**Project Network Function Virtualization 236635**

**Short background:** The idea is to replace many of the functionalities that exist in the Residential Gateway (RGW) with a virtual service that resides on the cloud, as part of virtualizing CPE (Customer Premises Equipment) functionality (see use case #7 here). The vision is to take out of homes the rather complex Residential Gateway box, and replace it with a very simple box that merely forwards traffic. All other existing (and future) functionality will be served by the cloud.

**The goal:** Replacing consumer DHCP hardware with a virtual cloud-based service residing on a commercial cloud, either Amazon cloud (AWS) or google Cloud Platform (GCP). You should also implement another RGW functionality (any functionality you chose).

**Methodology:** Since we do not have access to a real residential network we need to emulate it and allow traffic to be sent to the commercial cloud. For that, we will need a tunnel between our “light” gateway and the cloud, one way to do this is by using a virtualization environment like virtual box 4.3.20 from: [https://www.virtualbox.org/wiki/Downloads](https://www.virtualbox.org/wiki/Downloads). you create one virtual machine there that is the default gateway, and from it you tunnel traffic into the cloud and back to local clients. (see picture below)

Then you will need to implement the DHCP server and other RGW functionality on AWS and evaluate its performance.

**Evaluation criteria:**

- Correctness.
- Scalability. You should be able to scale up to at least 300 tenants (houses), with 3 devices in each tenant.
- Performance and Cost. Your solution should not consume unnecessary resources.
- Creativity. This is both in supporting the basic DHCP functionality, and in developing further extensions to it.

**Good Luck!**