



NII Today

National Institute of Informatics News

FEATURED TOPIC | GakuNin Academic Access Management Federation

- NII Interview* | Improving services for researchers and promoting collaboration among universities with GakuNin
- NII Special 1* | Improving Content Service User Experience with Single-Sign-On
- NII Special 2* | The dawn of a new era in resource utilization with SINET cloud connection services and GakuNin
- That's collabo.1* | Enabling IT service improvement at low cost by university collaboration through GakuNin
- That's collabo.2* | The possibilities of identity federation through trust frameworks





Improving services for researchers among universities with GakuNin

With commercial web-based e-mail, we can check and send e-mails wherever we are. Still, trying to access in-house networks (intranets) from home or when outside on business can be troublesome or simply impossible: an inconvenience business people have often experienced. However, at universities, people are now able to read e-journals and access the university database from anywhere in the world as if in their own research room. This is made possible with an identity federation called GakuNin.

Taki: I am not familiar with the work of the Academic Identity Federation. Can you tell me what it does?

Nakamura: The Academic Identity Federation is a federation of universities and research institutions around Japan which aims for collaboration among universities through academic access management, or "GakuNin." It is an attempt to make it easier for students and staff to use a range of web-based services such as e-journals using Single Sign-on (SSO) technology.

Taki: What is that specifically?

Nakamura: For example, when you are at home, or, are away on business, you can access the university database or an e-journal site that has a contract with your university library. With SSO you only need one user ID and password, making a different ID and password for each service unnecessary. Also, once you have logged in with SSO, there is no need to re-enter your ID and password every time you start using another service.

Taki: That sounds really convenient. At the moment we need a number of IDs and passwords.

Nakamura: There is a range of on-campus services for students and staff that universities provide, such as e-mail, course registration, performance evaluation, budget management and library catalog search functions. When these services were launched, each required a different ID and password. However,

universities began to unify IDs using a centralized ID management system, meaning more and more of them can be accessed with only a single ID and password. This is what is known as authentication integration. Yet, difficulties remain when using external services such as e-journals.

Taki: Universities and publishers have contracts between them, so they have to confirm that the user is a member of that university.

Nakamura: That's right. IP (Internet Protocol) addresses were used for that purpose, meaning services could be accessed from a university computer only, and not from the user's home or other off-campus location. That's inconvenient. While there are ways to gain access to services through the university computers from home or elsewhere, they're technically difficult and are a chore for the user. We want to facilitate web-based services that can be used from anywhere in the world, by successfully linking on-campus authentication systems with external services.

Taki: Technically what kind of structure is that?

Nakamura: We are building a cooperative authentication infrastructure mainly for academic institutions based on the SAML (Security Assertion Markup Language) standard. Also, from the perspective of external service providers such as e-journals a unified authentication system instead of

different ones for each university makes it easier for them to provide a universal service. Work on constructing this kind of cooperative infrastructure began around 2001, mainly in academic institutions in Europe and the USA. In Japan, NII began to look into it in 2006 and made a full-scale launch in 2009, thus bringing Japan up to date with the rest of the world. The standard SAML software, Shibboleth, is standard in academic communities.

Taki: What does Shibboleth mean?

Nakamura: It is an ancient word taken from the Old Testament and meaning "stream" in Hebrew that was used for identifying friends and enemies. To find out their enemies, the fleeing Ephramites, the Gileadites made them say "shibboleth" when they tried to cross the river. The Ephramites could not pronounce the "shi" sound, saying "si" instead. The usage of the word—a means of identifying friends and enemies—originated in this ancient story. As software, Shibboleth is an authentication system to determine whether the other person can be trusted.

Taki: Yes, that brings to mind similar stories here in Japan. Besides facilitating the reading of e-journals, what other advantages does GakuNin have?

Nakamura: GakuNin offers an environment where a range of services can be used with equal ease, regardless of the user's location, with just a single login. These include e-learning, teleconferencing, file-sharing,

Motonori Nakamura

Professor by Special Appointment
Academic Authentication Systems Office
Academic Infrastructure Division
Cyber Science Infrastructure
Development Department
National Institute of Informatics

Junichi Taki

Editorial Writer and Senior Writer
Nikkei Inc.

Joined Nihon Keizai Shimbun (Nikkei) after graduating from the School of Political Science and Economics, Waseda University. Held positions in the Industry Department and Washington DC News Bureau, and was the Senior Staff Writer in the Economics Department at Osaka Head Office and Head of the Science and Technology News Department at Tokyo Head Office amongst other posts, before taking up his present position in March, 2009. In charge of science and technology, environment and medicine.

and promoting collaboration

scheduling and project management.

Taki: That sounds convenient for use in collaborative research with outside institutions.

Nakamura: At present, when undertaking collaborative research with researchers from other universities, there's no convenient, ready-made set service for scheduling or the like. I suspect that researchers look around for suitable services in most cases, or create their own. Using a universal authentication system, we can provide a web environment for joint use by participants, not only in Japan but also for those working on international collaborative projects. However, work still has to be done to make it into more than just a system for verifying members' identities. Researchers involved in identity federation throughout the world are currently working on this, and it will bring it to fruition before long.

