Cityroam and OpenRoaming, Providing Secure Public Wireless LAN Services with eduroam

Hideaki Goto   Tohoku University / NII

Why City/Free Wi-Fi & off-campus eduroam?

- Tourism
- Smart Cities, IoT
- Provide citizens with access means for various digital services.
- "Wi-Fi for all." (WiFi4EU by European Commission) resolving digital divides
- Community supports for Research & Education.

What are needed?

- ✓ Secure connections with good usability
- ✓ Free roaming
- ✓ User identity verification and traceability
  (for security, trusts between operators, and compliance)

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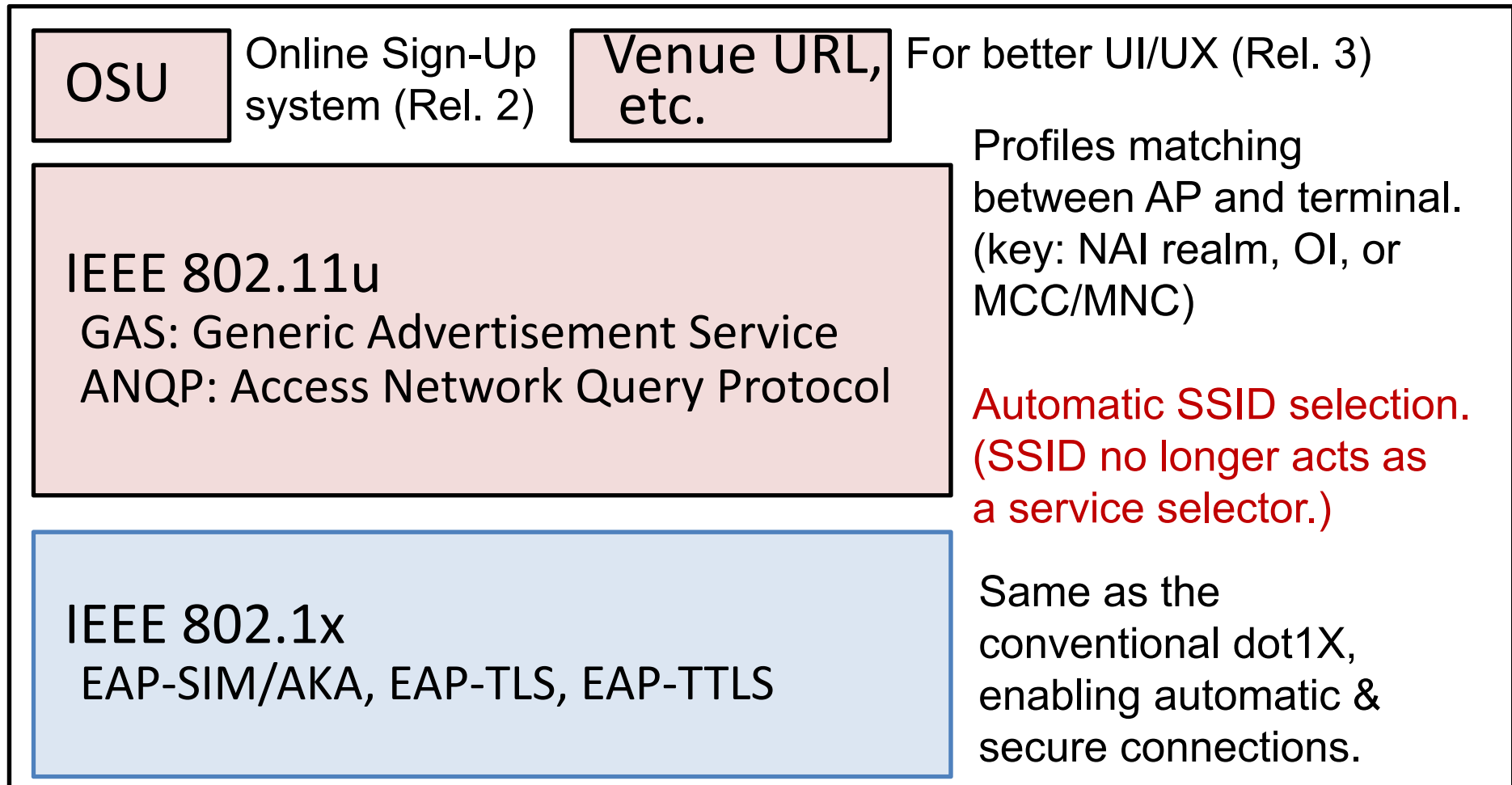# eduroam / Free Wi-Fi amid the COVID-19 pandemic

- Campuses and mobility have been heavily affected.
- eduroam traffic drops, but is active at some places like hospitals.
  - Would Wi-Fi roaming help students *refrain from commuting far* to their own universities?
- Students & staff suffer from telecommunication fees.
  - Improving the learning environment in the digital era is crucial.
  - Free Wi-Fi at nearby facilities must be useful.
  - Security and roaming are important.

