Privacy Protection Architecture based on oneM2M

KDDI Research, Inc
Norihiro Okui
KDDI Research

Profile

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<tbody>
<tr>
<td>CEO</td>
<td>Yasuyuki Nakajima</td>
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<tr>
<td>Establishment</td>
<td>April 1, 1998</td>
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<tr>
<td>Shareholders</td>
<td>KDDI CORPORATION, KYOCERA Corporation, TOYOTA MOTOR CORPORATION</td>
</tr>
<tr>
<td>Employees</td>
<td>298 people (April 1, 2018)</td>
</tr>
<tr>
<td>Head Office</td>
<td>2-1-15 Ohara, Fujimino-shi, Saitama, 356-8502 Japan</td>
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History

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tr>
<td>1953</td>
<td>KDD Research Lab was established as a research department of Kokusai Denshin Denwa (KDD) Co., Ltd.</td>
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<td>1998</td>
<td>KDD R&amp;D Laboratories, Inc. was established.</td>
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<tr>
<td>2016</td>
<td>KDDI R&amp;D Laboratories, Inc. and KDDI Research Institute, Inc. were merged to form KDDI Research, Inc.</td>
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Agenda

- Privacy Policy Manager (PPM)
- Activity of KDDI Research on oneM2M
- PARMMIT
Risks of privacy disclosure in IoT connected world are increasing

- More and more IoT devices will generate personal data

Servicers are required to use personal data in user intended way

- End user may not understand what kinds of data are provided to a service from privacy policy
Privacy Policy Manager (PPM)

- **PPM provides user friendly UI of privacy policy**
  - End user configures the user’s privacy preferences
  - PPM compares privacy policy with privacy preference
  - End user creates a privacy setting for each service

- **PPM issues access control information to control personal data**
  - Access control information is based on privacy settings
  - PPM does not host personal data

- **PPM shows personal data transfer logs**
  - End user easily understand what kinds of personal data are used in each service
PPM Standardization in oneM2M

oneM2M Release 2
- Mar. 2015: Use case of PPM
- May 2015: Proposal of PPM architecture
  - Jul. 2015: Proposal of Markup-language
  - Sep. 2015: PPM architecture on oneM2M
  - Jan. 2016: PPM implementation model
  - Aug. 2016: oneM2M Release 2

Dynamic Authorization

oneM2M Release 3 & 4
- Sep. 2017: Enhance PPM architecture
- Dec. 2018: oneM2M Release 3
  - Jan. 2018: Proposal of service subscriber and user
- Future work
  - XXX. 2019: Technical report for Release 4
  - YYY. 2020: oneM2M Release 4

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PPM Architecture in oneM2M

**Dynamic Authorization (Release 2)**

**Direct Dynamic Authorization Server**
- Originator
- Platform
- Data
- PPM
- Access control info

1. Request personal data
2. Request access control information
3. Respond access control information
4. Respond the data or NG

**Indirect Dynamic Authorization Server**
- Originator
- Platform
- Data
- PPM
- Access control info

1. Request personal data
2. Request access control information
3. Respond access control information
4. Respond the data or NG

**Distributed Authorization (Release 3)**

- Platform
- PEP
- PDP
- PRP
- PIP
- Entity

- Platform
- PEP
- PDP
- PRP
- Entity
- PIP

- Platform
- PEP
- PDP
- PRP
- Entity
- PIP

PEP: Policy Enforcement Point
PDP: Policy Decision Point
PRP: Policy Retrieval Point
PIP: Policy Information Point
PARMMIT

Project overview

- Japanese Government Project
  - Ministry of Internal affairs and Communications
- Social implementation of IoT / BD / AI Information and communication platform*1
  - Establishment of cooperation technology between IoT devices and platform
  - Verification of Interoperability between platforms

- Term: 2017 - 2019

Target of PARMMIT

Development and implementation
- Advanced technology for IoT platform: “Distributability” and “Privacy Protection”
  - Distribution technology considering user’s privacy
  - High usability PPM
  - Traceability, integrity and low latency

Standardization
- Feedback to oneM2M
  - M2M service subscriber and user
- ISO

Proof of Concept (PoC)
- Application to use case

PARMMIT Working Group
**PARMMIT Architecture**

- User can configure user’s privacy preference on PPM with user-friendly UI
- PPM controls user’s personal data according to user’s privacy settings
- Servicer could simplify the management of consent information by using PPM
PARMMIT architecture is based on oneM2M Release 2

- PPM is defined as an external authorization server and acts as AE on oneM2M
  - Static authorization or direct dynamic authorization

PARMMIT Architecture (oneM2M)

Join PPM and Configure privacy settings

Access control

User

AE

PPM

IN-CSE

Platform

Location
Body temperature
Heart rate
Velocity
Steps

Data

Location
Body temperature
Heart rate
Velocity
Steps

IN-CSE

AE

IN-CSE

AE

Service A

Service B

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PARMMIT Working Group

■ Overview

● Term: Oct. 1st, 2018 – Mar. 31st, 2020

● Participant company: 11 companies (Oct. 1st, 2018), Over 20 companies will join
  • ACCESS CO., LTD, DAIICHI SANKYO COMPANY, LIMITED, Mitsubishi Tanabe Pharma Corporation, GSIS: Graduate School of Information Sciences, Tohoku University, PIONEER CORPORATION, Macromill, Inc., Murata Manufacturing Co., Ltd., LIFENET INSURANCE COMPANY, …

● Web: https://rp.kddi-research.jp/parmmit/

■ Objective

● Discuss use cases for proof of PARMMIT concept
  – Use cases treat personal data such as health care information

● Implement PARMMIT architecture and practicality evaluation

■ Expectation

● Create matching opportunities between information supply business and information utilization business

● Promotion of new business by data linkage
PARMMIT Working Group

■ Activity plan
  ● Implementation plan about PARMMIT architecture for PoC
  ● Proof of PARMMIT concept using a use case
  ● Promotion of PoC result
    • Target: CEATEC 2019

■ Procedure
  ● Workshop for discuss use cases and technical requirement
    • Use case of Multi-industry collaboration
    • Use case of low latency requirement
    • Use case of Ad hoc collaboration