Is an e-Infrastructure enough?
—The NII Research Data Cloud and AXIES’s attempt to institutionalize the infrastructure
Today’s Talk

1. Open Science, the enabler of collaborative research!

2. Introduction to NII and its Services

3. Engaging the Academia in Japan with RDM
Open Science, the enabler of collaborative research!
What is Open Science?

... Science has always been open!
Definition: Open Science

...Umbrella Term

Open data
Pre-print
Data-intensive
Citizen science
Open code
Open access
Collaborative bibliographies
Alternative reputation systems
Open tab books/workflow
Science blog
Open annotation

Definition: Open Science

- Said to have no fixed definition
- General understanding:
  - New ways of doing research and organizing science
  - Enabled through digital technology
  - Reshaping academic value systems
‘Science 2.0’ describes the on-going evolution in the modus operandi of doing research and organising science. These changes in the dynamics of science and research are enabled by digital technologies and driven by the globalisation of the scientific community, as well as the increasing societal demand to address the Grand Challenges of our times. They have an impact on the entire research cycle, from the inception of research to its publication, as well as on the way in which this cycle is organised.
Michael Nielsen
Reinventing Discovery

- SPARC honors Michael Nielsen as innovator for bringing Open Science into the mainstream (2012)
- Reinventing Discovery tells the exciting story of an unprecedented new era of networked science.
- It demonstrated various cases with strong emphasis on citizen science.

https://www.amazon.co.jp/Reinventing-Discovery-New-Networked-Science-ebook/dp/B005OQGZ54
Globalization and Collaboration

- More and more researchers working on international collaboration projects
  - Need for sharing and storing information
  - Need for online collaboration platform

Source: Open Science Framework
https://cos.io/our-products/open-science-framework/
Global Challenge and Innovations

- Global challenges and innovations requiring:
  - Combining data from various discipline
  - Multi-disciplinary collaboration

- Data sharing could:
  - Enable data combination from various discipline
  - Enable research data to be used for industrial purposes and problem solving
Introduction to NII and its Services
The National Institute of Informatics (NII) seeks to advance integrated research and development activities in information-related fields, including networking, software, and content. NII also promotes the creation of a state-of-the-art academic-information infrastructure.
SINET5

21st Century Academic Information Infrastructure for Advancing Open Science

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

- **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
NII is the Japanese NREN

• 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.

<table>
<thead>
<tr>
<th>Number of Organizations</th>
<th>National Universities</th>
<th>Municipal Universities</th>
<th>Private Universities</th>
<th>Junior Colleges</th>
<th>Colleges of Technology</th>
<th>Inter-Univ. Research Institutes</th>
<th>Labs and Others</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>86 (100%)</td>
<td>71 (78%)</td>
<td>348 (55%)</td>
<td>62 (18%)</td>
<td>55 (97%)</td>
<td>16 (100%)</td>
<td>179</td>
<td>817</td>
</tr>
</tbody>
</table>

(As of March 2015)
Scholarly Information Infrastructure

**Journal articles**
- CiNii Articles
  - Metadata and links of Japanese journal articles
  - 19 M records
- JAIRO
  - Metadata and links of Japanese institutional repositories
  - 2.5 M records

**Catalog information**
- CiNii Books
  - Catalog of materials held by universities
  - Bibliographic info: 11 M records
  - Holding information: 137 M records
- CiNii
  - Articles
  - More than 800 institutions
  - More than 1,300 libraries

**Research Information**
- KAKEN
  - Project reports of MEXT supported scientific researches
  - 820 K records

**Linkage to other DB services**
- J-Stage (JST)
- NDL
- Academic Societies

**Compilation**
- NACSIS-CAT
- JSPS
- MEXT

**Digitization**
- JSPS
- MEXT

Note: The record numbers are as of March 2017.
Drivers for RDM in Japan

- General agreement to promote Open Science
- Policies by the funding agencies and international journals
- Research frauds and the “10 years research data preservation rule”
- “Research reproducibility” issues
- Need to promote data-intensive science
- “Society 5.0” vision

⇒ Strong need for RDM
NII, the leading voice in digital transformation in higher education Japan

NII in strong collaboration with all ICT centers and university-libraries across Japan
Engaging the Academia in Japan with RDM
Why an RDM Charter?

