



Advancing Open Science with NII Research Data Cloud

RCOS

Research **C**enter for
Open **S**cience and Data Platform



The Research Center for Open Science and Data Platform (RCOS) was established at the National Institute of Informatics (NII) for the purpose of developing and managing research data infrastructure, thereby laying the foundation for “open science” in Japan.

Scientific research is shifting toward a new paradigm, one in which there is open collaboration and the free sharing of research publications and data within academia and beyond. This new paradigm is commonly referred to as “open science.” Open science will accelerate progress in scientific research, helping researchers to meet the social challenges of today.

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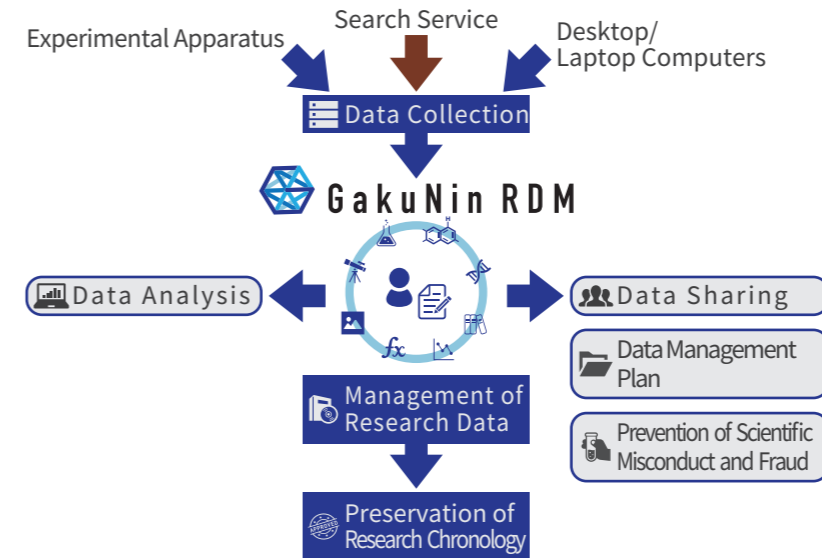
NII Research Data Cloud (NII RDC)

Management



Flexible and Reproducible Research Data Management

GakuNin RDM is a regional research data management (RDM) service employing the authentication and authorization infrastructure (AAI) GakuNin for Japanese academic institutions and researchers. In this service, we have implemented many useful functions for the management and sharing of research data as Web services using cloud computing resources and storage. The service offers essential functions for RDM, including file preview, version control, private data sharing and access control, and local-directory synchronization. It also provides many plug-ins for external research tools and functions for creating research logs, allowing for the preservation of research integrity. Expansions and updates are made continually. Users can easily construct customized, institution-specific RDM systems using the GakuNin RDM, in conformance with internal research data policies and security policies.



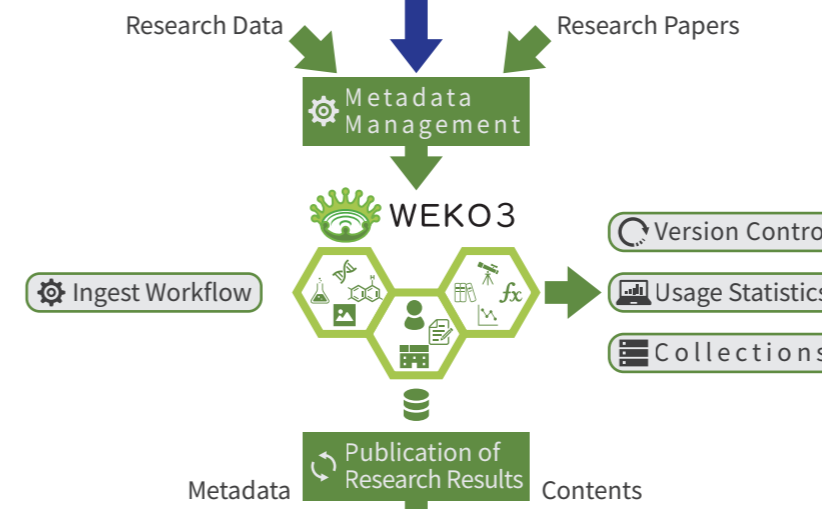
The GakuNin RDM service manages all types of data — survey data from articles, data from previous research, data obtained from experimental apparatus, IoT sensor data, data obtained from computer simulations — in a unified manner. This service records all logs concerning data input/output and research operation. It helps to prevent scientific misconduct and fraud by preserving data from all research activities. It also allows for the sharing of data among collaborators through the version control function and various preview functions. In addition, the GakuNin RDM plug-in can bind to external cloud storage and research tools, including data analysis software. It provides an ideal platform for collaboration between experimental and theoretical researchers.

