Keio University and Fujitsu successfully demonstrate technology to streamline management of digital identity data for enhanced student services

Contributing to a more convenient and secure use of digital identities and services

News facts:
·   An interconnected identity platform allows users to safely and seamlessly link personal information held by different organizations with various services
·   The new technology is expected to enable more convenient use of digital identities and services
·   The new research base established by the Keio Research Institute at SFC and Fujitsu further aims to offer users safe and secure solutions both for individuals and business organizations in their daily activities and transactions

Tokyo, April 14, 2022 – The Keio Research Institute at SFC and Fujitsu today announced Japan's first successful field trials of a self-sovereign identity technology (1) conducted between March 17 and April 12, 2022. The new technology facilitates the distribution of digitally managed information attributable to individuals (digital identity) between different organizations and services by using an interconnected identity platform.

In the trial, a digital student ID issued for the trial via Keio University's Next-Generation Digital Identity Platform (2) was converted by an identity conversion gateway developed by Fujitsu to test the use of different online services linked to an identity platform that uses Fujitsu's digital identity exchange ("IDentitY eXchange") technology (3).

Fujitsu and the Keio Research Institute at SFC confirmed during the trial that the required information of students could be disclosed to the different services and the information was shared correctly. Put into practical use, this system allows users to link personal information issued by companies, universities, and local governments with various services, delivering a wider range of convenient services linked to students' digital identities. Possible usage includes offering student discount services for travel agencies or providing job hunting and recruitment support tailored to students' needs after graduation.

Based on the results of the trials, on April 1, 2022 the Keio Research Institute at SFC and Fujitsu established the "Trusted Internet Architecture Laboratory" on Keio University's Shonan Fujisawa Campus as a joint research base for designing architectures and developing technologies for the secure use of internet services leveraging the new digital identity technology.

<u>Background</u>

In recent years, self-sovereign identities, which allow individuals to manage their personal information and provide only the necessary information to service providers, have increasingly attracted attention as a means of reducing the risk of information leakage. Personal information required for online services, including identity verification, qualifications, and personal resumes, is often managed by different individual organizations (local governments for address information, companies for employment information, universities for academic information, and other organizations for professional qualifications) and can prove difficult to utilize and distribute between different organizations and services.

Technical standards for digital identities that make it possible to utilize and distribute information between different organizations and services offer the potential to realize greater convenience for a variety of services. Different services require different types of information, however, and the levels of information an individual wants to disclose may vary from service to service. In order to provide users with more convenient services, it is thus necessary to interconnect the multiple identity infrastructures with its various protocols.

To address these issues, the Keio Research Institute at SFC and Fujitsu started collaboration on the development of digital identity technology in September 2021. As a result of this collaboration, Fujitsu developed an identity conversion gateway that allows multiple identity infrastructures to be seamlessly interconnected without using a unified protocol.
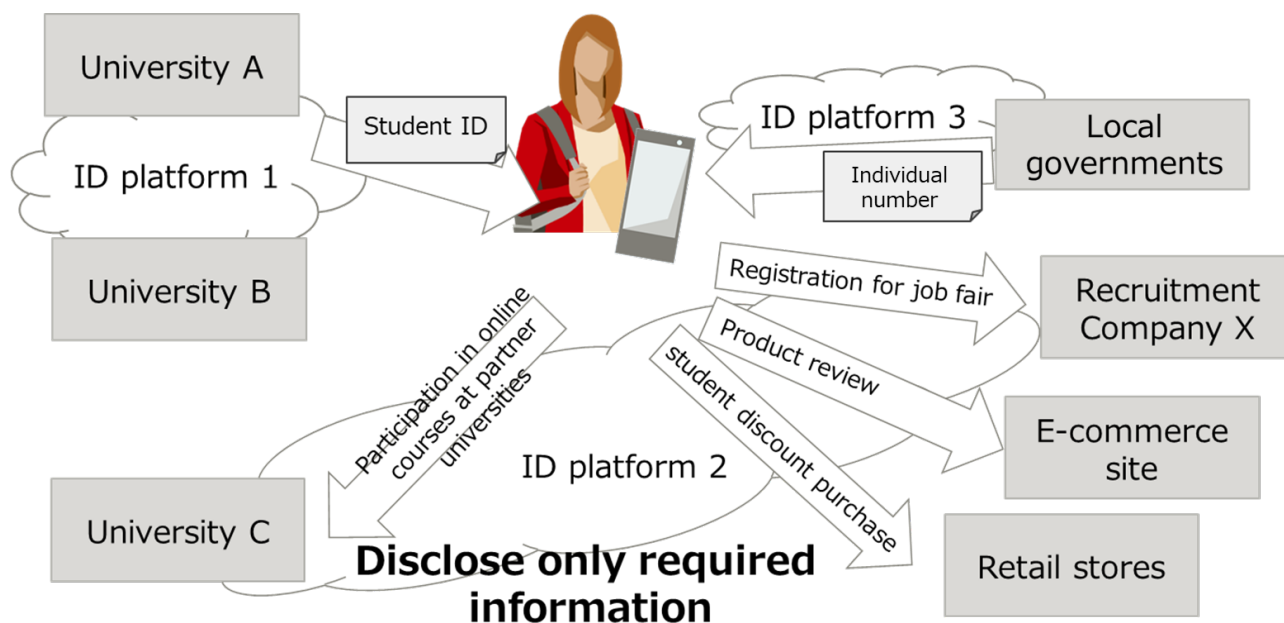
Interconnectedness of digital identities

