



Inter-University Research Institute Corporation /
Research Organization of Information and Systems

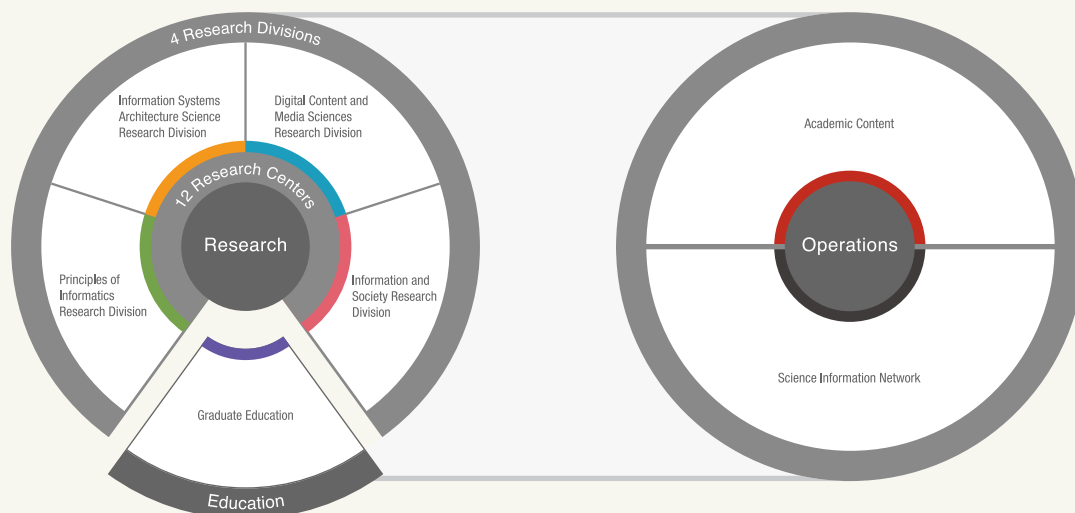
National Institute of Informatics

2016

Outline for FY2016

Weaving Information into Knowledge

As Japan's only general academic research institution seeking to create future value in the new discipline of informatics, the National Institute of Informatics (NII) aims to promote integrated research and development activities in information-related fields such as networking, software, and digital content, through a wide range of activities spanning theoretical and methodological research to practical applications. As an inter-university research institute, NII promotes the development of a state-of-the-art academic information infrastructure to provide an essential resource for research and education within the broader academic community. In this pursuit, it focuses on partnerships and other joint initiatives with universities and research institutions, as well as industrial enterprises, throughout Japan.



The National Institute of Informatics is a vehicle for creating future value through informatics, driven by the two wheels of research and operations.



Integrated Research, from Basic Methodology to State-of-the-Art

Informatics is a new academic discipline based not only on computer science and information technology, but also on the human, social, and life sciences. The National Institute of Informatics (NII) comprises 4 research divisions and 12 research centers, enabling everything from basic informatics methodologies to cutting-edge challenges like artificial intelligence, "big data," IoT, and cybersecurity to be tackled comprehensively. As part of this effort, NII also pursues informatics research through collaborations with industry and international research projects.

Research Divisions



Principles of Informatics Research Division

Pursues research aimed at exploring new principles and theories in informatics and at pioneering new technologies and frontiers to serve the needs of the future.



Information Systems Architecture Science Research Division

Pursues research on software and hardware architectures and systems to enhance computing and network capabilities.



Digital Content and Media Sciences Research Division

Pursues theoretical and systems research on methods for analysis, creation, storage, utilization, and processing of text, video, and other content formats.



Information and Society Research Division

Pursues interdisciplinary research covering information systems technology and human and social science, to serve the needs of an increasingly information-based society.

Research Centers (research divisions dedicated to specific fields)

Center for Cybersecurity Research and Development

Established April 2016

Through R&D that leverages the knowledge acquired from the construction and operation of academic information infrastructure, this center aims to ensure the security and operational efficiency of universities in cyberspace and to cultivate human resources in collaboration with universities.

