

June 20, 2019

Mobility Day, TNC19, Tallinn, Estonia

Updates on eduroam/NGH and City Wi-Fi Roaming 2018-2019

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eduroam in the WBA City Wi-Fi Roaming trials

(2017)

WORLD™ Wi-Fi Day

CITY WI-FI ROAMING PROJECT CONNECTS THE NETWORKS OF MAJOR CITIES AROUND THE WORLD

OPERATORS AROUND THE WORLD INCLUDE:

AT&T, 2 Degrees NZ, Airtel, AIS TH, Bell Mobility, Boingo Wireless, BT, Celcom Axiata Berhad, China Mobile, Dialog Axiata,	Du, Etisalat Nigeria, Fon, Hong Kong Telecom, Idea Cellular, iPass, Korea Telcom, MegaFon RU, Mobilink, Mobily, Mobitel,	MTN Nigeria, NTT DOCOMO, Omantel, Orange, Portugal Telecom, PT Telkom Indonesia, Robi Axiata,	Shaw Communications, SK Telecom, Smartone, Sudatel, Swisscom, Tata Telecom, Telstra, TELUS, T-Mobile USA, TRUE, Videotron, ER Telecom
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(2018)

WORLD™ Wi-Fi Day

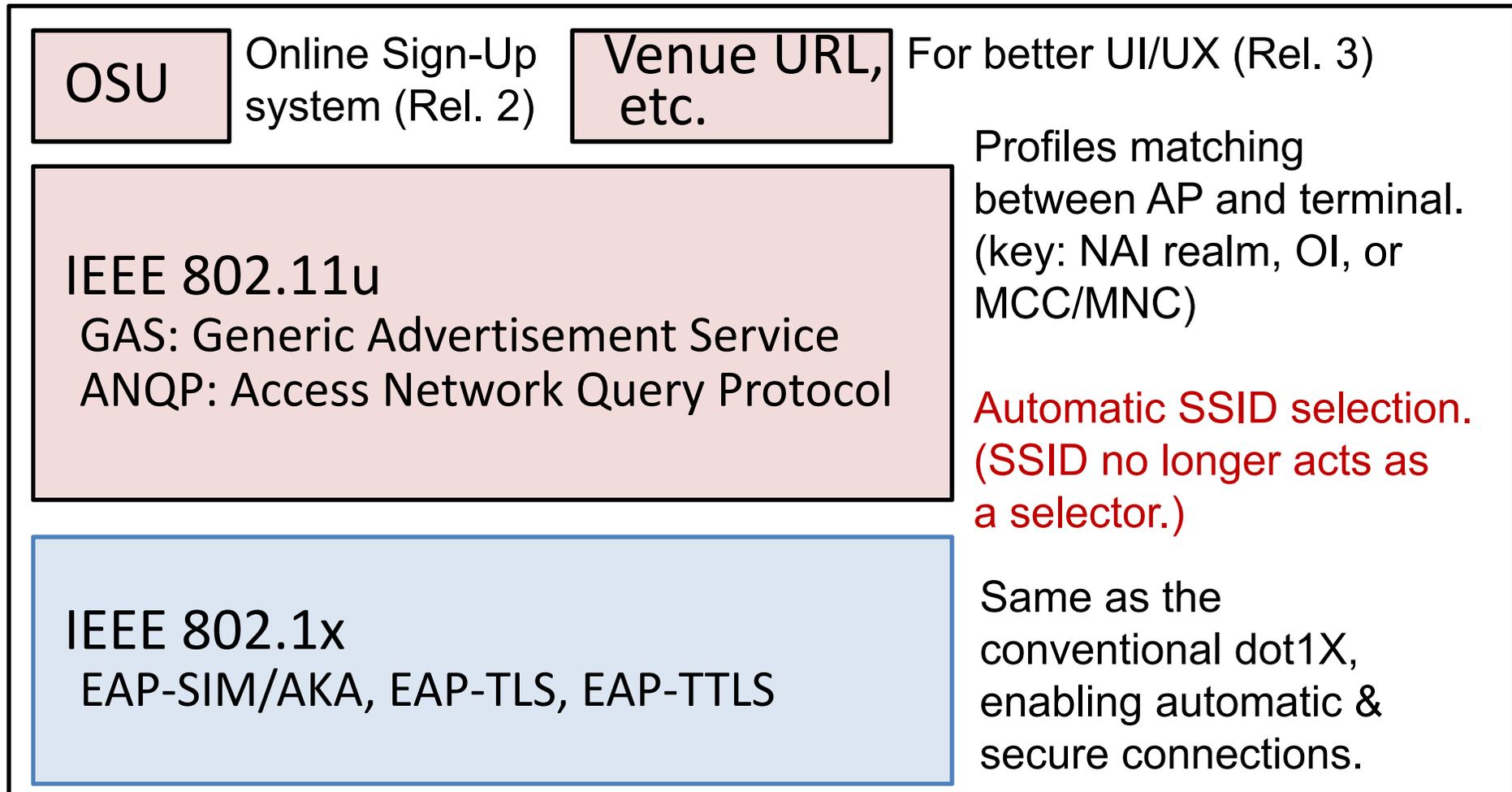
CITY WI-FI ROAMING PROJECT CONNECTS THE NETWORKS OF MAJOR CITIES AROUND THE WORLD

