eduroam/OpenRoaming combined deployment in Cityroam

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Nationwide Cityroam deployment in Japan

- **Cityroam** is a roaming federation providing secure roaming system for Public Wi-Fi since 2018.
- All venues provide both eduroam and OpenRoaming (2020-).
- Multi-operator, multi-vendor
- Unique venues across the nation. (90+ spots)
Cityroam venues

- Cafes, hotels, shopping malls, etc.
- Sapporo Gakuin University (for better services for residents)
- Ski resorts (Hakuba47)
- Kita-Kyushu Monorail stations
- Conference venues (temporary deployment)
  - Internet Week 2018 & 2019, AXIES 2018, 2021, 2022,
  - Comic Market 95th-97th, 99th-101st, etc.

New direction: Univ.&Schools should provide Public Wi-Fi, too.

Cityroam supports quick deployment of eduroam + Public Wi-Fi.

Mobile eduroam/OpenRoaming AP (over 4G & VPN)
Cityroam venues

Co-working space in Morioka (OpenRoaming was added in 2020)

Conference Center in Nagano (May 2021)

Hot Spring facility in Nagano (May 2021)

Resort Hotel & Complex in Ise (Feb. 2022)

Vending machines in Kyoto City Parks (May 2020)
eduroam traffic separation – basic (but complex) implementation

- Require multiple RADIUS connections
- Complex AP configuration
eduroam traffic separation – This doesn’t work!

You cannot see whether the access request is for eduroam or not by just looking at the realm.
For example, anonymous@example.jp
Access request routing in eduroam/OpenRoaming combined architecture

Forward to eduroam if ("%{Called-Station-Id}" =~ /:eduroam/)
Using the eduroam.org OpenRoaming proxy (under dev.)

RadSec
Access-Request for OpenRoaming
openroaming-ap.eduroam.org (RadSec with eduPKI cert.)

eduroam JP hub
Access-Request for eduroam
SRV="openroaming1.eduroam.org:2083"

edoauam/OR JP hub at NII
additional direct connections

and other roaming partners

eduroam-only members
eduroam&OR members (including W-ISPs)
Renewed “TOKYO FREE Wi-Fi” supports OpenRoaming

- Released on Apr. 1, 2023
- Tokyo Metropolitan Government + KDDI / Wire & Wireless (Wi2)
- Enhanced security, safety, and usability. 😊

OpenRoaming hotspots provided by the Tokyo Met. Govt.

- 4 new sites in Apr. 2023
- 600+ sites planned in 2023

Smart Poles and Digital Signages in Nishi-Shinjuku Area (2021-2022)
Rough access statistics in the eduroam/OpenRoaming combined deployment

- **eduroam accesses account for 75%**

- Details of the others cannot be disclosed…,
  - **SIM-based authentication is popular.**
    The authentication is stable.
  - **Samsung’s built-in OSU** produces high access counts.
    The number of authentication failures is relatively high for unknown reasons.
  - Cisco OpenRoaming app is popular, but the percentage is not so high.

It is quite important to lower onboarding hurdles.

Embedded profiles win!
Outcome

- High access number from the beginning thanks to the eduroam users (although it’s not actually OpenRoaming).

- eduroam has clearer value proposition.
  - Many municipalities take eduroam as a valuable application.
  - Some potential operators become interested in eduroam, while others like the “secure Wi-Fi for everyone,” i.e., OpenRoaming.

- Existing profiles (SIM) and built-in OSU work quite well.
Private 5G experimental AP

- A part of the NICT Beyond 5G program
  - Towards 5G / Wi-Fi convergence
  - In-door 5G AP with omnidirectional antenna (CU/DU/RU all-in-one)
  - SIM-based AuthN to be added.
• Supplementary slides
Passpoint Provisioning Tools

- Tools and codes that help operators develop their own Passpoint profile provisioning systems.
- The CGI perl scripts allow end users to download Passpoint profiles and configure Wi-Fi without typing in Wi-Fi ID/password or certificate.

https://github.com/hgot07/PasspointProvisioningTools
Profile Provisioning for Android

- Profile in PPS MO format (w/o signing)

**Demo user page**
- Wi-Fi setting information
- Logout
  Please be sure to close the window or tab shown after tapping. You cannot login there again.

**Web-based Wi-Fi provisioning**
- Configure OpenRoaming (Android 10+)
- Configure OpenRoaming (iOS/iPadOS 14-
  macOS 10+)
- Configure OpenRoaming (Windows 11 22H2+)
- Download OpenRoaming profile (all OS. cap-
  pable format)
  Please use geteduroam to configure user devices using this profile.
Profile Provisioning for iOS/iPadOS/macOS

- MDM using .mobileconfig
- Signing is optional.
Profile Provisioning for Windows 10/11

- ms-settings: URI scheme (EAP-TTLS only)
- Signing is required.
  (Windows 11 21H2 and older require EV cert.)
Towards OpenWiFi

OpenWrt-based APs (Edgecore EAP101, EAP102)

Hotspot 2.0 configuration is the same as in OpenWrt.
Inexpensive Wi-Fi 6 AP for Managed OpenRoaming?

Fantastic performance using WireGuard VPN. 😊
eduroam over OpenRoaming

- eduroam supports three wireless association methods.
  - SSID-based, legacy 802.1X (eduroam’s standard)
  - Passpoint using eduroam’s own RCOI.
  - Passpoint using RCOI(s) defined in OpenRoaming.

- Fixed SSID is preferred so far. Why?
  - Widely adopted.
  - Simple and monolithic service.
  - Passpoint support on user equipment has not been matured.
    High QoS is required in R&E.