

Impact of Network Conditions on Audio Streaming Service Reliability

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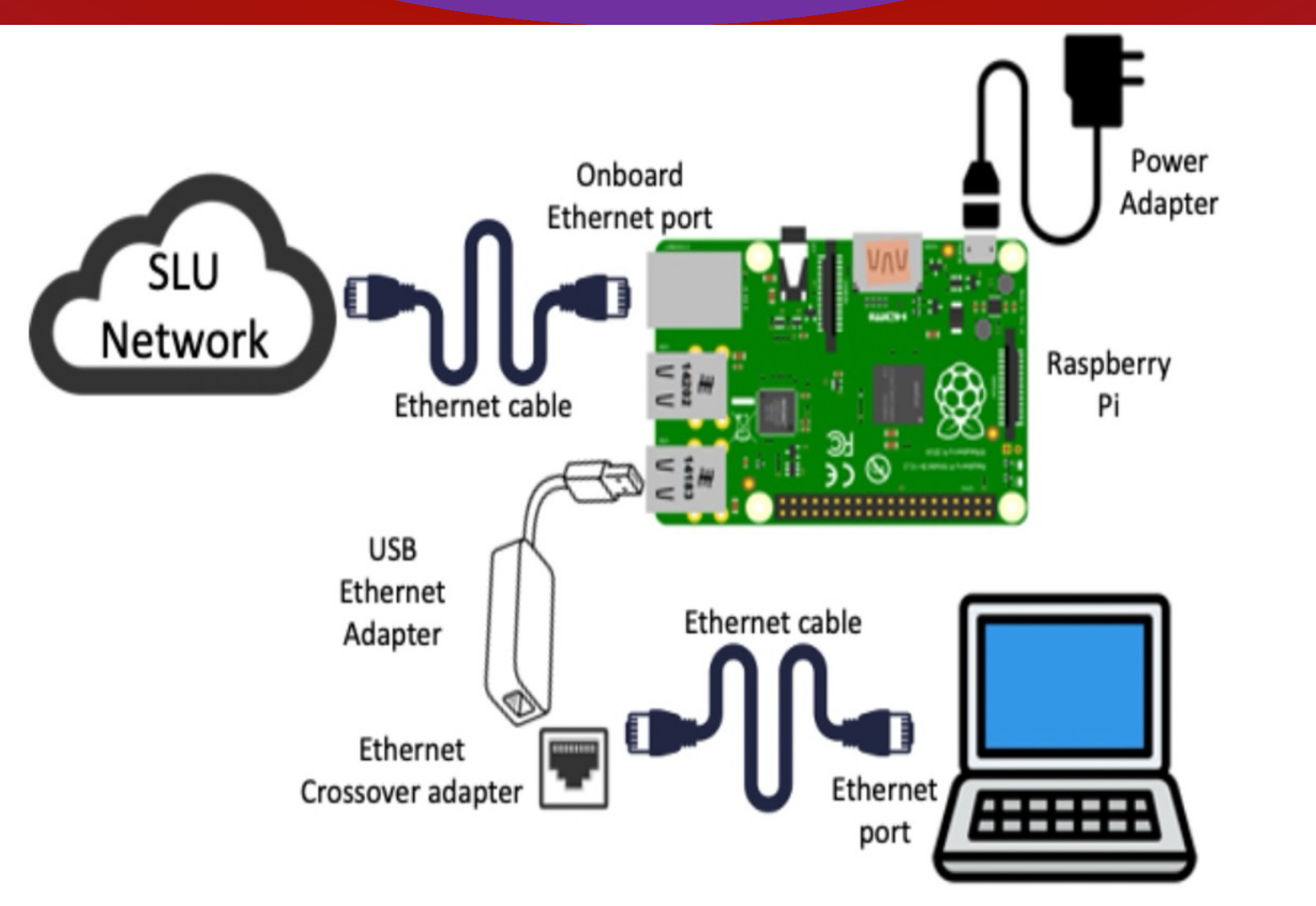


