Current Status and Future of the Scholarly Information Services of NII

Koichi Ojiro
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National Institute of Informatics
Outline of NII
# Brief History of NII

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>May 1976</td>
<td>Foundation of Research Center for Library and Information Science (RCLIS), The University of Tokyo</td>
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<tr>
<td>April 1983</td>
<td>Establishment of Center for Bibliographic Information, The University of Tokyo (reorganized from RCLIS)</td>
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<tr>
<td>April 1986</td>
<td>Establishment of National Center for Science Information Systems (NACSIS)</td>
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<td>April 2000</td>
<td>Establishment of National Institute of Informatics (NII) (Converted from NACSIS)</td>
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<td>April 2004</td>
<td>National Institute of Informatics (a member of Research Organization of Information and Systems)</td>
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NII’s Two Missions

Comprehensive research on informatics

Research/education and infrastructure development

Development of advanced infrastructure for scholarly communication

Outcome

Feedback

Research/education

Development

1) Scholarly Information Network

2) Scholarly Contents

3) Education/training

Scholarly Network R&D Center

SINET Usage Promotion Office

Cloud Promotion Office

Scholarly Certification Promotion Office

Contents/system Development Office
“State-of-art scholarly information infrastructure” to connect universities and research institutions via an ultrafast network and share devices (computers, etc.), platform software, contents/databases, human resource, and research groups.
Science Information Network

- SINET4: Japanese Academic Backbone Network
Science Information NETwork (SINET)

- SINET is the Japanese academic backbone network for more than 700 universities (including all national universities) and research institutions.
- It supports lots of leading-edge research activities as well as educational activities.
Network History and SINET4

- SINET started operating as an Internet backbone network in 1992, and the third version (SINET3) expanded its service menu gradually over the single network.
- As the use of advanced multilayer network services has increased nationwide, the network is required to be higher-speed and more reliable. Regional disparities in accessibility to the network must also be alleviated.

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<th>Year</th>
<th>Event</th>
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<tr>
<td>1987</td>
<td>Packet-switched network (X.25) - closed network</td>
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<tr>
<td>1992</td>
<td>Higher speed - SINET (Internet)</td>
</tr>
<tr>
<td>2002</td>
<td>Expansion of service menu - Super SINET</td>
</tr>
<tr>
<td>2007</td>
<td>More reliable - SINET3</td>
</tr>
<tr>
<td>2011</td>
<td>Higher speed, Regional disparity alleviation - SINET4 (5 years)</td>
</tr>
<tr>
<td>Present</td>
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## Services of SINET4

SINET4 provides the following variety of multilayer network services.

<table>
<thead>
<tr>
<th>Service Menu</th>
<th>Status</th>
<th>Note</th>
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<tbody>
<tr>
<td>Commercial Internet access</td>
<td>✓</td>
<td>Via IXs and global ISPs</td>
</tr>
<tr>
<td>IPv6</td>
<td>✓</td>
<td>Native/dual-stack/tunnel</td>
</tr>
<tr>
<td>IPv4 full-route information</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>IPv4/IPv6 multicast</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>IPv4/IPv6 multicast (QoS)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Application-based QoS</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>L3VPN</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>L3VPN (QoS)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>L2VPN/VPLS</td>
<td>✓</td>
<td>Fastest growing service</td>
</tr>
<tr>
<td>L2VPN/VPLS (QoS)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>L2VPN/VPLS on-demand</td>
<td>Planned</td>
<td>For several projects</td>
</tr>
<tr>
<td>L1 on demand</td>
<td>✓</td>
<td>Over 1,000 paths were setup/released so far</td>
</tr>
<tr>
<td>Performance measurement</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Traffic measurement</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Private Cloud support</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
The core links form nationwide 40-Gbps (STM256) backbone and are configured to have redundant routes for high service availability.
Nodes were not damaged even by the earthquake with a seismic intensity of 7 and continued to work even in areas where the blackout lasted for long periods of time (maximum of 96 hours) through emergency power supplies by refueling them until commercial power sources were recovered.

Primary circuits of links were severely affected, and two links were down, but the backbone could keep the routes between arbitrary core nodes open; and Sendai and Sapporo were not isolated.