Taki: Participation in international collaborative research without being able to access cloud services using academic authentication will no doubt become difficult from hereon in.

Nakamura: Yes, and in the world of e-science there are signs of that already. Take, for example, the system can be used for the transfer of academic credits among universities. Domestically, there are already credits transfer systems mainly through regional consortia of universities. However, with approved credit exchanges still being processed offline, and other similar states of affairs, there is still room for improvement in student-orientated services like these. Identity federation is necessary in shared registration systems and for distributing course materials. I believe that GakuNin will be key to building an environment of efficient and effective IT-based research and education.

Taki: How easy is it for universities to use the cloud?

Nakamura: More and more universities are consigning their in-house data management to external data centers on private clouds. NII provides SINET (Science Information Network), which connects universities nationwide and supports academic clouds.

Also, with identity federation among universities, we should be able to use the cloud even more efficiently and at lower cost by sharing data center resources among universities.

Taki: How many universities are currently in the Federation?

Nakamura: There are forty-six, including Hokkaido University and Chiba University. This number is expected to increase as there are universities that want to join but are presently unable to because their on-campus systems haven't developed to that point yet.

Taki: How about globally, as with universities in China and other parts of Asia?

Nakamura: China has established a system similar to that in Japan, but other Asian countries have yet to do so. In the Asia region, interest has been focused mainly on the development of network connectivity. However, with the push to popularize the system in Japan, there has been recent interest from India, Taiwan, and Malaysia. It was Europe and the USA that took the initiative in developing a universal academic authentication system, and Internet2, a research organization consisting of American universities and corporations, is developing Shibboleth.

Organizations in each country, such as InCommon in the USA, and the UK Federation in the United Kingdom, are working to popularize domestic identity federation, and GakuNin is the Japanese version of those systems.

Taki: What are the challenges when promoting the system in Japan?

Nakamura: The system only started recently, so the issue is that it's not yet widely known. There are already around 700 universities nationwide linked to SINET, which NII operates, and all these universities are ready to join through the network infrastructure.

Taki: Only 40 participants out of 700 is still quite small, isn't it?

Nakamura: Yes, many universities are at the initial stage of wanting to establish an

integrated campus-wide authentication service. They are working towards that, and then when the time comes to update the system they hope to join GakuNin. Understanding of GakuNin is gradually spreading, and its popularization is mainly a question of time.

Taki: It seems the advantages of joining GakuNin have to be made more widely known. Regarding the relationship between GakuNin and SINET, do universities link to e-journal publishers via SINET?

Nakamura: No, it's not always necessary to go through SINET. NII supports authentication by supplying the data relating to the university and the service in order to determine the connections to be made, which boosts security. Also, there are rules which all universities have to follow to ensure that the authentication can be trusted. Identity federation facilitates the provision of secure and user-friendly services to students and university staff. Also, the effective use of academic clouds reduces costs, and we plan to publicize such benefits more.



A Word from the Interviewer

The interview with Professor Nakamura brought home two points. The first was that GakuNin will, without question, increase user convenience for university researchers and students. The second was that if universal academic identity federation spreads, it will promote cross-border collaboration between universities, creating a user-friendly IT environment for researchers and students; however, it might also increase the intensity of international competition between universities. The speed of popularization of new IT services such as the cloud is often slower in Japan than in Europe and the USA. IT is essentially a cross-organizational technology, so in Japan, where the organizational structure is very hierarchical, decision-making up to the point of introduction takes time. A time-consuming vertical hierarchy like this could well be a barrier to further GakuNin penetration, with professors saying things such as "This has nothing to do with our faculty." I hope, however, that this is just a groundless apprehension on my part.



Improving Content Service User

Single Sign-on (SSO) enables seamless access to a range of services with a single ID and password. Content services such as e-journals can be accessed at anytime from anywhere. Once logged in to a certain service, there is no need for the user to re-login when going to a different service. The current user experience of library services has significantly improved thanks to the SSO-enabled GakuNin authentication service. The following looks into this improvement, and also at related trends in Japan and overseas.

Roots in the e-journal: the GakuNin authentication service

According to Kazu Yamaji, Associate Professor at the NII Academic Access Development Office, "GakuNin was fully launched in 2010 after feasibility studies and pilot operation in 2008 and 2009 respectively. The first service to be connected to GakuNin was overseas e-journal access. There are academic authentication federations in Europe and the United States, begun before their advent in Japan, that operate at the national level, and numerous e-journal access services that integrate with them. Our first challenge was to tie up with the world's largest academic publishers, such as Elsevier, Springer and Thomson Reuters, all of which are already integrated into academic authentication federations."

NII therefore formed the GakuNin Taskforce made up of cooperating university personnel for academic authentication operations, and a Library Team comprising Associate Professor Yamaji and five other librarians for the task of integration with content services. It thereafter oversaw a process of vendor (publishers, etc.) selection, negotiation, test operations, through to launch of operations, with the aim of expanding the range of services available. There are currently tie-ups with about forty mainly European and U.S. publishing companies.

