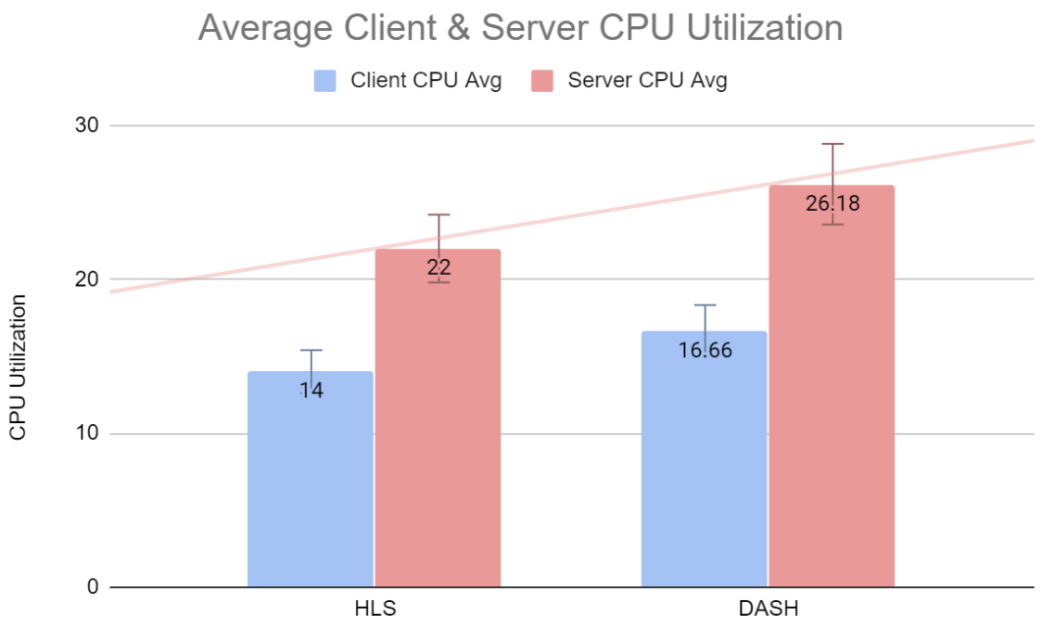
Section C – Final Report

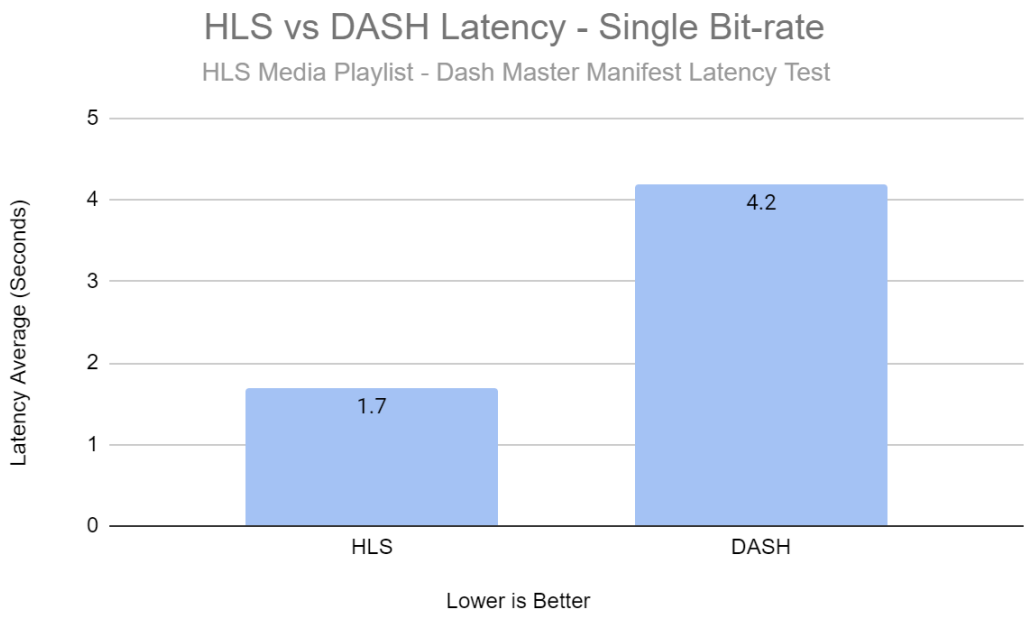
In this research paper, quantitative data was gathered to evaluate the differences in optimization between the HLS and DASH technology which are showed different results but are based on a common technology. One of the main objectives of this research paper was to analyse the quality of HTTP Live Streaming bit-rate adaptation methods with multi-tier caching servers. The research carried out performance comparison of HLS & DASH packaging and delivery tests. Additionally, the research conducted a performance analysis of using a centralised Storage with RAM, compared to traditional hard-disk based storage. The researcher also compared the utilisation of non-variable bit rate streams with the variable multi bit-rate streams for HLS and DASH packaging. Finally, the researcher analysed the performance of the application of cache re-packagers as well as IP-based load balancing functionality for the geographical region-based deployment of a u number of cache servers.

