GetNextLive - In-concert multisource WiFi video streaming services

GOALS

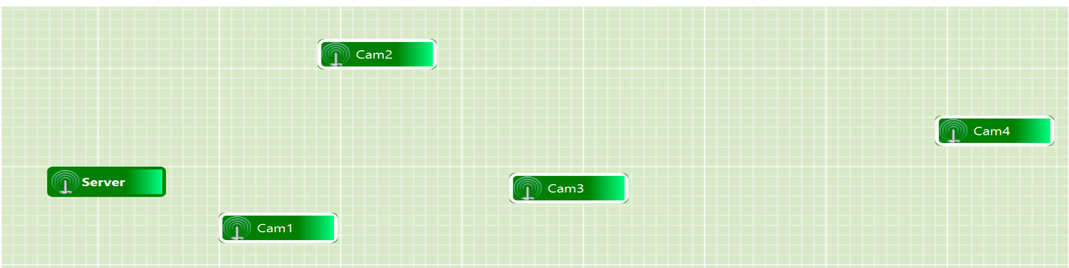
To test and improve our easy to use and affordable service for live streaming of concerts on GetNextTo, with the automatic recording of videos from multiple WiFi cameras, that can be published as VoDs.

In our experiment we have been testing WiFi communication with our cameras, allowing to get the video streams and to send control signals without cables. It might seem that video streaming over WiFi is not an issue, but in a concert venue there are hundreds of people with mobile phones with WiFi and LTE enabled, causing interferences. In the experiment, we have focused on fine tuning of our adaptive streaming software and validated the QoE of the video.

CHALLENGES

- Design the experiment with in Fed4FIRE+
- Create predefined profiles for video encoding based on QoS and QoE information
- Focus on exploring the QoE differences when using IDR frames vs intra-refresh

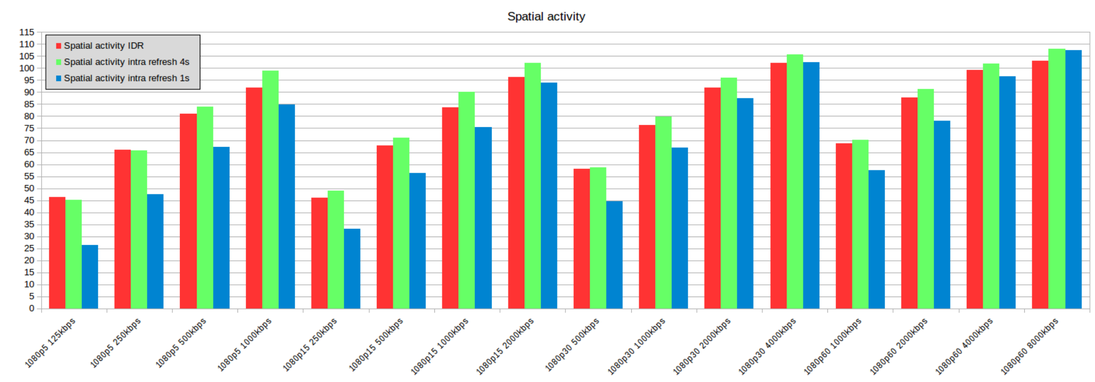
DEMO SETUP

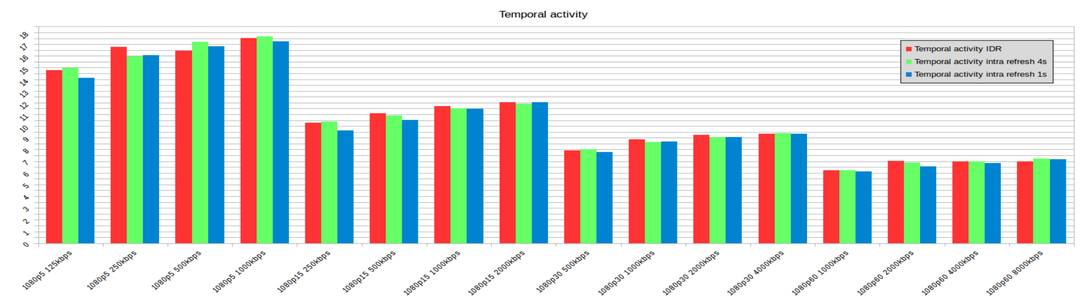


For the experiment we have used a 5 node setup at the w-iLab.t testbed. We have chosen the Zotac nodes, 4 acting as cameras, 1 as the receiving server. All have been connected using WiFi network.

The camera nodes were using our streaming software and have been transmitting pre-recorded clips of various qualities. The receiver node, recorded the video streams, with we then downloaded and evaluated offline using our QoE tool.

RESULTS





MORE RESULTS

In the experiment there were 3 types of GOP compared. First of them was a classic GOP with IDR frames, allowing easy restarts of the stream at each IDR frame. This GOP configuration, when fit into a low-delay restricted-bandwidth channel, suffered distinct quality degradation on each instance of IDR, since such frames contained image with no previous context squeezed into a size similar to the size of other frames.

In order to amend these problems, the intra-refreshed GOP type was chosen, where instead of whole frames being refreshed at once, only portions of frames contained no old data. This type of GOP was tested in two configurations, one where refreshing sequences were started every 4 second, and the other, where the refreshing waves were started every second. In theory, the shorter period should improve quality when the stream is subject to frequent random packet loss.

CONCLUSIONS

- The results achieved allowed us to find correlation between the QoS and QoE and also to study the difference of video transmission using different techniques, IDR-Frames vs intra-refresh.
- As our results are partial, we must continue the experimentation, to become a full overview and be able to introduce the changes into our product.

POST MORTEM

- We have design the experiment in the Fed4FIRE+ environment
- We have conducted several runs of our experiment reaching promising preliminary results
- Unfortunately, due to the COVID-19 pandemics and low income in the music industry, we had to reduce our IT staff. We hope, when things will get back to normal, we can continue with our improvements