Library services and the GakuNin difference

Content services have further developed

thanks to integration with GakuNin, and this has spurred a significant change of direction in the library services of universities and other organizations. One member of a library team, Mr. Hideaki Noda of the Chiba University Library, says the following:

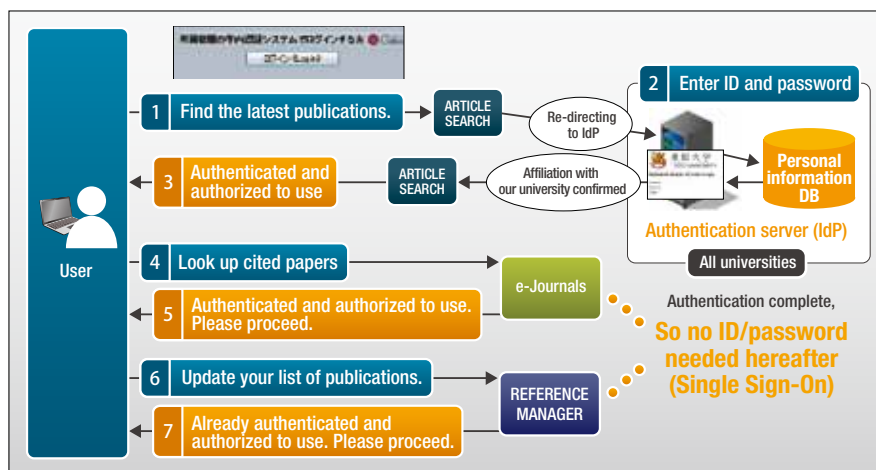
"Chiba University entered into a licence contract for the e-journal which the library is now providing as part of its overall services. However, up until that time we relied on a locale-specific, IP address(*)-based service which was basically limited to on-campus use. Access from outside the campus meant having to get an ID and password from each different publishing company and enter them as appropriate. And that meant having to manage an ever increasing number of such IDs and passwords as the number of services grew. Being as complicated as that was, the number of remote access users never reached more than about 5% of the Chiba University campus body."

On the other hand, GakuNin is a Single Sign On (SSO) system, allowing access to

all services with just one individual ID and password. Furthermore, once logged in, the user has access to all the services that GakuNin is part of. There's then no need to enter a separate ID and password for each different publishing company.

SSO works not by the service provider holding ID data and personal information, but by the organization of which the user is a member holding it. The data is processed, through GakuNin, by a distributed-model authentication base. The service provider permits access by relying on the veracity of the user authentication result generated by the IdP (Identity Provider) located at the university. Such mutual reliance by institution and vendor for the purpose of authentication makes for a very significant difference from the IP address authentication in general use.

IP address authentication was actually a problem insofar as absolutely anyone could access e-journals simply by being on campus. On top of that, applying to each and every publisher for a remote access ID and



SSO enables convenient access to library contents, with a single login. Users can enjoy access not only from research offices on-campus, but also from their homes and other universities, and when on the move or traveling overseas.

Experience with Single-Sign-On

password and managing those generated was burdensome, and it was frustrating not being able to offer users an e-content service that had the appeal of usability anywhere. So SSO, besides improving user-friendliness, also makes it possible to centralize ID and password management and reinforce security.

Mr. Noda continues: "Researchers go through a regular cycle of searching, reading and stocking publications, which is what every stand-alone service can cater to. However, with SSO you get to freely and seamlessly surf multiple such services, which is a very big advantage."

The role of JUSTICE in future service development

The Japan Alliance of University Library Consortia for E-Resources (JUSTICE), located in the NII offices, was launched in April of 2011 and is an indispensable part of the GakuNin content service. JUSTICE forms the link between the NII and university libraries, and is responsible for negotiating contract conditions and prices with vendors in order to ensure that each organization can enjoy stable and ongoing access to e-journals. According to Ms. Fumiyo Moriya, seconded from the University of Tokyo Library System and now in charge of consortium operations at the JUSTICE office:

"JUSTICE is focusing much of its effort on the joint purchase of e-journal subscriptions. Currently, each university undertakes the business of making contracts and payments, but we are in the position of coordinating the needs of universities and approaching publishing companies on their behalf. At that time we first find out whether or not they are in GakuNin and, if not, try to solicit their participation.

"From here on in we plan to maximize the benefits of GakuNin and provide an array of options. For example, we want to provide



Hideaki Noda

Librarian
Academic Content Division
Chiba University Library of
Health Sciences

Kazu Yamaji

Associate Professor
Academic Access Development Office
Cyber Science Infrastructure Division
Cyber Science Infrastructure
Development Department
National Institute of Informatics

Fumiyo Moriya

Japan Alliance of University Library Consortia
for E-Resources (JUSTICE) Secretariat
Library Liaison Cooperation Office
Cyber Science Infrastructure Development
Department
National Institute of Informatics

more tailored authentication options, catering to individual departments or to teaching staff in a particular field. The number of options can no doubt be increased if we target users in this way to achieve cost reductions, and if we can integrate services."

"Recently we have had more contact from overseas publishing companies, academic societies and platform vendors. One of them was HighWire, an e-journal platform operated by Stanford University Libraries in the United States. Says Associate Professor Yamaji, "By connecting with HighWire in March 2012, the number of service content titles instantly rose to almost one hundred. This being the case, vendors in Japan are starting to consider connecting with GakuNin to coincide with their next upgrade. It's apparent that Japanese

vendors are now very keen to provide services more finely tuned to the type of user, such as discounted services for students."

