

EECS 4215: Lab/Homework Assignment 3

7 % of the course grade

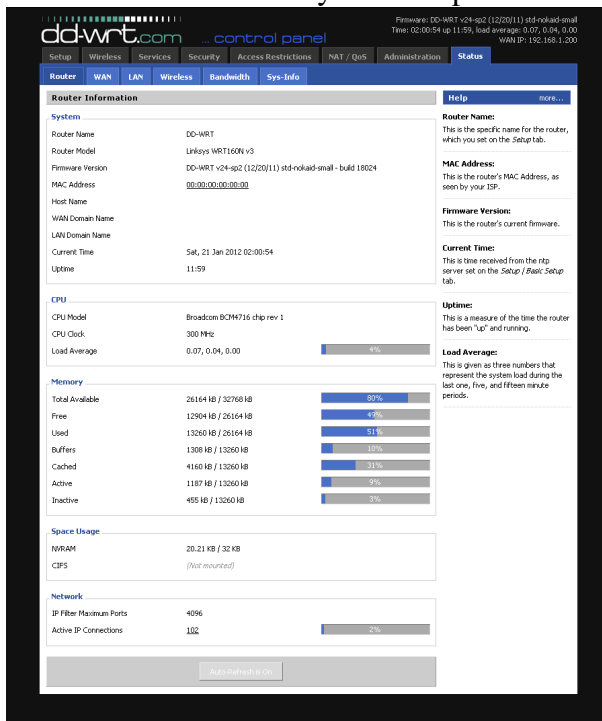
Due: Saturday, April 18, 2015, 23:59 EDT

Motivation

The assignment will introduce you to DD-WRT router firmware and wireless LAN setup and configuration.

Introduction

DD-WRT is Linux-based firmware for wireless routers and wireless access points. It is compatible with several models of routers and access points, for example, the Linksys WRT54G series (like the ones used in this lab). Alternative firmware may offer unique features and functionality sets compared to the original firmware it is replacing.



Description

In this assignment you will have to configure one of the routers provided according to the requirements provided in the next section (and then submit a configuration file), as well as to answer a few questions related to wireless networking.

Router Configuration

General

There are two models of the router provided for this assignment. They differ in hardware slightly and in the versions of the DD-WRT software installed. Please note that the configuration files that you create with one router can only be used with the same router

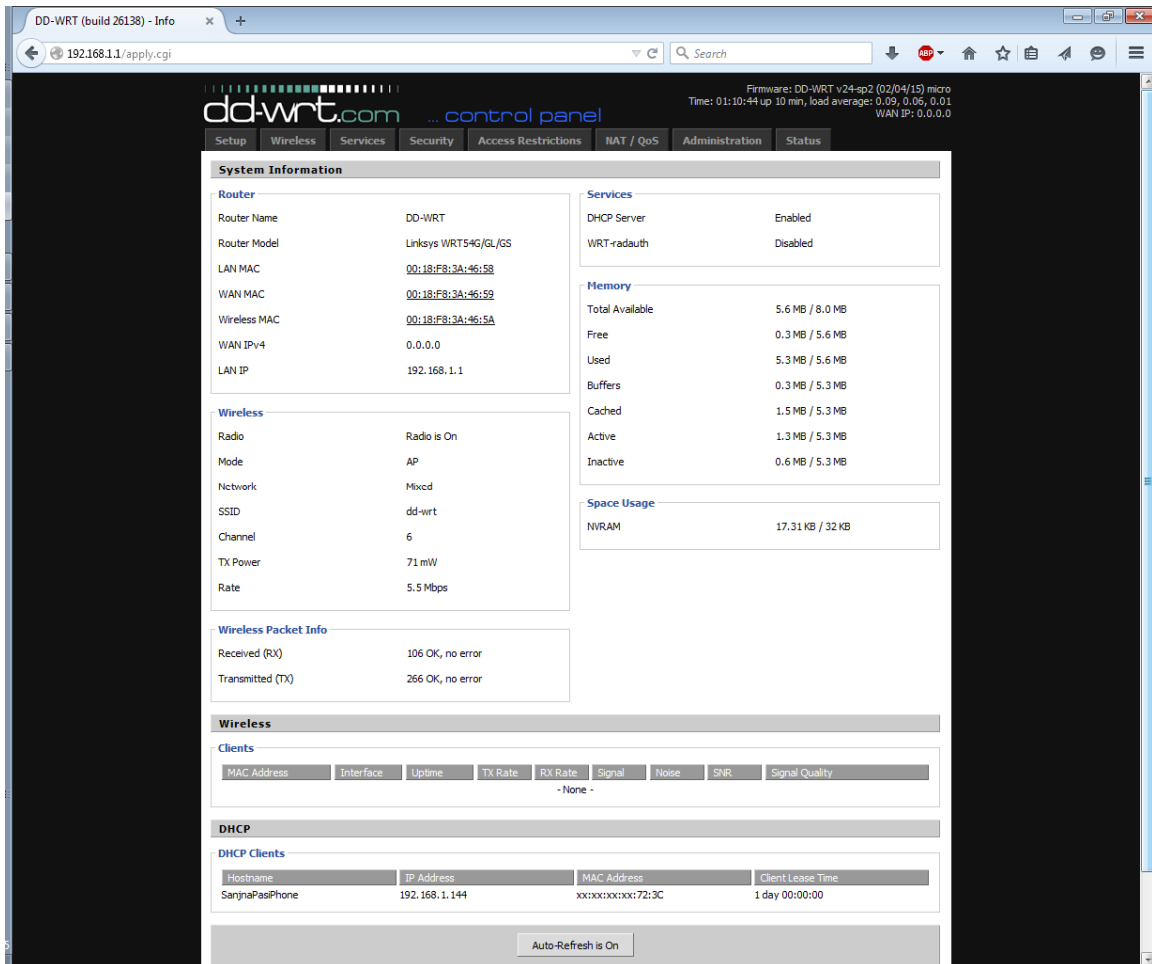
model. Visually, the models are recognizable in that the WRT54GL has a square opening on top and the WRT54G does not. If you look at the setup screen (screenshot above, top right corner), you'll notice that WRT54GL has a "voip" version of the DD-WRT installed, whereas the WRT54G has a "micro" version.

