On the Cost of Using Happy Eyeballs for Transport Protocol Selection

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Introduction

• TAPS work item 3
  – “... explain how to select and engage an appropriate protocol and how to discover which protocols are available for the selected service between a given pair of end points”

• Calls for happy eyeballs mechanism for transport protocol selection
  – Try multiple protocols in parallel
Cost of Happy Eyballs?

- Three test cases
  - Basic: unencrypted connections, no caching
  - TLS: TLS-encrypted connections, no caching
  - Cache: Caching of previous connection attempts
- Metrics
  - CPU utilization
  - Kernel memory usage
CPU Utilization in Basic Test Case

- Requested object size = 1 KByte
- Requested object size = 35 KBytes

Request object size = 1 KByte
- TCP
- SCTP
- HE-TCP

Request object size = 35 KBytes
- TCP
- SCTP
- HE-TCP

Average request rate (requests/s)

CPU utilisation (%)
CPU Utilization in TLS Test Case

![Graph showing CPU utilization (%)](image)

**Average request rate (requests/s)**

<table>
<thead>
<tr>
<th></th>
<th>1K</th>
<th>35K</th>
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<tbody>
<tr>
<td>TCP</td>
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<td>HE-TCP</td>
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<tr>
<td>TCP 1000</td>
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</tbody>
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Cache Hit Ratio vs. CPU Utilization

Unencrypted

TLS-encrypted

1 KiB

35 KiB
Conclusion and next steps

• Happy Eyeballs is a feasible transport selection mechanism
• Transport service library with Happy Eyeballs support
  – https://github.com/NEAT-project/neat
• More extensive evaluations
• draft-grinnemo-taps-he
For details on the evaluation of happy eyeballs see:

https://irtf.org/anrw/2016/anrw16-final27.pdf