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FUJITSU Cloud Service K5
Introduction to Personium Service

December 2017

Fujitsu Limited

Version 1.10

Contents

Overview of Personal Data Store (PDS)

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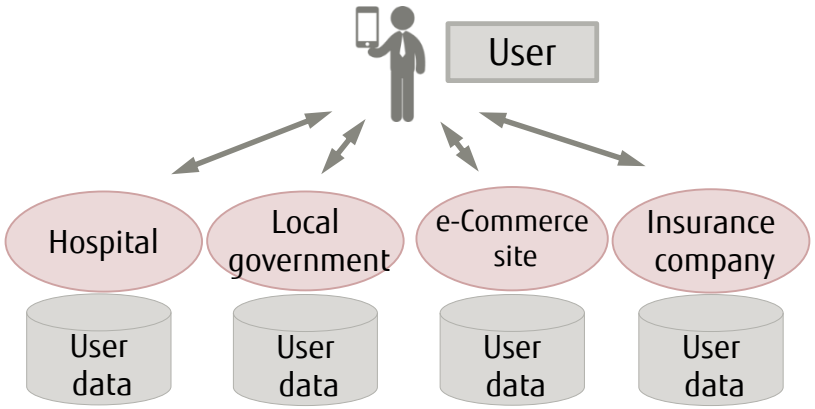
A PDS is a repository service for storing the personal data(*1) of individuals. It links services by becoming the hub, or central point, from which to control (i.e.: grant access rights to) the recipients of data.

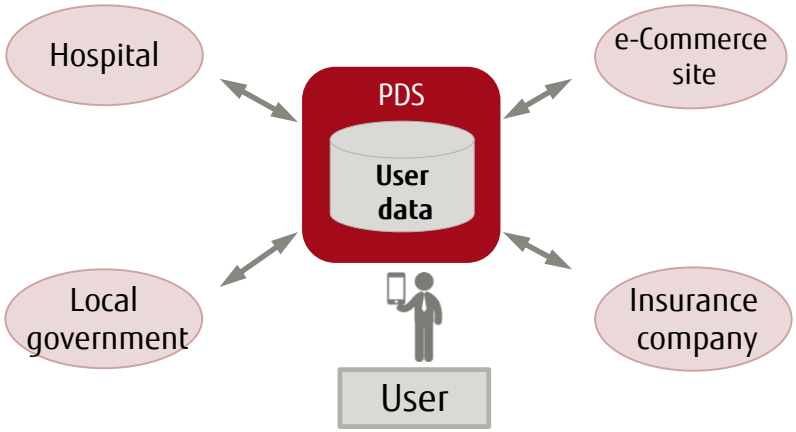
Conventional (System-centric data management)



■ Relationship between the user(*2) and user data(*3)

- The operator(*4) manages user data
- There is a risk of information leakage and data privacy issues occurring when operators attempt to link user data their respective systems.

PDS (Human-centric data management)



■ Relationship between the user and user data

- The user manages user data
- Because the PDS service only allows user data to be disclosed as permitted by the user, there is no risk of information leakage or data privacy issues.

*1: Personal data: Personal information relating to the behavior and status of a user (position information, purchase history, etc.)
*2: A user: A party using the services of an operator
*3: User data: The personal data of each individual user
*4: An operator: A party offering business services to the user

Why PDS?

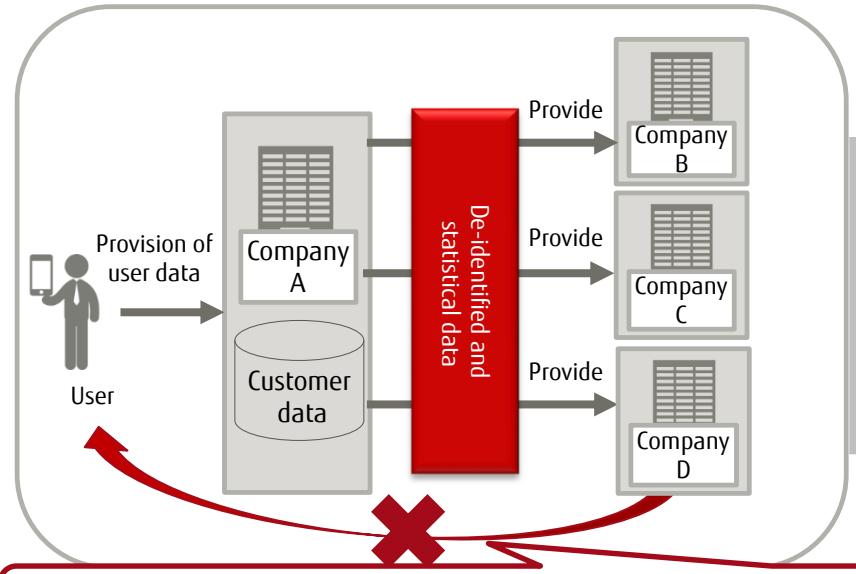
Limits to existing data circulation

Existing data trading methods require that personally identifiable information be anonymized, which means that there can be no direct remuneration to the user who provided the data. By contrast, a PDS service gives the individual control over disclosure of their personal information. This allows **data to** be traded under the individual's own name, and direct recompense provided to the individual for the use of their personal data.

Expectations of deep data

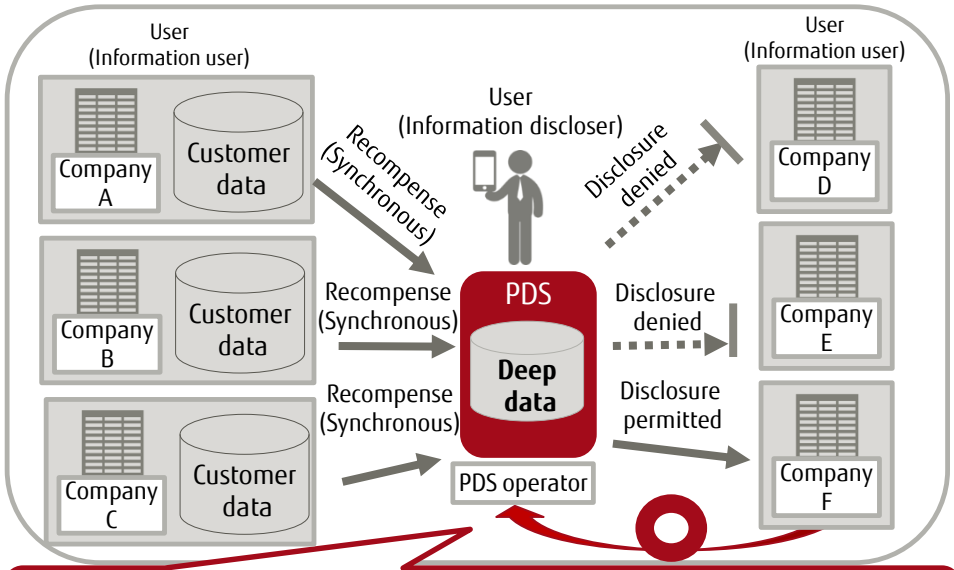
Large, rich collections of personal data that have accumulated in the PDS in the form of preference and behavior logs, over a long period of time and across a wide range of fields, are referred to as 'deep data.'
Leveraging deep data greatly increases the business value of personal data to the information user because it allows highly precise, personalized offers and recommendations to be extended to individuals.

Existing use and application of data



Data is provided anonymously, so there can be no direct recompense to the user who provided it.