Associate Professor Yamaji expresses a desire to break further into the Japanese vendor market, and speaks of providing new services in Japan that have not been seen to date, and using GakuNin to help breathe new life into that market. He anticipates the integration of ever fuller content with ever more diversified services.

(Written by Madoka Tainaka)

* IP address

An identification number assigned to each computer or communication device connected to an IP network such as the internet or intranet. In other words, it is an "address" in web space.



The dawn of a new era in resource SINET cloud connection services

There has been an increase over recent years in individual universities' launching of cloud services. Using the cloud enables a reduction in the operating costs and management tasks involved in the email, web and storage services provided by individual universities to date. Furthermore, linking to the SINET academic information network and GakuNin makes application sharing among multiple universities easier and further reduces costs. The potential of the academic cloud is being further developed with the progressive integration of services offered to universities by commercial service providers.

Commercial cloud services for universities provided through SINET

SINET(*1) is an academic information network built and operated by NII,1 and which serves as an academic information infrastructure for all of Japan's universities and research organs. SINET provides these organizations with a cutting edge network with nodes throughout Japan, for the purpose of creating academic communities and promoting the circulation of academic data. SINET is also compatible with overseas research networks such as Internet 2(*2) in the United States and GÉANT3(*3) in Europe.

To date, individual universities created their own clouds and cloud services, but with

the current move to reduce costs, calls began to be heard for SINET to host of a variety of IT services. In response, NII changed its rules in July 2011 to allow connectivity to commercial services so long as they were made available to SINET subscribers. A new environment is thus being built whereby users can access the cloud services of commercial service providers via SINET alone. (Seven providers have connected to date.)

Shunji Abe, SINET Promotion Office Manager, says: "In the past year, Internet2 launched NET+ ("net plus"), which reinforces application services by way of integration with commercial service providers. I believe we will see more and more of this happening all over the world. By bringing together commercial service providers that can provide a variety of cloud services, SINET will bring down costs and offer a superior service."

Integration using the GakuNin authentication system's global single sign-on feature will involve the added advantage of being able to use multiple services with just a single ID/password combination.

Services over the low-cost cloud

Looking at the current state of cloud services at universities, Shizuoka University rented a commercial data center in March 2010 and set up a private cloud using the SINET network. Virtual machines(*4) were installed on it and terminals for administration were changed into thin clients(*5) on every campus. It also provides on-campus users with commercial cloud services for free.

Kyoto University of Education also set up a private cloud service at a commercial data center in Gunma prefecture, launching it in September 2011, to which it migrated its email system, authentication system, file server and website server.

As for the SINET cloud connection service, one example of use is that of Tokyo University of Agriculture and Technology. In December 2011, the university began using a new SINET frame which commercial enterprises could link to directly. It switched its email service, with about 11,000 users, to A-Cloud Mail operated by Itochu Technosolutions and also outsourced its customer service and security. In this way it achieved a reduction in tasks, better spam handling, and greater mailbox capacity.

Then there is Hyogo University of Teacher Education which connects to the ePort Folio System on NTT Data Kyushu's cloud service as part of an academic administration



Madoka Aihara

Assistant Manager
Service & Tariff Planning Section
Corporate Planning Department
UQ Communications Inc.

Shunji Abe

SINET Promotion Office Manager
Associate Professor
Architecture Science Research Division
National Institute of Informatics

Masayoshi Setoyama

Solution Manager/Section Leader
Public Business Department
First Business Division
NTT Data Kyushu Corporation

utilization with and GakuNin

system that it had already adopted. The ePort Folio System is a service that supports the verification of qualifications and abilities based on the university's teacher training standard. It can also be used to verify student self-assessments and reports.

Masayoshi Setoyama, Solutions Manager at NTT Data Kyushu Corporation, talked about how they can provide a service that supports GakuNin with a lighter burden:

"This service can be viewed as a "second campus" in that it doesn't require the placing of a server on campus but connects to SINET through a server inside a data center. Our company provides the cables to connect to SINET greatly reducing the initial installation and operational outlay for universities. Our library management system and educational affairs system is now integrated with GakuNin, and using the knowledge acquired during that process the ePort Folio System is set to be integrated with it by 2013."

Expected improvements in IT services through SINET and GakuNin collaboration

Keio University's Shonan Fujisawa Campus adopted UQ Communications' Mobile WiMAX Campus Network Connection Service as early as April 2011. This made an "on-campus" experience possible from even off campus by assigning the university's IP address to a mobile terminal for access to the on-campus LAN.

Madoka Aihara, Assistant Manager at UQ Communications says: "Next, we approached Kyoto University about providing it the service and were asked if GakuNin would be available on it for the user who had completed authentication registration. We appreciated the fact that this would eliminate the need for a separate authentication system on our part, and proceeded with GakuNin integration."