Research Center for Financial Smart Data

Established Feb. 2016

This center pursues the development of technology for financial information analysis, by turning "big data" into "smart data," and through statistical analysis and modeling of economic and social phenomena, to enable more precise predictions of the future, natural language processing, and machine learning.

Cognitive Innovation Center

Established Feb. 2016

This center strives to generate innovations to tie state-of-the-art cognitive technologies incorporating artificial intelligence techniques such as "deep learning" to social, industrial, and new business applications. It also works at raising awareness to promote social implementation of such technology.

Research and Development Center for Academic Networks

This center develops and delivers new services and functions to enhance the capabilities and efficiency of the Science Information Network (SINET)—a crucial supporting network for more than 800 universities and research institutes in Japan.

Research Center for Knowledge Media and Content Science

This center pursues leading-edge research on analysis and knowledge extraction from academic papers and other academic content, as well as empirical R&D for promoting the distribution of academic know-how.

Center for Global Research in Advanced Software Science and Engineering

This center is dedicated to the integration of research, implementation, and education aimed at developing 21st-century software infrastructure, through collaboration with both Japanese and international research institutions and industrial enterprises. It also aims at cultivating world-class researchers and technologists to serve as a nucleus for next-generation efforts in this field.

Research Center for Community Knowledge

This center pursues R&D on Net Commons, on the collection and analysis of shared knowledge creation processes, and on activities to promote the diffusion of research findings. It also supports the development of next-generation information and communications technologies and information sharing infrastructure systems.

Center for Cloud Research and Development

This center aims at establishing a national advanced R&E infrastructure for taking advantage of clouds with the upgraded Science Information Network (SINET). It researches and develops advanced cloud infrastructure technologies utilizing SINET, such as intercloud, which utilizes multiple cloud platforms in a federated manner.

Center for Dataset Sharing and Collaborative Research

This center develops useful data sets for informatics research and makes them available to researchers. In addition, it conducts R&D on the creation of data sets and on systems for their utilization for joint usage research in informatics.

Global Research Center for Quantum Information Science

This center promotes leading-edge research and human resource development aimed at establishing NII as a world-class center for quantum information research.

Global Research Center for Cyber-Physical Systems

This center promotes R&D on social cyber-physical systems (CPS) aimed at solving social problems and creating new value propositions through collaboration between the physical (real) world and the cyber (virtual) world, by means of joint industry-government-academia initiatives.

Global Research Center for Big Data Mathematics

This is the center of the JST ERATO Kawarabayashi Large Graph Project. This world-class center for "big data" mathematics research, focused on the development of high-speed algorithms, pursues both cutting-edge research and human resource development.

Graduate Education

The National Institute of Informatics mainly provides education to graduate students in three ways: (1) Direct participation in education at SOKENDAI (The Graduate University for Advanced Studies); (2) Cooperation with other graduate schools; and (3) Accepting research students as part of special collaborative projects. SOKENDAI is the first graduate university in Japan that aims at promoting original, international academic research that transcends the boundaries of conventional academic disciplines and develops a leading academic discipline that creates new streams of science. The Department of Informatics in the School of Multidisciplinary Sciences at the National Institute of Informatics offers both five-year and three-year doctoral programs of graduate education. Including common foundation subjects, the educational activities of the Department of Informatics are focused on the following six fields of specialization: (1) Foundations of Informatics; (2) Information Infrastructure Science; (3) Software Science; (4) Multimedia Information Science; (5) Intelligent Systems Science; and (6) Information Environment Science. In total, the department offers over 70 subjects. Since many of the subjects are offered in English, outstanding students from overseas are readily accepted. There are also many mature students; in fact, they account for around 30% of all the department's students.

Industry-Academia Collaboration

In addition to forging alliances with universities, public research institutes, and industrial enterprises to pursue joint research projects and human resource development, NII promotes the implementation of research findings for the benefit of the public. As examples of industry-academia collaborations, in February 2016 NII established two new research centers—the Research Center for Financial Smart Data and the Cognitive Innovation Center—with the aim of channeling research findings to socially valuable applications. The Research Center for Financial Smart Data is the first research center at NII whose operation and research is funded entirely by the private sector.