Existing use and application of PDS data



Returning control over information provision to the user enables the user to freely specify who the recipients of that data will be, thus permitting the user to trade their data for a direct return.

Overview of PDS Business: Service Linkage - Example 1

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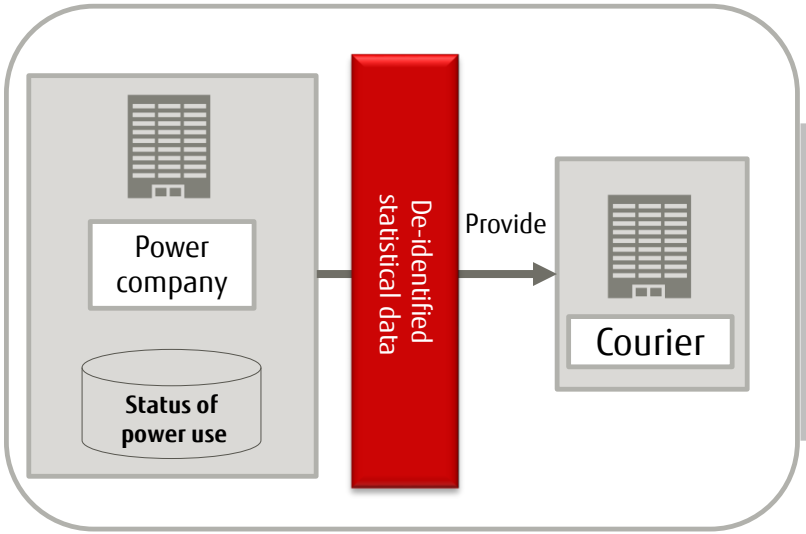
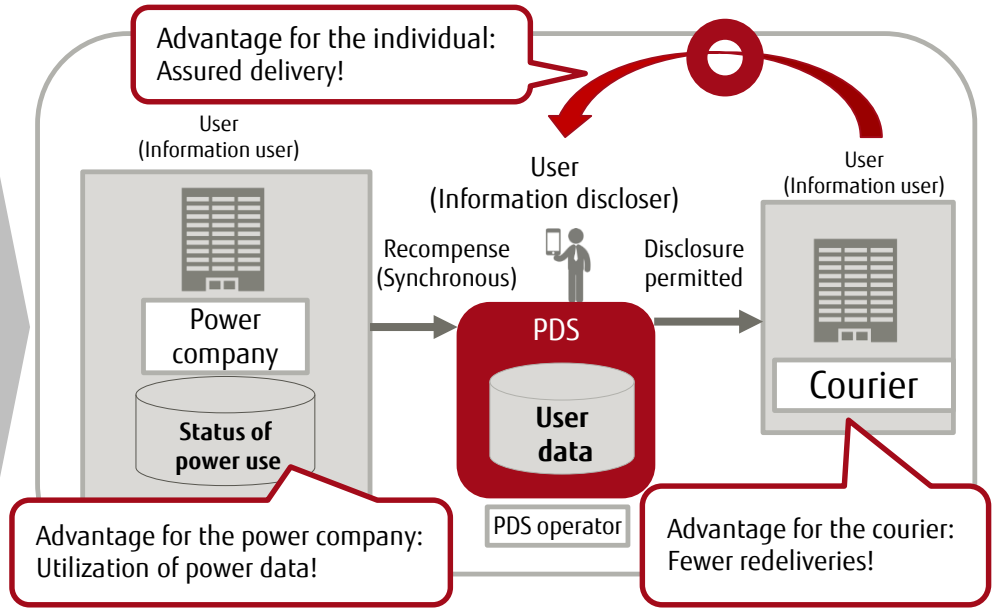
- Example: Leveraging home-based information

Scenario: Before delivering a parcel, a courier wants to confirm if there is anyone at the delivery address.

Existing use and application of data



Use and application of PDS data



Provision of de-identified data

Power usage information indicates whether there is someone at home or not. However, this information is anonymized and therefore lacks usability.

Data provision based on control over own personal information

Home-based information is provided to the courier for delivery this week "only"
Information is voluntarily provided as necessary by the individual.
Personal information is circulated safely and with the individual's consent.

PDS is an extremely important tool

Overview of PDS Business: Service Linkage - Example 2

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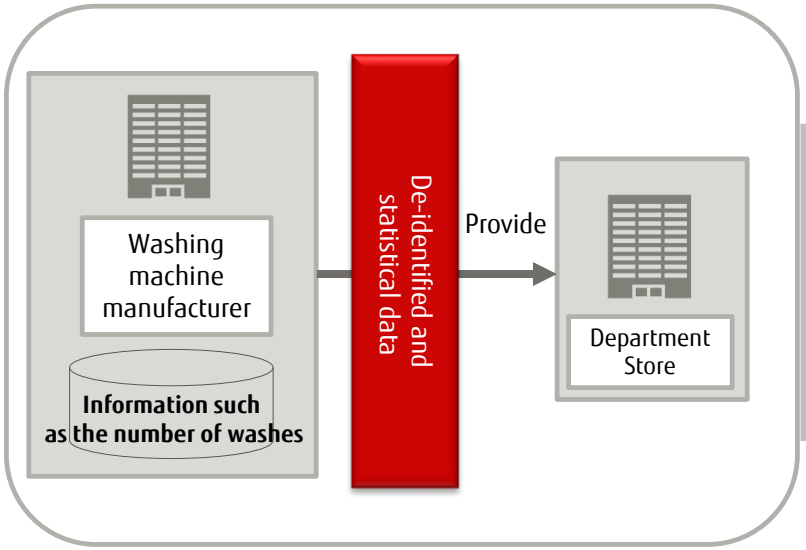
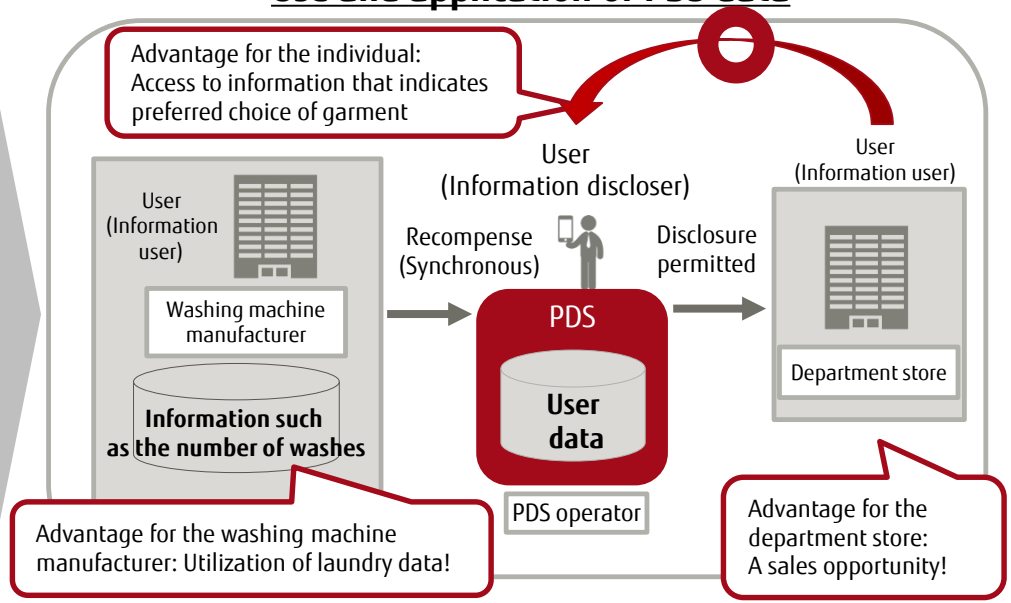
- Example: Leveraging information pertaining to clothing details, laundry history, family composition, and birthdays.

