Wi-Fi Mesh Laboratory Exploration

Mobile Communications Project

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Motivation

For this project, our motivation is twofold:

1. To gain a better understanding of how WiFi Mesh networks function;
2. To understand which situations we can use these in a productive manner, and how we to properly apply them.

Proceedings

Experiments conception

1. Understand how a Mesh WiFi network could be used to improve networks where there is a medium/high density of obstacles between the host and its clients (home networks).
2. Assess how increased coverage could provide better performance for clients that are moving within a specific network.

Objectives

1. Compare mesh networks in opposition to traditional network in a set of real-world scenarios.
2. Comprehend and evaluate how the mesh network can improve connectivity in scenarios of large physical distances and obstacle avoidance.

Tools

Software that was used throughout the project work.

1. PING
2. IPERF3
3. TERMUX
4. WiFi analyzer
5. NetSpot
6. MEO Smart WiFi

Automation

- **Bash scripting** for test execution consistency and preciseness.
- **Graphics** and data processment handle in **Python** in order to eliminate the possibility of human error when interpreting.

Experiments

Scenarios & Expected learnings

Scenario 1 - Obstacle Avoidance

- Understand the adaptability of the topology to the environment.

Scenario 2 - Mobile Client

- Explore the advantages of a mesh network for mobile hosts and it’s drawbacks.