- Participants at AXIES-RDM session started to claim,

  “We need a charter in order to convince the university administration and to get the researchers and staff engaged!”

- AXIES
  - Academic eXchange for Information Environment and Strategy
  - Community of CIOs and ICT centers of universities in Japan.
  - Counterpart to EDUCAUSE in the US
Multi-stakeholder Approach
needed to implement RDM at universities

Grad students, technicians, lab manager, etc.: data generation, RDM

Research Admin Office
R admin
R integrity

Research Support Unit (URA Station)
R evaluation
R support

Univ. Library
D preservation
D publishing

ICT Center
E-infrastructure
IT policies

Univ-wide policies & strategies

President

Dept. admin offices: coordination

CIO
Research VP
Library
CIO

I want to make the university research competitive!

Professional Assoc.

Data Protection
Data Curation

Learnt Societies

ポリシー策定
専門的助言
RDM implementation in an academic institute

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**Decision-making on RDM implementation**

- President
- Research Strategy
  - Drafting of research strategy
  - Research Evaluation
  - Finding research collaborators

**Research Strategy**

- Running Inst. Repositories
- Adding metadata
- DMP support
- RDM Training etc.

**Univ. Library**

- Open/Closed/Embargo
- Publishing func.
- Storing func.
- Preservation func.

**INST. REPOS.**

- Access control func.
- Version control func.

**STORAGE**

- Closed
- R Integrity (10 yrs preserv)
- Grant Mgmt (DMP)

**Research Administration Office**

- Data generation
- Data store, access
- RDM (data cleaner)
- Metadata and description

**Researcher**

- Grad students, technicians, lab manager, etc.

**ICT center**

- Provision of e-infrastructures

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**Acad. Inf. Discovery Service**

- Search

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**Research Lab**

- Lab

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**Research Strategy**

- Drafting of research strategy
- Research Evaluation
- Finding research collaborators

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**Grad students, technicians, lab manager, etc.**

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**Informations**

- R Data Info
- DMP Info

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**Preservation func.**

- INST. REPOS.
- Open/Closed/Embargo
- Publishing func.
- Storing func.
- Preservation func.

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**Publish**

- Search

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**Publish**

- Search
“RDM Charter for Academic Institutions”

- RDM Charter
  - Not for researchers, but
  - For academic institutions!

- Purpose of RDM Charter
  - Give university administration ideas and options to implement RDM in respective institutions.

Don’t dare to tell me how to manage my data! I know what I’m doing!
“RDM Recommendation for Academic Institutions”...Main Text

1. Need for RDM at academic institutions
   - Research data used at every research process in every discipline
   - Researcher who manages research data controls research competitiveness in the digital age

2. Infrastructure for RDM should be provided by institution
   - Inefficient if every researcher cares for his/her own environment

3. Efficiency that the RDM infrastructures are common across institutions and AXIES role

4. Expectation that this recommendation will be referred at academic institutions
RDM Recommendation for Academic Institutions’ Composition

- The Recommendation
  - Addresses the viewpoints why academic institutions needs to take RDM seriously.
  - Viewpoints in bullet points:
    I. Role of academic institutions in RDM
    II. Policies and organizations for RDM needed in acad. Institutions
    III. RDM procedures in acad. Institutions
    IV. RDM Purpose options in acad. Institutions
    V. Digital platform functions needed for RDM in acad. Institutions
    VI. Human resources development for RDM in acad. Institutions
    VII. Reuse and service options of research data in acad. institutions

- Appendix
- Glossary
- References
Next Steps of AXIES

 GOAL

➢ Make sure that RDM platform is not just provided as system but make it work within institution!

 Activities

➢ Designing questionnaire survey template
➢ Establishing RDM case studies
➢ Developing RDM policies and guidelines

Calling universities for collaboration!
An e-infrastructure is not enough to induce collaboration and innovation!

People need
- Common interest,
- Shared vision, and
- **Workflow** which links stakeholders along a line.