

LIVESTREAMING VIDEO OVER A 5G NETWORK COMPARED TO A 4G NETWORK

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Abstract

Mobile network connectivity is a key part of how we as a society connect with each other while out and about, while live streaming through platforms such as YouTube and Facebook are becoming a common practice in the industry. So, it is important to see how the latest mobile network technology in 5G and looking at how capable it is at live streaming video compared to its predecessor 4G and if currently if there are any benefits to using one mobile network over the one.

Introduction

Over the years live streaming video content over the internet has become ever more popular with major companies and broadcasters such as WWE & Sky streaming their events on platforms such as Facebook Live, & YouTube. This has happened because of the increased ability to connect with other people through devices such as smartphones and tablets, using a mobile network data connection. Currently, the main type of data connection by mobile companies is 4G but moving into the future with more people using mobile networks, this creates a problem for the service providers. as they must develop technology to keep up with the demand of the consumers. 5G is the next generation of mobile connectivity and is being slowly becoming available in 'key cities around Europe such as London and Milan.' (Vodafone, 2019) The question that was wondered is how viable is 5G in its current state of development to be used as the connection to live stream video effectively compared to the previous generation of mobile connectivity 4G.

Aims & Objectives

Main Aim:

Finding out Which network has better capability for livestreaming currently, 5G or 4G.

Objectives:

- Does the stream's bitrate affect its networks ability to stream correctly.

- Does the resolution have any effect on the stream being successful

Method

The method for this project was to use a 5G router, going to a 5G accessible location, in this case Bristol, and completing a series of live streams using 5g and 4G networks. The networks were tested at different bitrates, which were 2.5, 5 & 10 mbps and different resolutions, 1080p and 720p. The streams were completed using screen capturing on OBS and streaming platforms that were used were Facebook Live, Youtube and Twitch via the multistreaming service, Restream.

Results

As seen in the tables, the results showed that 4G was the better network for live streaming in this project as it was able to complete 3 successful streams at a variety of bitrates and resolutions compared to 5G only being able to at 1080p at a bitrate of 2.5mbps. 5G had to complete stream restarts on half of the streams compared to none on 4G. 5G had a bitrate drop between the restream server and the streaming platforms compared to 4G only having this issue on its 720p tests.

Table 1: 5G Results

Resolution	Targeted Bitrate (mbps)	Avg. Bitrate (Incoming) (mbps)	Difference between Target and Actual bitrate (mbps)	Framerate (Incoming) (FPS)	Dropped Frames	Avg. Bitrate (Streaming Platforms) (mbps)	Avg. Difference in Bitrate (Restream to Streaming Platforms) (Mbps)	Stream Restarts (YouTube)	Stream Restarts (Twitch)	Stream Restarts (Facebook)
720p	2.5	0.6	1.9	8	N/A	N/A	N/A	N/A	N/A	N/A
	5	2.3	2.7	15	50%	1.9	-0.4	0	0	0
	10	2.6	7.4	30	67%	2.2	-0.4	1	1	0
1080p	2.5	2.5	0	30	0%	2.6	0.1	0	0	0
	5	3.3	1.7	22	27%	2.9	-0.4	1	1	0
	10	3	7	7	77%	2.7	-0.3	1	1	0

Table 2: 4G Results

Resolution	Targeted Bitrate (mbps)	Avg. Bitrate (Incoming) (mbps)	Difference between Target and Actual bitrate (mbps)	Framerate (Incoming) (FPS)	Dropped Frames	Avg. Bitrate (Streaming Platforms) (mbps)	Avg. Difference in Bitrate (Restream to Streaming Platforms) (Mbps)	Stream Restarts (YouTube)	Stream Restarts (Twitch)	Stream Restarts (Facebook)
720p	2.5	2.5	0	30	0%	2.6	0.1	0	0	0
	5	4.3	0.7	27	10%	4.1	-0.2	0	0	0
	10	5.9	4.1	22	27%	5.6	-0.3	0	0	0
1080p	2.5	2.5	0	30	0%	2.6	0.1	0	0	0
	5	5	0	30	0%	5	0	0	0	0
	10	4.7	5.3	17	43%	4.8	0.1	0	0	0

Conclusions

The conclusions that were drawn from this project is that 4G is currently the more viable option for livestreaming over 5G. This is down to their being a developing infrastructure for 5G compared to 4G's being fully developed leading to 5G's stability issues currently. Also, the results could be down to 5G's network slicing technique, which 'splits up the network into different purposes.' (sdxcntral, 2018) However, because 5G is still early its development there is still a lot of potential for it far exceed the capabilities that the current 4G network has when it comes to livestreaming video.

Acknowledgements and References

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