Report Lab 1 Group C3

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Abstract

1 Introduction

- summary of standard -

2 Materials and Methods

- pcs with arch linux - wifi adapter - iwconfig/ifconfig - iperf - wireshark
Node 1 Node 2 Node 3 global AP local AP

3 Results

In the following we provide the results of the conducted simulations.

3.1 Task 4.1.10 Q/A

What are all the different modes that iwconfig offers and what do they do? Taken from iwconfig manual[1].

- *Ad-Hoc* Used for networks composed of multiple nodes without access point (AP).
- *Managed* Used for nodes connection to an AP in an environment that is using multiple APs.
- *Master* Acting as AP.

- *Repeater* Node forwards packets.
- *Secondary* Acts as backup master or repeater.
- *Monitor* Node is passive (not sending) and captures all packets received on the frequency used.
- *Auto* Magic!

Why did we set the channel in monitor mode? We need to select a specific channel (frequency range) that we want to observe since observing all channels is not possible or desired.

What's the difference when capturing in promiscuous mode and non-promiscuous mode? According to the wireshark manual page[2]:

- In promiscuous mode the MAC address filter is disabled and al packets of the currently joined 802.11 b network are captured.
- In non-promiscuous mode we see the traffic that this node is intended to receive only.

3.2 Task 4.2.1 Wireless ipserf server

Running the bandwidth benchmark on *Node 1* and *Node 2* using *global AP* as server in managed mode, resulted in both nodes getting almost the same throughput of 800KiB/s for the outgoing and incoming traffic. This was observed using *iptraf*. This implies a fair bandwidth sharing scheme.

3.3 Task 4.2.2 Different Channels

Node 1-3 performed the *iperf* benchmark using the *local AP* as AP and server and running in managed mode.

Hypothesis *We expected an equal distribution of the available bandwidth among all three nodes. Since only three nodes are competing for the bandwidth and not the whole class (12 nodes) as in subsection 3.2 the throughput for each node is expected to be higher.*

	total	incoming	outgoing
Node 1	900	300	600
Node 2	900	400	500
Node 3	900	400	500

Table 1: Results of measurement form Task 4.2.3. Units are KiB/s.

Observations The observed results are gathered in subsection 3.5. Our hypothesis turned out to be correct. Changing the positions antennas by one meter did not have any observable influence. If *Node 1* was further away from the *local AP* than *Node 2*, both still got the same chance for using the medium because of waiting for the back-off time before sending introduces some randomness. The back-off time is much larger than the propagation delay resulting from the larger distance.

3.4 Task 4.2.3 Rate Changing

The transmission rate of *Node 1* was set to 1MiB while the other two nodes used 11MiB and the same benchmark was executed.

Hypothesis *We assumed* Node 1 *would be slower and* Node 2 *and* 3 *faster than before in subsection 3.3 because the* Node 1 *would free some bandwidth.*

Observation The observed results are gathered in section 3.4. Our hypothesis turned out to be incorrect. All nodes were transmitting at the same slower speed if *Node 1* was sending. If *Node 1* was not sending *Node 2* and *3* were transmitting at full speed. This due to the fact that the *Node 1* needed more time for sending the same amount of data and thus allocated the medium for a longer period of time, slowing down the other two nodes as well.

3.5 4.2.2

4 Analysis

References

[1] Linux Manual. iwconfig - linux man page. `http://linux.die.net/man/8/iwconfig`, 2015.

	total	incoming	outgoing
Node 1	2500	1000	1500
Node 2	2500	900	1500
Node 3	2100	1000	1200
local AP	7000	4400	2300

Table 2: Results of measurement form Task 4.2.2. Units are KiB/s.

[2] The Wireshark team. Wireshark manual. `http://wiki.wireshark.org/CaptureSetup/wlan`, 2015.