

June 14, 2018

Mobility Day, TNC18, Trondheim, Norway

eduroam on Passpoint/NGH Updates and the City Wi-Fi Roaming

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eduroam joined Next Generation Hotspot (NGH)



**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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(2017)

The world becomes virtual campus!



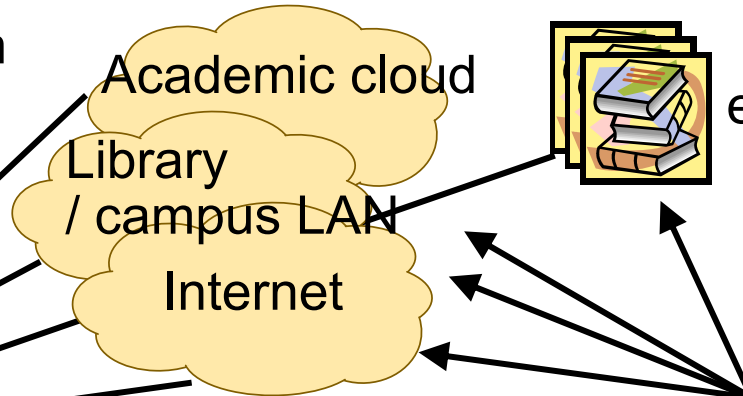
- 130+ eduroam hotspots at rental meeting rooms, cafes, etc. in the central area of Tokyo since 2011
- eduroam at airports, train stations, etc. in Sweden
- eduroam on HotCity (municipal Wi-Fi) in Luxemburg
- eduroam at 18 airports in Norway
- eduroam in downtowns of York, Munich, Porto, etc.
- 132 hospitals in the UK (as of 2017)



Collaboration with Public WLAN services in Japan

■ Virtual expansions of campus networks!!

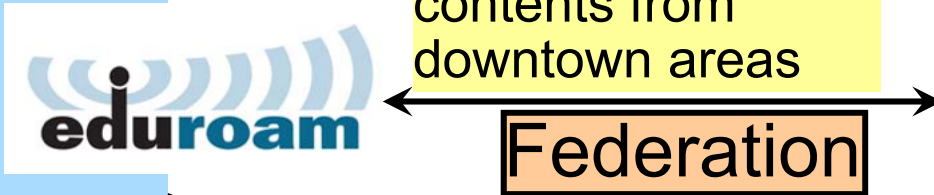
217 institutions in Japan
(June 2018)



by NHN TECHORUS
(Since 2011)



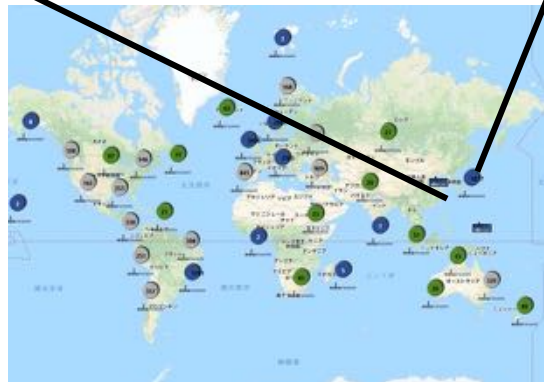
Enable accesses to
academic NW and
contents from
downtown areas



NW accesses using
universities accounts


130+ in-door APs at cafes, conference sites,
large shops in and around Tokyo

Created a new option
for outsourcing campus WLAN systems



90 countries worldwide

How can we enable off-campus eduroam services?

- Ask Free Wi-Fi operators to add “eduroam” SSID.
 - conventional way w/ minimal impact to users
 - can be costly as many Free Wi-Fi systems require additional supports for dot1X
 - enabling a lot of SSIDs may hit the AP’s limit and also deteriorate the performance
 - Enable roaming with *secured* Free Wi-Fi 
 - maybe much easier in negotiations with operators 😊
 - can be less costly 😊
 - different SSIDs ☹️
- Passpoint/NGH is a hope.

