CSE 5345 Lab # 2 – OPNET
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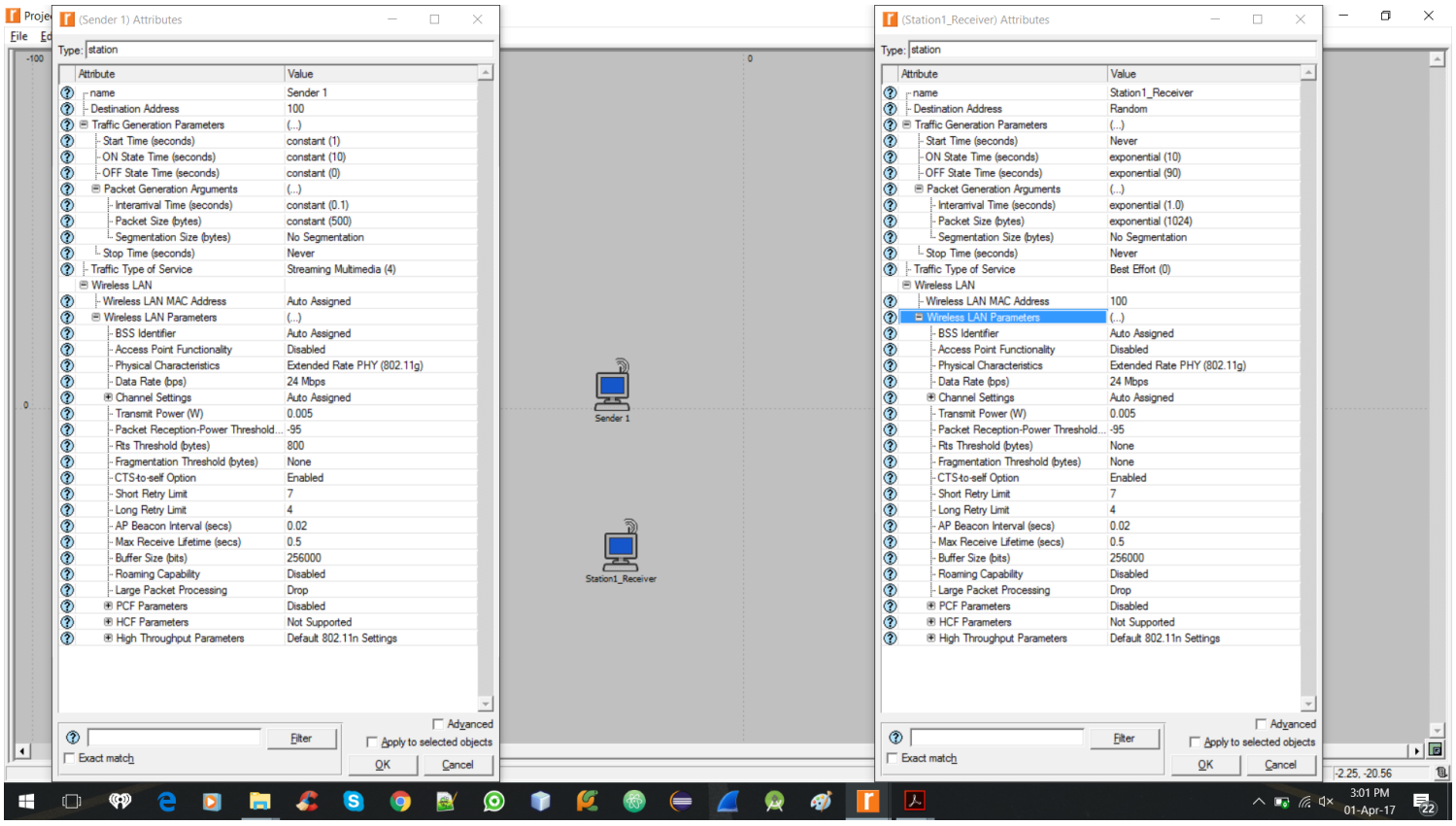
SECTION 1

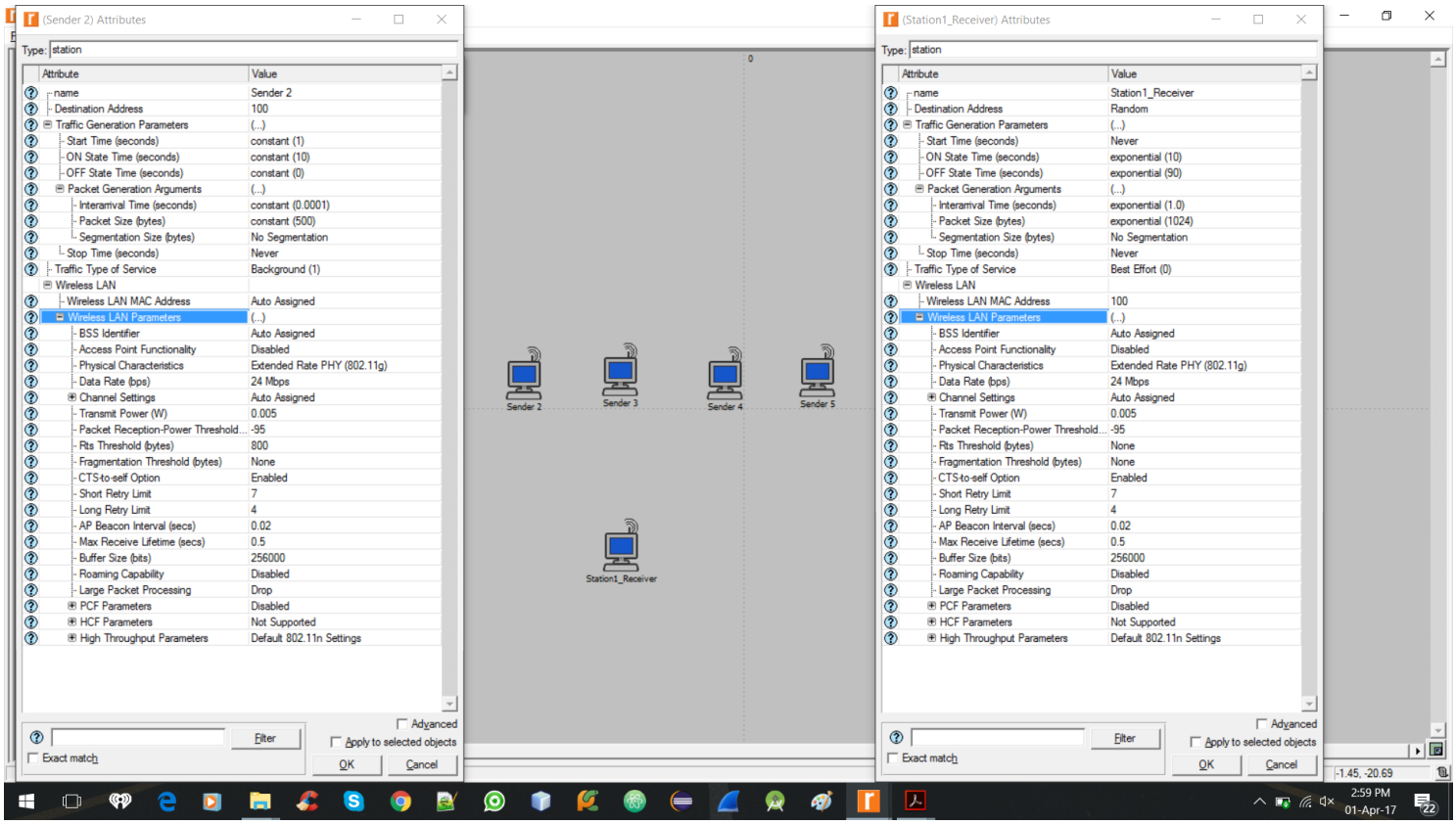
Station 1 will be serving as receiving station, without sending out its own traffic. 5 other stations will be sending traffic destined to Station 1. Pay attention to the WLAN parameter configuration. There are traffic access categories (EDCF traffic classes) and observe their AIFS and CW_{MIN}/CW_{MAX} configurations and notice how they are different. For the 5 sending stations, enable streaming video traffic in traffic generation configuration for 1 station; enable background traffic in traffic generation configuration for 4 other stations. Set the packet size for both categories to be constant 500 bytes for all stations. Set RTS threshold to be 800 bytes in the WLAN parameters. For background traffic, set the packet inter-arrival time to be small enough (e. g. 0.0001s) so that the station is always backlogged.