Scenario: Your wife has washed a particular dress 15 times. There is a dress on sale - same label but a new design. It might be a nice present for your wife's birthday next month!

Existing use and application of data



Use and application of PDS data



Provision of de-identified data

Can find out how much a garment is liked and how many times it is worn based on the number of washes, but the information is anonymized and therefore lacks usability.

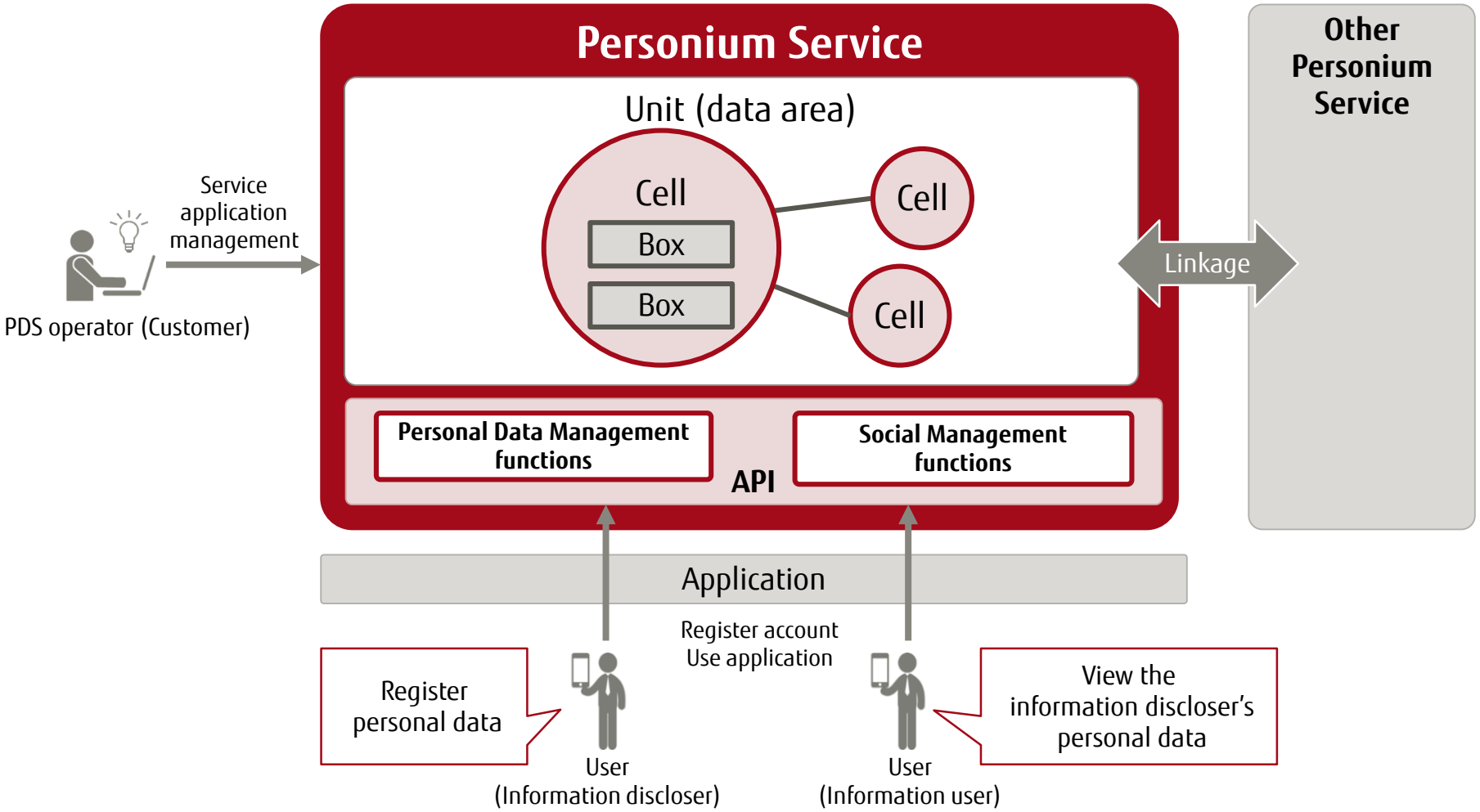
Data provision based on control over own personal information

Information about washing, etc., is provided to the department store "only"
Information voluntarily relayed as necessary by the individual
Personal information is circulated safely and with the individual's consent

PDS is an extremely important tool

Overview of the Personium Service

- The Personium Service supports your PDS business.
- PDS uses a RESTful Web API to provide the data area necessary for PDS business, data access management functions, and functions for accessing files and data in the data area.
- Using the Personium Service enables PDS operators to rapidly build a platform for PDS business and provide the PDS services to users.



Features of the Service (1 of 2)

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The Personium Service provides the personal data management functions required for PDS business applications. It supports PDS business by enabling the setting of access rights based on the data relationships between users and between PDS operators.

Uses open source Personium

Open source Personium-based services reduce the risk of being locked into a particular vendor. The Service provides the latest in technology, representing the achievements of developers throughout the world.

Provides data access functions based on the relationships between users

The Service enables each user to have both disclosure and confidentiality control over their personal data by defining, as parameters, the relationships between users.

Provides mutual access control over data between different PDS operators

The service enables data linkage between different PDS operators who deploy the Personium Service.

Features of the Service (2 of 2)

This Service provides security features for protecting user data.

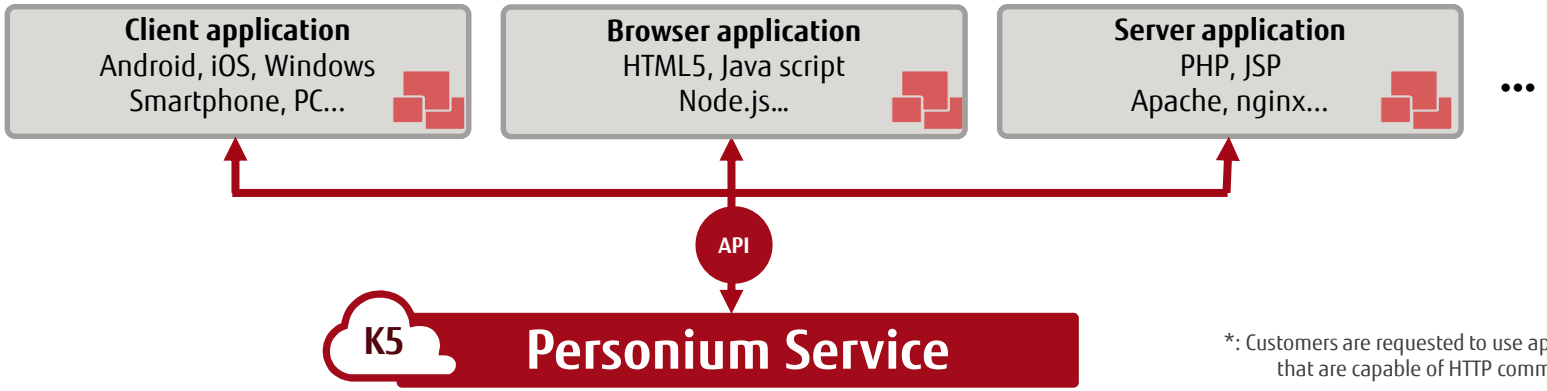
Application authentication

Application authentication enables data operations (register, read, change, delete) to be performed between the user client and user data, once certificate management using OAuth 2.0 has been completed. This protects user data from malicious users.