The WiMAX service, integrated with SINET and GakuNin, was also adopted by Kyushu University. Creating a cloud service that

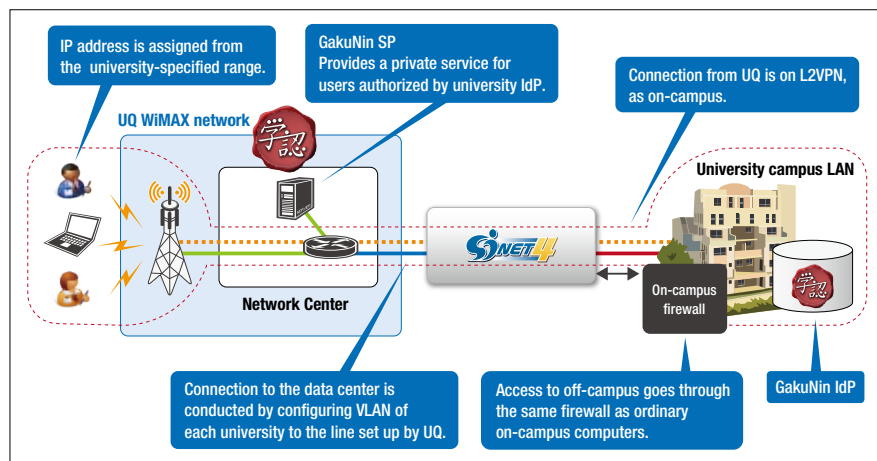


Illustration of campus LAN extension to mobile, using the cloud connection framework.

integrates with SINET and GakuNin achieves high value with few resources. Participating in Gakunin brings cost reductions over the existing service as well as newly created services, all of which strengthens the position of both the university and the commercial enterprise.

Yet, what are considered ordinary services such as email and storage also need catering to with services that take into account the needs of universities and research institutions.

Associate Professor Abe says "We are currently looking at services that cater to the special needs, the new needs, of universities and similar institutions. We are sounding out what is needed and soliciting proposals to try and ensure the most user-friendly and efficient use of SINET and GakuNin."

We can look forward to a vitalization of research and education and further progress in academia if universities can link to each other through GakuNin, by way of sharing the same online system, and opinion exchanges in research communities. Regional consortia of universities, such as in Ishikawa, Shinshu, Kyoto and Shikoku, are already looking into and preparing for integration with the cloud, and utilization of Gakunin. Universities and enterprises need to think about what can be achieved by mutual utilization of university resources, and get a sense of the need to

leverage outside resources. That is the key to expanding services in the future.

(Written by Yuko Sakurai)

*1: Science Information Network (SINET)

A science information network established and operated by NII.

Reference: NII Today No.38 [SINET4 The Next Stage of Information Lifelines] (Issued July 2011)

*2: Internet2

A next-generation internet research project in the United States in which over 200 universities and other tertiary institutions and over 60 enterprises participate. The Shibboleth application used by GakuNin was developed by Internet2. For further details please visit <http://www.internet2.edu/>

*3: GÉANT

A next generation network for internet research and development in Europe.

It covers over 40 countries and connects over 8,000 research and educational institutions.

For further details, please visit <http://www.geant.net/>

*4: Virtual machine

A virtual computer built of software. Multiple virtual machines can be constructed in a single computer and operated independently.

*5: Thin client

A system that runs application software and manages files and other resources on the server side, with the computer only having the minimum number of functions.



Enabling IT service improvement by university collaboration through

IT service improvement and cost reduction is an issue for universities and research institutions. IT managers from various educational institutions—national, public, private universities and colleges of technology (Kosen)—all with different perspectives on participation in GakuNin, gathered and told us about initiatives at their institutions and about how GakuNin helps solve problems. We also heard from IT managers' about their current challenges and requests they had for new services.

Compensating for few resources by joining GakuNin

At present, there are forty-six schools participating in GakuNin. Can you tell us the background to your participating?

Tadaki: In 2000, Saga University began to integrate authentication information and user management. You see, at the time, there were only one or two full-time teachers at the Center in charge of administering about 10,000 people. Also, as well as the UNIX system we used then, we also started using Windows, and had to synchronize the two accounts. We heard about GakuNin when we were examining the Single Sign-On function in the course of a system update, and joined at the trial stage, which made for good timing.

Jin: In 2004, fifty-one Kosen colleges came together to form an independent body, the Institute of National Colleges of Technology, which is developing a unified information infrastructure over the mid to long term.

This April, the same authentication infrastructure was set up in each Kosen, and administration of the accounts was integrated. Not wanting to fall behind what the universities are doing, we are currently preparing for participation in GakuNin. Our aim from hereon in is not only to reduce costs and optimize, but also to develop human resources for network management. In the course of standardizing the information infrastructure and devices, we also plan to universalize services.

Maeda: I am affiliated with the Faculty of Information Sciences and Graduate School of Information Sciences, at Hiroshima City University, and am also the Information Processing Center Manager, although the Center doesn't have any full-time staff. We don't have much in the way of human resources, so were interested in GakuNin, with its range of services provided at low cost, and so we joined last year. The specific reason

we joined was that Hiroshima University, the Hiroshima Institute of Technology, and our university, had embarked on a collaborative Program for Biomedical Technology and Informatics, and we were looking for a way to handle e-learning and account management.