SETUP:

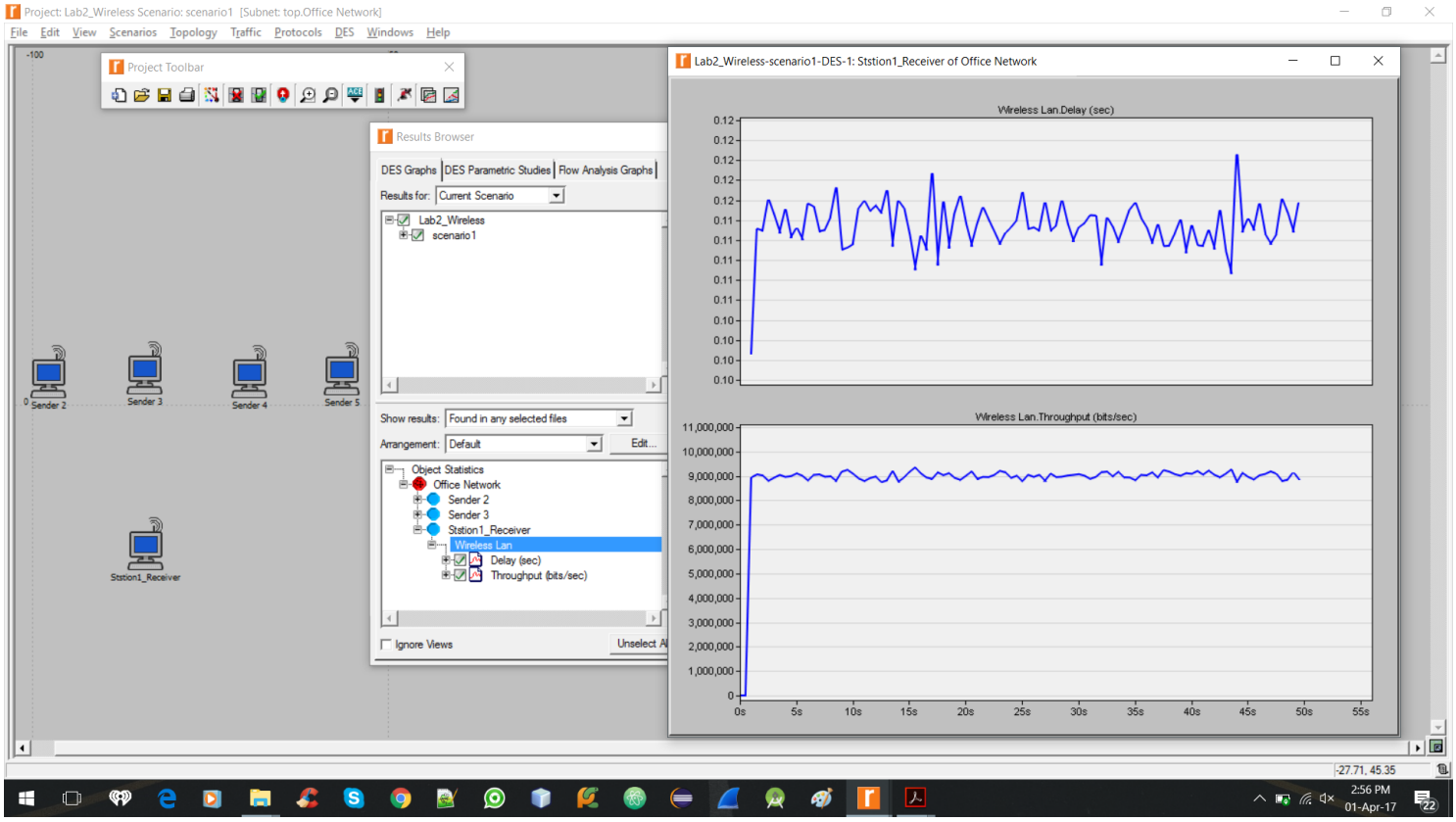
Sending station with STREAMING VIDEO traffic enabled.



Sending stations with BACKGROUND traffic enabled.