Outline of the field trial

1. **Period:** March 17 – April 12, 2022
2. **Details of the field trial:**
   - Generation of the Keio Research SFC Institute's meeting room reservation site and an anonymous response questionnaire that is connected with Fujitsu's digital identity exchange technology
   - Creation of a digital student ID for use in the trial issued by Keio University's next-generation digital identity platform (developed based on Microsoft's distributed identity technology) and verification of technology to disclose student ID information on the different sites via Fujitsu's identity conversion gateway based on site requests and user selections
3. **Results:**
   - Students using the trial digital student ID issued via the Keio University platform were able to successfully authenticate themselves on the meeting room reservation site linked with Fujitsu's identity platform
   - The same digital certificate could be used as an anonymous questionnaire after user authentication by selecting partial items and information (academic year etc.) on the questionnaire site using Fujitsu's confidential disclosure certification technology (a further full disclosure of all information was not necessary)
4. **Responsibilities of the two parties:**

   Keio Research Institute at SFC
   - Arrangement of technical requirements for interconnection of identity platforms and examination of implementation methods
   - Development of a reservation site for meeting rooms at the Keio University Shonan Fujisawa Campus that can be verified in connection with a digital student ID issuing site and Fujitsu's digital identity platform

   Fujitsu
   - Examination of implementation methods for interconnection of identity platforms and system design
   - Provision of an identity platform that incorporates confidential disclosure certification technology, which enables users to disclose only the necessary personal information in a verifiable form
   - Develop a verifiable questionnaire site that can be connected with the identity conversion gateway and Fujitsu's identity platform
5. **Overview of the technologies implemented in the Identity Conversion Gateway developed by Fujitsu**
   - **Identity infrastructure connection technology**
     Technology that matches and connects the identity conversion gateway with multiple individually managed certificate storage applications (wallets) of other identity platforms (4).