Igarashi: I manage the information infrastructure at Seijo University. My wish is for students to have successful experiences of IT use at university that will help their professional development once they graduate. Private universities are different from national universities in that they don't have a leader like NII, so getting to the point of actually implementing things is difficult. It was while considering adopting an SSO service that we heard about GakuNin and the improved service it made possible on a low budget, and joined.

Security strengthening and the added benefit of regional collaboration

One of the advantages of GakuNin is that it uses the on-campus authentication service to link to external services. What other benefits have you found?

Tadaki: Cost reduction is a huge benefit. With information systems, operating costs are more of an issue than construction costs, but integrated authentication management eliminates the user management part of those costs. With SSO, there is no need to make an authentication page for each system, and there's no handing on of passwords to the other systems, meaning security is also improved. Not having to change each organization's ID system also makes GakuNin easy to join.

Igarashi: Differentiation from other universities has to happen at a layer higher than that of IT infrastructure, and at that level GakuNin's Shibboleth authentication is a big advantage.

Jin: All our Kosen can use our own accounts, which enhances collaboration between each one and creates opportunities for further

regional collaboration.

Maeda: We also use it for regional collaboration.

In the future, we can expect to see authentication collaboration between public universities and local authorities. What kinds of challenges do institutions trying to introduce GakuNin face?

Maeda: One issue is that building an IdP (authentication server) is really hard. Another is that the benefits are not easily understood by the office. The gap in understanding between the recipients of GakuNin services and those who set up the environment is one hurdle to adoption. But in the future, I think that the provision of services directly related to management and administration will lead to understanding.

Igarashi: System replacement is not straightforward at universities that already have SSO systems. Having some kind of connector like an IdP filtering service would, I think, make joining easier.

Maeda: There are universities where individual faculties have contracts with e-journals. GakuNin support is technically possible in these cases too; so an increase in case studies tuned to such needs would no doubt see a wider range of universities participating.

Expectations for academic system authentication integration and e-learning services.

Tadaki: From a researcher's perspective, I would like to see nationwide systems like an electronic application system for Grants-in-aid for Scientific Research, and basic information on research results, as well as authentication integration for academic conferences. I would like to make all out use of the infrastructure for academic research, and information distribution and sharing. It would be good too if national universities'

at low cost GakuNin



Kaori Maeda

Deputy Director (Information Manager) and
Information Processing Center Manager
Professor
Faculty of Information Sciences and Graduate
School of Information Sciences
Hiroshima City University

Kazuhiro Igarashi

Assistant Manager
Media Network Center
Seijo University

Shinichi Tadaki

Professor
Director of Computer and
Network Center,
Saga University

Tomoya Jin

Assistant Manager, Information Planning
General Affairs Division
Headquarters Administration Office
Institute of National Colleges of
Technology

operations systems could be shared. Even if it couldn't be implemented in unison, a few universities could start using a framework that enabled participation later on.

Maeda: I'd like a security education system in the e-learning context.

Jin: At Kosen we use e-learning to carry out information security education for the teaching staff. It was when we first looked into developing this independently that we heard about GakuNin as a means of implementing it. And now we are taking part in the GakuNin early assessment.

Igarashi: We introduced English e-learning at our university. It would be good if services like this could be used on the cloud so that all the universities participating in GakuNin could use them together.

Jin: What about safety confirmation systems? Since the 2011 earthquake, safety confirmation systems have become ever more important, and I think there are ways in which GakuNin can support them.

Tadaki: The cloud is vital for safety confirmation, considering how devices can get damaged in disasters. Mails sent en masse,

such as when informing students that the university is closed because of a typhoon, are often interpreted by mobile carriers as spam, so we need to realize that e-mail is no longer effective for such purposes. It would be much better if safety confirmation and emergency communication could be done over the web. Using Twitter or other platforms for safety confirmation involves the issue of personal information.

Igarashi: I hope that collaboration with SNS can develop, and that it becomes possible to attach and send individual user attributes when necessary. I'd also like to see increased collaboration with overseas universities. That would require raising GakuNin's security level, but if that could be done it could serve as a standard for the enhancing of the on-campus security environment. It would also be good if there were more services available that increased motivation to learn like discounts offered by electronic library-linked services on e-journal purchases by collecting GakuNin points.

Tadaki: Or, I wonder if it would be possible to consider authentication in regard to physical

objects, such as books that can be borrowed from other university libraries?

The incorporating of device authentication could extend to biometric authentication.

Maeda: In the USA, Massachusetts Institute of Technology opens classes to the public, and that kind of opening of content and enabling of sharing leads to service improvement. It would be good to see developments like that in Japan, too.

Igarashi: In the past, we were delighted just to have Internet access. Now, with GakuNin, it is great to have a connection on a higher layer. Also, if numerous universities and corporations participate, the possibilities for the introduction of superior services also increases.

Tadaki: If over 100 universities join, the possibilities will increase even further. In universities overseas systems like GakuNin are used to secure excellent IT human resources. I hope that the GakuNin system and technology will attract young technicians in Japan, too.