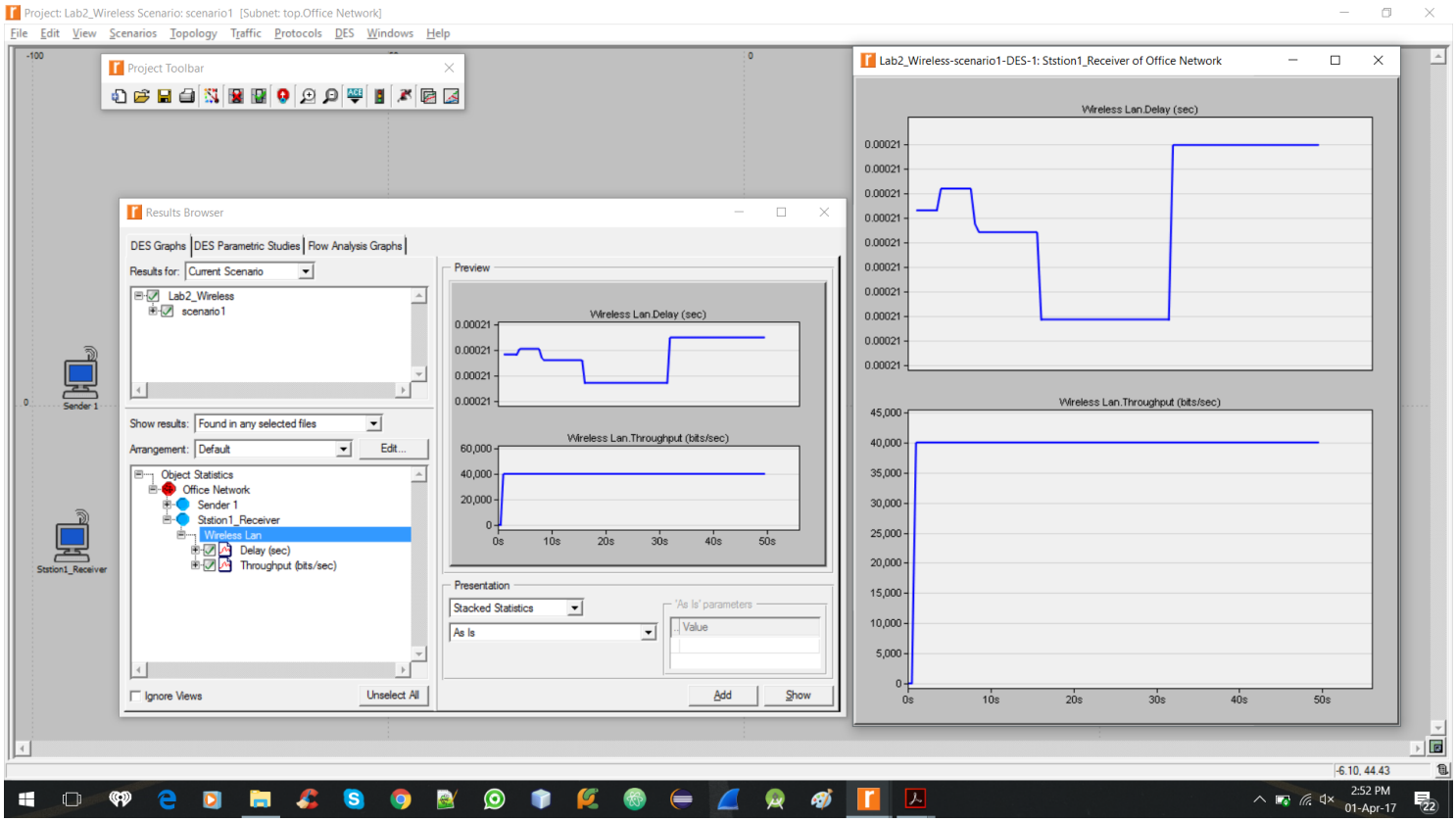


a. Throughput and access delay of an individual station with background traffic
The following result was taken by disabling the STREAMING VIDEO traffic, in order to find out the throughput and access delay for the BACKGROUND traffic without the STREAMING VIDEO traffic affecting; for obtaining the result of the BACKGROUND traffic on an individual station.