Scenario 1

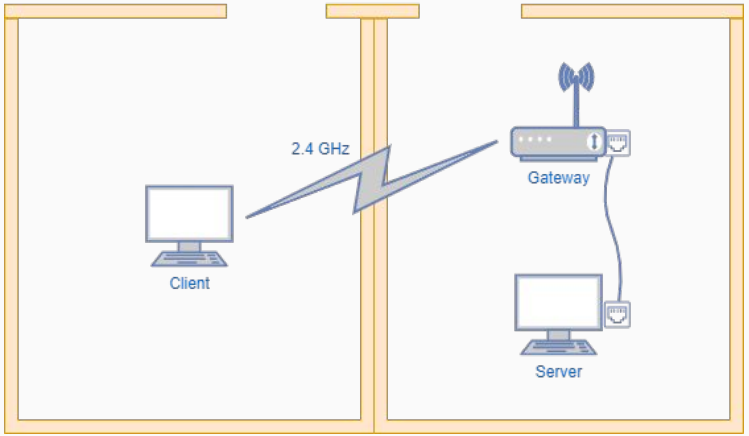
Obstacle Avoidance

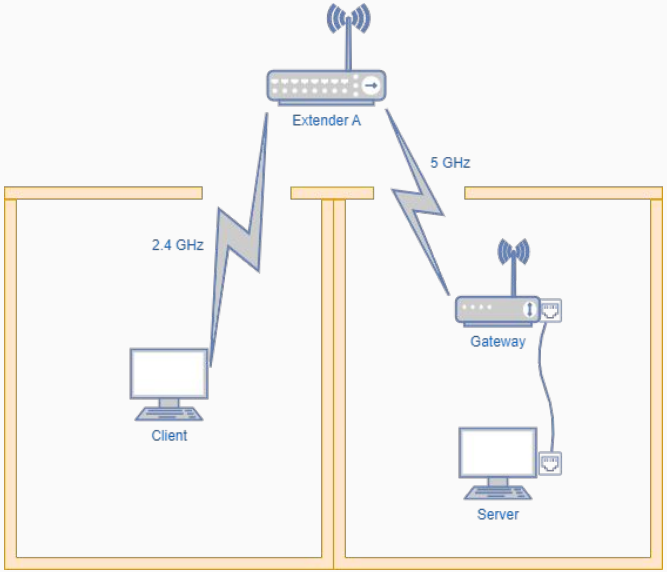
Objective

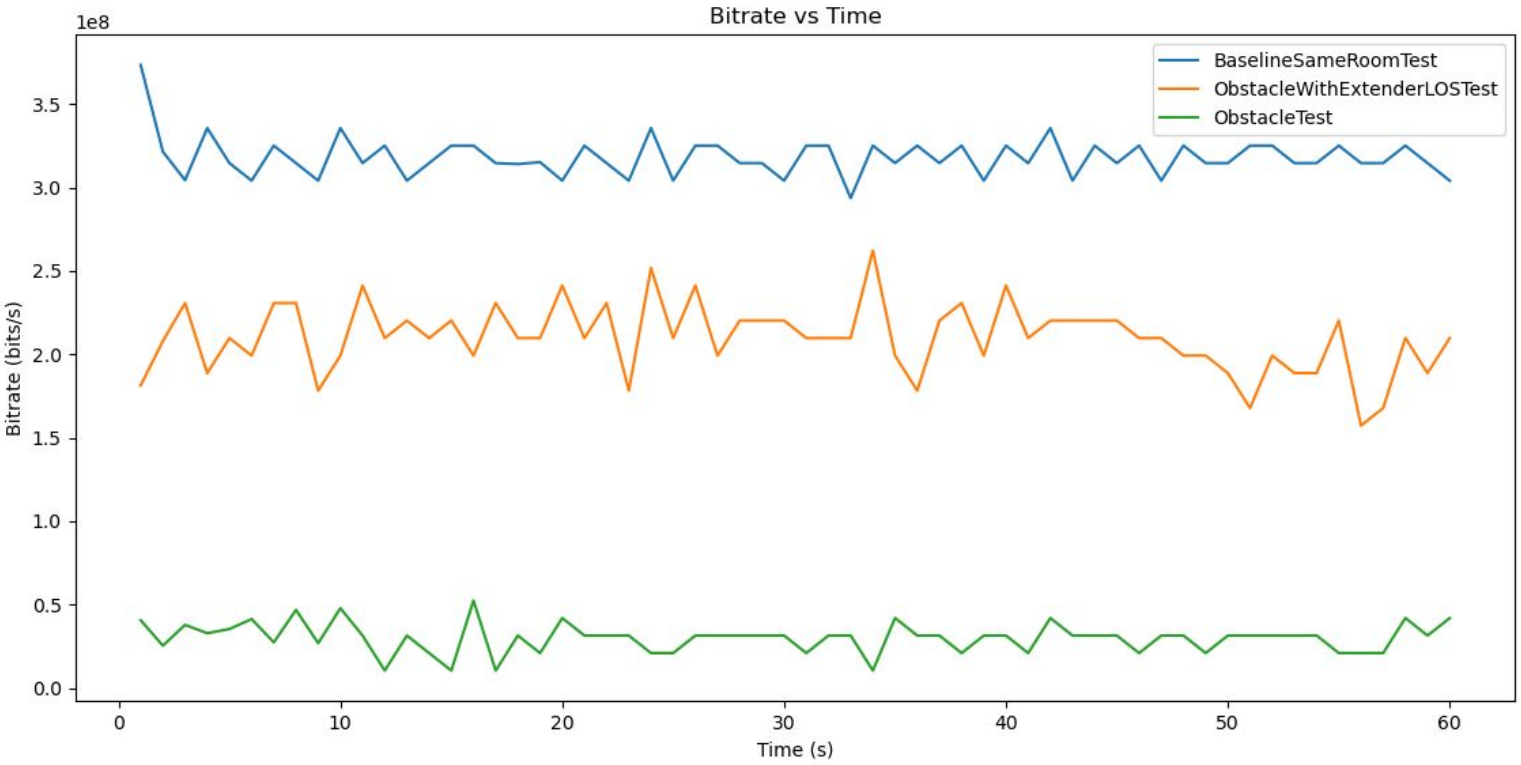
- Assessing the impact of obstacles on a wireless network.

