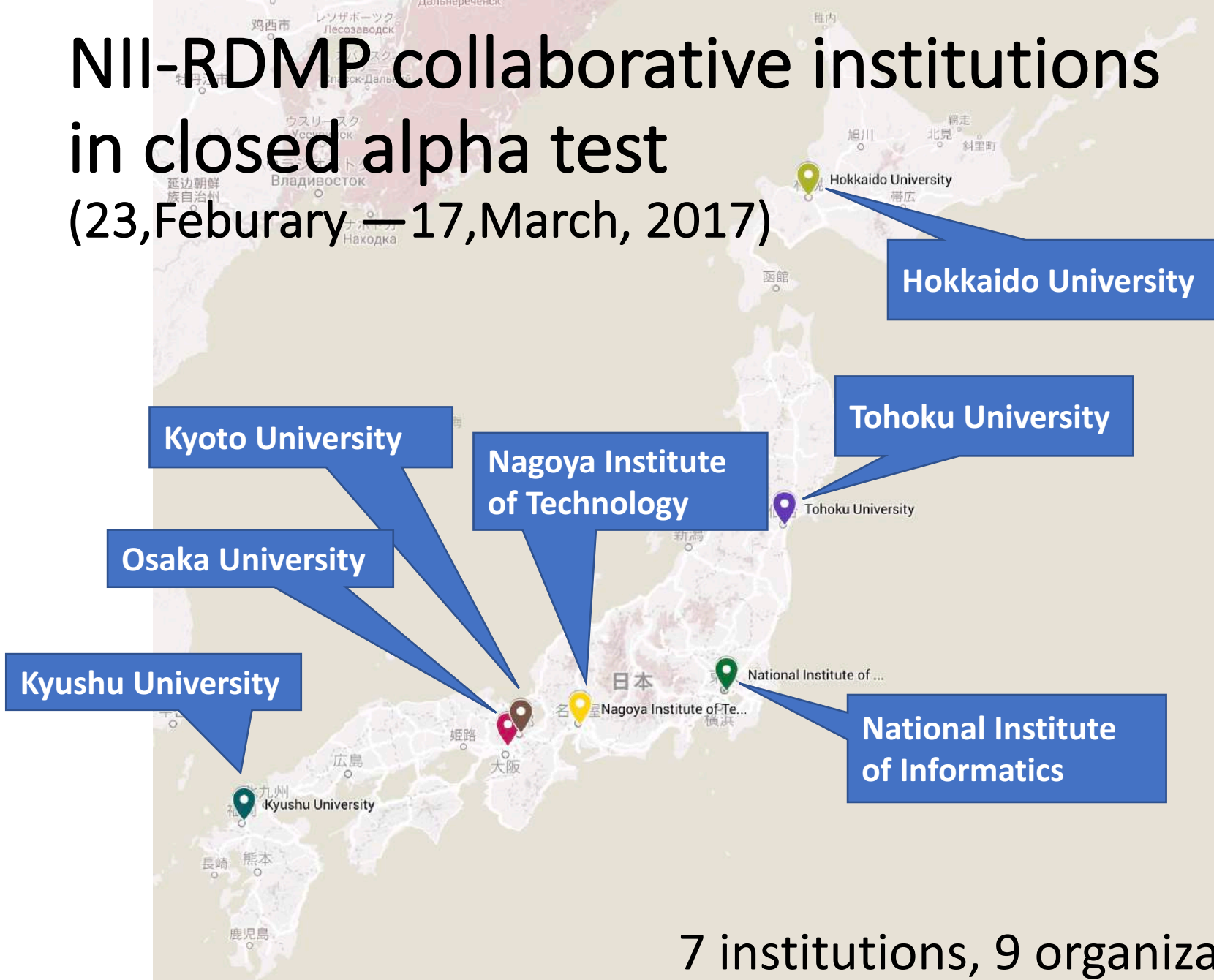
Results and Discussion 2

NII-RDMP closed alpha test

Purpose

- **NII-RDMP closed alpha test**
 - 23,February—17, March, 2017
 - 7 institutions, 9 organizations
- We are evaluating NII-RDMP systems by the sub-working group of university CIOs, and our developer reflects the comments into the RDMP system.
 - Software debug
 - Scalable experiment
 - Accounting estimation on public Clouds

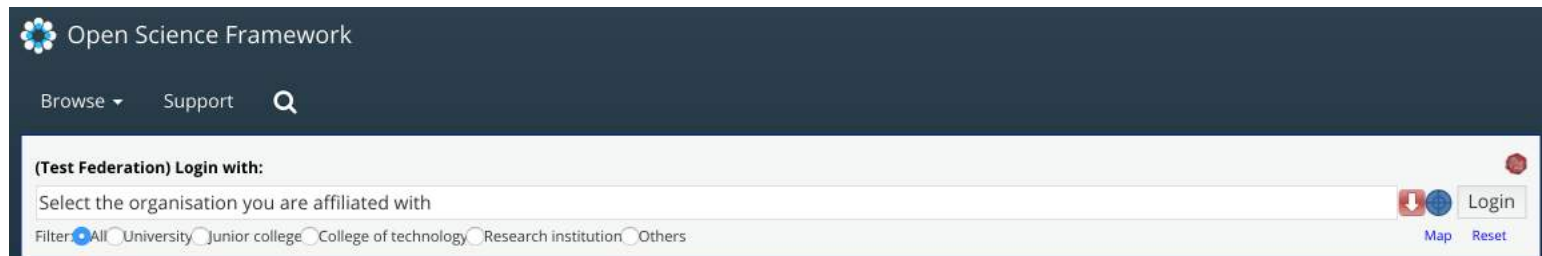
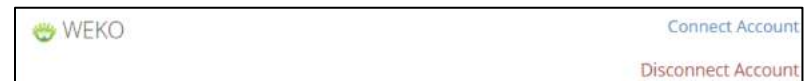
NII-RDMP collaborative institutions in closed alpha test (23,February—17, March, 2017)



7 institutions, 9 organizations

Restrictions in closed alpha test

- The organizer will drop all user database after the closed alpha test for security.
- Limited access by firewall control and NII OpenIdP account.
- Connect a Cloud storage to the RDMP via the internet.
- WEKO add-on and Gakunin Embedded DS are disabled. Private mode only in OSF.



Application tester wanted

- I am looking for the participating institution towards the **second closed test of NII-RDMP** in 2017. Please contact us if you are interested in our service.

Conclusions

- NII is currently providing the service of scholarly information infrastructure on a nationwide scale for academic communities, and also we need to collaborate the research result database with Japanese funding agencies.
- We are developing the NII-RDMP as new service for research data management of research integrity to the open science era.
- We are trying the closed alpha test for the software improvement with 7 universities.

Acknowledgments

- Dr. Sugiki Akiyoshi (Information Initiative Center, **Hokkaido University**)
- Dr. Yamaki Shunsuke (Cyberscience Center, **Tohoku University**)
- Prof. Matsuo Hiroshi (Department of Computer Science, **Nagoya Institute of Technology**)
- Dr. Tomoki Yoshihisa (Cyber media Center, **Osaka University**)
- Ms. Midori Moriishi (Information and Communications Technology Services, **Osaka University**)
- Dr. AOKI Takaaki (Institute for Information Management and Communication, **Kyoto University**)
- Dr. Kohei Hatano (**Kyushu University Library**)
- Dr. Eisuke Ito, (Research Institute of Information Technology, **Kyushu University**)
- Dr. Kazutsuna Yamaji (Digital Content And Media Sciences Research Division, **National Institute of Informatics**)

Fin