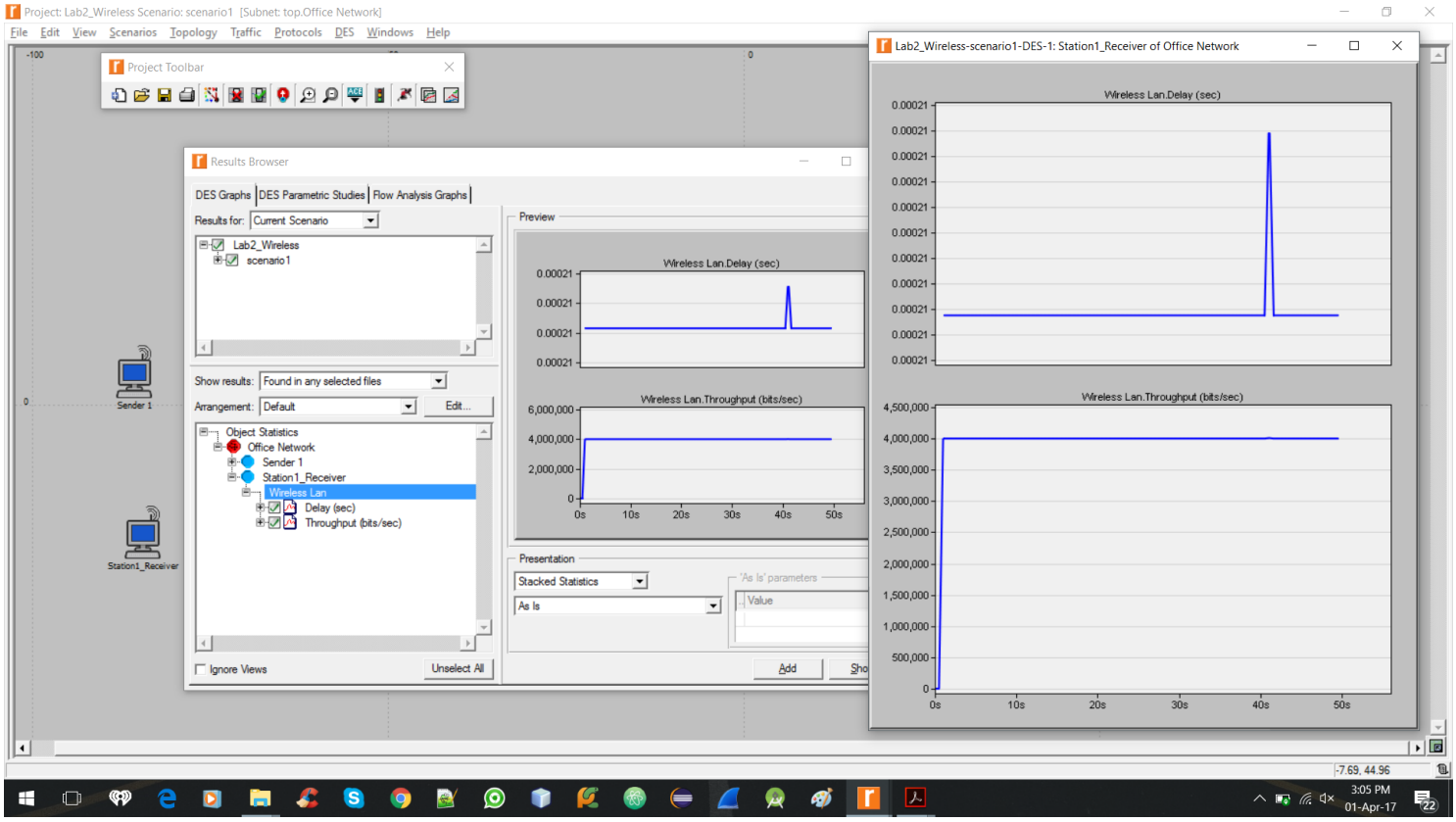


b. Throughput and access delay of an individual station with streaming video traffic
The following result was taken by disabling the BACKGROUND traffic, in order to find out the throughput and access delay for the STREAMING VIDEO traffic without the BACKGROUND traffic affecting; for obtaining the result of the STREAMING VIDEO traffic on an individual station.

Scenario 1: First set the video packet inter-arrival time to be 0.1s. Run the simulation and collect results.

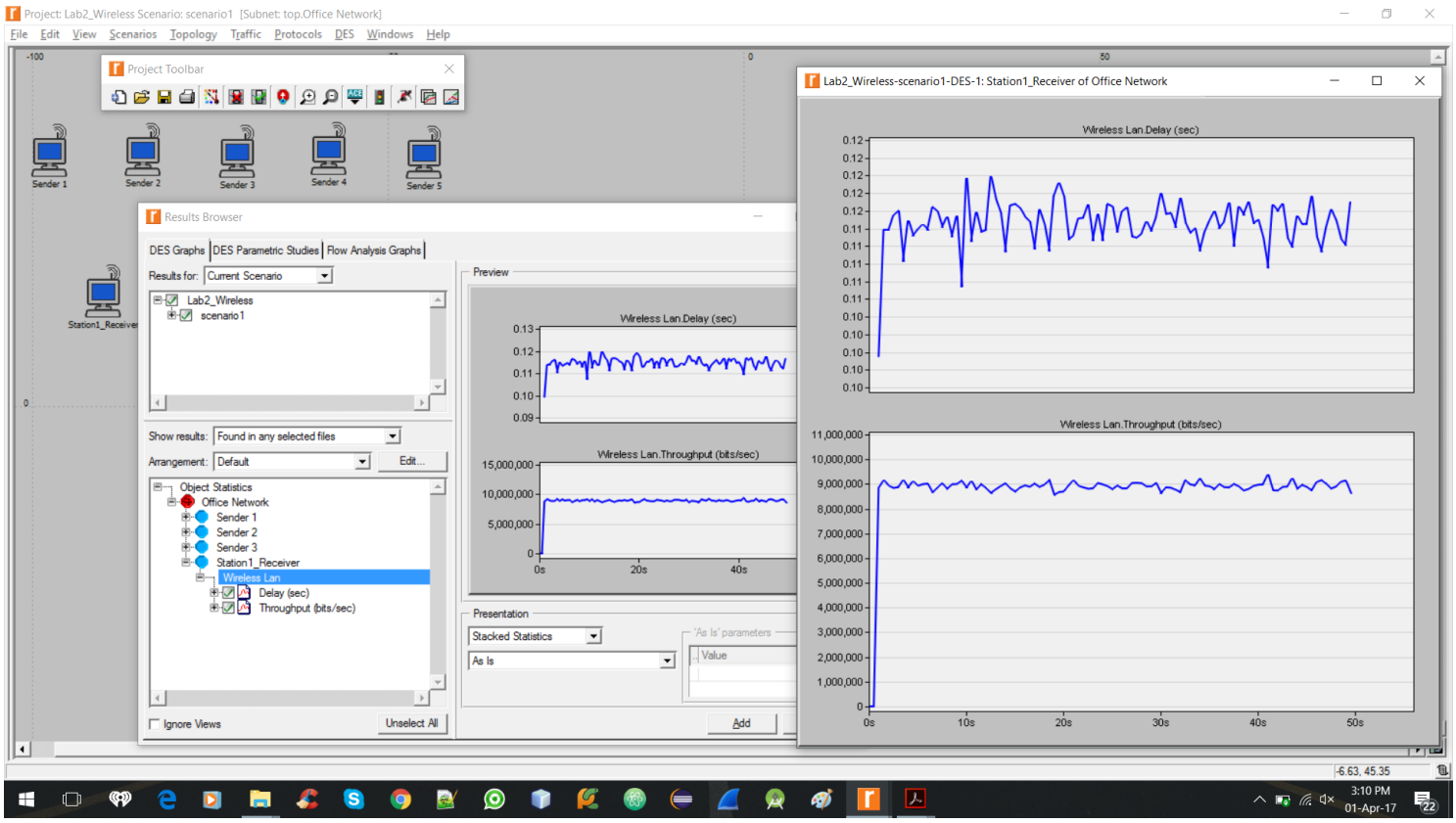


Scenario 2: Second set the video packet inter-arrival time to be 0.001s. Run the simulation and collect results

