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Bi-Weekly Update: Analysis and implementation of scalable video streaming over P2P network **Date: Mar 7, 2025**

Overview

Experiments which explore how peer-churn rate affects the performance has been set up. Initial data has been collected. The scripts are updated to git: https://github.com/Harper-Yan/CSC-579-P2P-Video-streaming-simulation/tree/master

However, the scale of experiment is pretty small; the parameters for better data collection and demonstration are needed. The data is unprocessed, further filtering visualizing, and interpretation are needed.

Data Demonstration

This is part of the data for peer-churn rate 30%. At this moment: 1> peer 0,2,3 have left, leaving only peer 1&4 in the system; 2> the streaming process has already began, so all StartupDelay is marked as 0; 3> the video used is small in size, so the buffer is not really active; 4> the bandwidth is slightly different between 2 peers, but falls in the same scale.

```
Peer 1 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 46.5908203125 KB
Peer 4 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 53.93359375 KB
Peer 4 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 53.93359375 KB
Peer 1 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 46.5908203125 KB
Peer 1 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 46.5908203125 KB
Peer 4 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 53.93359375 KB
```

When peer churn rate is decreased to 10%, one can observe an increase in average bandwidth usage in active peers. (Peer 3 & 1 have low bandwidth usage because they are already at the end of streaming process)

```
Peer 4 left (churn rate: 10%)
Peer 3 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 69.265625 KB
Peer 3 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 5.5087890625 KB
Peer 1 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 0.0322265625 KB
Peer 2 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 22.94140625 KB
Peer 3 - Startup Delay: 0s, Buffering Events: 0, P2P Bandwidth: 69.2978515625 KB
```

Next steps

1. Test if the data forms a strong pattern by launching experiments with bigger scale, more fine-grained parameters and heavier workloads.

2. Evaluate the appropriateness of the metrics selected to demonstrate.

3. Visualize the data, explain and interpret them, then make supported claims.