Functions under this Service are provided via a REST API.

Provision of a RESTful Web API

This Service uses a RESTful Web API to provide functions, enabling flexible customization.
As long as the applications are capable of HTTP communication, it can access a platform-independent environment, regardless of the programming language and execution environment(*).
In addition, customers can use their own domain names.



*: Customers are requested to use applications that are capable of HTTP communication

Function Overview

■ Personal Data Management functions

The PDS operator or PDS application provides the following functions for managing the user's personal data:

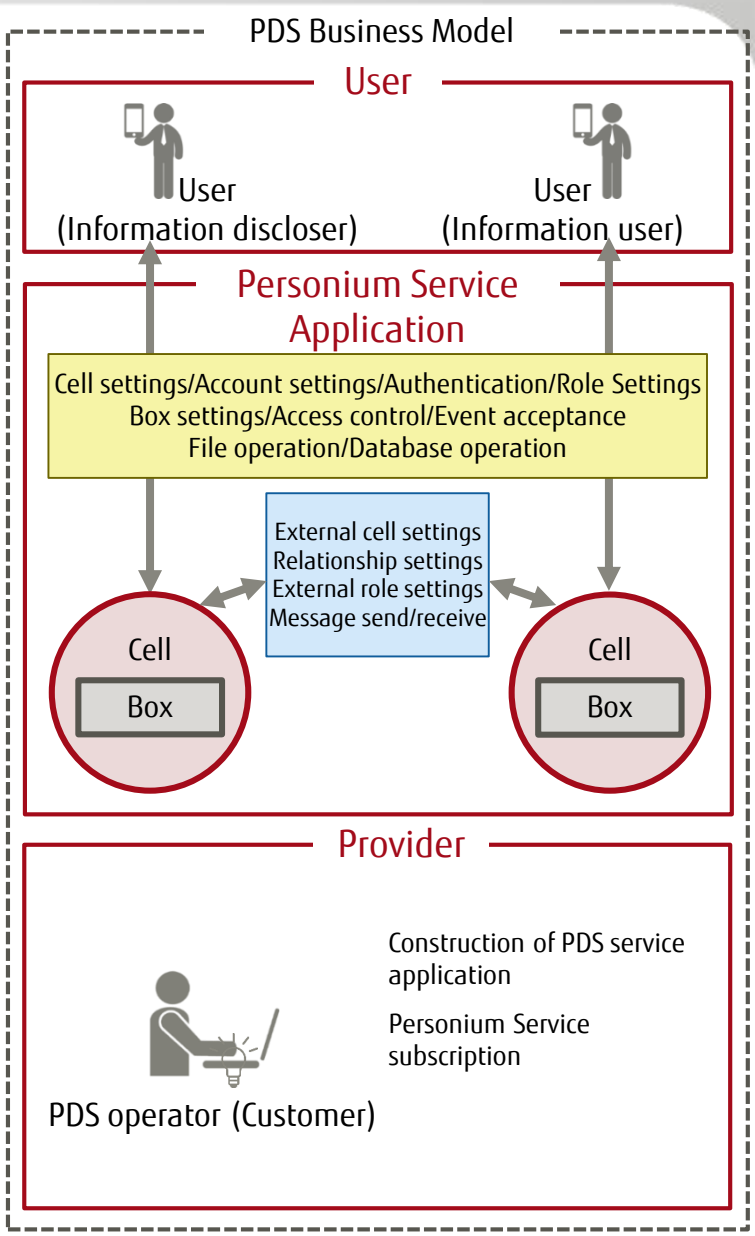
i. Cell management functions (Functions for managing the user's personal data)
- (a) Cell settings (Register, read, change, delete, list the user's personal data areas)
- (b) Account settings (Register, read, change, delete, list the accounts belonging to the user's personal data areas)
- (c) Authentication (User authentication)
- (d) Role settings (Register, read, change, delete, list the user roles)
- (e) Box settings (Register, read, change, delete, list application-specific data areas)
- (f) Access control (Set, read, change the access rights for users and user folders)
- (g) Event acceptance (Accept events and output logs for users)

ii. Box management functions (Functions for managing the user's personal data in application and use-specific areas)
- (a) File operation (Collection settings, file settings, access rights settings)
- (b) Database operation (Schema settings, data manipulation)

■ Social Management functions

This Service provides the following functions for defining relationships between users in users' personal data, and using that for enabling disclosure control and confidentiality control of users' personal data:

- i. External cell settings (Register, read, change, delete, list users to whom disclosure can be made)
- ii. Relationship settings (Register, read, change, delete, list the relationship with users to whom disclosure can be made)
- iii. External role settings (Register, read, change, delete, list the roles of users to whom disclosure can be made)
- iv. Message send/receive (Communication function for permitting disclosure of a user's personal data)

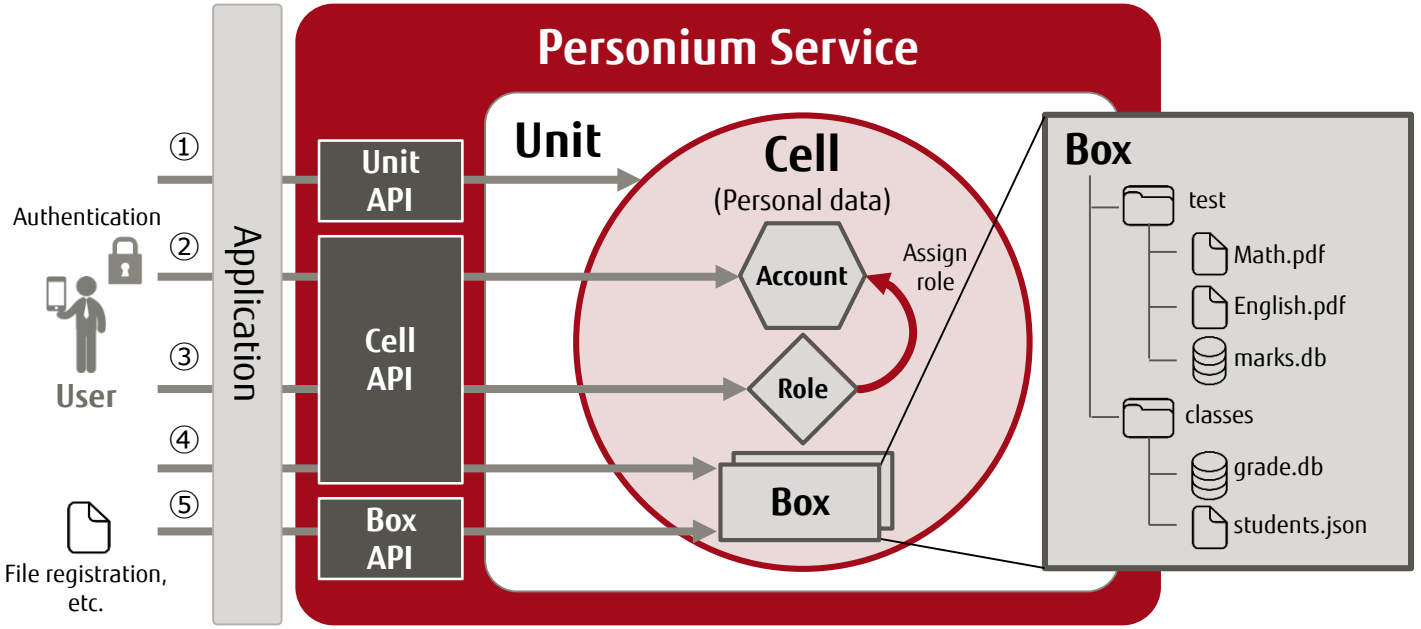


Detailed Description of Functions: Personal Data Management

Personal Data Management uses units, cells and boxes to manage user information and data.