OPERATORS AROUND THE WORLD INCLUDE:

AT&T • Boingo • ER Telecom Russia • FON • iPASS • KT • NTT DOCOMO • Shaw • SKT • Sprint • Telus • T-Mobile US
eduroam JP Tohoku University • eduroam NL / SURFnet • eduroam NO / UNINETT • eduroam US

INTERCONNECTIVITY PARTNERS & INFRASTRUCTURE PROVIDERS	AAA/HS2.0 CAPTIVE PORTAL PROVIDER
BSG Wireless • Syniverse Technologies • Global Reach Accuris Networks • Cisco • Ruckus Wireless	GlobalReach

Passpoint (aka Hotspot 2.0)



Next Generation Hotspot (NGH):

Passpoint + Roaming (+ something sophisticated)

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

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

What do we need?

- ✓ Secure connection means with good usability
- ✓ Free roaming
- ✓ User's identity verification and traceability
(for security, trust between operators, and compliance)

How can we enable off-campus eduroam services?

- Ask Free Wi-Fi operators to add “eduroam” SSID.
 - conventional way w/ minimal impact to 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 
 - much easier in negotiations with (some groups of) operators 😊
 - can be less costly 😊
 - different SSIDs ☹️

Passpoint/NGH is a hope.

City Wi-Fi Roaming 2018 (The 3rd trial at WBA)

- Step 1: Repeat the City Wi-Fi Roaming trial (Oct. 1 – Nov. 30, 2018)
- Step 2: Develop WBA Roaming Federation (Pilot operation is planned for 2019)
- Step 3: Permanent service and enlarge participation

New

New



4 telecom, 3 Wi-Fi operators
20+ cities (6 sites in Cityroam)
4 eduroam member countries

eduroam-on-NGH
in Birmingham



Cityroam, the secure roaming system for Public Wi-Fi

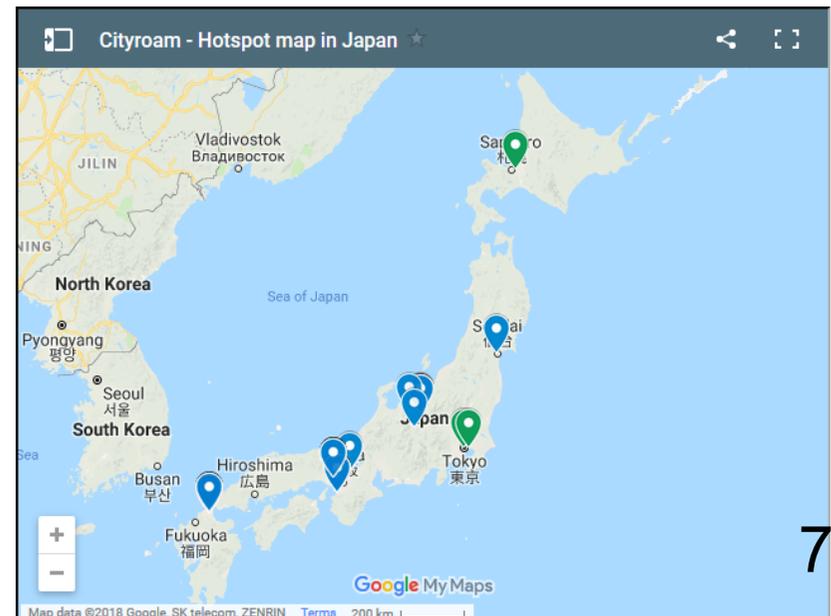
- Passpoint/NGH as well as dot1X
- Affordable roaming platform for various RCs and operators including small ones and cities.
 - IdP: eduroam, ANYROAM, NGHSIG Cloud IdP, etc.
(planned: telcos/ISPs and cities via WBA's federation)
 - SP: Free Wi-Fi operators supporting 1X/Passpoint
- Strategies:

