Hackathon update: Testing QUIC clients with CR-enabled QUIC
Interop setup

Docker setup with bridge either side of simulation container

- **Path simulator is NS3**
  - 600ms delay; 10Mbps
  - .. only 5Mbps achieved due to NS3 limitations
- Server is our modified Quiche, which includes CR
  - Previous RTT 600ms; and Jump of 400 packets
Cloudflare Quiche with CR

These are "work-in-progress" results

<table>
<thead>
<tr>
<th></th>
<th>quiche</th>
<th>aioquic</th>
<th>kwic</th>
<th>mvfst</th>
<th>ngtcp</th>
<th>picoquic</th>
<th>quic-go</th>
<th>chrome</th>
<th>lsquic</th>
<th>neqo</th>
<th>msquic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump happens?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sends Unvalidated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packets</td>
<td>773</td>
<td>191</td>
<td>212</td>
<td>200</td>
<td>191</td>
<td>201</td>
<td>270</td>
<td>95</td>
<td>181</td>
<td>210</td>
<td>138</td>
</tr>
<tr>
<td>Validates CWND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Final CWND</td>
<td>320,323</td>
<td>310,740</td>
<td>258,213</td>
<td>255,655</td>
<td>438,278</td>
<td>469,988</td>
<td>503,106</td>
<td>154,197</td>
<td>411,908</td>
<td>492,626</td>
<td>225,801</td>
</tr>
</tbody>
</table>

Without CR cwnd ~ 80 KB
Conclusions and Plans

This time we found:

All clients returned ACKs that left the server perform CR!

Not all clients fully utilised the jump cwnd (aioquic, kwik, mvfst, msquic), but all benefited.

We will follow-up on finding more about these differences.

Conclusion: All clients worked, we can discover more.

Next Hackathon:

We will replace the "ns3" bottleneck with a "dedicated emulator"

We can include multiple server implementations: PicoQUIC (2 flavours); Cloudflare; Others (do talk to us)

Would like some more interesting work patterns and better performance metrics.

We'll be back!