Example of PDS creation and operation

① Create cell
② Create account
③ Create role and assign to account
④ Create box
⑤ To manipulate files, access the box from an account with box read or edit permissions

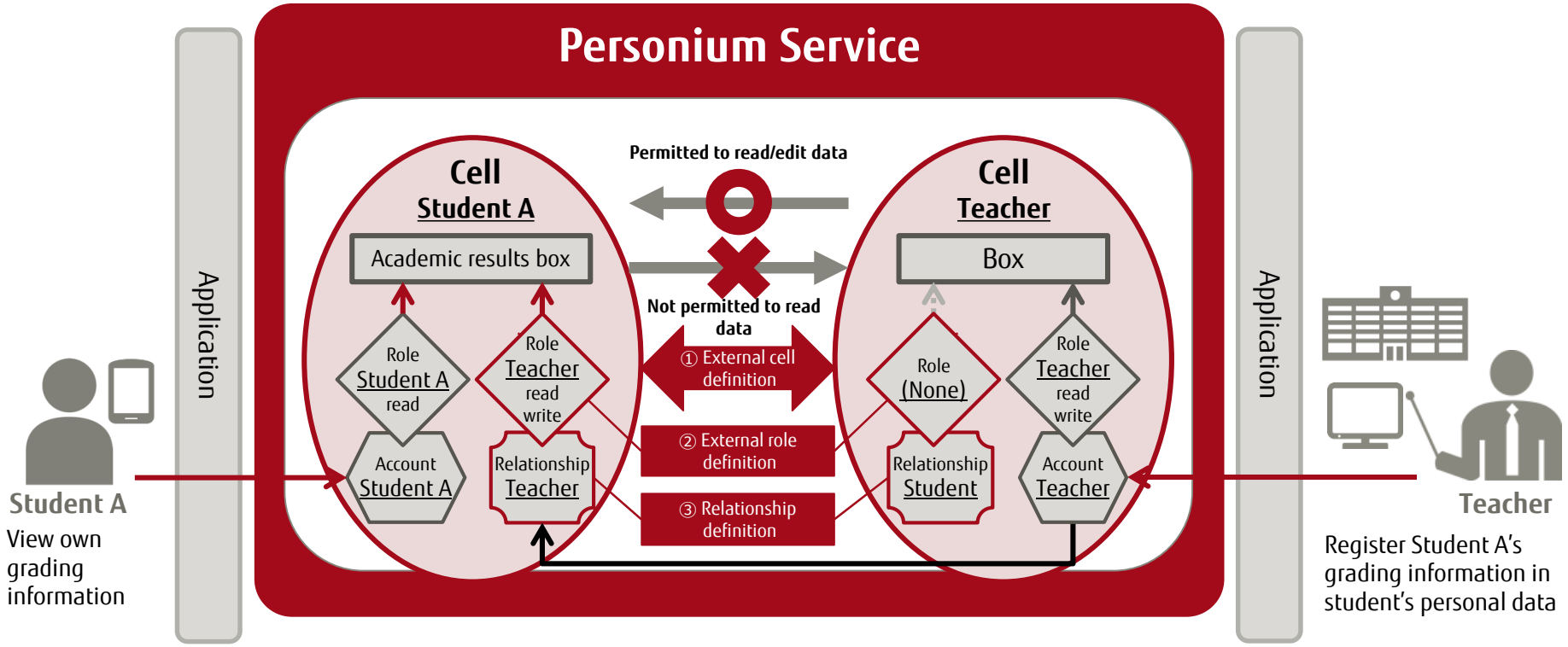


Name and containment relationship	Outline	Number that can be created	Operating privileges		
Unit	The unit for managing cells	1 unit per service environment	Unit user token	-	-
Cell	The unit for managing users and user data (personal data)	1 cell per user		Cell-level permission Note: Only a unit user token can create a cell	-
Account	The account of the user belonging to the cell	Multiple			-
Role	Defines the user's role and privileges	Multiple			-
Box	The user's data storage area	Multiple			Box-level permission - Note: Must have cell-level permission or higher to create a box

Detailed Description of Functions: Social Management (Mutual access control between users)

Enables disclosure control and confidentiality control over personal data by **defining the relationship between users** in each user's personal data (cell).

- Example: Setting mutual access rights to personal data in an education setting



Functions provided

The functions provided enable each user to have disclosure control/confidentiality control over their personal data by defining, as parameters, the relationships between users and specific access rights.

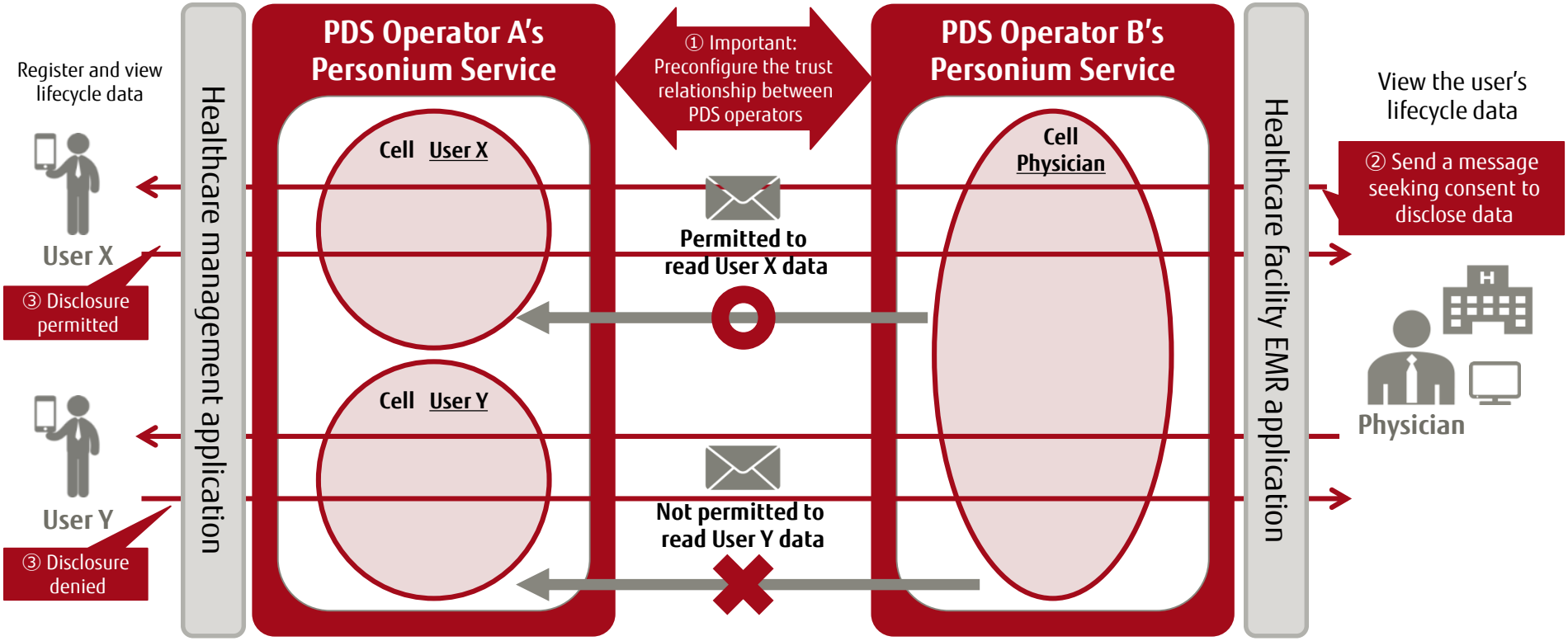
Outcome

Users determine for themselves which personal data to disclose, thus maintaining confidentiality between users.

