Trusted Proxy and the Cost of Bits
(In 10 minutes or less)

Peter Lepeska
Internet for Everyone Must Be 100x Cheaper

- Internet.org says we need 10x cheaper access technologies and 10x fewer bits to provide Internet for the 4+ billion people still not online.
- Caching and compression will reduce the bits.
- Acceleration enables low cost access technologies like geo-satellites for lower density and hard-to-reach areas including in-flight and transoceanic.

CACHING + COMPRESSION + ACCELERATION = AFFORDABLE ACCESS
Opera Mini trades a rich web experience and end-to-end encryption for great compression (average 80%). Mini decrypts HTTPS at the server. For 250 million users worldwide, these tradeoffs make sense.

“Not everyone has the option of being a data hound” - Gigaom.
HTTPS Increasing Dramatically

- With SPDY proxies, % encrypted traffic is still higher
- Mandatory TLS for HTTP/2 will accelerate this trend
- If rate of increase continues, the web will be mostly HTTPS within the next few years. What does this mean for compression, caching, acceleration?
Satellite Web without Acceleration

<table>
<thead>
<tr>
<th>Encrypting Event</th>
<th>Plaintext/accelerated (seconds)</th>
<th>Encrypted/unaccelerated (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yahoo.com switch to HTTPS</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>CNN.com via GCP</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

Viasat’s prefetching proxy pushes resources into the modem ahead of the browser, increasing effective concurrency by a factor of four.
What Viasat Is Doing About It

• Build and deploy a browser for our Exede users with trusted proxy support that provides user notification and control
• Use the browser to gather data on user acceptance and as a demonstration platform to lobby mainstream browsers to support trusted proxy functionality
• We prefer shipping a special browser to shipping a root certificate and doing standard MITM with cert forging.
What about content distribution?

Content closer to the user is always good but two issues:

• CDNs do not push content close enough to the user. The last mile is the bigger problem.

• Also CDNs favor content providers who can pay to have their content pushed globally.

TRUSTED PROXY MAKES ACCESS MORE AFFORDABLE WITHOUT FAVORING A HANDFUL OF CONTENT PROVIDERS
Concluding thoughts

- Increasing HTTPS means more MITM proxies so Middleware interop issues cannot be avoided via HTTPS
- Proxy interoperability needs to be tackled head on by protocol designers, including the complex issues around trust.
- We are participating in the Open Web Alliance, which hopes to bring together all stakeholders, to define and document a common architecture for an “open proxy”

TRUSTED PROXIES INCREASE INTERNET ACCESS, AFFORDABILITY, AND PERFORMANCE
Thank You

Contact Peter at bizzbyster@gmail.com