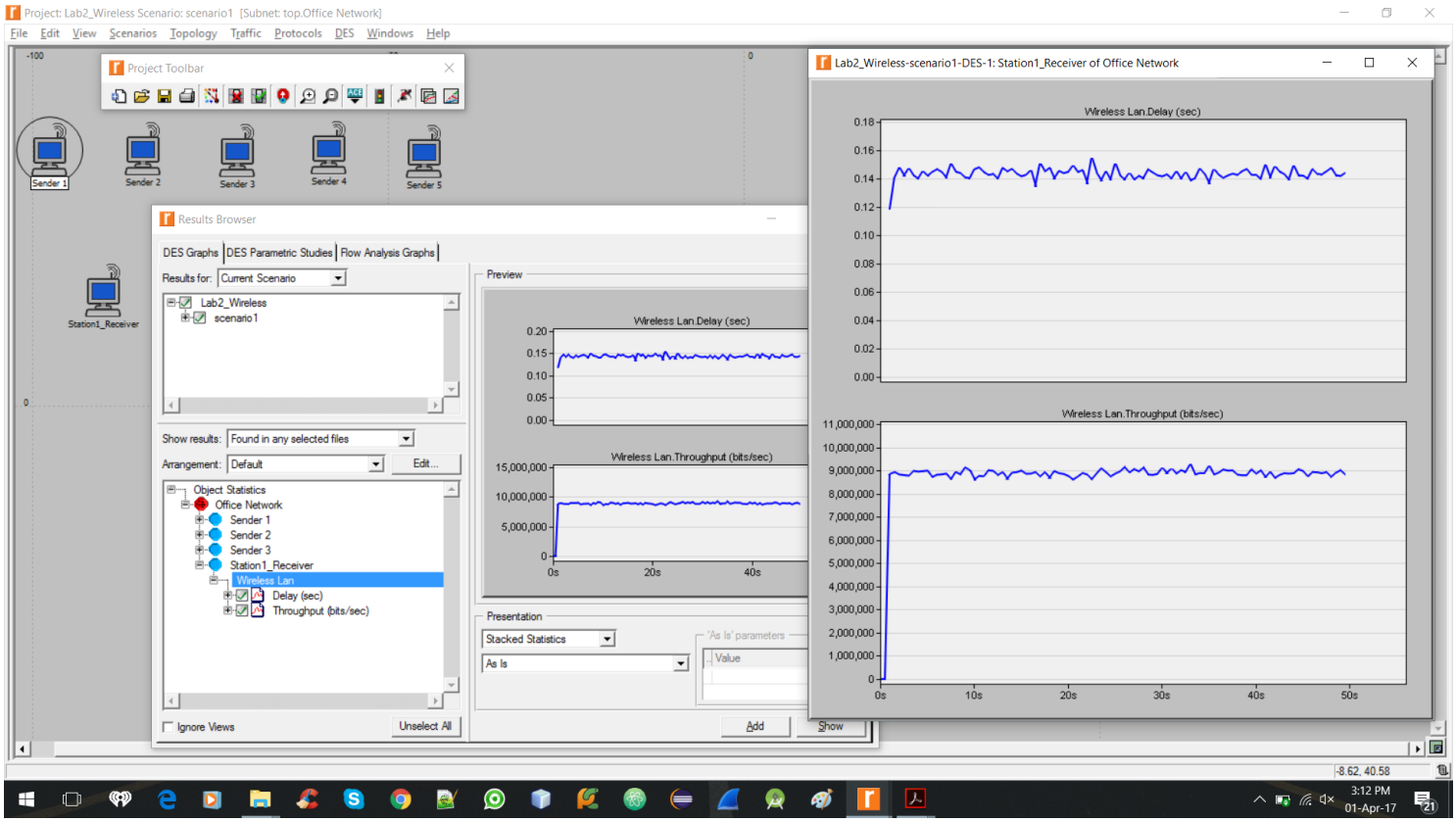


Following results were collected when BACKGROUND and STREAMING VIDEO traffic, both were enabled.

1. video packet inter-arrival time: 0.1s.



2. video packet inter-arrival time: 0.001s.



For each of the scenario, answer the following questions:

a. Does the video traffic have higher priority over background traffic? How can you tell from the results?
Answer: From the results provided we can infer that the delay observed in background traffic (0.11 – 0.12 seconds) is substantially higher than the delay observed in the streaming video traffic (0.00021 seconds).

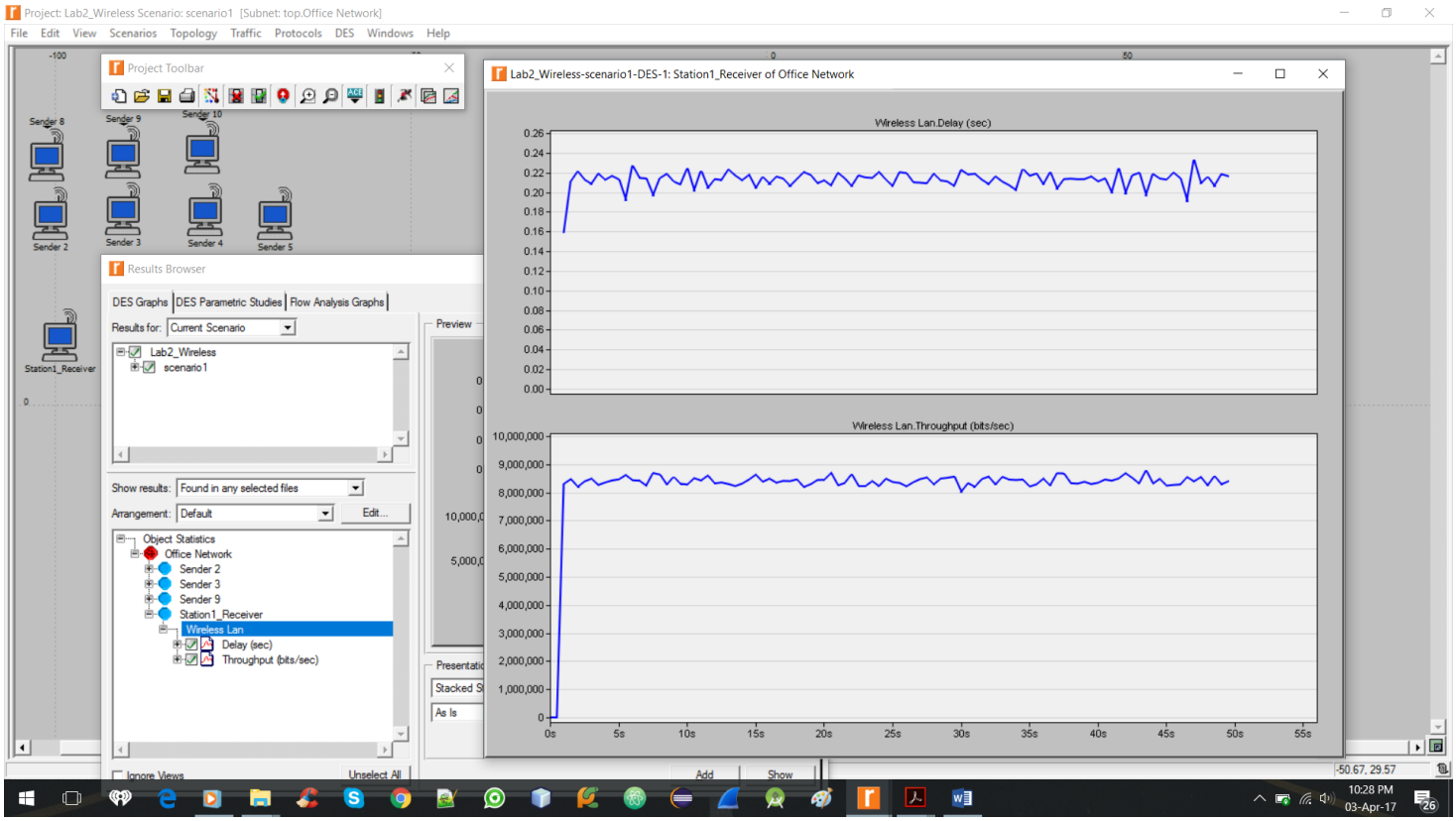
b. Is background traffic utilizing the bandwidth that is left by the video traffic in the network? How much bandwidth does a station with background traffic get on average?
Answer: Yes, background traffic is utilizing the traffic. The total bandwidth used by the background traffic is 9,000,000 bits/sec. So, the average traffic used for 4 sending stations is 9,000,000/4 = 2,250,000 bits/sec

