TECHNISCHE UNIVERSITÄT BERLIN

Fakultät IV – Elektrotechnik und Informatik
Fachgebiet Intelligente Netze und Management verteilter Systeme
Prof. Anja Feldmann, Ph.D.
A. Mehmood, W. Mühlbauer, H. Schiöberg, A. Wundsam

Praktikum RouterLab SS 2008
Work Sheet 6: Pimp your home network

In this worksheet you will install a more open, Linux based firmware on your WRT. We will use *Open-WRT*, Version *White Russian, 0.9* with the *X-WRT* webinterface. You can find more information about those at `http://www.openwrt.org` and `http://www.x-wrt.org` respectively.

We will reuse the complete setting from Assignement 5, Question 4. The first thing to do is to restore this setup.

All definitions and corresponding IP Adresses, like "Web Server", "Client", "PPP-AC" and so on also have the same meaning as on Assignement 5.

If you didn't manage to finish Assignment 5, you can use the setup from Assignement 5, Question 1. Be warned though, that the 7th Assignment (IPv6 at home) will most likly require the complete setup from Assignment 5, Question 4, so you may want to book some extra time to finish Assignment 5.

Table 1: Assignment of devices to groups

Gruppe	Ham-Cloud	Muc-Cloud
Router	ham-rj1	muc-rj1
Switches	ham-sc1	muc-sc1
Infrastucture IP range	10.1.0.0/16	10.2.0.0/16
Dialin IP range	105.1.0.0/16	105.2.0.0/16
DataCenter IP range	106.1.0.0/16	106.2.0.0/16
Dialin Wallplug	15A8:01:07	15A8:01:08
Loadgens	loadgen104,loadgen106	loadgen102, loadgen107

Question 1: (30 Points) *Install OpenWRT*

Direct your browser to the webserver: `http:/106.?.42.42/download/`. Dowload the file `openwrt-wrt54g-squashfs.bin` [1] to your client. Open the web-interface of your WRT, got to "Firmware Upgrade" and upload the file. **This takes a few minutes, do not switch off power!**

Redirect your browser to `192.168.1.1` after the power LED of the WRT stopped flashing.

Hint: In the X-WRT web interface each setting must first) be saved and second) be applied separately.

> You can play arround with most settings, but
> **Do not disable Boot Wait**
> If something goes wrong, this blocks the only way to recover the device
> without a soldering iron!

(a) Set a password: The web interface will prompt for a password. Set one. You will need that password later, the corresponding user name is root.

(b) Configure package repositories: Go to "System→Packages", remove all preconfigured repositories, and add two new repositories with URL `http://106.?.42.42/x-wrt/packages` and `http://106.?.42.42/freifunk/packages`. Hint: removing the repositories takes a very long time, since the device tries to update the remaining repos from the Internet each time, which

---

[1]This is X-WRT 0.9-milestone-3-rc2

fails. You can as well edit /etc/ipkg.conf directly, either through ssh into the WRT and typing ipkg update when you are done, or through System→File Editor.

(c) Install the horst and the wl-adv package. ssh into the WRT. Run horst. Which ESSIDs do you see? Which kind of packets eat the most air-time?

Question 2: (40 Points) *Collect NetFlow Data with your WRT*

(a) Install fprobe on your WRT. You can either do this through the web-frontend, or by typing "ipkg install fprobe" in the shell. Here is the manpage of that tool: `http://www.digipedia.pl/man/fprobe.8.html`. Install the tcpdump package as well.

(b) Install a flow-collector on your client. You can find a collection of such tools on `http://www.networkuptime.com/tools/netflow/`. You can choose any of those.

Linux users can have a look at the flow-tools, as they will be subject of another assignment anyway.

(c) Generate traffic by downloading a few files from the webserver and by logging on to the PPP-AC via ssh.

Record the flows and a tcpdump trace and describe the outputs. What are the differences? For which task would you prefer tcpdump or flows. Why?

Hint: tcpdump on WRT comes with limited protocol-decoders. If you want to have full protocol decode, use the `-w` option to dump to a file, copy that file to another computer and use tcpdump or wireshark there.

Question 3: (30 Points) OLSR: Open Link State Routing

Install the olsrd and olsrd-mod-httpinfo packages on your WRT.

Configure the following settings in the web frontend:

- Network→WIFI-LAN:
  - Split WLAN: enable.
  - IP Address: 110.0.0.<group-number>
  - Netmask: 255.255.0.0
- Network→Wireless:
- ESSID: routerlab-course
- Channel: 1
- Mode: Ad-Hoc

Reboot the WRT. You should now be able to access the status page of your OLSR daemon at `http://192.168.1.1:8080`

We have set up an OLSR Router that forms a gateway to the webserver. Your OLSR should at least connect to our gateway.

(a) What is the IP of our gateway? How did you find out?

(b) Do a traceroute from your client to the webserver. Disconnect the wallplug. Traceroute again.

(c) Run tcpdump on your WRT. What is a Hello and a TC message? What is the Hello and the TC intervall of our gateway ?

(d) Optional: Now edit /etc/olsrd.conf. You can do that through the web interface(System→File Editor), or by logging in via ssh. Add the line

    106.?.0.0 255.255.0.0

in the Hna4 section. (Don't forget to replace the "?" with 1 or 2, depending on group). This announces the route to your Webserver in the OLSR network. Find a group working on the other cloud, and access their webserver.

Submission details: read the FAQ
`http://www.net.t-labs.tu-berlin.de/teaching/ss08/RL_labcourse/faq.shtml`
Submit the following:

- The physical topology with used *routers*, *switches*, *loadgens* and assigned IP addresses.

- All configuration inputs on routers, switches and loadgens (no trials, only the final ones!), except for the WRT configuration.

- The outputs of the `tcpdump`, textual output of the flow collector or a screenshot, screenshot of the horst tool, the routing table of olsr.

Due Date: June 20th, 2008, 8.00am