(Written by Yuko Sakurai)



The possibilities of identity federation

Once GakuNin can function as a collaborative infrastructure, seamless collaboration with overseas parties and commercial services will also become possible. For this to happen requires the building of a trust framework through which user information can be safely shared among participants. A trust framework enables identity federation in industry and academia, making it the potential foundation of a more secure and highly reliable online service.

Mutual guarantee of user authentication reliability

Authentication structure is a major issue when operating GakuNin, and proper use of the system can only begin once a safe, reliable and usable authentication infrastructure has been established. The issue can be addressed by way of a trust framework. Hiroyuki Sato, Associate Professor at The University of Tokyo, and a key figure in GakuNin trust construction, explains what a trust framework is:

"The idea is simple. It is a system that provides some warranty of user authentication reliability in an online service. An IdP (Identity Provider) confirms who the users are, and supplies each user with an ID. Then, with the user's consent, his or her personal information is securely transmitted to the service provider (SP), which then provides online service to the user. This whole structure is called a trust framework."

On networks, individuals are normally identified by an ID and password, yet there is no way to confirm that the person using the ID is the person actually registered. However, if a trusted body can properly warrant the ID as belonging to the actual person trying to log in, this concern can be resolved.

Natsuhiko Sakimura, a leading figure in digital identity research and Senior Researcher at Nomura Research Institute Ltd.,

explains as follows:

"A readily recognizable example of a trust framework is the JAS (Japan Agricultural Standards) mark on foodstuffs. When we see the JAS mark, we know that a third party organization has warranted that the ingredients are displayed in accordance with JAS standards; we trust it, and purchase the product. Technically speaking, credit granting by a third party resolves asymmetry, and this concept is now being made a reality in the online context."

Enabling international service collaborations

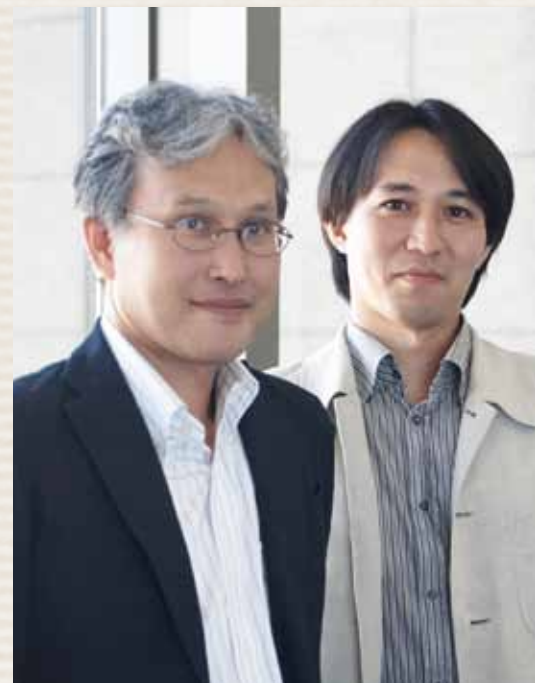
So what will the construction of a trust framework enable?

"If a trust framework can be constructed properly, it will be possible to provide and use a variety of online services securely and conveniently," says Associate Professor Sato. Online trust frameworks are already in operation in the United States, and services are expanding. The provider of this framework in the U.S. is Open Identity Exchange (OIX) (*1), a private, non-profit organization. GakuNin has received OIX certification, and access with the same ID is possible even for services provided by the US National Institutes of Health, the National Library of Medicine, and the Library of Congress.

"This means that GakuNin meets international standards of reliability," says Mr. Sakimura, a board member of OIX. "That is to say, once the standards have been met, seamless global use becomes a reality. It also solves the extremely inefficient operational problem of each service provider having to enter into a contract with each user, issue IDs, and conduct authentication. So, there are huge advantages for the service providers, too."

Supported by both rules and tools

For the trust framework to operate



Hiroyuki Sato **Takeshi Nishimura**

Associate Professor
Information Technology
Center
The University of Tokyo
OIX LoA 1 Assessor for
GakuNin

Specially Appointed Researcher
Academic Access Development Office
Cyber Science Infrastructure Division
Cyber Science Infrastructure
Development Department
National Institute of Informatics

properly, having an appropriate operational standard (or policy) and the supporting technology is essential. One example of this is the uApprove.jp software. Takeshi Nishimura is a project researcher at NII who was involved in its development; he describes its features as follows:

"With a trust framework, the IdP which issues IDs and conducts authentication provides the SP with only that personal information which the user has agreed can be sent. The uApprove.jp software enables this function. After getting the user's agreement at the time of online authentication, it forwards the required personal information to the SP from the data held by the IdP."