International Exchange

In addition to communicating research findings internationally, NII actively works to promote international exchanges amongst its researchers and students and to make international collaboration a key element of its function as a center for informatics research. In these and other ways, NII strives to make an international contribution to the discipline of informatics. It seeks to create Memorandum of Understanding (MOU) agreements with overseas universities and research institutes and to engage in joint international research projects with such partners, thereby enabling researchers and students to benefit from deeper international exchange experiences. To make these kinds of international exchange efforts as effective as possible, NII promotes an international internship program and MOU grants system to facilitate international research exchange in a wide range of fields.

Services to Support Academic Research and Education

In partnership with universities and other institutions, NII is developing leading-edge academic information infrastructure. In FY2016 NII launched the full-scale operation of the latest version of the Science Information Network (SINET5), which connects all of Japan with blazing fast 100-Gbps data network lines. On top of this, NII is working to develop academic authentication infrastructure as well as vital, next-generation academic content infrastructure. In this manner, NII is working together with universities and research institutes to help both the academic community and society at large.

Science Information Network (SINET)

Advanced infrastructure

SINET is a state-of-the-art optical data network featuring the very latest technology, such as a full mesh topology to minimize transmission latency between data centers in each of Japan's prefectures.

High reliability / Robustness

SINET delivers high-reliability network operation and performance through the use of a multilayered, state-of-the-art network architecture (optical network layer, MPLS-TP network layer, IP/MPLS network layer) and a combination of methods to avoid loss of service in the event of network damage, such as built-in redundancies at each layer and the provision of bypass routes.

Multifunction / Flexibility

Security

To enable the circulation of data and the secure use of cloud content services, SINET offers an extensive range of functions such as authentication, VPN services, and monitoring to assess the state of the network. SINET is also providing a broad range of useful services across the network layers, such as the ability to create virtual network environments.

Intercloud and cloud utilization support

SINET offers high-performance cloud-based research and education environments, such as interclouds that enable multiple clouds to be utilized as a single platform. This support is helping universities and research institutes to make greater use of and receive more benefit from cloud services.

Academic content

By providing academic repositories that link universities and university libraries to enable shared use of repositories and a wide range of academic content, and through platforms like CiNii and JAIRO Cloud that enable the sharing and publishing of academic information, SINET is helping to promote the ideals of "open access" and "open science."

Ultra-high speed

With a line bandwidth of 100 Gbps connecting its nodes, SINET can achieve ultra-high network speeds over vast areas.

Internationality

With the addition of direct lines to Europe (without passing through the US), international network latency is now minimized. SINET connects to the rest of the world through four international circuits—the US West Coast (100 Gbps) and East Coast, Europe, and Asia—for truly global reach and enhanced support for international joint research projects.



Academic Content Infrastructure

CiNii (NII academic information navigator)



This is a database service that enables searches of academic information such as academic papers, publications, journals, and doctoral theses. In addition to CiNii Articles, which allows searches of Japanese academic information from publications issued by academic societies, university research bulletins, databases of journal articles at the National Diet Library, and other sources, and CiNii Books, which allows searches of information from books (publications and journals) kept at university libraries all over Japan, in 2015 a new service, CiNii Dissertations, started operation. CiNii Dissertations allows searches of information from doctoral theses approved by Japanese universities and the National Institution for Academic Degrees and Quality Enhancement of Higher Education.

JAIRO Cloud (joint usage repository service)



This is a cloud-based service that provides institutional repositories for universities and other academic institutions. The service utilizes WEKO, an institutional repository software developed by NII that enables institutions to create and operate their own repositories very simply, using just a web browser. More than 350 institutions in Japan are already using JAIRO Cloud.

