UNIVERSITY
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Master's thesis

TCP PEP

Extension of a TCP Performance Enhancing Proxy to
Support Non-interactive Applications

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TCP PEP

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Enhancing Proxy to Support
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Chapter 1

Intro

Chapter 2

Background

2.1 5G

2.1.1 Future of wireless communication.

... highly increased bandwidth ... using Millimeter frequency bands ... at the cost of Highly fluctuating bandwidth with wireless networks, especially with mmWave.
Line of sight blocking.

2.1.2 Buffer bloat. (Buffering)

Large buffers, create buffer bloat, which is detrimental for latency sensitive applications. Preferred to drop packets and keep buffers small to avoid timing sensitive packets such as SYN.

Most focus has been on latency sensitive applications. This thesis will explore non interactive applications where latency is not that critical and more buffering is acceptable and desirable.

2.1.3 non interactive applications

Non-Interactive applications such as Web traffic, File transfers and Videos? can benefit from larger buffering, especially with fluctuating bandwidths.

2.2 TCP/IP

Interactive traffic uses TCP? source End to end argument. TCP handshake, reduce RTTs but using TCP Fast Open.

2.2.1 TCP Fast Open

Short flows terminating in a few round-trips. Meaning the "bottleneck" is the required initial TCP handshake.

TCP Fast Open allows data being exchanged during the handshake.

2.2.2 0 RTT

Allow "syn fowarding" with TCP Fast Open creating a 0RTT increase when connecting through a proxy. 0RTT Transport Converter [1].

2.2.3 Congestion control

Congestion controller domains (different congestion controllers.) [2]. Wireless versus Wired networks, different congestion controllers needs.

2.3 PEPs

More logic inside the networks. Domain splitting and 0RTT. cite Kristjon Ciko?

2.4 Kernel Modules

LKM (Loadable Kernel Modules), "program" running inside the Linux kernel. Userspace vs Kernel.

2.4.1 System Calls

Reduce over head from userspace -> kernel system calls.

Chapter 3

Implementation | Design

Chapter 4

Evaluation

Chapter 5

Conclusion

Bibliography

[1] Olivier Bonaventure, Mohamed Boucadair, Sri Gundavelli, SungHoon Seo, and Benjamin Hesmans. 0-RTT TCP Convert Protocol. RFC 8803, July 2020.

[2] M. Welzl and W. Eddy. Congestion control in the rfc series. RFC 5783, RFC Editor, February 2010. `https://www.rfc-editor.org/info/rfc5783`.