No roaming fee.

(Each City/Free Wi-Fi has its own local ecosystem.)

Utilize existing accounts as much as possible.

(roaming with telcos/ISPs)



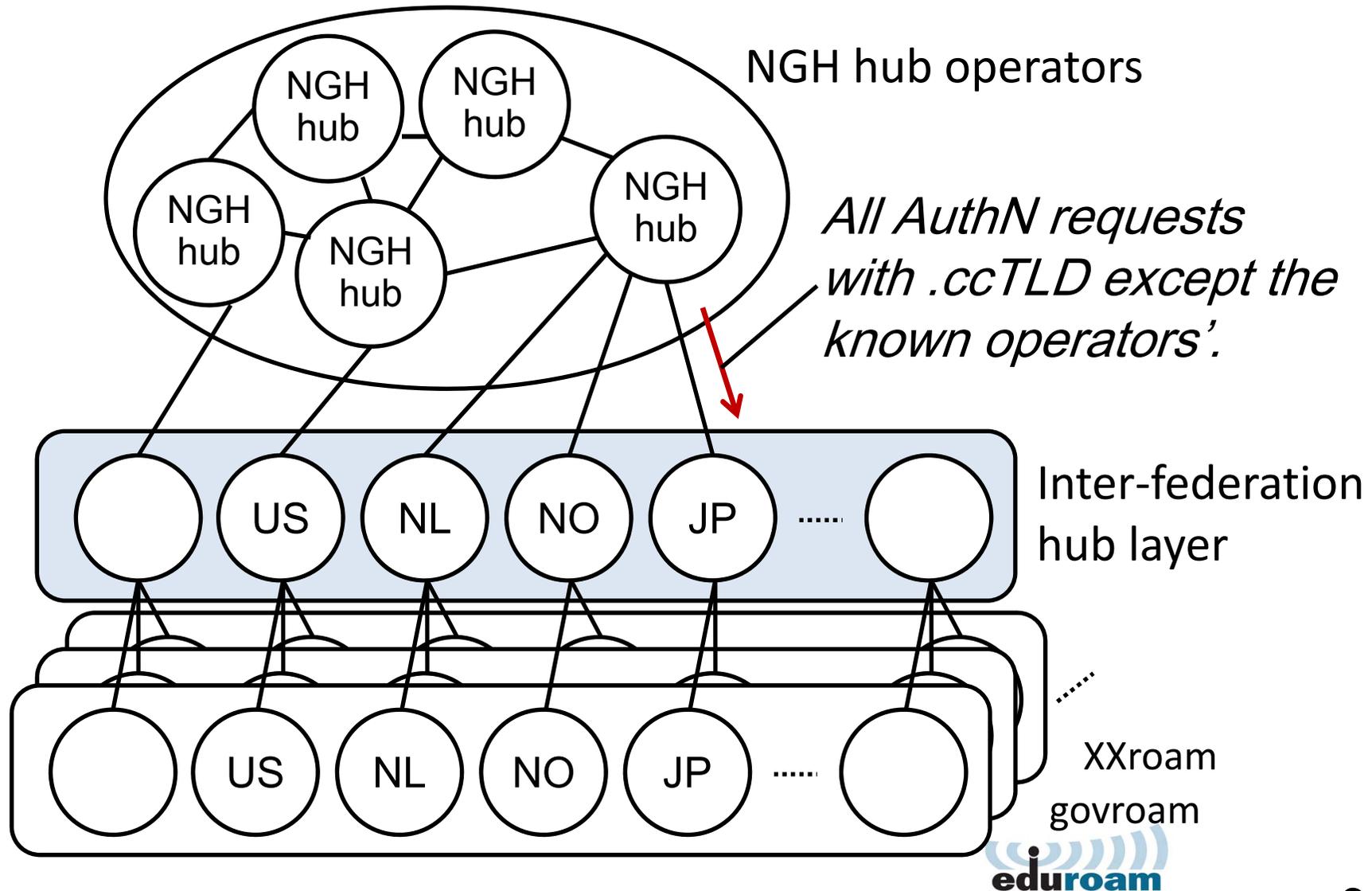
City Wi-Fi Roaming in Japan (Oct. 1 – Nov. 30, 2018)