Publication



Research Data Publication Hub

WEKO3, a research data publication platform, is a next-generation repository system for publishing research results, such as data and research papers, that their owners have chosen to make openly accessible. Utilizing WEKO3 with the GakuNin RDM, researchers can readily publish their research results, and thereby participate in open science. WEKO3 also provides the necessary tools for operating and managing institutional repositories, including user-defined metadata support, customizable ingest workflow, and persistent identifier assignment. WEKO3 provides cutting-edge tools for repositories to Japanese universities and research institutions through the JAIRO Cloud, a cloud service for institutional repositories.



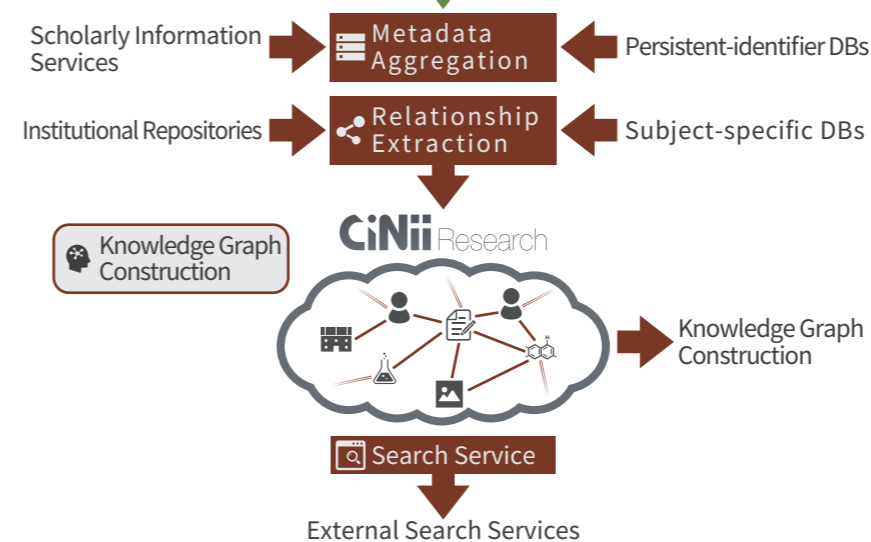
WEKO3 facilitates the preservation and publication of research results, categorized according to institution and research field. It makes data citable by assigning a digital object identifier (DOI) to research data, research papers, and bulletin papers. It enables access to specific versions of contents through a version-control feature and allows for customizable ingest workflow, for example facilitating workflow in accordance with the operation policies of an institution and workflow consistent with an on-campus system, through a customizable ingest workflow feature. WEKO3 allows for the combination of multiple repositories and databases in a university into one repository with multiple facets through use of a collection management feature.

Search



Relation-Aware Research Data Discovery

CiNii Research is a platform that can be used to search for scholarly resources, including research publications and datasets produced in research carried out in Japan. This platform constructs a large-scale “scholarly knowledge graph” that elucidates various relationships among articles, datasets, researchers and projects. For instance, when article is published with supplemental datasets, this article is linked with its authors and its datasets. With this knowledge graph, CiNii Research not only helps researchers find research datasets and articles relevant to their daily research activities but also helps them obtain ideas for new research topics.



CiNii Research aggregates a wide variety of metadata related to research activities. Sources of metadata contain NII scholarly information services, namely CiNii and KAKEN, institutional repositories based on WEKO3 and other software, databases for persistent identifiers, including JaLC and ORCID, and subject-specific databases. CiNii Research then extracts relationships among articles, datasets, researchers and projects from the aggregated metadata to construct and enhance our scholarly knowledge graph. Researchers can obtain relevant information from the knowledge graph using its simple search interface.