■ A place to connect the theories of the university with the actions of the industry



An intellectual "monozukuri" (manufacturing) education program based on science-TOPSE

■ Supporting academic research and educational activities



Database of Grants-in-Aid for Scientific Research-KAKEN

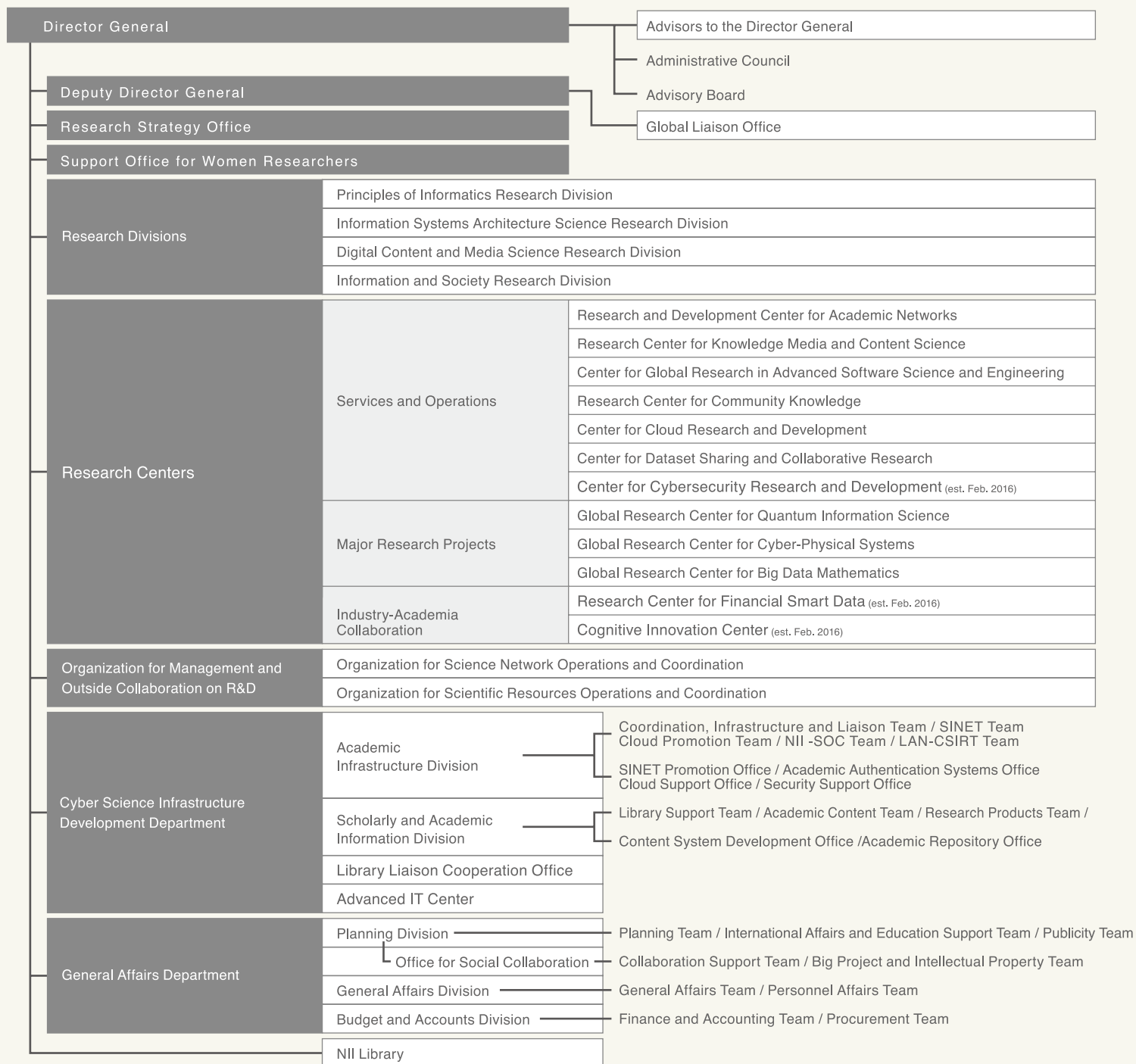


The Academic Access Management Federation in Japan



Digital certificates-The UPKI Digital Certificate Issuance Service

Organization



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■ NII Video Channel
View lectures and research presentations by NII.
<http://www.nii.ac.jp/event/videos/>

■ NII Today
Easy-to-follow presentations on NII's latest research.
<http://www.nii.ac.jp/about/publication/today/>