The surviving nodes and links diverted the IPv4/IPv6 packets to other routes by OSPF, saved VPN packets by MPLS protection/FRR.
Scholarly Information Services by NII

- Provision of Scholarly Contents
Big Picture: Scholarly Information Services by NII

**Papers**
- **NII-REO**
  - E-journal Archives and e-collections
  - For universities
    - 3.7 million articles
- **CiNii**
  - Articles
  - Indexing service for academic papers
    - 15.3 million records
- **JAIRO**
  - Refereed and Un-refereed articles from societies or bulletins
    - 3.8 million articles
- **NII-ELS**

**IRs**
- **CiNii**
  - Articles
- **JAIRO**
  - Comprehensive metadata harvester for Japanese IRs
    - 1.3 million records
- **CiNii**
  - Books
- **NII-DBR**
  - Academic Research Database
    - 2.2 million records

**Books**
- **CiNii**
  - Books
- **NII-DBR**
  - Academic Research Database
    - 2.2 million records
- **KAKEN**
  - Official reports of Grants-in-aid
    - For scientific research
    - 0.67 million reports

**Database**
- **CiNii**
  - Articles
    - Refereed and Un-refereed articles from societies or bulletins
    - 3.8 million articles
- **JAIRO**
  - Official reports of Grants-in-aid
    - For scientific research
    - 0.67 million reports

**Projects**
- **OUP**
  - Publishers
- **Springer**
- **J-Stage (JST)**
- **NDL**
- **Academic Society**
- **OCLC Asia Pacific Regional Council 2012 Membership Conference**

**Universities and Institutions**
- **Universities and Institutions**
  - (250 organizations)
  - (1.200 organizations)
Collaboration with University Libraries

- Union catalog database
- ERDB (under consideration)
- Institutional repositories
- Digital archiving
NACSIS-CAT

- Bibliographic records: 10 Million
- Holding records: 120 Million
- Name Authority: 1.6 Million
- Member libraries: 1,263
  - More than 90% universities in Japan
  - Including 128 Foreign universities

Related services:
- Inter-library loan
- CiNii Books
Photocopy requests
851 thousand/year
Gradually decreases with availability of E-resources

Loan requests
90 thousand/year

ILL for overseas
BLDSC (1994-2010)
OCLC (2002-)
KERIS (2004-)

![ILL records chart]
CiNii Books

http://ci.nii.ac.jp/books/

- NACSIS-CAT search engine
- Start of service from Nov. 2011
- Searchable from library collection information
- Linked with library OPAC
- Provision of various Web APIs
Development of ERDB (Electronic Resources Database)

Support for library staff in management work

Management tool

University library staff

Library management system

Commercial management system

Excel

Simple management tool

Data collection/integration

Data development team
(NII/University libraries/JUSTICE)

(1)

ERDB
Bibliography, contract information, use conditions, usage statistics, etc.
(by unit of journal, book)

(2)

Data source

Publishers

Commercial KB

Academic societies

OCLC KB

JISC KB+

NDL

JST

NII

JIRNavi

NDL

JST

User service

CiNii

Library OPAC

A-Z list

Link resolver

Discovery service

NACSIS-CAT

Seamless access to both electronic and print resources

Support for user access

(3)
ERDB: Providing Support for Management and Access (Scenario)

(1) Development of ERDB and data sharing
- Aggregate bibliographic, contract information, use condition, usage statistics and other data on domestic and foreign electronic resources (journals, e-books, etc.) into an electronic resources management database (ERDB).
- Data development team comprising of university libraries, JUSTICE and NII will compile the data in advance

(2) Support for university library operations
- University library staff will be able to efficiently manage electronic resources by using ERDB data via various management tools

(3) Support for user access
- Users will be able to search and gain accurate and rapid access to necessary e-resources through CiNii, library OPAC, A-Z list, link resolvers by linking the data aggregated in ERDB with these applications
- Seamless access to both print and electronic resources can be realized by providing cross-search with NACSIS-CAT and other existing data
Institutional Repositories

What are Institutional Repositories?
Digital archiving systems that universities and other research/education institutions establish to collect, preserve and provide free access to the intellectual products they create.

(Contents archived)
- Academic papers (articles from academic journals, university bulletin, and theses)
- Other information such as technical reports, conference presentations, textbooks, data, etc.

Role of NII
- Support for construction of institutional repositories
- Support for collaboration among institutional repositories
- Provision of integrated search function

Role of universities
- Construction of institutional repository
- Collection and preservation of information produced by members of the institution
- Information dissemination

Also contributing to the promotion of open access by providing articles that have been published on foreign journals.
NII-funded Programs

- **1\textsuperscript{st} Period:** FY2005-2007
- **2\textsuperscript{nd} Period:** FY2009-2009
- **3\textsuperscript{rd} Period:** FY2010-2012

- **3 Categories of Funding**
  - Area 1: Content development for new IRs (31 institutions)
  - Area 2: Research and Development (8 projects)
    - Pilot studies to accelerate the deposit of content (e.g. Theses and Dissertations, Government-funded research publications)
    - Development of new value-added services, etc.
  - Area 3: Support for community activities (DRF, SCPJ)
Expansion of Japanese IRs (1)
Expansion of IRs (2)