How can we deploy off-campus eduroam services?

- Ask Free Wi-Fi operators to add "eduroam" SSID.
  - conventional way w/ minimal impact to the users
  - costly as many Free Wi-Fi systems require additional supports for dot1X
  - enabling a lot of SSIDs hits the AP's limit and also deteriorates the performance
- Enable roaming with *secured* Free Wi-Fi   New scheme
  - much easier in negotiating with the operators ☺
  - simple system, lower cost ☺
  - different SSIDs ☹
    Passpoint/NGH is a hope.

Passpoint (aka Hotspot 2.0)

OSU   Online Sign-Up system (Rel. 2)

Venue URL, etc.   For better UI/UX (Rel. 3)

IEEE 802.11u
GAS: Generic Advertisement Service
ANQP: Access Network Query Protocol

Profiles matching between AP and terminal. (key: NAI realm, OI, or MCC/MNC)

Automatic SSID selection. (SSID no longer acts as a service selector.)

IEEE 802.1x
EAP-SIM/AKA, EAP-TLS, EAP-TTLS

Same as the conventional dot1X, enabling automatic & secure connections.

Next Generation Hotspot (NGH):
Passpoint + Roaming (+ something sophisticated)

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Passpoint is gaining popularity

- Some operators provide secure Wi-Fi option:
  - San Francisco & San Jose Wi-Fi (2014)
  - Orange Romania (2014)
  - LinkNYC (2016), InLinkUK (2017)
  - Boingo Passpoint Secure at 40+ airports in US, Brazil, Portugal, UK, ...
  - Some US phones come with built-in Passpoint, enabling automatic connection to Wi-Fi
  - OpenRoaming (2020)

Wi-Fi Alliance and Wireless Broadband Alliance (WBA) are promoting Passpoint/NGH.
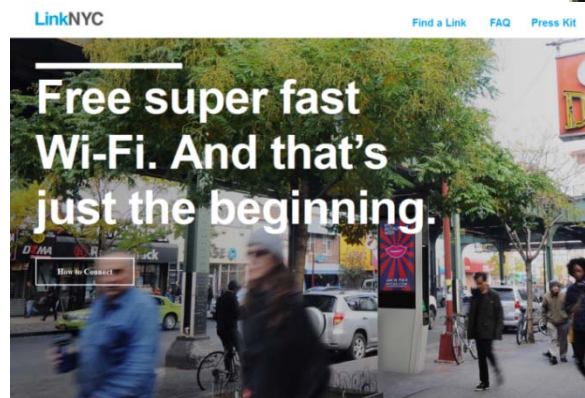
Look!

What we have been doing...

- Next Generation Hotspot Special Interest Group (NGHSIG) (since Jan. 2017)   https://nghsig.jp/en/

- Participation in the WBA City Wi-Fi Roaming trial 2017
    - The first eduroam on the NGH in the world.

- Cityroam federation in Japan (since 2018)

- Participation in the WBA City Wi-Fi Roaming trial 2018
    - eduroam NO, NL, and US joined, too.

- WBA OpenRoaming launched (2020)
    - Cityroam/eduroam JP - OpenRoaming development
    - eduroam - OpenRoaming development (GÉANT)

Cityroam, the secure roaming system for Public Wi-Fi

- ■ Passpoint/NGH as well as dot1X
- ■ Affordable roaming platform for various Roaming Consortia and operators (SMB, cities, etc.)
  - ■ IdP: eduroam, ANYROAM, Cityroam Cloud IdP, etc. (planned: telcos/ISPs and cities via OpenRoaming)
- ■ Strategies:
  No roaming fee.
  (We make the most of the local ecosystem each Free Wi-Fi has.)