Passpoint (Hotspot 2.0)

- Some operators provide secure Wi-Fi option:

- San Francisco & San Jose Wi-Fi (2014)
- Orange Romania (2014)
- LinkNYC (2016), InLinkUK (2017)
- Boingo provides Passpoint Secure at 25+ airports in US, Brazil, Portugal
- AT&T phones come with built-in Passpoint, enabling automatic connection to Wi-Fi

- ...

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

Look!



Passpoint (aka Hotspot 2.0)

OSU

Online Sign-Up system
(optional)

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 selection key.)

IEEE 802.1x

EAP-SIM/AKA, EAP-TLS, EAP-TTLS

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

Next Generation Hotspot (NGH):

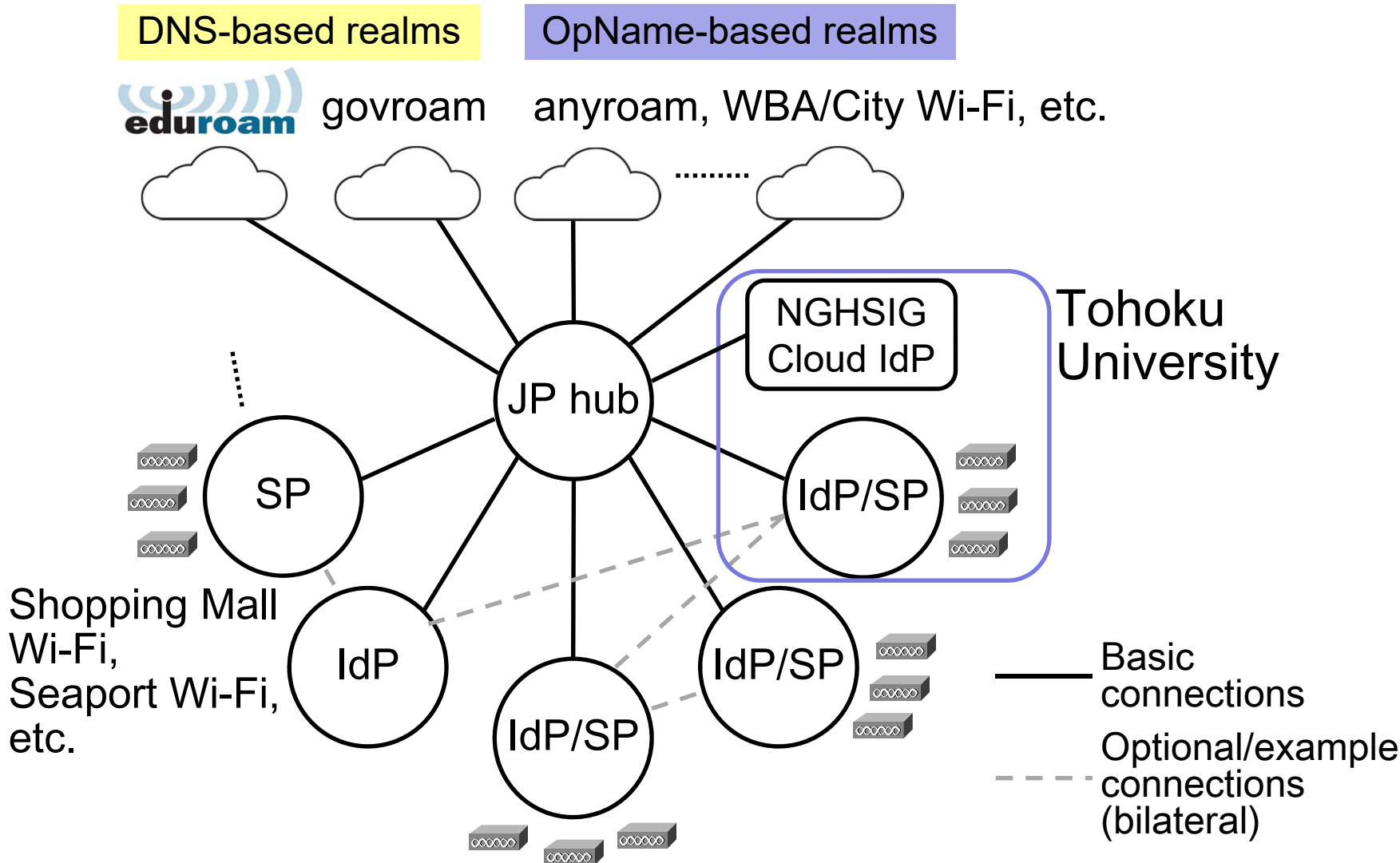
Passpoint + Roaming (+ something sophisticated)