Mr. Sakimura talks about the function whereby the IdP lets the user choose what information is sent:

"Compliance with regard to privacy has

through trust frameworks



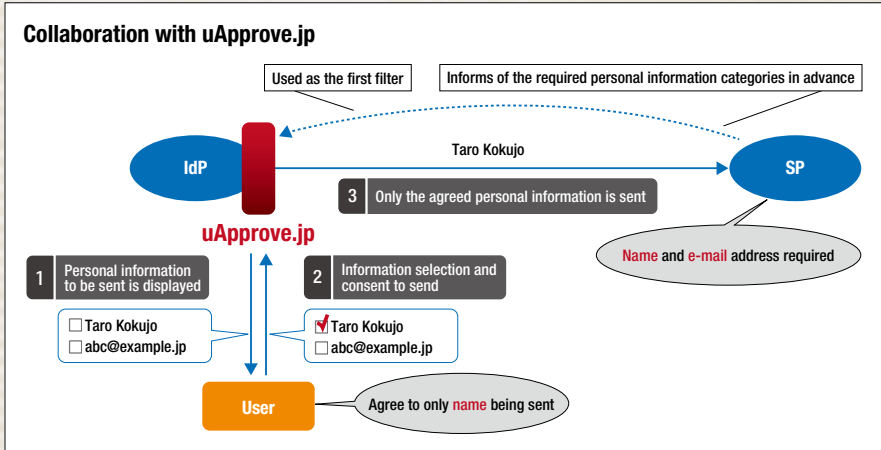
Natsuhiko Sakimura

Senior Researcher
Nomura Research Institute Ltd.
Open Identity Exchange Chairman

become an extremely important issue, and each institution has various policies regarding it. It's important to guarantee compliance effectiveness with a tool such as uApprove.jp. Yet it is not limited only to this. Identity federation is made up of a range of technologies, such as formats in accordance with international standards, technology that protects transmitted data from falsification or theft, and technology that lets the recipient use the other party's signature to verify that that other party and the content are genuine. Trust frameworks are supported by this combination of rules (policies) and tools (technology)."

Expanding services with seamless ID collaboration between industry and academia.

The trust framework itself is made possible



By collaborating with the IdP plug-in uApprove.jp, the user is able to decide which information is sent.

by appropriate policies and cutting edge information technology, but the reliability of the framework itself originates in having a reliable identity provider. GakuNin users being students and researchers, it is the universities that warrant identity and issue IDs, which makes for a very high level of reliability.

Associate Professor Sato anticipates new functions for GakuNin:

"This means that GakuNin is a trust framework that can enable online authentication not only for universities, but for commercial service providers as well. Such a framework covers education and research, but can also extend to student welfare. Also, a connecting gateway function has been developed for the different communications protocols(*2) of GakuNin and general commercial services which gives users seamless access to commercial SP services using only their GakuNin ID."

For example, there has been a dramatic increase in accessibility to student discount services. As the university warrants the identity, there is no need for cumbersome procedures such as sending copies of student ID cards, and student discount services can be easily accessed online.

By enabling industry and academia identity federation, the GakuNin trust framework

goes beyond just academic use to become a potential base for connecting society at large.

The shape of the information society of the future lies here, in this system, with its high levels of security and convenience.

(Written by Akiko Seki)

*1: Open Identity Exchange (OIX)

OIX is an organ that provides an authentication framework for the Federal government of the United States, certifying ID management providers using the Federal Standard.

*2: Communications protocol

A communications protocol is a set of mutually determined rules for when computers communicate through a network. Many commercial services use Open ID for authentication-related communication. GakuNin uses SAML, which has a different authentication structure.

NII Today Back Issue



NII Today provides readers with the latest National Institute of Informatics news from a variety of perspectives. Contents include reports on the latest research trends in informatics, collaborative projects with other educational institutions and corporations, and the voices of dedicated researchers working at the forefront of their fields.

This issue marks the 44th issue of NII Today, since its previous incarnation as the National Institute of Informatics News.

No.	Issue date	Feature
43	October, 2012	Multimedia Sensing
42	July, 2012	The Academic Cloud
41	April, 2012	Web Data-Driven Information Flow
40	January, 2012	Green Innovation through ICT
39	October, 2011	Information and Human Society: The New Relationship Between Society and Media
38	July, 2011	SINET4: The Next Stage of Information Lifelines
37	April, 2011	Security: Towards a Safe, Secure Society
36	January, 2011	GridXe-Science
35	October, 2010	Artificial Intelligence: From Personal to Societal Knowledge
34	July, 2010	Language: Using language as knowledge
33	April, 2010	New Trend of Software Engineering

NII will continue to produce high quality publications that appeal to the thinking reader.

Back numbers can be viewed and downloaded at the following address:
<http://www.nii.ac.jp/en/about/publications/today/>

Weaving Information into Knowledge



NII Today No.44, Jan. 2013

This English language edition NII Today corresponds to No. 58 of the Japanese edition

Published by National Institute of Informatics, Research Organization of Information and Systems
<http://www.nii.ac.jp/>
Address: National Center of Sciences

2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430
Chief editor: Yoh'ichi Tohkura Cover illustration: Makoto Komori
Photography: Yuki Akiyama and Takashi Arai Copy Editor: Madoka Tainaka Production: inscape Inc.

Contact: Publicity Team, Planning Division, General Affairs Department
Tel: +81-3-4212-2164 Fax: +81-3-4212-2150
E-mail: kouhou@nii.ac.jp

Cover Illustration

GakuNin will make it possible to access any content or service anytime, anyplace. Imagine the convenience and comfort of cruising, as if on air, through a giant library, with any book you want right there for the taking.