SECTION 2

Repeat the above simulation, collect simulation results, and answer the same questions, but with the following changes to the setup: increase the total sending stations to 10, make 3 of them video stations

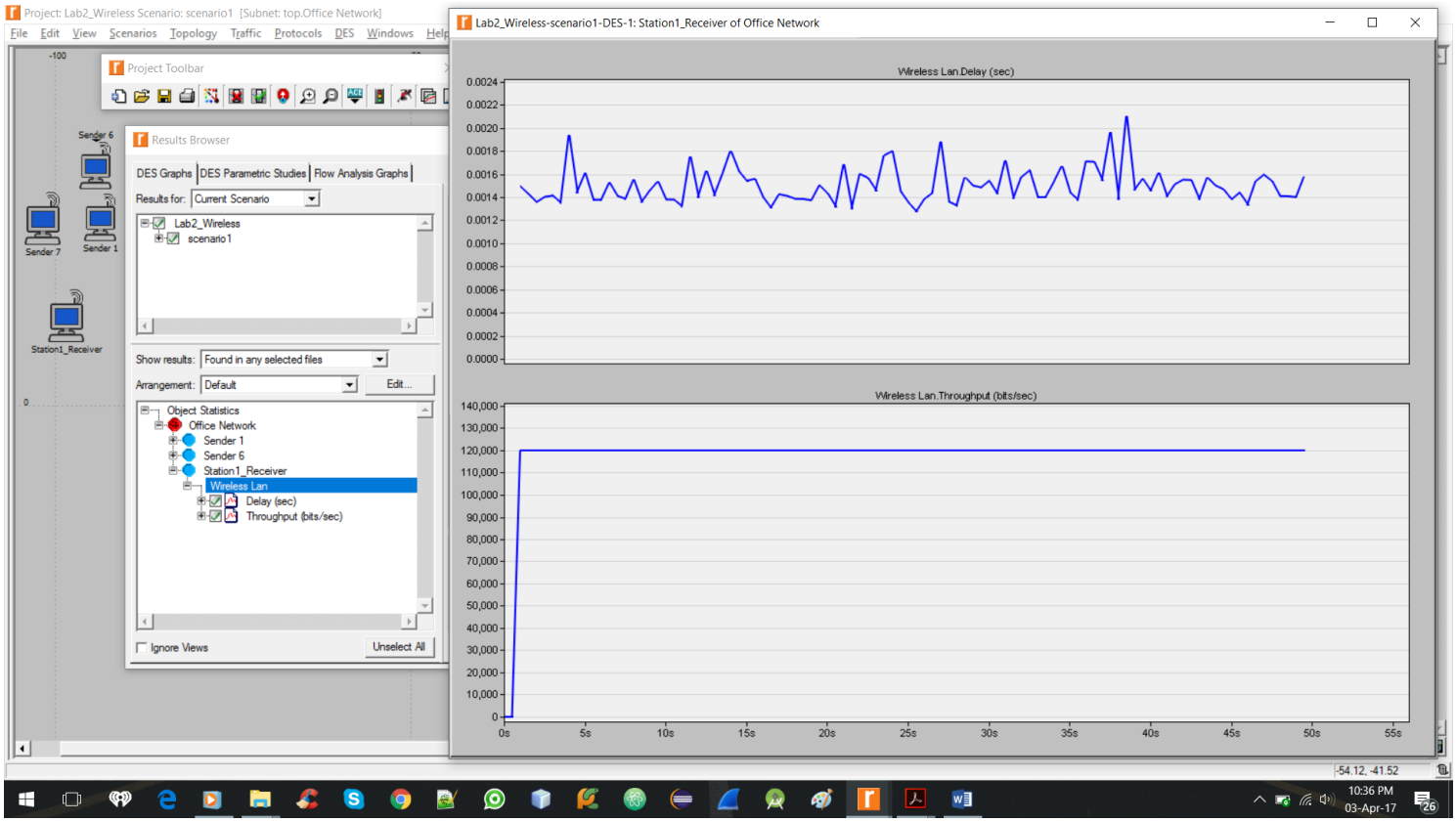
a. Throughput and access delay of an individual station with background traffic

The following result was taken by disabling the STREAMING VIDEO traffic, in order to find out the throughput and access delay for the BACKGROUND traffic without the STREAMING VIDEO traffic affecting; for obtaining the result of the BACKGROUND traffic on an individual station.