NGH Special Interest Group (NGHSIG) Since Jan. 2017

- Push forward dot1X adoption and Hotspot 2.0 deployment to make Public Wi-Fi secure.
- Exchange and accumulate technical info. about RADIUS, roaming, and HS2.0.
- Provide NGH testbed for development and pilot services.
- **Develop an inter-roaming architecture,
“eduroam/govroam on NGH”**
- Survey on legal aspects and compile rules.

<https://nghsig.jp/en/>

NGH testbed system in Japan

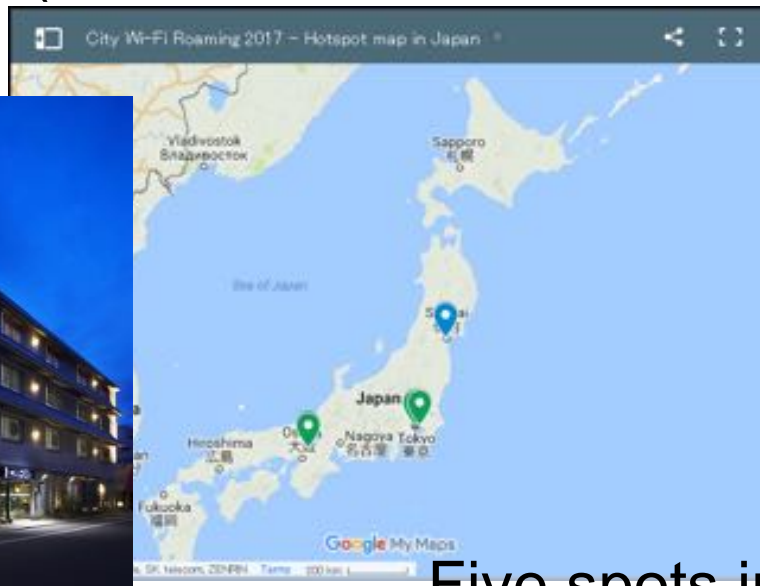


City Wi-Fi Roaming 2017

- An NGH trial program by WBA
 - Period: World Wi-Fi Day (June 20) – Aug. 20
 - 40 carriers, some Wireless ISPs, and about 20 cities
 - Tohoku University became the first academic institution participating in the trial.
(NGHSIG as the first NGH operator in Japan)



eduroam/NGH-ready hotel in Kyoto.



Five spots in the country.



eduroam on NGH

- Roaming tests during the City Wi-Fi Roaming trial, **enabling eduroam service on City Wi-Fi.**
 - Connected the eduroam JP proxy to the NGH infrastructure.
 - RADIUS test from ER Telecom in Russia.
 - Connection tests in Birmingham and Leeds in the UK.

It works!



Successful connection using eduroam credentials on the Briggate Street, Leeds.