  Utilize existing accounts as much as possible.
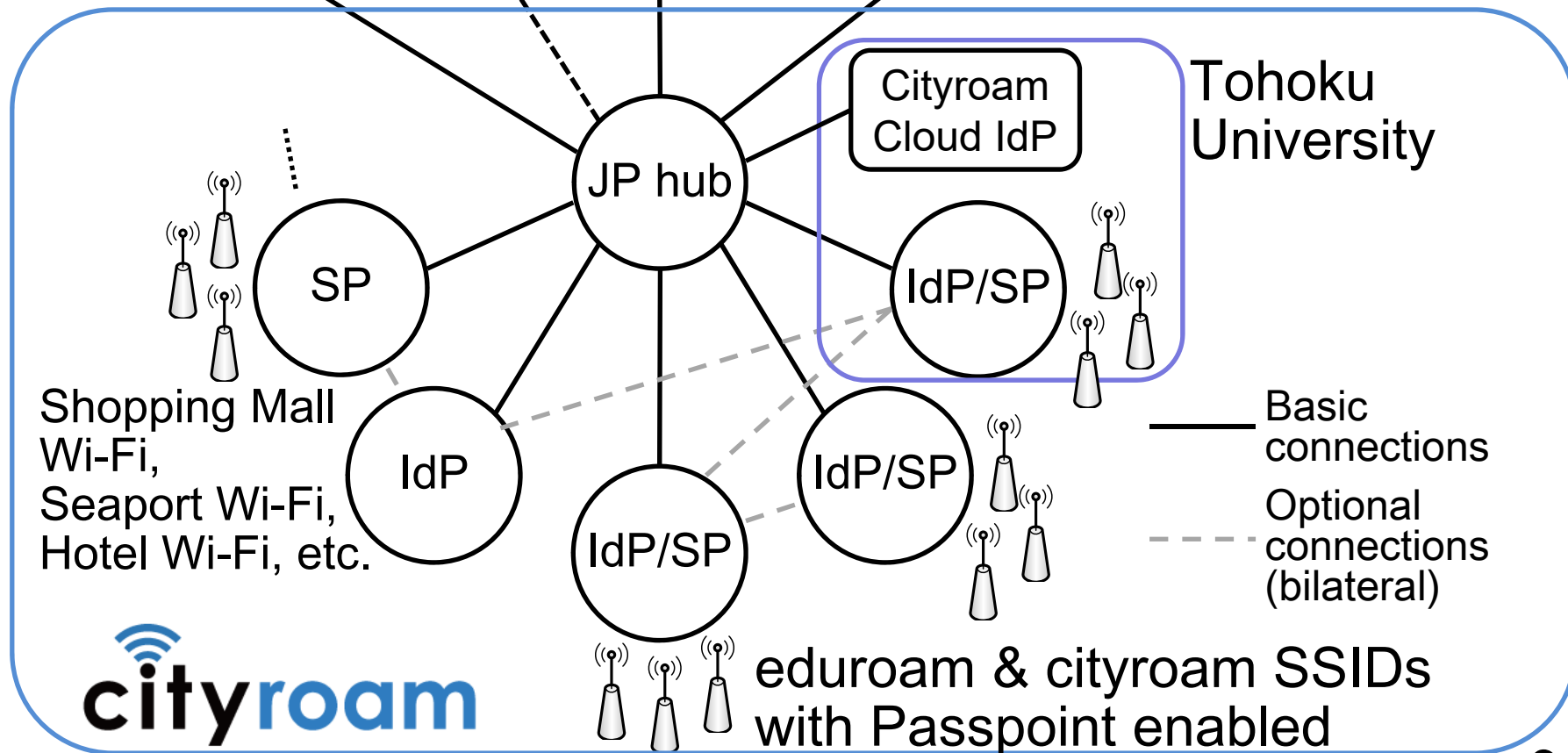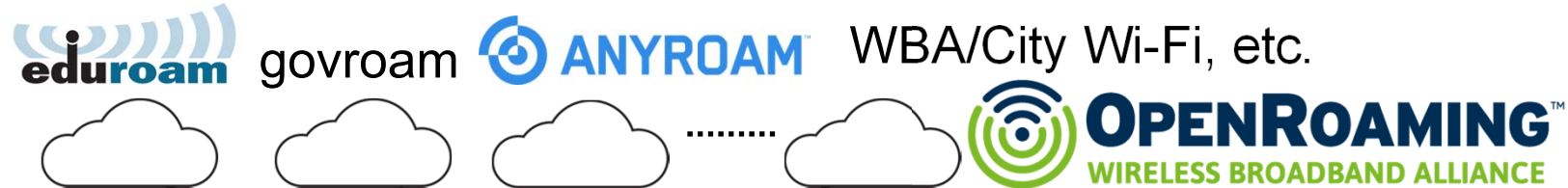 (roaming with telcos/ISPs)

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The Cityroam system in Japan

Cityroam sites

- Passpoint services on the Cityroam APs in 12 cities/towns.
    - Cafes, hotels, shopping malls, etc.
    - Sapporo Gakuin University (for better services for citizens)
    - Ski resorts (Hakuba47)
    - Kita-Kyushu Monorail stations
    - Conference venues (temporary deployment) Internet Week 2018 & 2019, AXIES 2018, 95th-97th Comic Market, etc.