Expected results

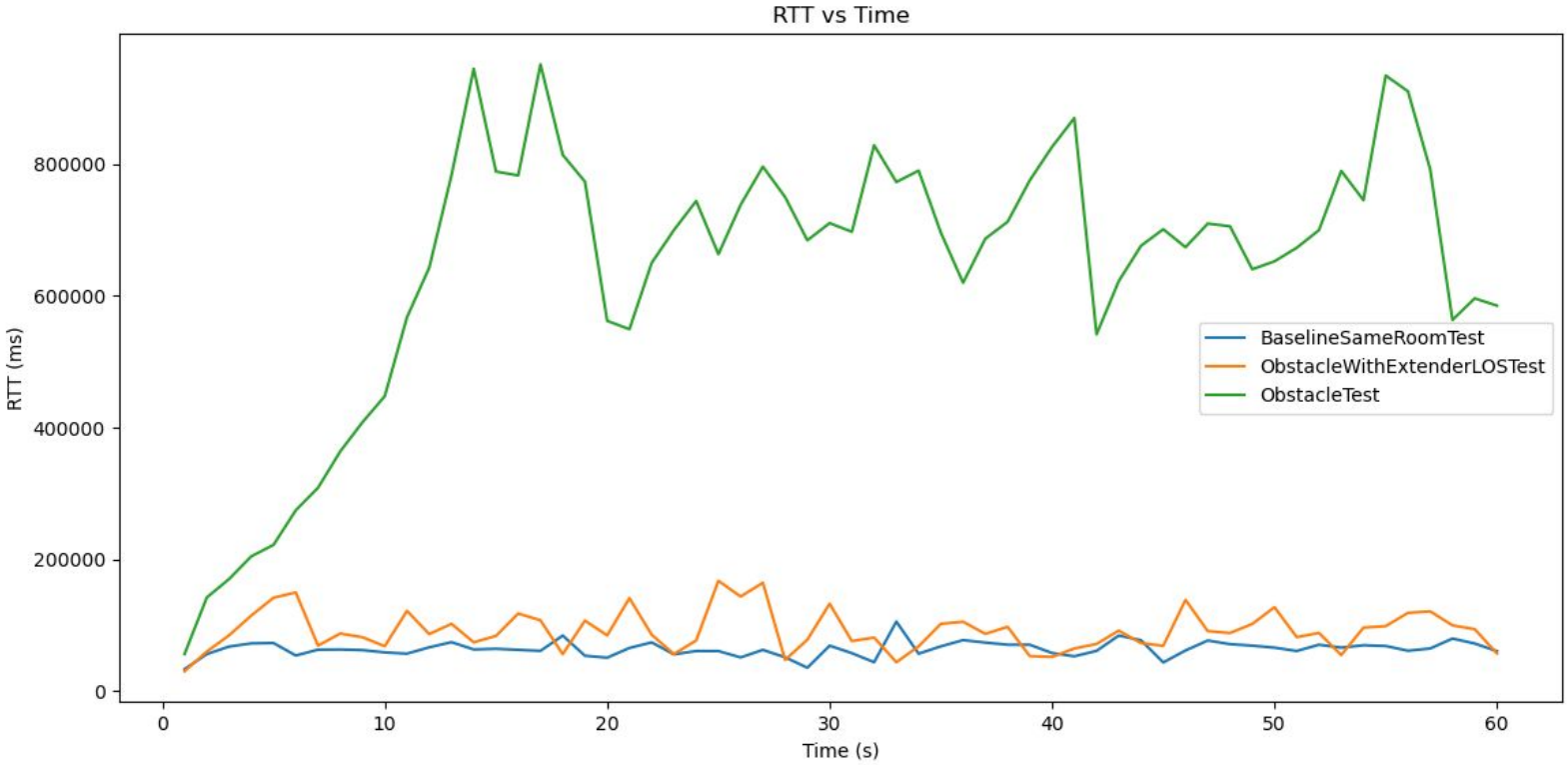
- Observing the quality of a connection directly through an obstacle as opposed to having an extender to avoid it.