1. Abstract:

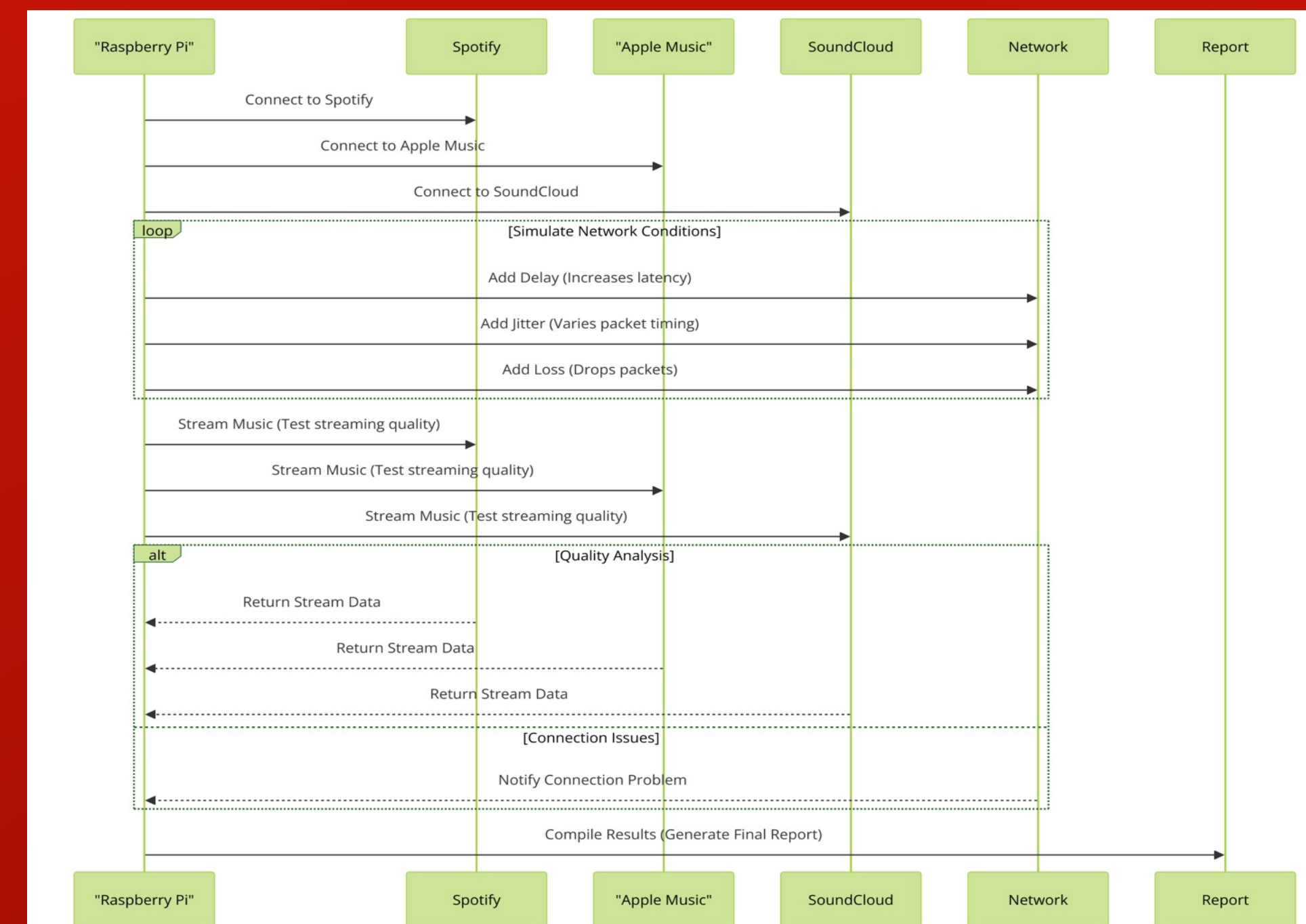
- This study explores the impact of network conditions such as bandwidth, delay, and packet loss, on the Quality of Experience (QoE) for three major music streaming platforms: Apple Music, Spotify, and SoundCloud. The research evaluates how each service's unique streaming protocols and audio compression techniques affect their performance under differing network conditions.
- Apple Music, streaming in AAC and ALAC formats, is hypothesized to excel in stable, high-bandwidth environments. Spotify, using its proprietary Spotify Streaming Protocol (SPS) was anticipated to offer a more robust performance across a range of network conditions, leveraging its protocol optimization for consistent playback. SoundCloud, employing HTTP Live Streaming (HLS), was expected to adjust dynamically to network conditions, prioritizing stream continuity over audio fidelity.