- **Reliability enhancement technology**

  Technology able to detect inconsistencies during the conversion process of an identity conversion gateway and to ensure the reliability of the identity conversion gateway from the service site's perspective (5).
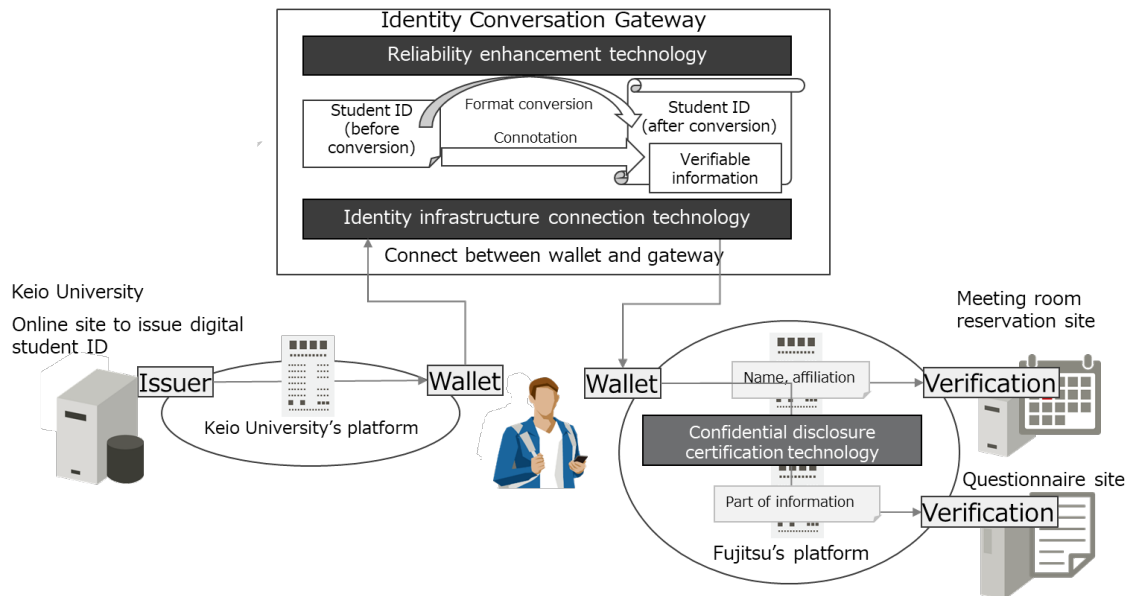
Overview of the demonstration and Identity Conversion Gateway

About the newly established joint research base "Trusted Internet Architecture Laboratory"

1. **Research Period**:
   April 2022 to March 2025

2. **Research Contents**:
   - "Redesigning" of the Internet as a communication platform that offers users safe and secure solutions both for individuals and business organizations in their daily activities and transactions with multiple, unspecified parties
   - R&D of new technologies and architectures to ensure safer, more secure usage of the current Internet
   - Development of an authentication technology for multiple, unspecified parties leveraging the newly developed identity conversion gateway
   - Development of a reliable communication protocol and web architecture design
   - Design of a data governance architecture and technology development
   - System design and standardization

3. **Organization**:
- Director: Professor Osamu Nakamura (Faculty of Environment and Information Studies, Keio University)
- Associate Director: Professor Jun Murai (Keio University)
- Associate Director:Project Professor Shigeya Suzuki (Graduate School of Media and Governance, Keio University)
- Researchers from the Keio Research Institute at SFC and Fujitsu （approx. 20 members)

The joint research base was established as an initiative of the "Fujitsu Small Research Laboratory" (6).

Notes
(1) **Self-sovereign identity:**

A mechanism that enables a person to safely disclose personal attribute information (identity) provided by a third party (such as a business operator) at the person's own volition.

(2) **Next-generation digital identity platform:**

An experimental platform that enables online verification of various types of certification data, such as graduation certificates and training completion certificates, using CTC's identity platform service "SELMID" that works in conjunction with Microsoft's distributed identity technology.

(Press release: https://www.keio.ac.jp/en/press-releases/2020/Nov/13/49-76286/)

(3) **"IDentitY eXchange":**

Identity distribution technology that enables service providers and users involved in online transactions to determine the authenticity of the customer's personal information.

(Press release: https://www.fujitsu.com/global/about/resources/news/press-releases/2019/0704-01.html)

(4) Within this technology, the identity conversion gateway receives the certificate from the issuing site by making it look like the issuing service on the issuer's infrastructure, and then sends the certificate to the issuing service by making it look like the issuing site on the verifier's infrastructure. In this way certificates stored in existing wallets can be leveraged without adding new protocols to the wallet for conversion. The technology further ensures that multiple wallets map to the same person by verifying the identity of each wallet with its certificate.

(5) This technology inherits verifiable information by including certificates in the issuer's infrastructure, and issues new certificates that can be verified by the service. This verifiable information allows the identity conversion gateway to detect arbitrary attribute changes as errors.

(6) **Fujitsu Small Research Laboratory:** Fujitsu researchers will work indefinitely or for extended periods of time in the university, aiming to accelerate joint research, discover new themes, develop human resources, and build medium- to long-term relationships with the university.

【Inquiries】

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