Obstacle Avoidance Results



Obstacle Avoidance Results

Scenario 2

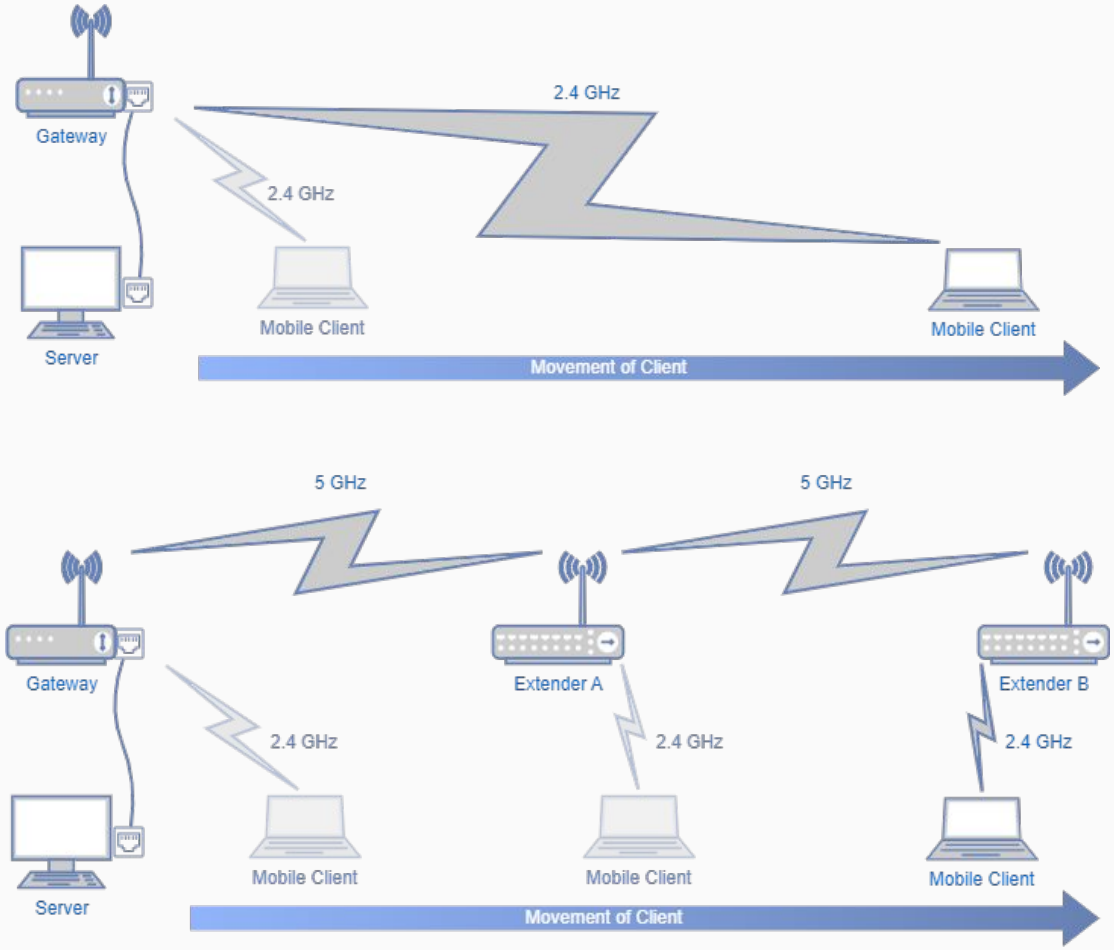
Mobile Client

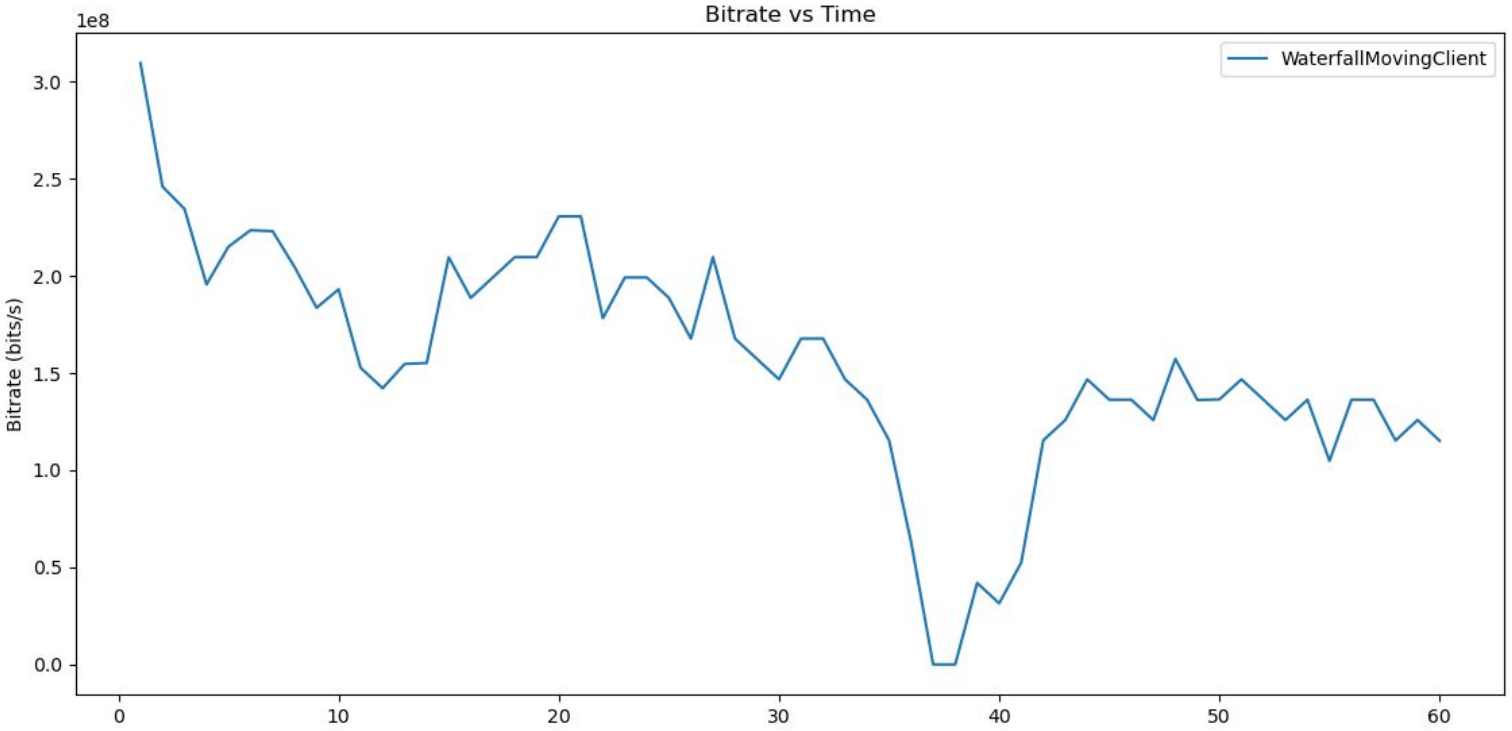
Objective

- Assessing the impact of distance to AP on a wireless network.