2. Background:

- This study was inspired by a personal interest in how different music streaming applications perform under real world conditions when it comes to quality.

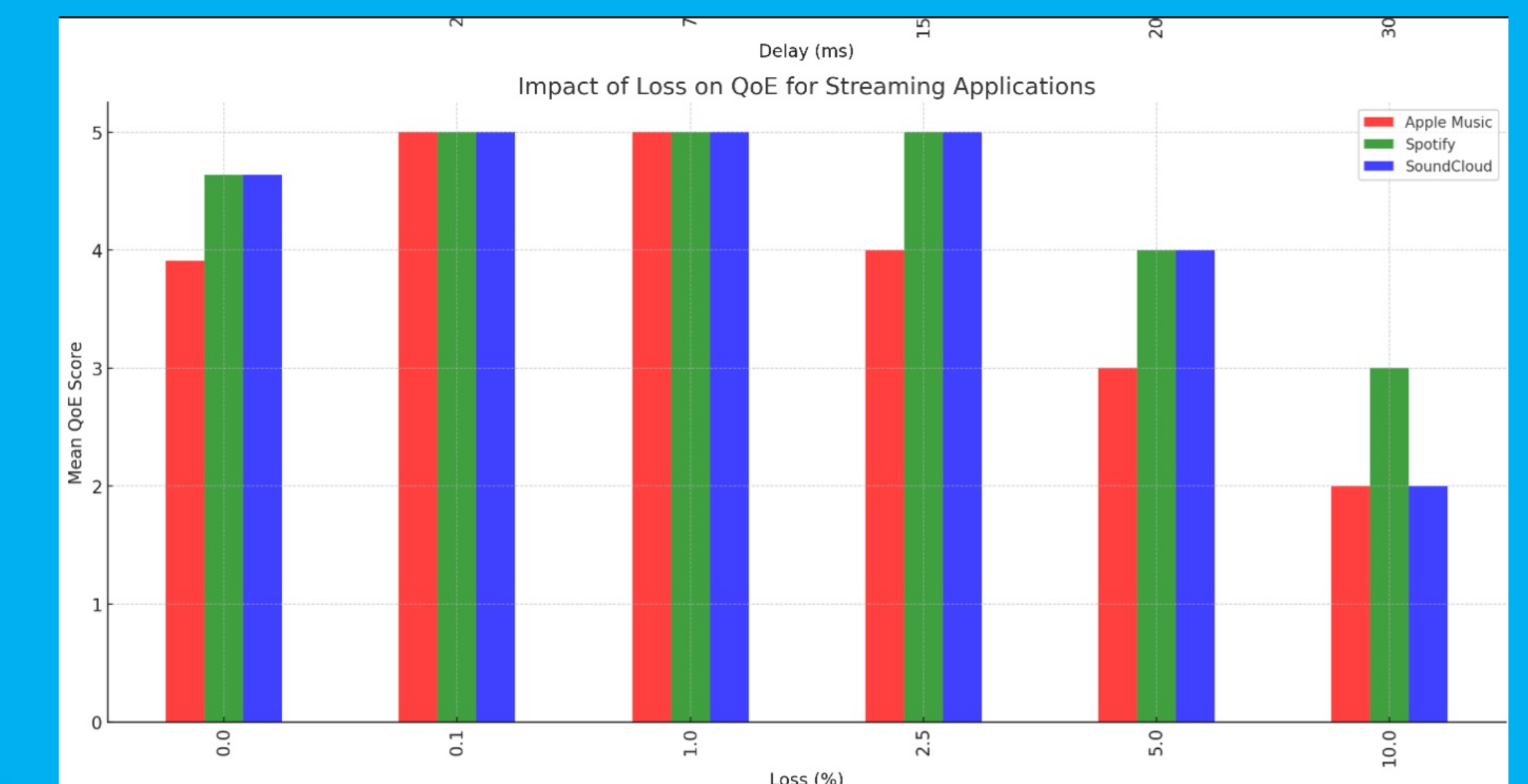
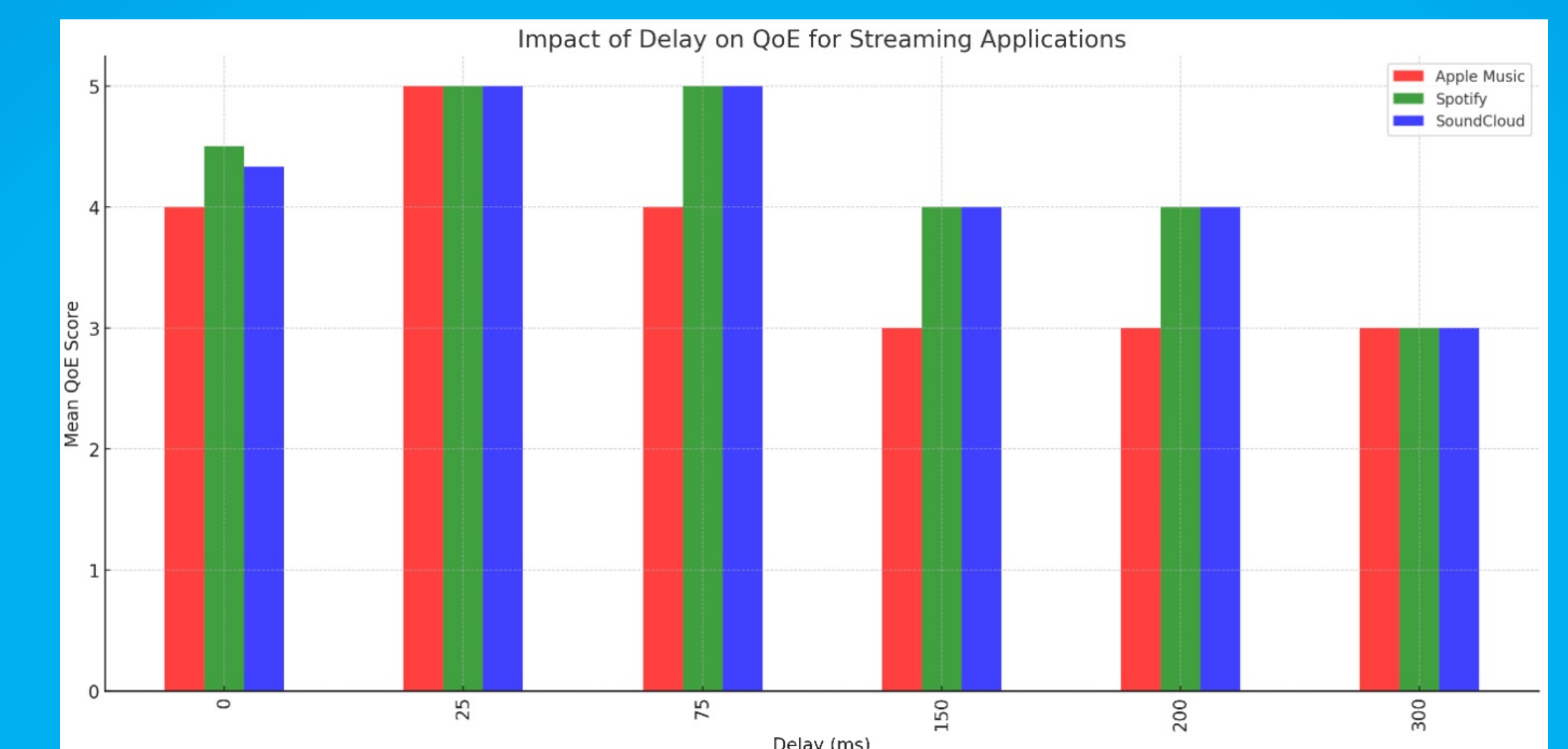