- Roaming with eduroam, AT&T, T-Mobile US, China Telecom, etc.
- 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, AXIES 2018, 95th Comic Market, etc.

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



Inter-federation hub layer for connecting Roaming Consortia



Passpoint profile for eduroam

- Use Roaming Consortium OI as the matching key
 - eduroam RCOI = 00-1b-c5-04-60
 - RCOI for *multi-realm roaming federations* like eduroam
 - Support multiple realms.
 - No need to load NAI realm on APs.

Does it work?

- Yes, it's been confirmed on iOS / Android / Windows 10 against Aruba, Cisco, Meraki, Ubnt, MikroTik.
- Some Android 6.x devices work, but **Oreo and early Pie suffer from an RCOI issue.** ☹️
- The issue has been resolved on Android Pie (late patch). Android Q beta also works. 😊
- **Some phones are shipped w/o Passpoint function.** ☹️

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 Security, Roaming, and better Tourist Attractions. 😊
Persuade them to support Passpoint/NGH.
- Set up an inter-federation hub in the region.
(RADIUS proxy + IPsec or RadSec)
- Participate in the WBA Roaming Federation together with the operators.

eduroam in WBA Roaming Federation 2019

- eduroam JP & Cityroam (NGHSIG)
- eduroam Netherlands (SURFnet)
- eduroam Norway (UNINETT)
- eduroam Managed IdP Service (eduroam.org)
- eduroam US & ANYROAM
- eduroam ES (RedIRIS)
- (Other operators/cities can still hop on!)

New

Roaming agreement for eduroam-on-NGH is on a *per-country basis*. Please contact me if you are interested in joining the federation.

Hotspot 2.0 configuration example (1/3)

SSID: eduroam_HS20

Hotspot 2.0: Enabled

Operator name: NGHSIG - Tohoku University

Venue names: Add venue name, Delete

<input type="checkbox"/> Language	Name
<input type="checkbox"/> English	Cyberscience Center

Venue type: University or College

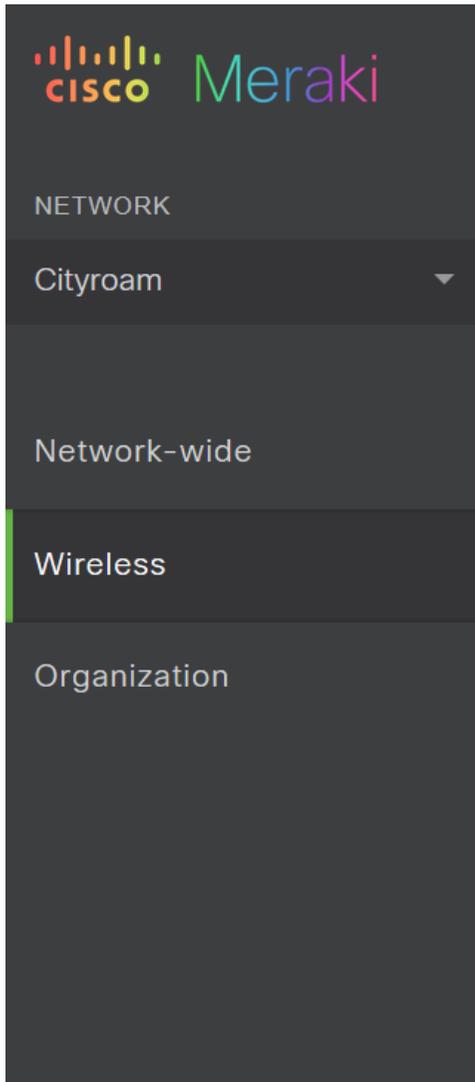
Network type: Test or experimental

Domain list: nghsig.jp, odyssys.net

Roaming Consortium OIs: 001BC50460

Used for identifying home/roaming network.

