**Assignment 2: Network Architecture**

A close up of a circuit board

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# Inhoudsopgave

### Basic Home Network Design …………………………………………………… Task 1

### Network Performance Analysis ………………………………………………… Task 2

### End-to-End Delay Calculation ………………………………...………………………Task 3

### File Transfer Throughput Calculation ……………………………………………….. Task 4

**Task 1: Basic Home Network Design**

Diagram of a basic home network

A diagram of a computer network

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**Task 2: Network Performance Analysis**

Part A: Transmission and Propagation Delay

A screenshot of a computer

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Part B: Router Congestion and Packet Loss

A screenshot of a computer

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**Task 3: End-to-End Delay Calculation**

Given:

* Packet Size (L): 100 MB = 800 Mb
* Rate from Host to Switch (𝑅1): 200 Mbps
* Rate from Switch to Host (𝑅2): 50 Mbps

**Calculate with these steps:**

**END TO END DELAY** = TRANSMISSION DELAY ON R1 + TRANSMISSION DELAY ON R2. R1 = 200 Mbps, R2 = 50 Mbps

THE PACKET SIZE (L): 100 MB = 100 \* 10 6 bytes = 100 \* 10 6 \* 8 bits.

**DELAY ON R1:** DELAY 1 = L/ R1 = 100\* 10 6 \* 8 / 200 \* 10 6 = 4 SECONDS.

**DELAY ON R2:** DELAY 2 = L/R2 = 100\* 10 6 \* 8 / 50 \* 10 6 = 16 SECONDS.

**TOTAL DELAY** = DELAY 1 + DELAY 2 = 4 + 16 = 20 SECONDS.

SO, THE TOAL END TO END DELAY IS **20 SECONDS**

**Task 4: File Transfer Throughput Calculation**

**Question 1:**

R1 = 500kbps, R2 = 2 Mbps, R3= 1 Mbps

Throughput = min (R1, R2, R3)

Throughput = min (500 kbps, 2000 kbps, 1000 kbps) = 500 kbps

The throughput of the file transfer is **500 kbps.**

**Question 2:**

We have to calculate the time and we can do it is these steps :

File size = 4000 kilobytes

Throughput = 500 kbps

1 kilobytes = 8 kilobits:

File size = 4000 kilobytes \* 8 kilobits/kilobyte = 32000 kilobits

The time to transfer the file:

Time = file size / throughput

Time = 32000 kilobits / 500 kbps = 64 seconds

So, it will take **64 seconds** to transfer the file.