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Portfolio 1

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[1 Introduction 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105778)

[2 Simpleperf 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105779)

[3 Experimental setup 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105780)

[4 Results and discussion 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105781)

[4.1 Network tools 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105782)

[4.2 Performance metrics 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105783)

[4.3 Test case 1: measuring bandwidth with iperf in UDP mode 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105784)

[4.3.1 Results 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105785)

[4.3.2 Discussion 2](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105786)

[4.4 Test case 2: link latency and throughput 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105787)

[4.4.1 Results 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105788)

[4.4.2 Discussion 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105789)

[4.5 Test case 3: path Latency and throughput 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105790)

[4.5.1 Results 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105791)

[4.5.2 Discussion 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105792)

[4.6 Test case 4: effects of multiplexing and latency 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105793)

[4.6.1 Results 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105794)

[4.6.2 Discussion 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105795)

[4.7 Test case 5: effects of parallel connections 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105796)

[4.7.1 Results 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105797)

[4.7.2 Discussion 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105798)

[5 Conclusions 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105799)

[6 References 3](file:///D:\Denne%20PCen\Nedlastinger\Template-report.docx#_Toc131105800)

# Introduction

An introduction should tell the reader why this work is interesting.

It should describe:

1. the key topic(s)
2. the problem(s) that you are solving
3. references to the relevant work (for example: iperf)
4. your approach to the solution
5. limitations and outcomes
6. how the rest of the document is organised

# Simpleperf

Implementation details of simpleperf. Describe the building blocks of simpleperf and the communication between the server and client.

# Experimental setup

Describe the virtual network/topology that you used to evaluate your simpleperf tool. Feel free to copy my image.

# Performance evaluations

## Network tools

Explain the tools that you have used in your experiment – iperf, ping etc.

## Performance metrics

performance metrics that you use to evaluate your simpleperf tool.

## Test case 1: measuring bandwidth with iperf in UDP mode

Measuring the bandwidth of three separate iperf tests with udp mode and -b XM.

H1 – h4

H1 – h9

H7 – h9

### Results

Between client-server pair h1 – h4:

Client bandwidth – 23.1 Mbits/sec

Server bandwidth – 20.3 Mbits/sec

Between h1 – h9:

Client bandwidth – 21.0 Mbits/sec

Server bandwidth – 16.2 Mbits/sec

Between h7 – h9:

Client bandwidth – 21.0 Mbits/sec

Server bandwidth – 15.0 Mbits/sec

### Discussion

#### Which rate (X) would you choose to measure the bandwidth here? Explain your answers.

Choosing the maximum bandwidth according to the capacity of the bottleneck link passed, will ensure an accurate measurement of the maximum bandwidth that the link(s) can support. Though, it is possible to achieve a higher throughput if the bottleneck link is not congested and if there are no other active flows. In most cases, choosing a bandwidth slightly higher than the actual rate ensures that the maximum bandwidth is achievable.

Between the pair h1 – h4, choosing a rate of 23M results in a server bandwidth of 21.6 Mbits/sec. The bottleneck link is L2 with a maximum rate of approx. 17 Mbits/sec whilst L1 with a max rate of approx. 22 Mbits/sec. The average rate being 20 Mbits/sec, which we can tell is achievable if no links are congested nor contested by multiple flows.

Between h1 – h9, choosing a rate of 20M gives a server bandwidth of 16.2 Mbits/sec. The pair passes all links, including the bottleneck link L3 with a max rate of approx. 14 Mbits/sec. In average, all links’ rate total in on ca. 17.5 Mbits/sec, slightly higher than the actual throughput. We can assume that the bottleneck link becomes slightly congested, thus giving a throughput lower than the average rate of all links.

Between h7 – h9, choosing a rate of 19M gives 15.4 Mbits/sec. The pair passes L2 (~17 Mbits/s) and L3 (~14 Mbits/sec), averaging 15.5 Mbits/sec between the two. The actual throughput is just barely lower, and we can assume it is due to how achievable the average rate is, compared to the bottleneck link.

#### If you are asked to use iPerf in UDP mode to measure the bandwidth where you do not know anything about the network topology, what approach would you take to estimate the bandwidth? Do you think that this approach would be practical? Explain your answers.

Identify the optimal packet size and test duration for achieving highest bandwidth. Do this by performing multiple sessions between the same endpoints whilst varying the parameters. In addition, perform multiple tests under different network conditions, as various network factors such as network congestion, network traffic etc. can affect the measurements.

Analyze the bandwidth measurements from both client and server, and packet loss to get a better understanding of the network performance.

In my case, I would start a test with a lower (than usual) rate to ensure that the network doesn’t become congested or negatively impact other network traffic. Steadily increasing the rate, until the test results level out or peak at a certain rate, doing this during periods of low network utilization, minimizing any potential interference. In the end, analyzing the results and performing multiple tests with what’s considered optimal, ensuring accurate measurements and as low as possible impact on network performance.

## Test case 2: link latency and throughput

### Results

### Discussion

## Test case 3: path Latency and throughput

### Results

### Discussion

## Test case 4: effects of multiplexing and latency

### Results

### Discussion

## Test case 5: effects of parallel connections

### Results

### Discussion

# Conclusions

A concise statement of your work’s important results and their significance. Here you should state any shortcomings/limitations of your work, problems that you failed to address and so on..

# References (Optional)

NOTE:

The report cannot exceed 20 pages, including the list of references. The page format must be A4 with 2 cm margins, single spacing and Arial, Calibri, Times New Roman or similar 11-point font.