Detailed Description of Functions: Social Management (Mutual access control between operators)

Enables data linkage between different PDS operators who deploy the Personium Service.

- Example: Linkage of health service data between healthcare facilities



Functions provided

Users can preconfigure PDS operators as trusted identities and authorize the disclosure of data to them. This enables diverse PDS operators to access user data among themselves.

Outcome

Removing the need for a shared environment between operators means fewer deployment hurdles. This opens the way for ecosystem(*) enablement.

Note: For further details, refer to "Working with the Customer to Co-create an Ecosystem" later in this presentation

API List

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The Personium Service provides the following REST API functions:

Function Name			Function Description
Personal Data Management functions	Cell management functions	Cell settings	Register, read, change, delete, list the user's personal data areas
		Account settings	Register, read, change, delete, list the accounts belonging to the user's personal data areas
		Authentication	User authentication
		Role settings	Register, read, change, delete, list the user roles
		Box settings	Register, read, change, delete, list application-specific data areas
		Access control	Set, read, change the access rights for users and user folders
		Event acceptance	Accept events and output logs for users
	Box management functions	File operation	Collection settings, file settings, access rights settings
		Database operation	Schema settings, data manipulation
Social Management functions	External cell settings		Register, read, change, delete, list users to whom disclosure can be made
	Relationship settings		Register, read, change, delete, list the relationship with users to whom disclosure can be made
	External role settings		Register, read, change, delete, list the role of users to whom disclosure can be made
	Message send/receive		Communication function for permitting disclosure of a user's personal data

Note: Check the following for a list of offerings:
K5 PaaS Portal > Documents > Personium Service > API Reference

Usage Scenario (1 of 2)

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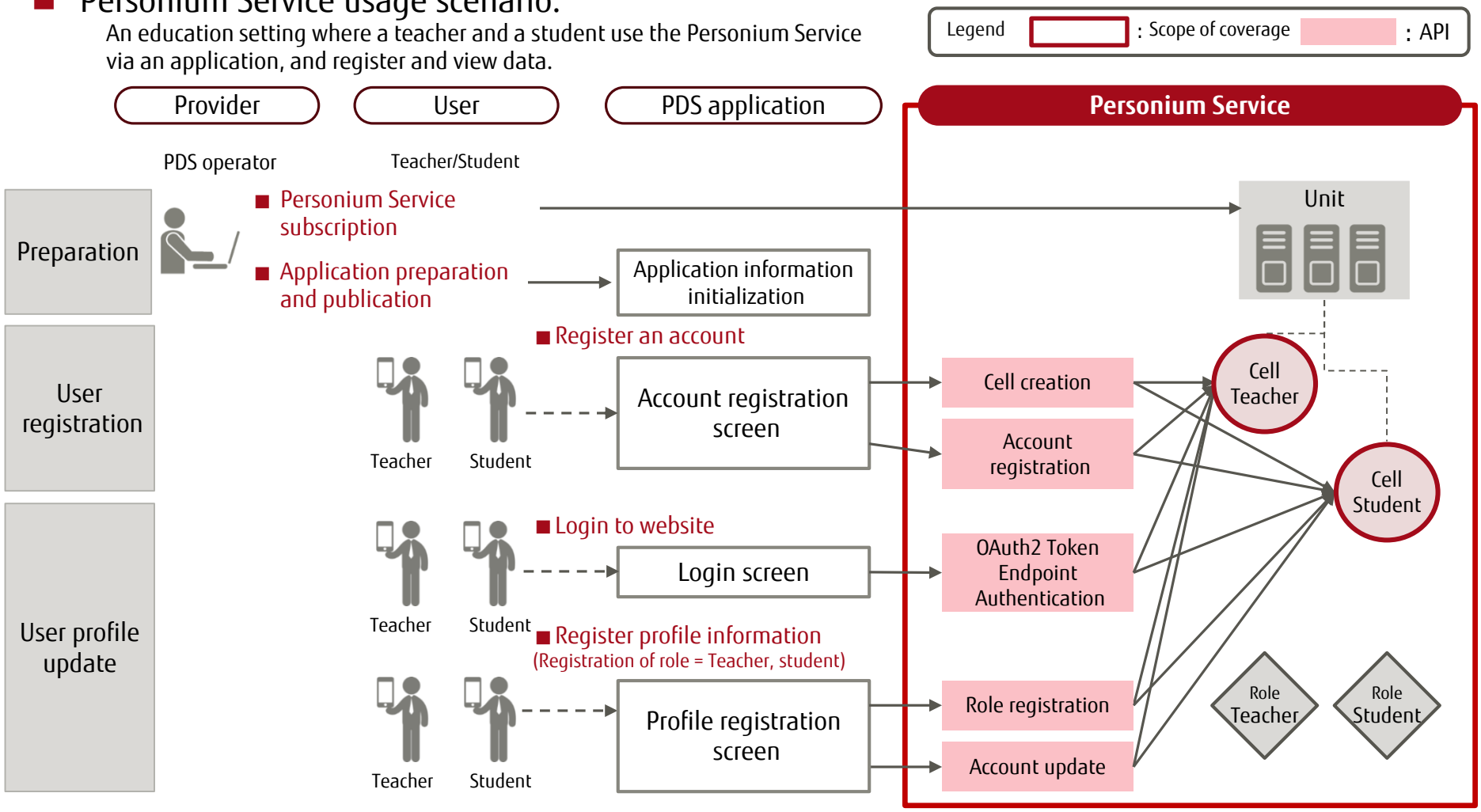
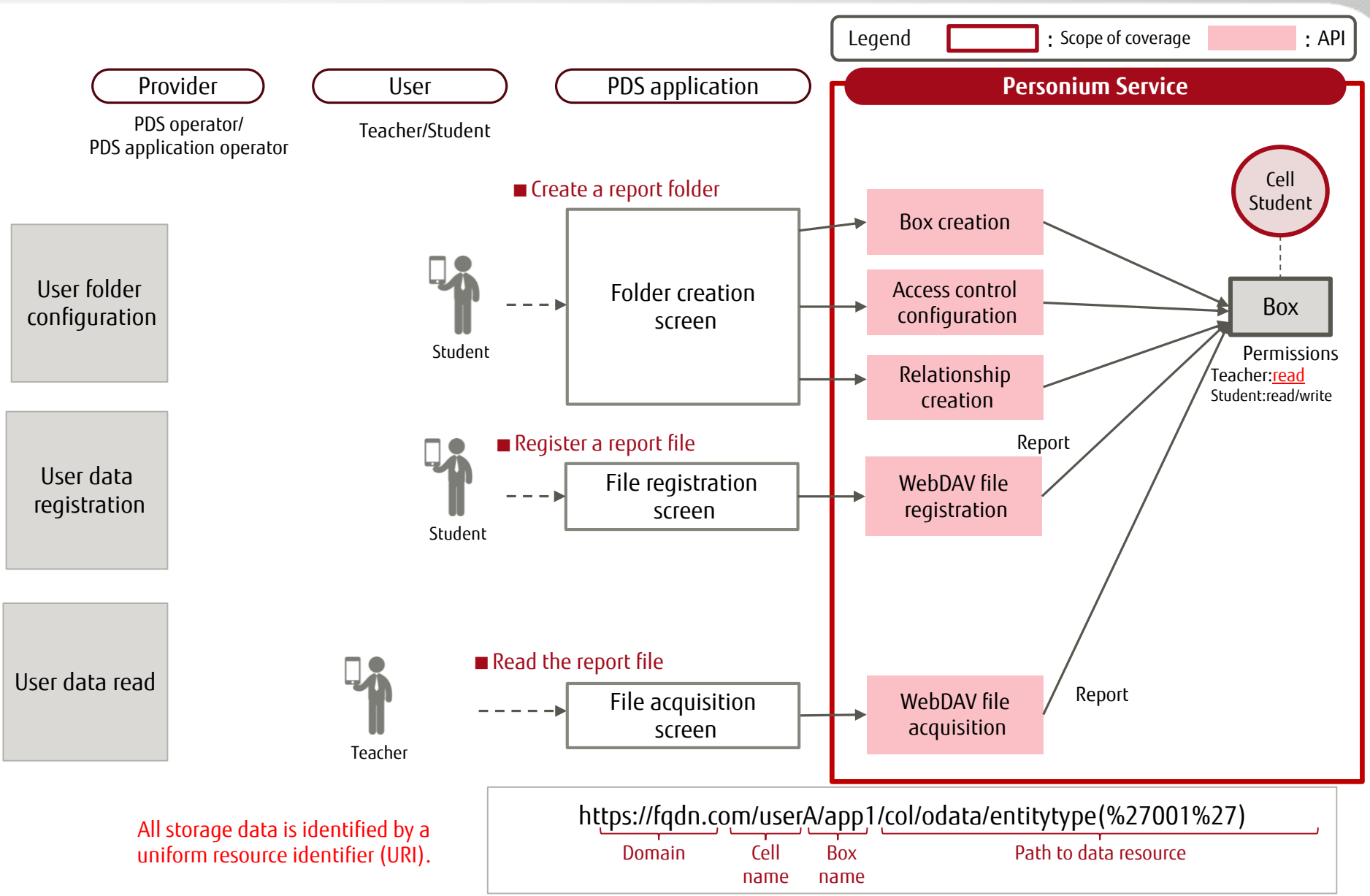
Using the Personium Service enables PDS operators to rapidly build PDS business platforms and provide PDS services to users.

