PROGRAMMING EMBEDDED SYSTEMS 2010 / Jb
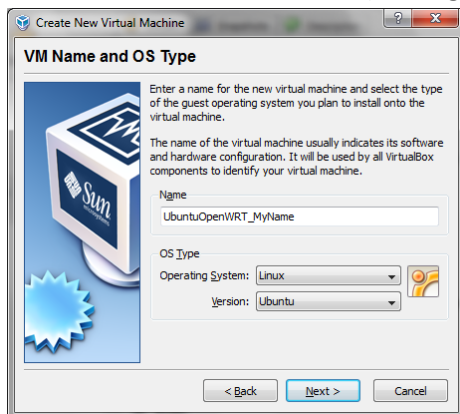
**Guidelines for exercise 5 /**

GUIDELINES FOR STARTING THE VirtualBox OpenWRT image

1. Unpack the file "L:\PES\ubuntu-9.10-OpenWRT-img.zip" into a folder on the local machine (e.g. c:\tmp), the name of the unpacked file is "ubuntu-9.10-OpenWRT-img.vdi".
2. Start the "Sun xVM VirtualBox" software
3. Create a new Virtual Machine (clicking "New" in upper left corner)

4. Set memory to 512 MB
5. In the VirtualHardDisk, use existing harddisk, and use the unpacked file from step 1
6. Modify the virtual machine, add also support for "Bridget Network"
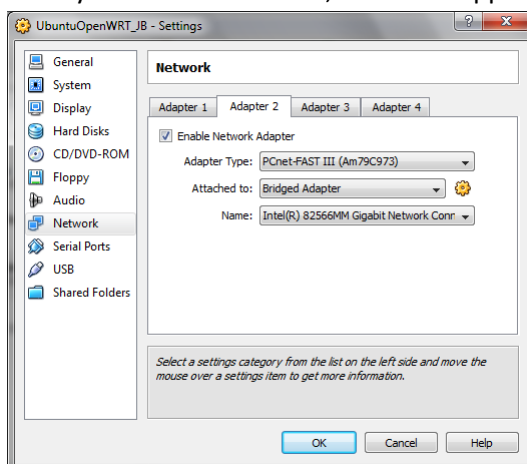
7. Start the new machine by double-clicking it

   …. Wait until the system boots ….

8. Login, using username "ubuntu", password "reverse"
9. Start an terminal (Applications -> Accessories -> Terminal)
10. Go to folder kamikaze (cd kamikaze), where the OpenWRT is installed
11. Configure the system by issuing "make menuconfig"
    The defaults should be OK, the buffalo in the lab is an "WHR-HP-G54", with a Broadcom 5352 chip. The chip has an MIPS32 CPU core with MMU (Memory Management Unit)
12. Build the system by issuing "make". Wait for the system to be built (including cross compiler, tool chains etc), the resulting firmware will be in the "bin" directory

HOW TO REFLASH

After the firmware has been built, the system has to be reflashed. The details on installing is a little bit vendor specific, and the overview is given here

The Buffao WHR-HP-G54 is Broadcom-based. Broadcom uses **CFE** (Common Firmware Environment, which is developed by Broadcom). Note that Buffalo uses default IP address 192.168.11.1, whereas OpenWRT uses default 192.168.1.1.

NOTE. The Buffalo **CFE Bootloader** always uses the network address 192.168.11.1 !

How to update

Configure the network interface in the computer (note the Virtualbox Ubuntu) to a address on the 192.168.11.0 network:

- ➢ `sudo ifconfig eth2 192.168.11.211`

Connect the lab network to port 1 on the Buffalo.

Run tftp in Ubuntu/Virtualbox

```
tftp 192.168.11.1
binary
rexmt 1
timeout 60
trace
put openwrt-brcm-2.4-squashfs.trx
```

Reconnect power to the Buffalo, data should start uploading, and the device reboot in some minutes.

Now, the device is seen on address 192.168.1.1, so now you should reconfigure the Ethernet device in Ubuntu/Virtualbox to this address:

- ➢ `sudo ifconfig eth2 192.168.1.211`

Now it is possible to telnet into the device

- ➢ `telnet 192.168.1.1`

Then, the web interface can be activated, however, then the outside network has to be connected to the "WAN" port of the router. The web interface (webif) can be installed by

- ➢ `opkg update`
- ➢ `opkg install webif`