Cityroam since 2018

- New service brand in Japan.
- Secured Free Wi-Fi with roaming for anyone.
 - IdP: eduroam, ANYROAM, NGHSIG Cloud IdP, etc.
(planned: telcos via NGH hub)
 - SP: Free Wi-Fi operators supporting 1X/Passpoint



City Wi-Fi Roaming 2018

- An NGH trial program by WBA
- Step 1: Repeat the City Wi-Fi Roaming trial
(June 20 – TBD, 1-2 months)
- Step 2: Create a Consortium / Federation
- Step 3: Permanent City Wi-Fi Roaming service
and enlarge participation

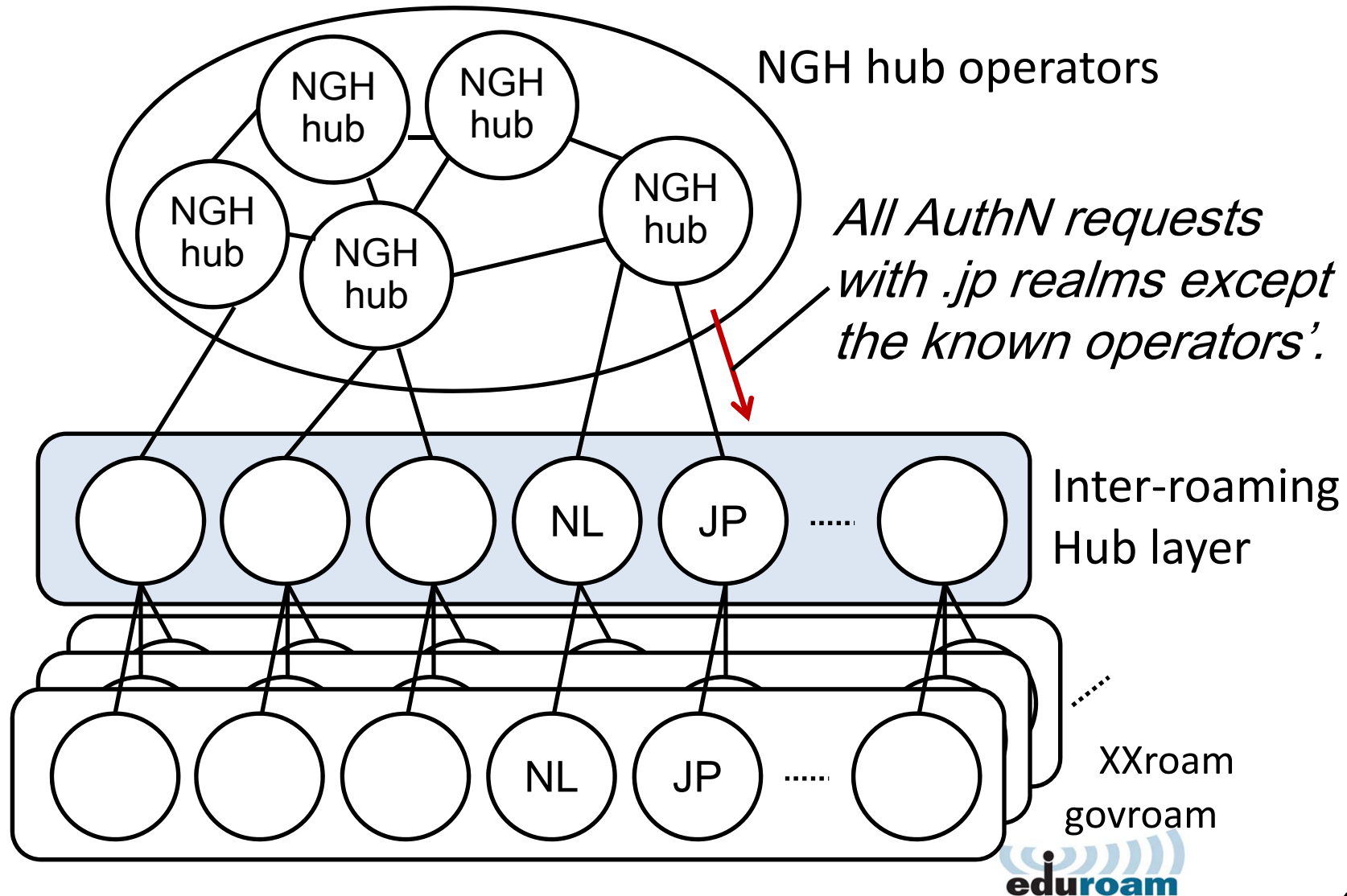


New



New

Inter-roaming Hub layer for connecting Roaming Consortia



Passpoint profile for eduroam – Test case 1

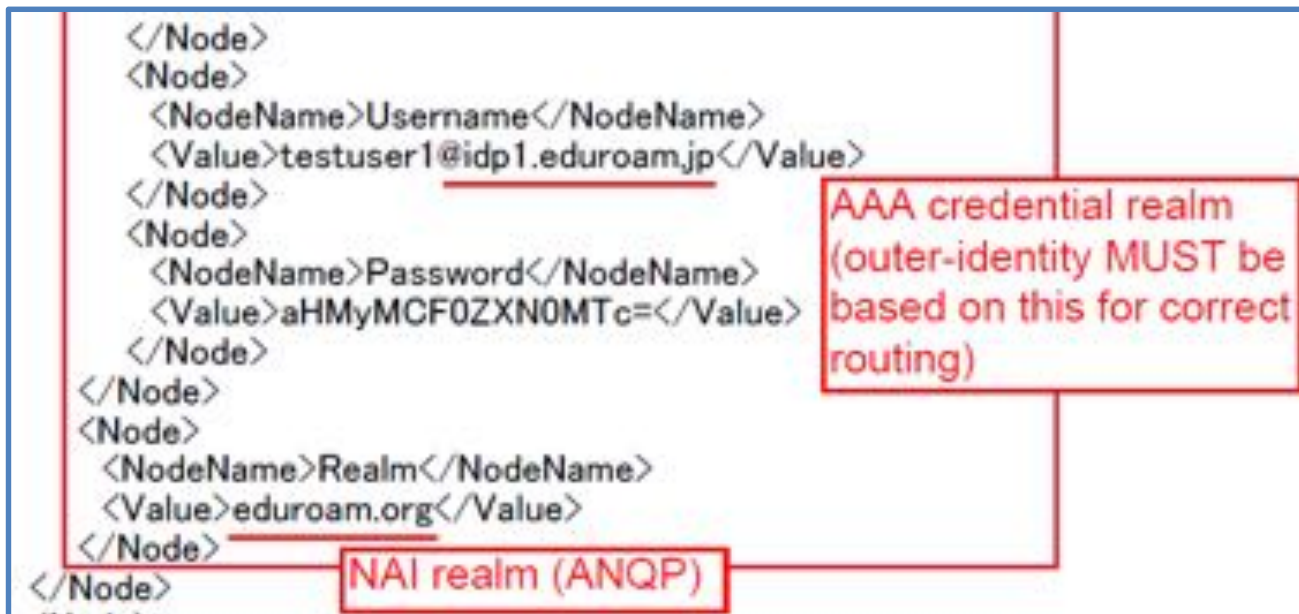
- Use Roaming Consortium OI as the matching key
 - eduroam OI = 00-1B-C5-04-60
 - By using RCOI,
 - we may set any NAI realm on the device,
 - no need to load NAI realm on APs.

Does it work?

- Yes, it works on iOS. (confirmed against Aruba OS)
- Some Android 6.x did work, but Oreo suffers from some RCOI issues. ☹️
- AOSP + patches have worked fine. 😊
The patches have been submitted,
but not yet included in Android Oreo/P. ☹️

Passpoint profile for eduroam – Test case 2

- Use NAI realm as the matching key
 - NAI realm for ANQP: “eduroam.org”
 - AAA realm: any eduroam IdP realm



Can we do this on Passpoint?

- It works on iOS.
- Android 6.x worked, but Oreo has blocked the way ☹️
(Outer-identity is now crafted based on the NAI realm.)

Work going on

- Refine the inter-roaming architecture, especially for eduroam-on-NGH.
- Troubleshooting and improvements of Passpoint/NGH. (working with WBA)
- Develop and expand Secure Wi-Fi Roaming in Japan. (NGHSIG)
- Negotiate with some cities and operators to have eduroam and/or NGH adopted.
- City Wi-Fi Roaming 2018

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