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

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

Mobile eduroam /Passpoint AP

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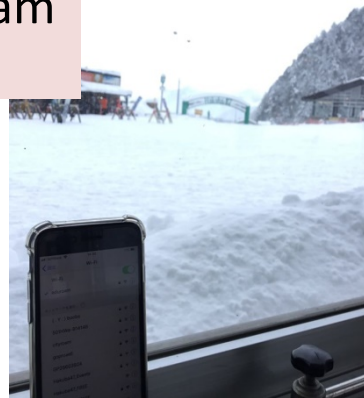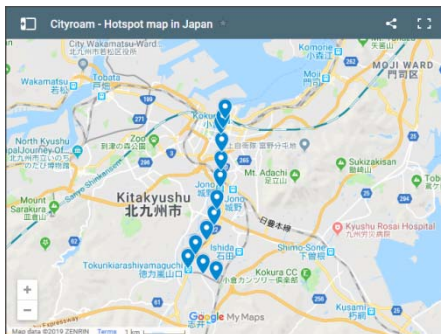
Vending machines supporting eduroam & Passpoint

- Coca-Cola Bottlers Japan Inc. (May 1, 2020) in collaboration with Kyoto University and NII

- Installed in some city parks in Kyoto.

- Available for various organizations including universities and schools.

New!

マルチキャリア対応!!
この自販機の周辺で
Wi－Fiが使える!

SSID: XXXX
パスワード: XXXX1234

eduroam

https://en.ccbji.co.jp/news/detail.php?id=777

OPENROAMING™
WIRELESS BROADBAND ALLIANCE

One Global Wi-Fi Network

VISION: Provide Automatic & Secure Wi-Fi Everywhere to Everyone

MISSION: Create an open framework for all types of players to develop their Wi-Fi services and business

OVERVIEW

WBA OpenRoaming™ creates the framework to connect billions of users and things to millions of Wi-Fi networks globally

WBA OpenRoaming™ is a roaming federation service enabling an automatic and secure Wi-Fi experience globally. With WBA OpenRoaming™, we are creating an open connectivity framework for all organizations in the wireless ecosystem to power new opportunities in the 5G era.

It encompasses three key elements:

eduroam

" eduroam has been doing federated Wi-Fi roaming since over a decade with many of the building blocks that meanwhile underpin Passpoint®. Now that Passpoint® and OpenRoaming™ provide a coherent vision and technology to enable inter-federation roaming in a scalable way, it is only natural for eduroam to join forces and take this exciting next step as a first-to-market pioneer participant. "

Paul Dekkers
Chair of the Global eduroam Governance Committee in GÉANT

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https://wballiance.com/openroaming/

WBA OpenRoaming

- Roaming system framework rather than a monolithic federation
  - Developed as Cisco OpenRoaming in 2019
  - Now, under the full control of the WBA (since Mar. 2020)

- Inter-connect telcos, ISPs, City Wi-Fi, etc.

- Based on the Passpoint and the Wireless Roaming Intermediary eXchange (WRIX) framework.

- PKI and RadSec + Dynamic Peer Discovery
  - Similar to eduroam, but in larger scale.

- Two policies using different RCOIs
  - Settled: Accounting and intermediary are required.
  - Settlement-free: No roaming fee. Easier onboarding.

RCOI: Roaming Consortium Organization Identifier

How to join OpenRoaming?

- Become a WBA member to get the digital certificates for onboarding.
  - Membership fee applies. WBAID is assigned.
  - *Implementer Member* is a new and affordable category.
- Get the digital certificates from a WBA agent.
  - WBAID with SubID is assigned.
  - Subscription fee applies.
- Connection via an operator / federation.

eduroam? Yes!
- **eduroam is already a member!** ☺
  - Each institution needs to configure DNS NAPTR record.
  - Passpoint profiles need to be issued.
  - If you prefer, set up a country's RadSec endpoint.

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How to develop "eduroam on Public Wi-Fi" in your region?

- Find some Free Wi-Fi operators and municipal governments that would be interested in better Tourist Attractions and/or Smart City. ☺

  - Emitting the "eduroam" SSID is the best practice. (The eduroam via Passpoint is the second best.)

- Set up an inter-federation hub in the region. (RADIUS proxy, IPsec, RadSec)

Please call us if you want to develop a federation like Cityroam in your region.

cityroam https://cityroam.jp/

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