Results gathered include client and server performance utilization when using HLS or DASH streaming.



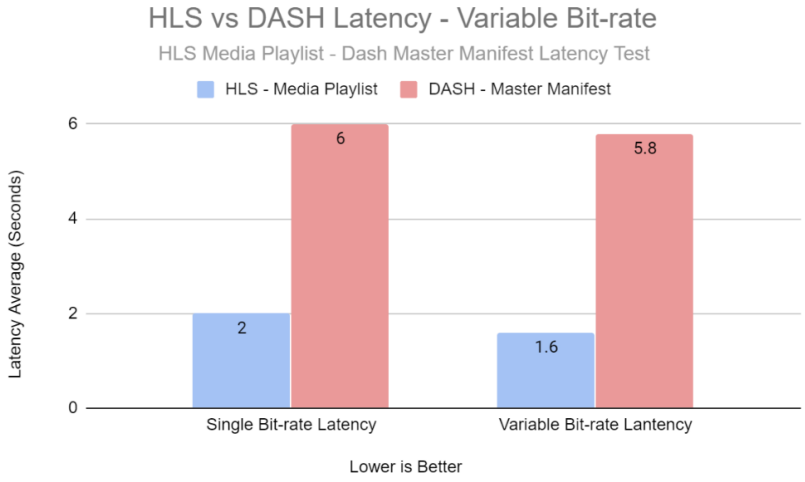
Graph illustrating the comparison of HLS and DASH CPU utilisation on Client devices and VOD server. A trendline was asses as utilisation is dependent on concurrent user utilisation.

Latency between both technologies were also gathered, it was found that DASH require more processing and has an increased latency hit as the manifest Master file require more processing and is typically larger than the playlist required by HLS.



Graph showing Latency comparison between single bit-rate HLS and DASH delivery.

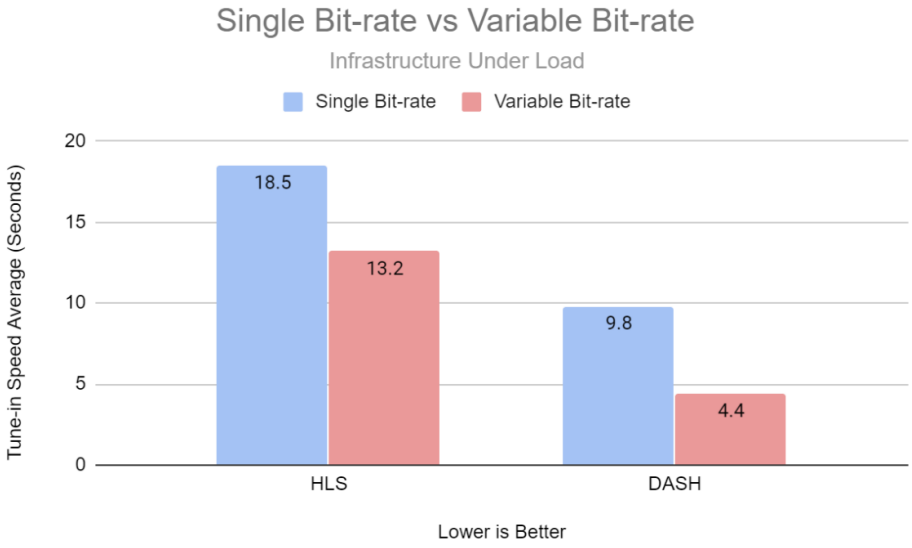
When testing various bit rates it was found that both HLS and DASH slightly reduced the latency time as both could tune-in to the lower bit rate file available.