- World total: 2165
  - Japan is the fourth with 137
  
  Actually, Japan is the 2\textsuperscript{nd} with 258

OpenDOAR 02-Jul-2012

Open DOAR: Directory of Open Access Repositorieshttp://www.opendoar.org/ (2012/7/2)
Increase of Materials Deposited

http://irdb.nii.ac.jp/analysis/index_e.php  （Last accessed: 2012/03/01）
JAIRO: Japanese Institutional Repositories Online

http://jairo.nii.ac.jp/

2012/08/09 Number of Organizations: 197, Number of records: 1,287,581

News
- You can search Institutional Repositories in Japan. →more
- JAIRO will be stopped for system maintenance work as follows (2012/8/7)
- The link to JAIRO Usage Analysis is added to the top page (2012/7/20)
- Papers associated with the Nobel Prize in Chemistry are available on JAIRO (2012/10/26)

Simple Search | Advanced Search

Search

Content types
- Journal Article (298,127)
- Departmental Bulletin Paper (546,391)
- Presentation (10,351)
- Technical Report (8,286)
- Article (43,210)
- Learning Material (6,791)
- Software (25)
- Thesis or Dissertation (99,832)
- Conference Paper (70,124)
- Book (20,923)
- Research Paper (22,743)
- Preprint (349)
- Data or Dataset (52,635)
- Others (14,574)

Limit search results by content type

Limit search results by organization

Click on "Organizations" to display or hide the list of organizations.
Outline

- Almost all national universities in Japan have their own repositories, but implementation rate of local/private universities stay around 10-20%.
- Limited resources and less technical knowledge, however, hamper implementation of IR especially in small universities.
- JAIRO Cloud provides a shared instance of IR system on the virtual server hosted by NII since April 2012.

Service Architecture

- NII offers easy-to-navigate IR platform with free-of-charge in initial stage.
- An easy-to-use repository module “WEKO” developed by NII, is used in the service.
- Metadata in JAIRO Cloud and other IRs in Japan can be searchable on integrated retrieval services via API, for instance JAIRO and CiNii by NII.

Future Plan

- NII will aim at new construction of more 200 IRs by the 2017 fiscal year.
JAIRO Cloud: Service Architecture

Institutions
- Registering and publishing content
- Screen UI management

NII
- Software management
- Initial settings
- Update etc.
- OS management
- Hardware management
- Network management

A University Repository
- WEKO
- NetCommons2
- Guest OS
- Host OS
- Hardware and Network

B University Repository
- WEKO
- NetCommons2
- Guest OS

CiNii

User

Accessibility

JAIRO

※1 CiNii (Scholarly and Academic Information Navigator) is a database service that enables searching of information on academic articles published in academic society journals or university research bulletins.

※2 JAIRO is a service providing the capability of searching academic information stored in Japanese IRs (journal articles, theses and dissertations, departmental research bulletins, research reports, etc.).
Digital Archiving Project

- Light archive
  - NII-REO
    - An archive to store contents jointly purchased by university libraries (local hosting server)
    - Electronic journals, backfiles (Springer, OUP)
    - Humanities & Social Sciences Collection (HCPP, MoMW)

- Dark archive
  - Collaboration with an international project for long-term preservation of electronic journals
  - Role as an Asian node for CLOCKSS (Controlled LOCKSS: Lots of Copies Keep Stuff Safe)
    - A joint project run together by publishers and university libraries around the world
    - Participating Japanese libraries: 30 (as of June 2012)
Overview of NII-REO

NII-REO

- HSS: Humanities & Social Sciences Collection
- OJA: Online Journal Archive

19/20th HCPP
18th HCPP
MoMW
...

Publisher server

Foreign publisher

University library consortium

University A
University B
University C
University D
University E

Search/view at publisher side

Negotiation/contract

Collaboration

Cross searching of multiple publishers
View of full text (contracted institutions only)

- Local loading of full text
- Negotiation/contract
- Collaboration

- Light archive (accessible at all times)
- Alternate access route when server or network fails
- Ensures stable and permanent access
- Shared platform for purchased electronic resources such as backfiles
Collaboration with Academic Societies

- Digitalization and provision of society journals
- SPARC Japan
- Informatics Square (under consideration)
- KAKEN
ELS & CiNii Articles

- Article information service that serves as a part of Japan’s academic information infrastructure

**Academic societies/universities, etc.**
Compilation/publication

**Digitization**

**Distribution**

Research infrastructure of researchers and students throughout the world

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**NII**

**NII-ELS**

**CiNii**

(Electronic library)

**(Scholarly and academic information navigator)**

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**FullText DB**

Academic society journals/research bulletins, etc.

About 3.8 million articles

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**Article DB**

NII-ELS+CJP+
NDL journal article index+
IR+J-STAGE=

About 15.3 million articles
Overlapping of article information ("noise") is eliminated to the utmost extent.

