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## Introduction

## Research questions

1. What different parameters can we appoint when measuring network?
2. What different loads can influence the performance of a network

## What different parameters can we appoint when measuring network?

When measuring a networks performance, various terms are introduced to help put a name to various behavioural patterns inside of a network. Below we list 6 of the most applicable ones to our research.

### Latency

Network latency is a term used to describe the time it takes one data-packet to go to its destination, and back. The time it takes this packet is described in milliseconds.

This information is not always useful but can negatively impact communication protocols which wait for an ACK-signal to progress in their control loop.

### Jitter

Jitter refers to a variable latency. Ideally, in a network, the user would like either no latency; or a steady, low, latency.

Jitter happens when the latency fluctuates heavily. This is especially noticeable with livestreams/feeds or voice connections, as it will seem like the connection either slows down or significantly speeds up randomly.

### Packet Loss

Previously we already mentioned packets, in those contexts; we assume that all packets make the target destination. Though in some cases, they do not. This is called packet loss.

While previously, those packets would always more or less arrive, though just with a delay; in this case they do not at all. Which means it has more drastic effects on the application in need of that data.

### Throughput

Throughput utilizes latency to portray the amount of data which travels through a network during a set amount of time. Throughput is measured by loading a network with lots of data, and observing how much time it takes to reach its destination.

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### Bandwidth

Bandwidth is a very common term. It refers to the total amount of data a network can transmit in a set amount of time. Usually, the bigger the bandwidth, the more data can be pushed through the network.

## What parameters can we use to predict a dip in network speed

Predicting network usage is near impossible, since the load induced on the network is tied directly to the amount of devices using it. “knowing” what each device is going to do, is not feasible.

However, we can continuously probe the network for its metrics; to determine if our added load puts the network at risk.

If we know just a few parameters, we can determine if our internet speed is sufficient to comfortably carry the load induced by our program. We can do this the following way.

If we take the size of a single frame, the frames per second and the current internet speed, we can very easily predict if our network is up to the task.

For example:

*LoadonNetwork=(frameSize\*FramesperSecond)/NetworkSpeed*

This equation will give us the amount of times we can run this program on our current bandwidth. The current networkspeed already takes into account the processes currently using bandwidth; but does not account for processes which have yet to induce a load on the system. For example, a tertiary user opens a web browser for video streaming. Therefore, we would like to have a comfortable margin where we can safely assume our process will run unaffected.