

# Weekly report: Week 5 of dissertation for Uninett AS on authentication in IoT

by Magnus Bakke & Liang Zhu at Informatics with specialization in network administration at the Norwegian University of Science and Technology

## Activities

### Monday January 28

Liang inquired about one of the candidate Wi-Fi adapters, the Asus USB-N10, at Nidaros Data. The clerk told him that the adapter would work “out of the box”, and Liang purchased it. While he researched how to configure Raspberry Pi machines to act as hotspots using this adapter, Magnus worked on the prestudy, summarizing what we’ve learned so far.

### Wednesday January 30

We tested the Asus USB-N10 adapter on the Raspberry Pi, and indeed, it worked “out of the box” and got us connected. We analyzed a script<sup>1</sup> used to connect devices to Eduroam. We used the Python editor PyCharm to inspect the script, but it is somewhat complicated, too much so to justify the time we would have to spend to decode how it works. We hoped that the script would run on the Raspberry Pi so that we could use a debugger, but the script is not compatible with the Raspberry Pi (as suspected). The goal was to discover how the script installs certificates on the user’s computer, so that we could learn from it before writing our own script that would run on the Raspberry Pi. Instead, we decided that each institution should customize their version of the image by installing their certificate on it (for example, <https://eduroam.no/connect/download/?idp=9;profile=10;os=x-pem>). This would allow the Raspberry Pi to communicate with the institution’s RADIUS server, and the user could authenticate using their credentials.

We also briefly discussed a solution involving making an LDAP user for the Raspberry Pi device who would only be authorized to call a single API endpoint that would accept an “institution” parameter and return the appropriate certificate, so that no customization would be necessary on a per institution basis, but concluded that this may be too much work for this project. We may suggest that this is included in the future.

As we have the “missing ingredient” for a basic hotspot, we attempted to configure the Raspberry Pi and detect the hotspot on a laptop. We were able to get both interfaces to function, but were unable to broadcast a hotspot.

---

<sup>1</sup> The script can be found by selecting an institution on this page: <https://eduroam.no/connect/idps/>

February 1, 2019

Magnus Bakke & Liang Zhu

The work on the prestudy continued.

## Remarks

We did not find time to write an email to the various companies offering PSK technology. We were also unable to solve all problems with the hotspot solution. The prestudy is not complete yet. Therefore, next week's progress plan will have the same tasks.