With integration of data from multiple institutions, more texts can be reached.

- 15.3M article metadata records
- 3.8M fulltext records
- 18k journal titles
- 5M search sessions / month
- 2M fulltext downloads / month

http://ci.nii.ac.jp/
CiNii Articles: Traffic

Per month

2007.4 Indexed by Google

2009.4 Drastic UI renewal

2010.11 Indexed by Yahoo

PDF DL
Search

2012/9/3
**Purpose**

To promote electronic publishing by academic societies and to establish international recognition of Japanese journals

To enhance international dissemination of Japanese research findings by nurturing world-class journals

**Actual state**

NII to support internationalization and digitalization of 45 English academic journals published in Japan as part of the SPARC Japan project

**Challenges**

Digitalization and open access need to be further promoted to enhance the dissemination capacity of Japanese journals

Digitalization and publishing of English academic journals have seen certain progress but not open access.

International networking of Japanese publishers has progressed, however publisher-library collaboration and awareness raising among researchers need to be further promoted to achieve open access

**Projects**

To enhance international dissemination capacity of Japanese academic societies

- Enhance dissemination capacity of leading Japanese journals
- Enhance overseas promotion

**Pilot projects**

to promote open access

**Support to digital publishing of society journals under international collaboration**

- Support for digitalization, internationalization and business model building of academic journals
- Packaging, Supporting dissemination through portal
- International collaboration (e.g. SPARC)
- Projects based on collaboration with university libraries

**Effects**

Formation of an international academic journal community

Training of young experts through implementation of projects

Creation of new business models for academic journals

Enhancement of scholarly communication infrastructure through collaboration with university libraries

Public and private universities

SPARC US

SPARC EU

JUSTICE (Japan Alliance of University Library Consortia for E-Resources)

Japan Science and Technology Agency
Activities of SPARC Japan

- **Perspectives**
  - To promote electronic publishing by academic societies and to establish international recognition of Japanese journals
  - To enhance international dissemination of Japanese research findings by nurturing world-class journals
  - To improve scholarly communication from an international perspective (promotion of open access)

- **Activities**

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<tr>
<td></td>
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<td>45 partner journals</td>
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<tr>
<td></td>
<td></td>
<td>All partner journals</td>
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<td></td>
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<td>digitalized in English, of which 13 journals are available only in electronic form</td>
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<tr>
<td></td>
<td>Starting from 2005 (10 seminars)</td>
<td>2006-2008 (22 seminars)</td>
<td>2009-2011 (23 seminars)</td>
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<td>Exhibits starting from 2007</td>
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<tr>
<td></td>
<td>First issue: Feb. 2009</td>
<td></td>
<td>12 issues to date</td>
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Informatics SQUARE (planning phase)

Value Added Services: Citation Linking/Relevance Ranking/Annotation/SNS

= web-scale discovery service in informatics

NII

Researchers and Students

Single Unified Index

Metadata Aggregation/Consolidation

Information Processing Society of Japan

Institute of Electrical Engineers of Japan

Institute of Electronics, Information and Communication Engineers

ACM Digital Library

IEEE

Springer Lecture Notes in Computer Science

IET

Japanese Society for Artificial Intelligence

Japan Society for Software Science and Technology

Societies and Publishers (Full-Text Vendors)

36 OCLC Asia Pacific Regional Council 2012 Membership Conference 2012/9/3
KAKEN: Database of Grants-in-Aid for Scientific Research

Stores project outlines, reports, and findings of Grants-in-Aid projects

http://kaken.nii.ac.jp/
Education and Training
Training Programs

- **NACSIS-CAT Training Course**
  - Participants: NII staff responsible of catalog information services
  - Aim: Acquire skill and knowledge on operation of union catalog database

- **Specialized Training Course**
  - Participants: University staff involved in research support
  - Aim: Acquire skill and knowledge on
    - Web Service
    - Information Literacy
    - Certification System

- **Internship Program**
  - Participants: Librarians, staff engaged in the operation of electronic computers and networks
  - Aim: Acquire skill and knowledge to handle advanced scholarly information systems through several months of hands-on training at NII
Summing-Up: Three Roles of NII

- **Role as a Data Provider**
  - Contents creation in collaboration with university libraries and academic societies
    - NACSIS-CAT, ELS, JAIRO Cloud, KAKEN, REO

- **Role as a Service Provider**
  - Provision of value-added services to the contents through cooperation with related institutions
    - NACSIS-ILL, CiNii Articles + Books, JAIRO

- **Role as a Supporting Organization**
  - Provision of training to librarians and society staff, advocacy activities
  - Commissioning of projects (funding)
    - Education & Training, SPARC Japan Seminar, Funding Programs
Thank you for your attention!