Graph illustrating comparison between non-variable bit-rate and variable bit-rate

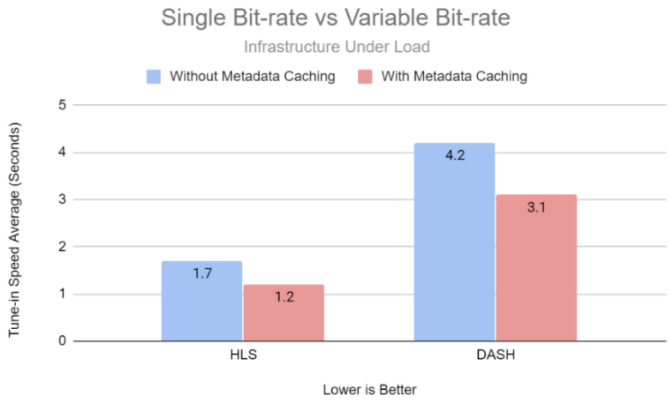
latency tests with HLS and DASH

Tune-in speed testing continues to confirm the result as a noticeable reduction in tune-in speed is experienced when HLS and DASH is combined with variable bit-rates



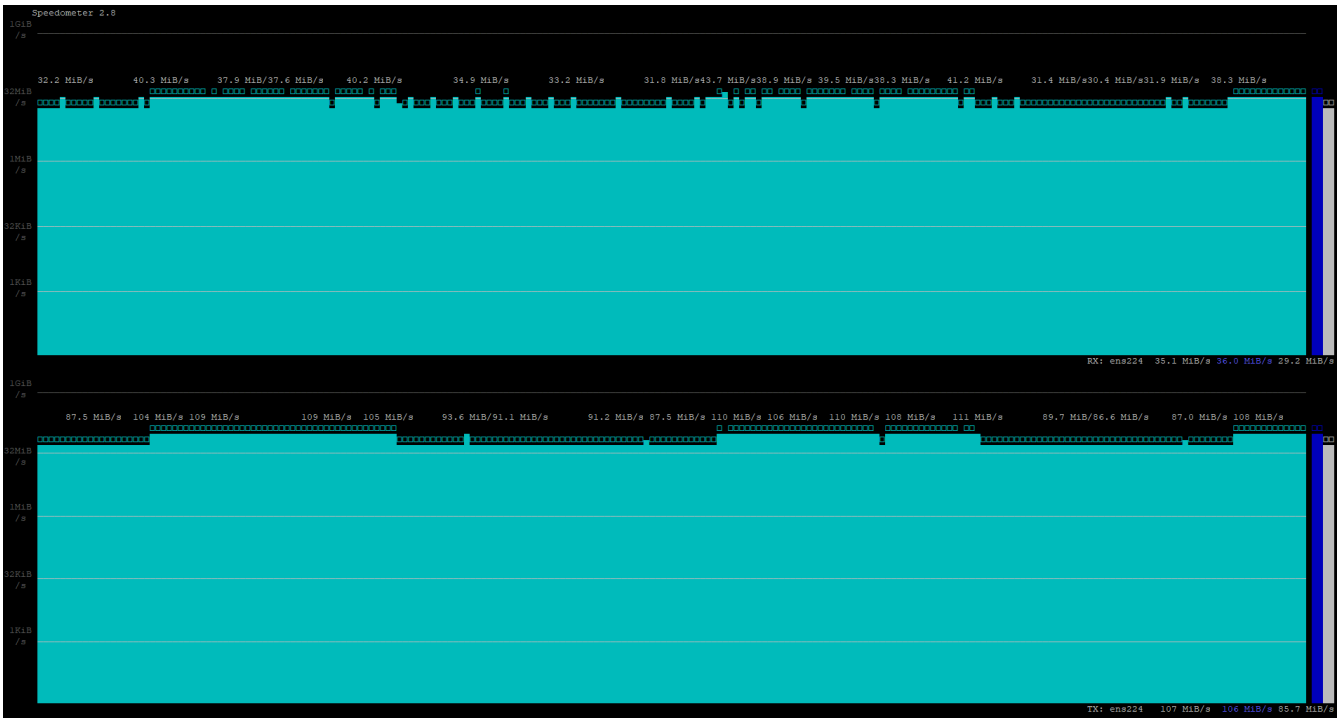
Graph showing the comparison of HLS and DASH Tune-In speed when running a single Bit-rate implementation compared to a Variable Bit-rate implementation.