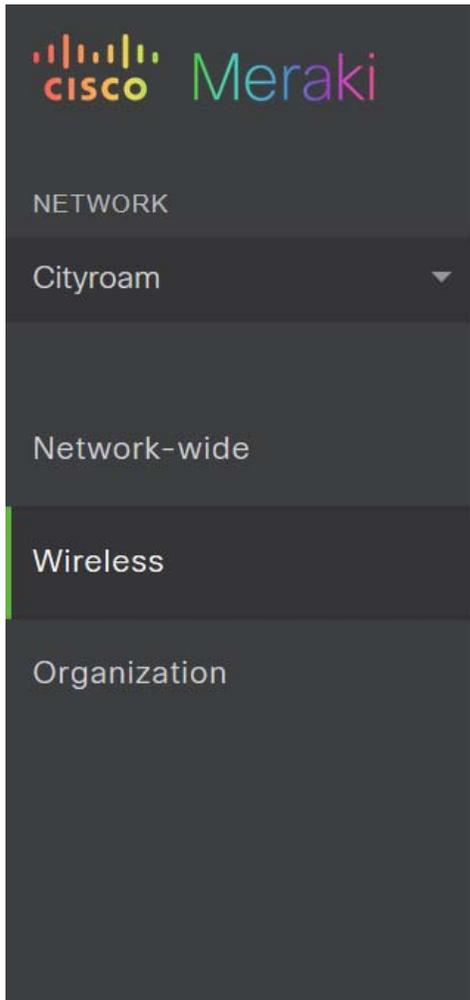
Hotspot 2.0 configuration example (2/3)



NAI Realms

<input type="checkbox"/>	Format	Name	Methods
<input type="checkbox"/>	0	nghsig.jp	13: EAP-TLS, Certificate, Certificate 21: MSCHAPV2, EAP-TTLS with MSCHAPv2, username/password, username/password
<input type="checkbox"/>	0	boingo.com	21: PAP, username/password, username/password
<input type="checkbox"/>	0	odyssys.net	21: MSCHAPV2, username/password, username/password
<input type="checkbox"/>	0	wlan.mnc410.mcc310.3gppnetwork.org	23: EAP-AKA, USIM, USIM
<input type="checkbox"/>	0	wlan.mnc008.mcc450.3gppnetwork.org	23: EAP-AKA, USIM, USIM
<input type="checkbox"/>	0	domru.ru	21: MSCHAPV2, EAP-TTLS with MSCHAPv2, username/password, username/password

Hotspot 2.0 configuration example (3/3)



<input type="checkbox"/>	0	anyroam.net	13: EAP-TLS, Certificate, Certificate 21: MSCHAPV2, EAP-TTLS with MSCHAPv2, username/password, username/password
<input type="checkbox"/>	0	wlan.mnc260.mcc310.3gppnetwork.org	23: EAP-AKA, USIM, USIM
<input type="checkbox"/>	0	eduroam.org	13: EAP-TLS, Certificate, Certificate 21: MSCHAPV2, EAP-TTLS with MSCHAPv2, username/password, username/password

MCC/MNCs
One MCC/MNC pair per line,
like:
123 456

310 260
310 410
450 08

No need to put eduroam NAI realm.

Most telcos are using NAI realm instead of PLMN-ID.

Ongoing work

- Roaming architecture and operation design
- Governance and operation framework
- Global policy and technical compliance docs
 - “No commercial use of personal data”?
- RadSec, PKI design
- Prioritization & profile preference mechanisms on users' devices
- UI/UX analysis and device improvements
- ...