With either router, please use username "root" and password "123" for this submission.

Screenshots need to be submitted; please insert them into a single document you will submit later. For reference, alt-PrintScr combination saves a screenshot into Windows' clipboard, from which you can paste it into a word processor, etc.

Configuration requirements

1. Hard-reset the router. See http://www.dd-wrt.com/wiki/index.php/Reset_And_Reboot
Alternatively, you can go to **Administration-Factory Defaults** to reset the router to factory settings.
2. Connect an Ethernet cable from any of the 4 switched ports of the router to an Ethernet port of a PC (if you use any of the lab PCs, please reconnect the network cable you unplug back into the PC after you're done).
Wait a couple of seconds to obtain an IP address (you might want to confirm it with an `ipconfig` command from a command line).
3. Open a web browser. Go to <http://192.168.1.1/> and change router name and password to **root** and **123** respectively. Take a screenshot and save it into, e.g., a Word document. It should like below:



4. Configure a wireless access point with an SSID identical to your departmental login name (e.g., it is **andriyp** for the course instructor). For channel number use (your student number) **mod** 11 (Hint: you can use Windows Calculator). Apply settings, wait, then take a screenshot and insert it into your document. Add a wireless interface with an SSID **virtual0**.
5. Setup WPA2 personal encryption with passwords identical to your SSID (if they are too short, append zeroes at the end). Apply settings, wait a few seconds, take a screenshot and insert it into your document.
6. Set wireless transmission power to [(your student number) **mod** 30 + 30 mW]. Enable RTS/CTS mechanism (see DDWRT documentation). Apply settings, wait a few seconds, take a screenshot and insert it into your document.
7. Enable filtering of Java Applets and ActiveX. Apply settings, wait a few seconds, take a screenshot and insert it into your document.
8. Setup forwarding of port 3389 to [(your student number) **mod** 100 + 10000] on address 192.168.1.111. Apply settings, wait a few seconds, take a screenshot and insert it into your document.
9. Setup QoS in such a way that VoIP services have the highest priority and bittorrent – the lowest. You can assume a typical 6 Mbps down / 800 kbps up

- DSL connection. Apply settings, wait a few seconds, take a screenshot and insert it into your document.
10. Enable telnet management and configure the max number of ports to 4096. Apply settings, wait a few seconds, take a screenshot and insert it into your document.
 11. Take screenshots of http://192.168.1.1/Status_Router.asp , http://192.168.1.1/Status_Lan.asp, http://192.168.1.1/Status_Wireless.asp, and <http://192.168.1.1/Info.htm> and insert them into your document.
 12. Go to **Administration-Backup** to save your settings. You will have to submit that file.
 13. Answer the questions below.

Questions

1. Some of the router firmwares allow one to change wireless bandwidths from the standard 20 MHz to 10 or 5. Please investigate why one might want to do that.
2. Similarly, one can usually prevent the router from working with the fastest available standard (let's say, work with b only, even when g is available), or one can restrict the highest speed to some non-maximum value (e.g., 18 instead of the maximum 54 for 802.11g). What is the value of such settings?
3. For 802.11n there are two bandwidths at which the transmission can operate: 20 and 40 MHz. Maximum speed at 20 MHz is 65 or 72 Mbps per stream, whereas at 40 MHz it is 135 or 150 Mbps (see table at http://en.wikipedia.org/wiki/IEEE_802.11n-2009). Why is doubling of the bandwidth increases the bit rate by (slightly) more than a factor of two?

If you have any questions, don't hesitate to contact the instructor (andriyp@cse.yorku.ca).

Submission

Submit your configuration file, the document with screenshots, as well as the files containing answers to questions electronically via `submit` command (or equivalent). Late penalty is 20 % per day. Submission 5 days or more after deadline will be given a mark of zero (0). Contact the instructor *in advance* if you cannot meet the deadline explaining your circumstances.

Academic Honesty

Direct collaboration (e.g., sharing answers) is not allowed (plagiarism detection software may be employed). However, you're allowed to discuss the questions, ideas, approaches you take, etc.

State all sources you use (online sources, books, etc.).