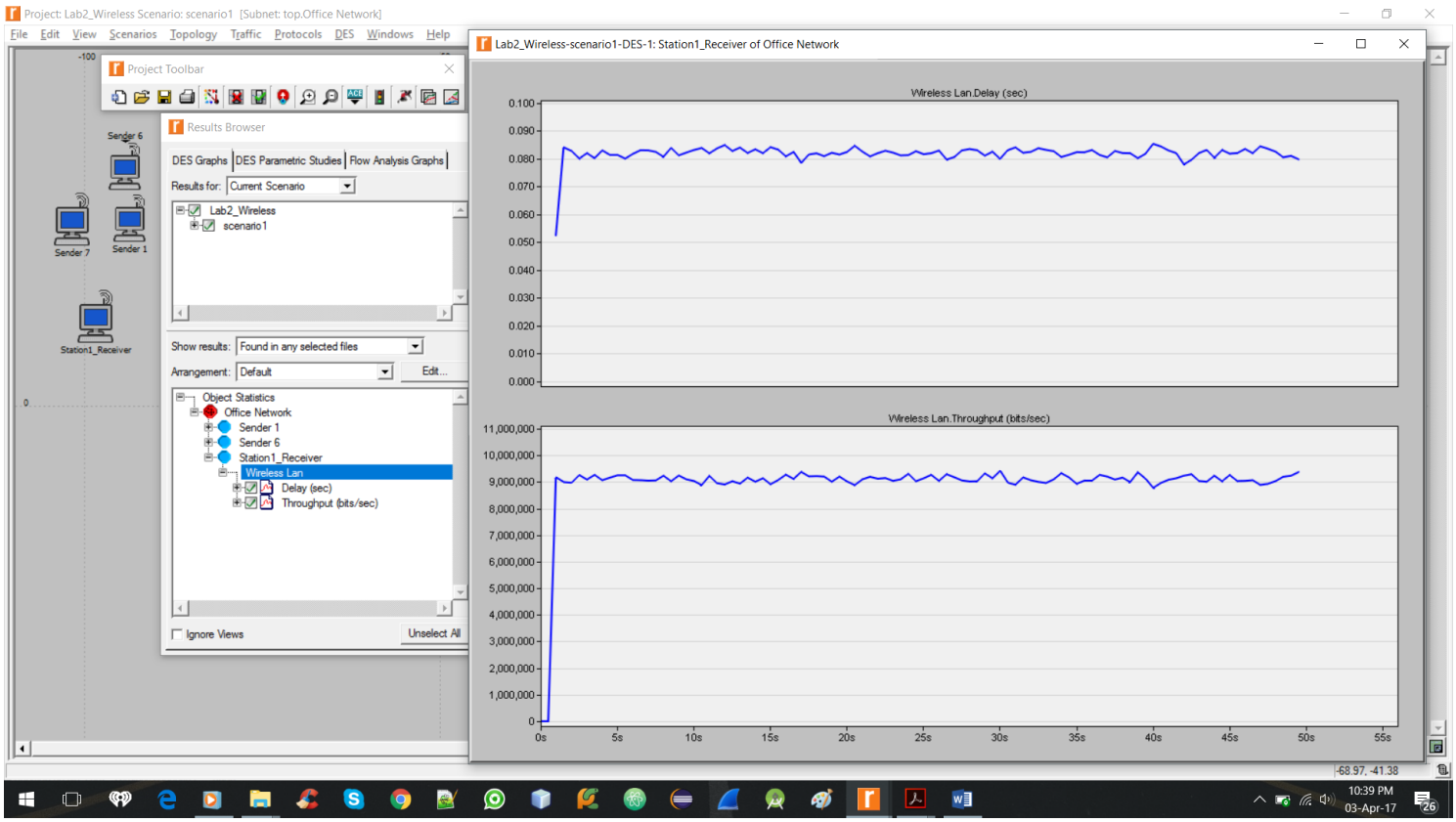


b. Throughput and access delay of an individual station with streaming video traffic
The following result was taken by disabling the BACKGROUND traffic, in order to find out the throughput and access delay for the STREAMING VIDEO traffic without the BACKGROUND traffic affecting; for obtaining the result of the STREAMING VIDEO traffic on an individual station.

Scenario 1: First set the video packet inter-arrival time to be 0.1s. Run the simulation and collect results.