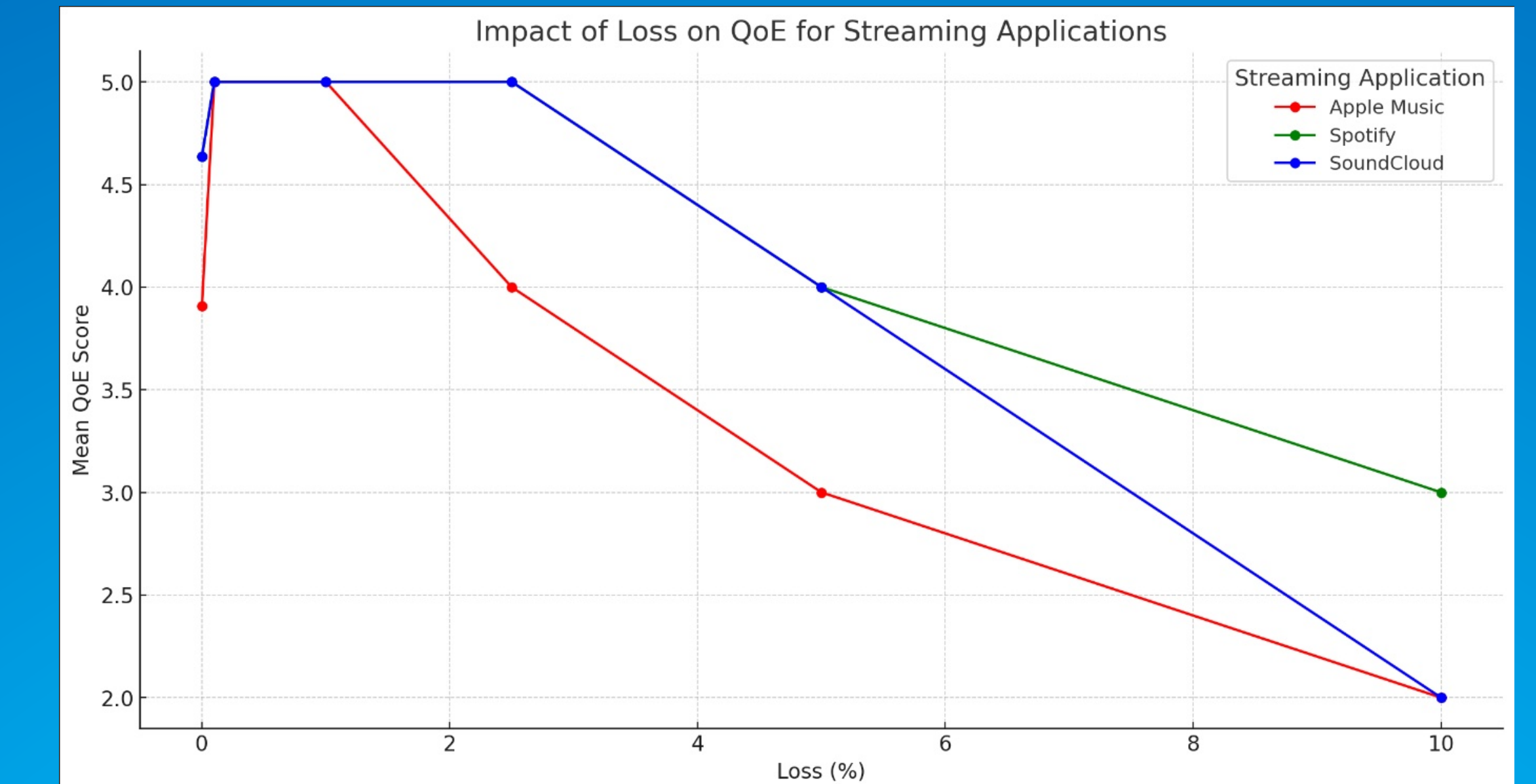
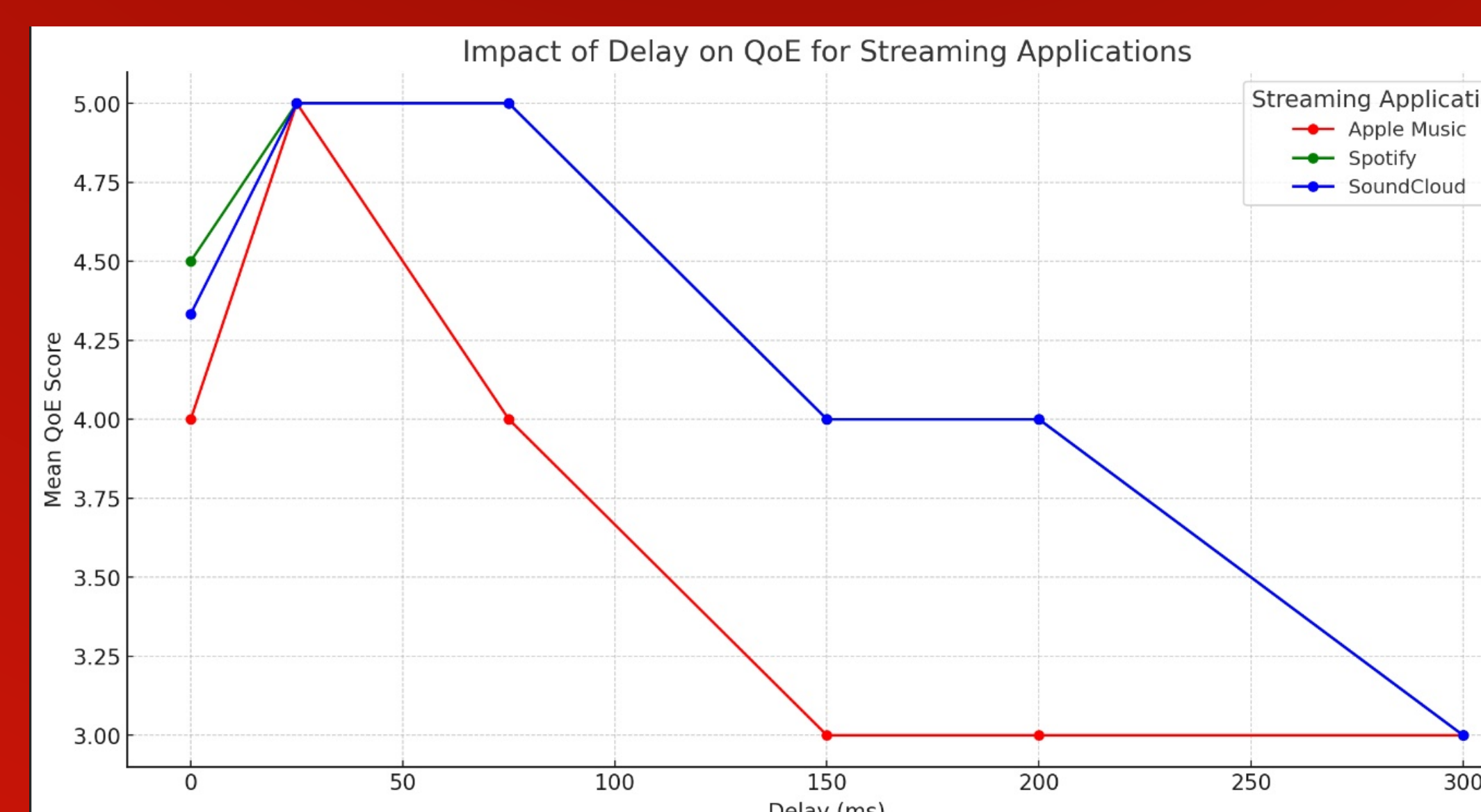
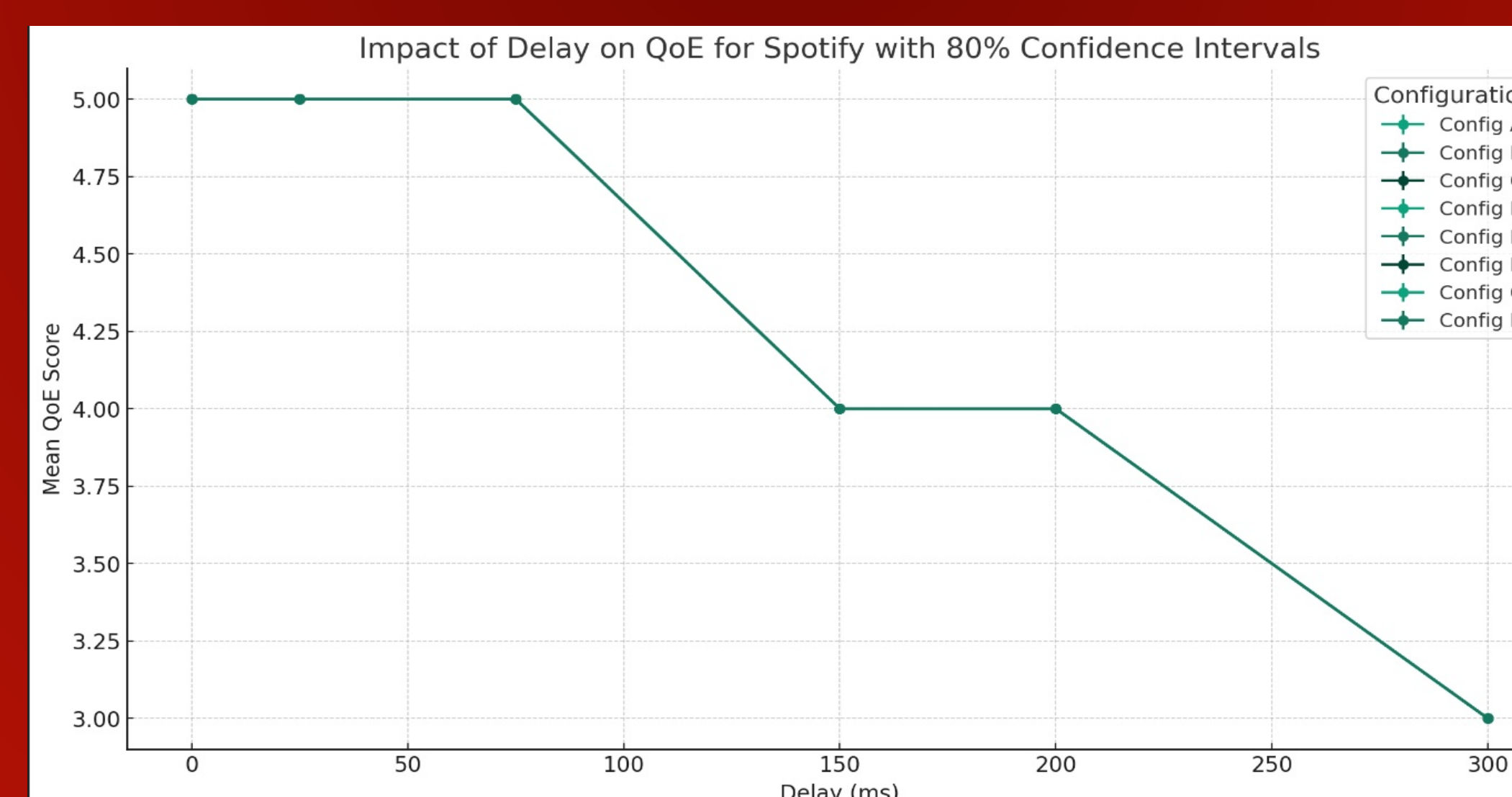


3. Method:



- Using a raspberry pi, adapters, power supply and while also connecting to the SLU network with ethernet, I was able to simulate different network conditions (delay, jitter and loss). Technical difficulties mostly involved unexpected network disruptions.
- Lastly, I collected scores for different configurations into an excel document and used the results to create a final report for analysis.

4. Results & Conclusion:



- Overall, Spotify maintains the best balance between audio quality & streaming stability. Apple music while offering superior sound quality under optimal conditions is significantly susceptible to network disruptions.
- Soundcloud effectively manages fluctuating network conditions but at the expense of consistent audio quality.
- Lastly, for future research, I would like to explore specific adaptive technologies used by these platforms.

5. Acknowledgements:

- Professor Choong-Soo Lee
- Peterson Quantitative Resource Center (PQRC)
- Class Peers