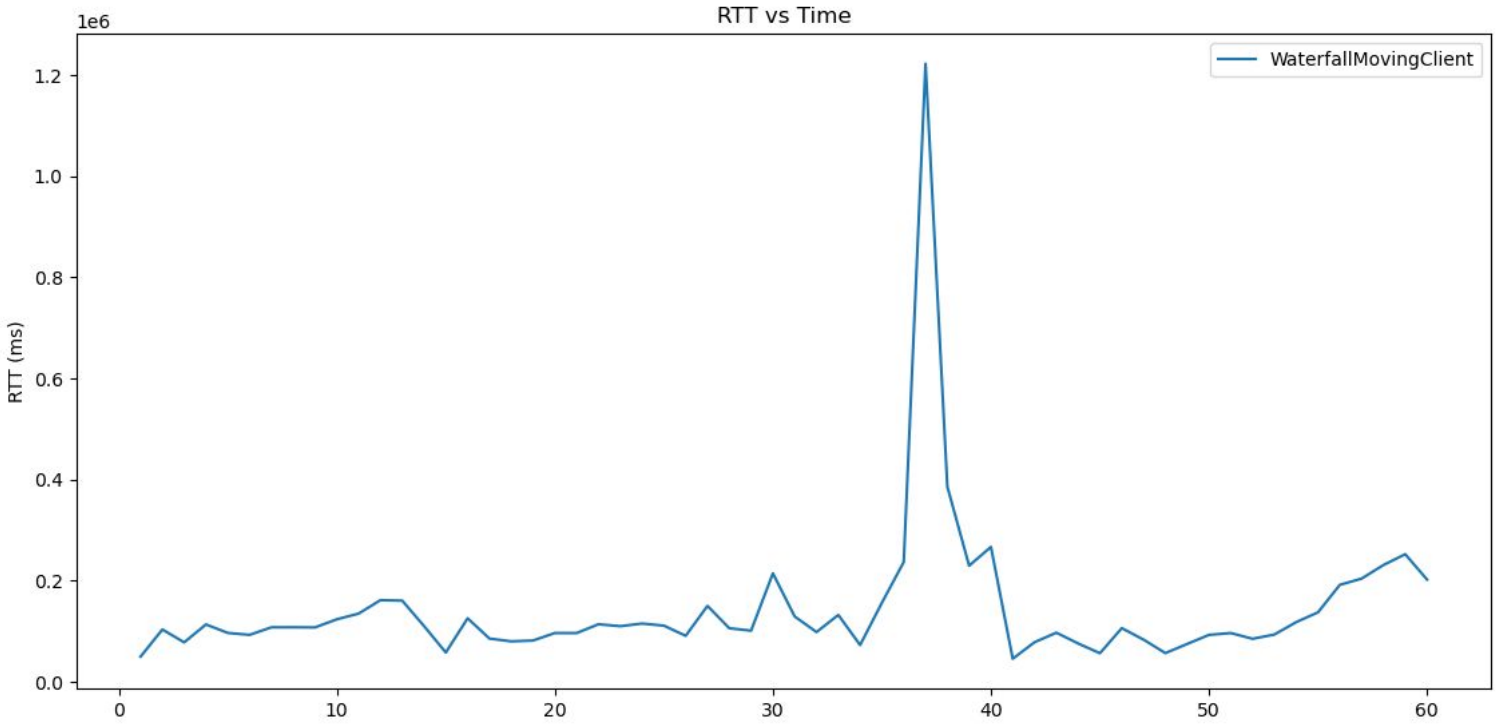
Expected results

- Observe the impact of a single large connection vs. the combination of multiple smaller connections.





Mobile Client Results



Mobile Client Results