It was found that running a RAM base metadata caching is more effective both technically and financially than running the entire video file on the RAM disk or traditional HDD drives.



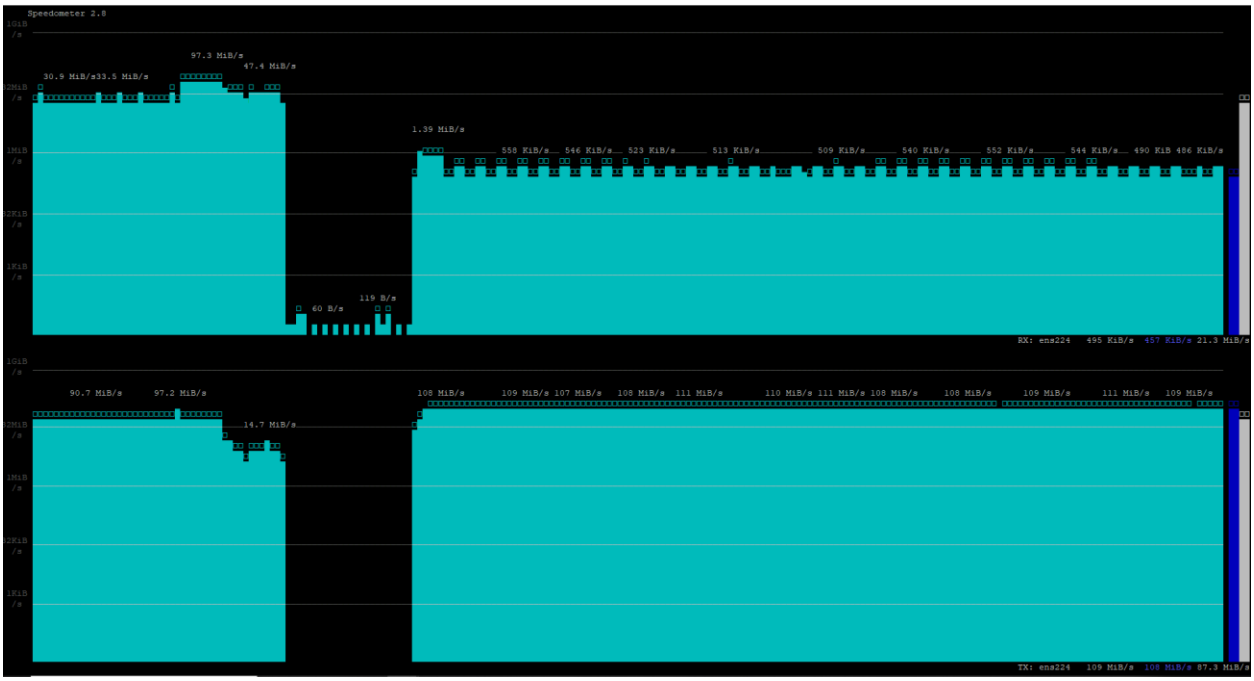
Graph showing the comparison of HLS and DASH when running a Metadata and Manifest caching implementation compared to running without Metadata and Manifest implementation.

By using the Caching modules, a successful video ingest and distribution was experienced as the caching modules were ingesting 36MiB/s but distributing 106 MiB/s. This confirms that the implementation was successfully working as the data was being stored in the cache server and re distributed to the clients.



Cache Server ingesting 36 MiB/s of data from the VOD server, storing it in cache and distributing it between clients at 106 MiB/s.

Another test was recorded as the clients stopped requesting new content and started to view data which was already ingested in the VOD cache server. The server started to receive 457 Kb/s of requests from the various clients and distributing 108 MiB/s of data to the client directly from the cache server without contacting the origin VOD packager.



Stopping VOD ingests and restarting media player of previously ingested file.

A cache server is receiving 457KiB/s of requests and distributing data at 108 MiB/s.

Combing all the results presented in the paper together it is evident that for an efficiently scalable and optimised streaming experience, DASH would be the technology to implement however HLS is still useful for running on low-power devices and still impose the limitation of running natively on Apple compatible devices which is a substantially large device share.