■ Personium Service usage scenario:

An education setting where a teacher and a student use the Personium Service via an application, and register and view data.



Usage Scenario (2 of 2)



All storage data is identified by a uniform resource identifier (URI).

https://fqdn.com/userA/app1/col/odata/entitytype(%27001%27)

Domain | Cell name | Box name | Path to data resource

Personium Service: Service Menu

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Service Menu

Menu	Unit	Remarks
Basic charge	Per month	Provides one Personium Service environment unit which includes a 100 GB data area to manage personal data

- Fujitsu is planning to add an options menu for extending the data area (disk).

Explanation of the Billing Model

- Billing by fixed monthly fee
- Fees are charged from the month in which the Personium Service start date occurs.
- Fujitsu has no facility for calculating the fee on a daily pro rata basis.

Restrictions and Notes

- The Customer's PDS business application development environment and execution environment must be separately prepared by the Customer.
- The Customer shall bear responsibility for managing personal data handled by this Service, as well as any data registered independently by the Customer.
- For information on the regions in which Fujitsu offers this Service, please refer to the "Service Description" and the "PaaS Restrictions and Notes" at the Cloud Service K5 website.
- The time required from application lodgment to the start of service is:
  - Approximately 7 business days from the time an application is lodged via the Service Settings Application screen at the K5 PaaS Portal

Reference: Sample GUI Program

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Provides a standard GUI aimed at a range of PDS business usage scenes

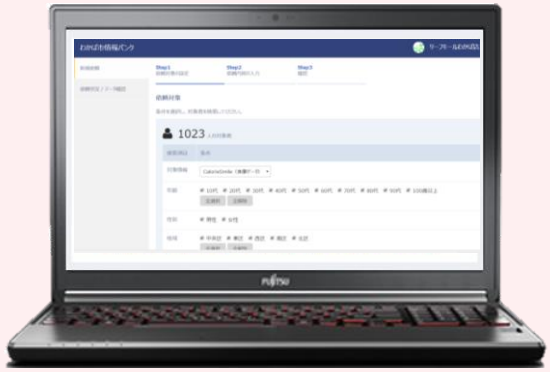
- Publish key functions using sample code
- The customer is able to freely customize functions as necessary. As a result, the Service is quick to launch