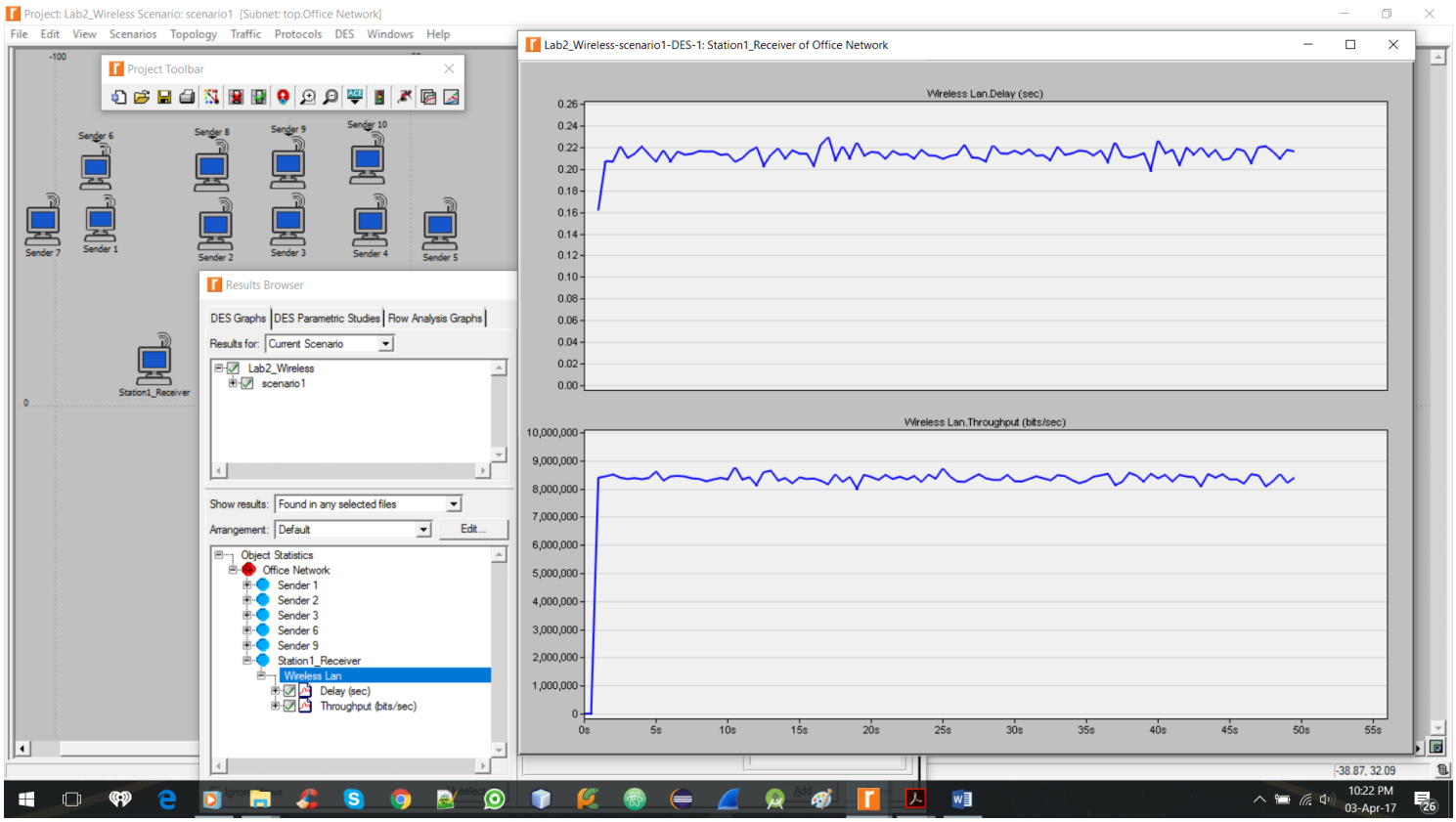


Scenario 2: Second set the video packet inter-arrival time to be 0.001s. Run the simulation and collect results

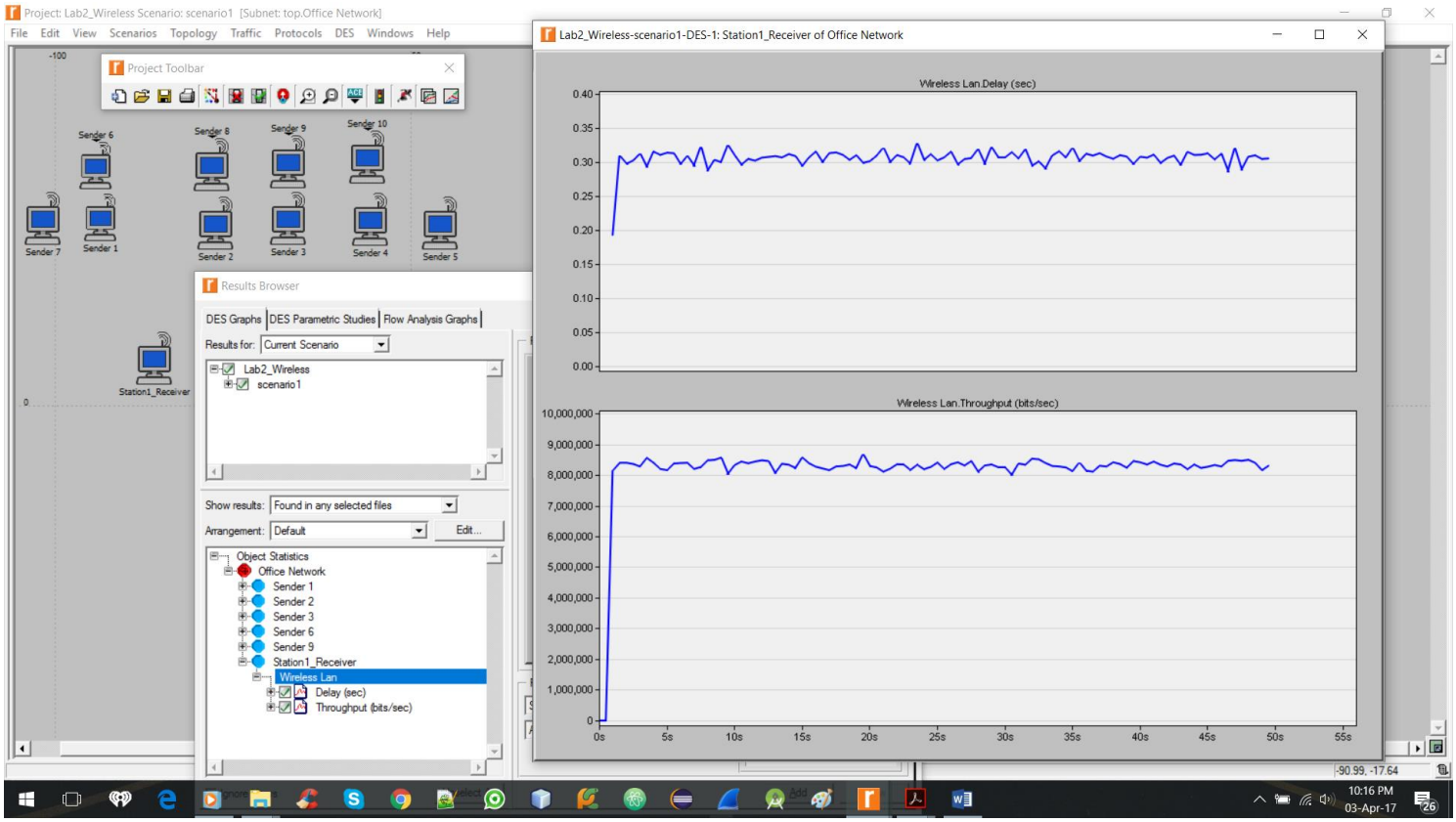


Following results were collected when BACKGROUND and STREAMING VIDEO traffic, both were enabled.

1. video packet inter-arrival time: 0.1s.



2. video packet inter-arrival time: 0.001s.



For each of the scenario, answer the following questions:

a. Does the video traffic have higher priority over background traffic? How can you tell from the results?
Answer: From the results provided we can infer that the delay observed in background traffic (0.20 – 0.23 seconds) is substantially higher than the delay observed in the streaming video traffic (0.0014 – 0.0018 seconds where the inter arrival time is 0.1 seconds and 0.080 – 0.084 seconds where the inter arrival time is 0.001 seconds).

b. Is background traffic utilizing the bandwidth that is left by the video traffic in the network? How much bandwidth does a station with background traffic get on average?
Answer: Yes, background traffic is utilizing the traffic. The total bandwidth used by the background traffic is 8,500,000 bits/sec. So, the average traffic used for 7 sending stations is 8,500,000/7 = 1,214,285 bits/sec