Login

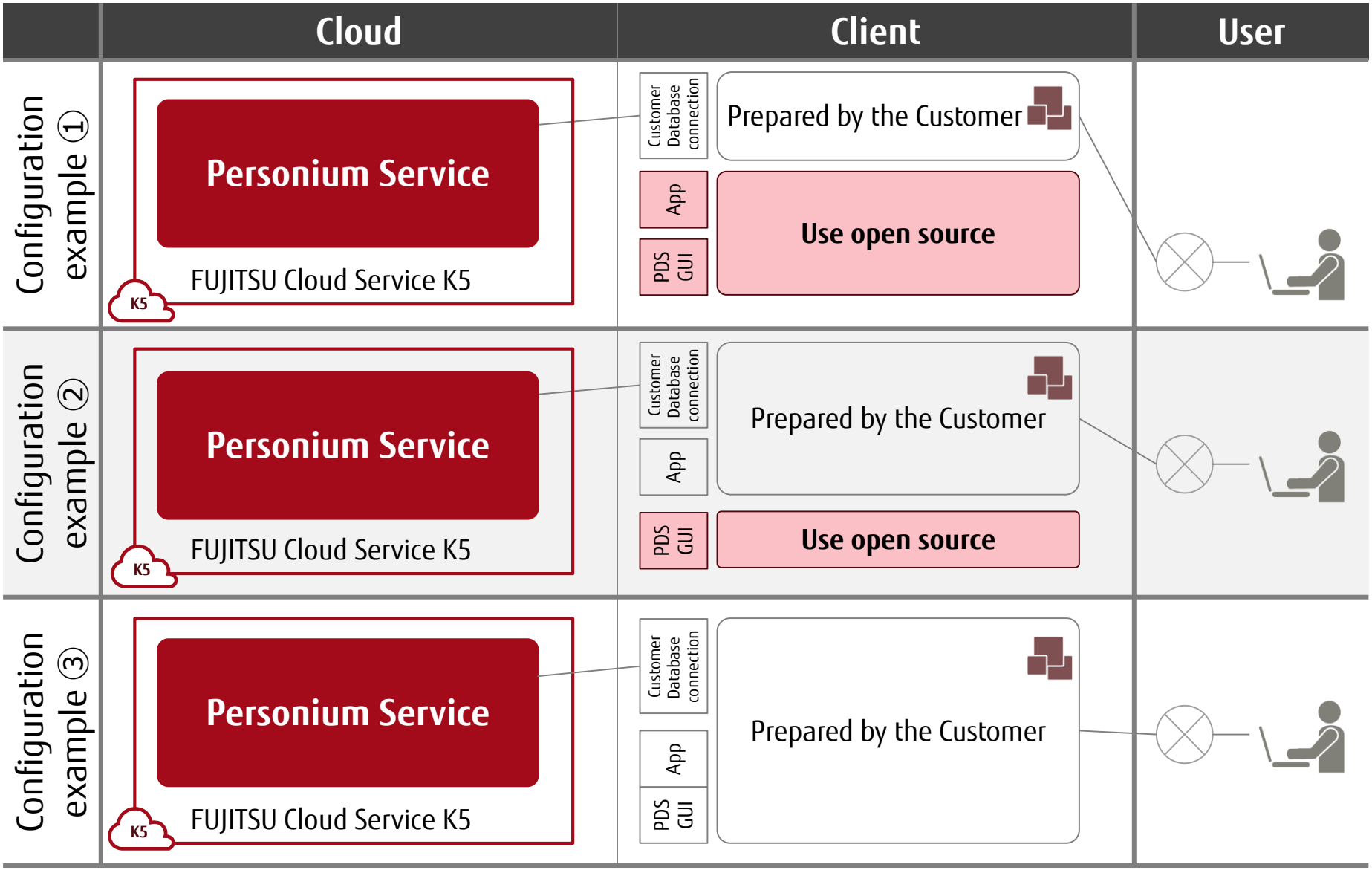
Menu screen

Data request details

Operator's screen for requesting provision of data



Reference:
Examples of K5 Personium Service Usage Configuration



Reference:
Working With the Customer to Co-create an Ecosystem

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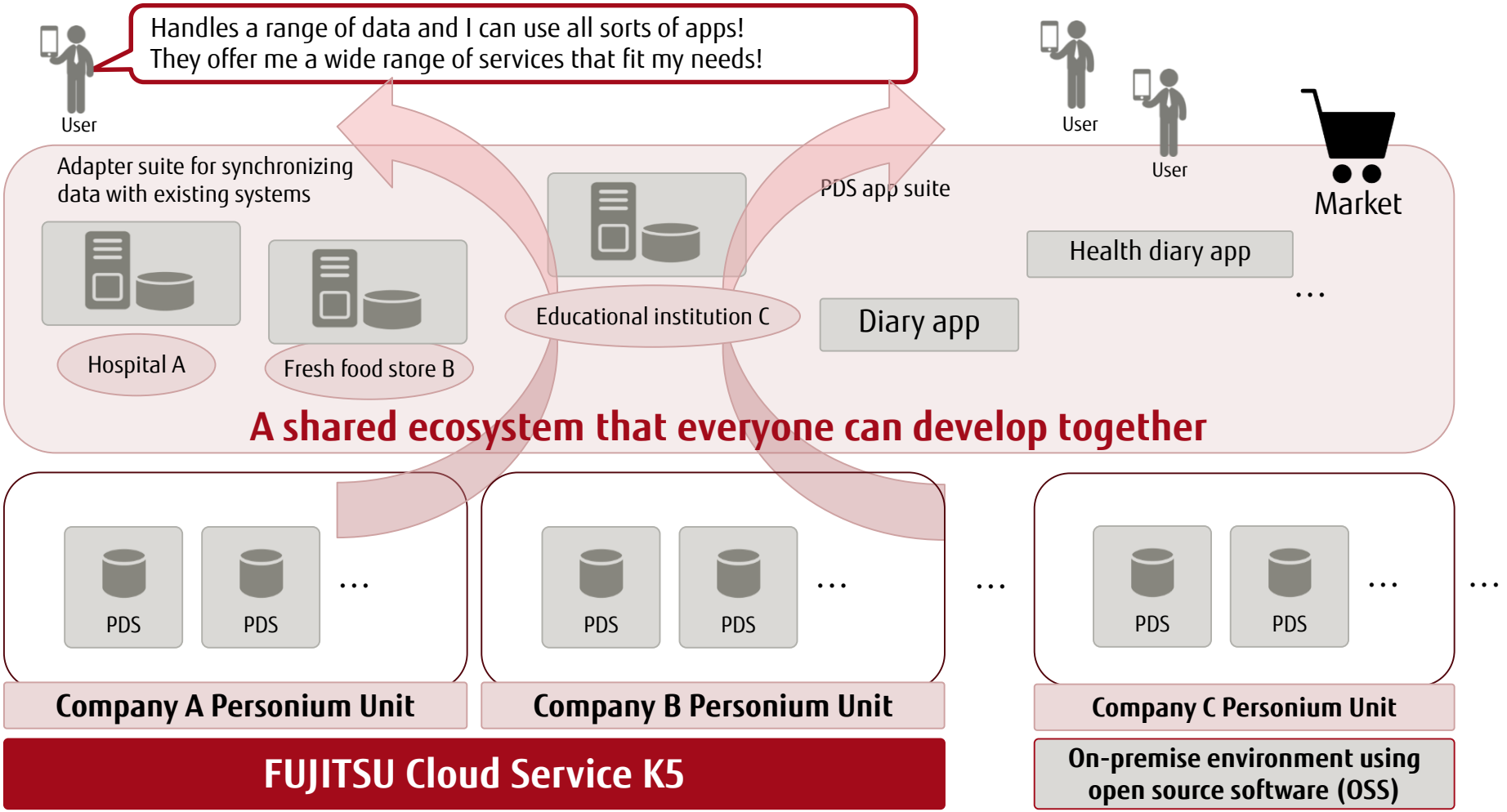
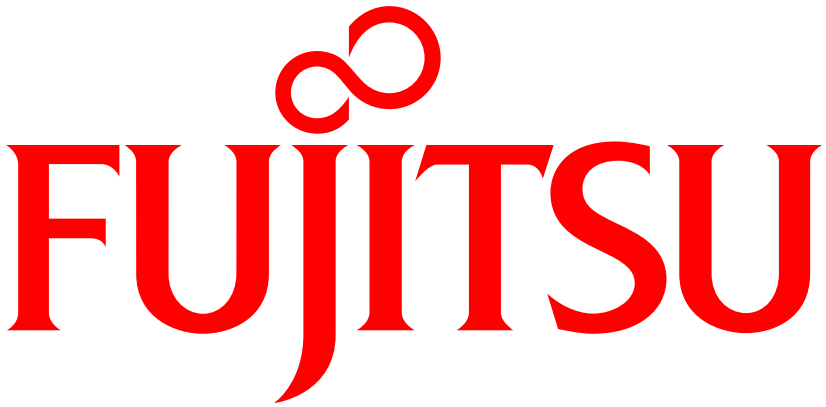
Vision of the future

Fujitsu aims to lay the foundations for an attractive market for users to publish information, using PDS applications and adaptors with existing systems. The PDS applications are created in Personium user ecosystems which include open source.
Note: You can also concentrate solely on building relationships with your customers and creating differentiators (special apps, GUI, etc.).





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