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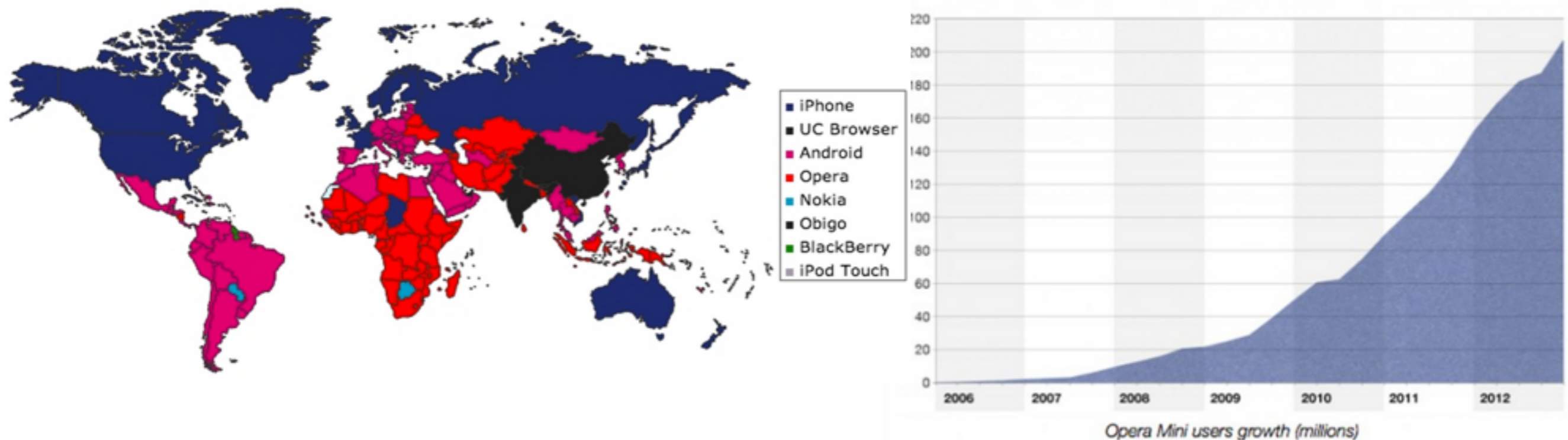
(In 10 minutes or less)

Peter Lepeska

Internet for Everyone Must Be 100x Cheaper

- Internet.org <u>says</u> 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 Dominates Where Access is Prohibitively Expensive

Legend:
- iPhone
- UC Browser
- Android
- Opera
- Nokia
- Obigo
- BlackBerry
- iPod Touch

Opera Mini users growth (millions)

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

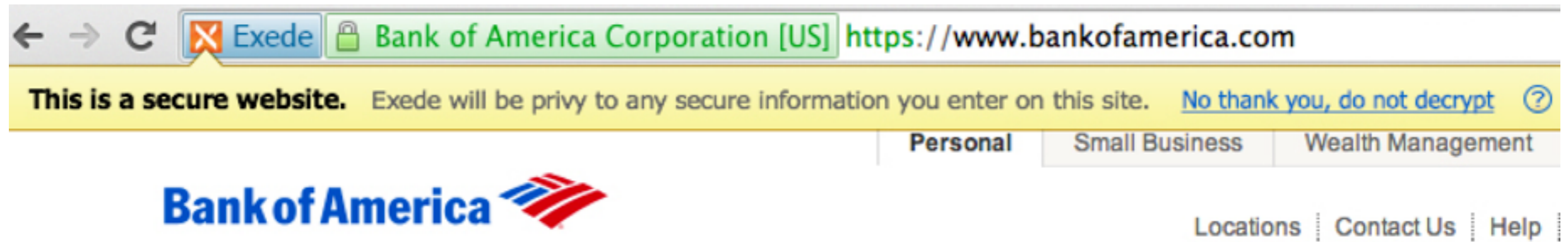% https requests according to httparchive.org
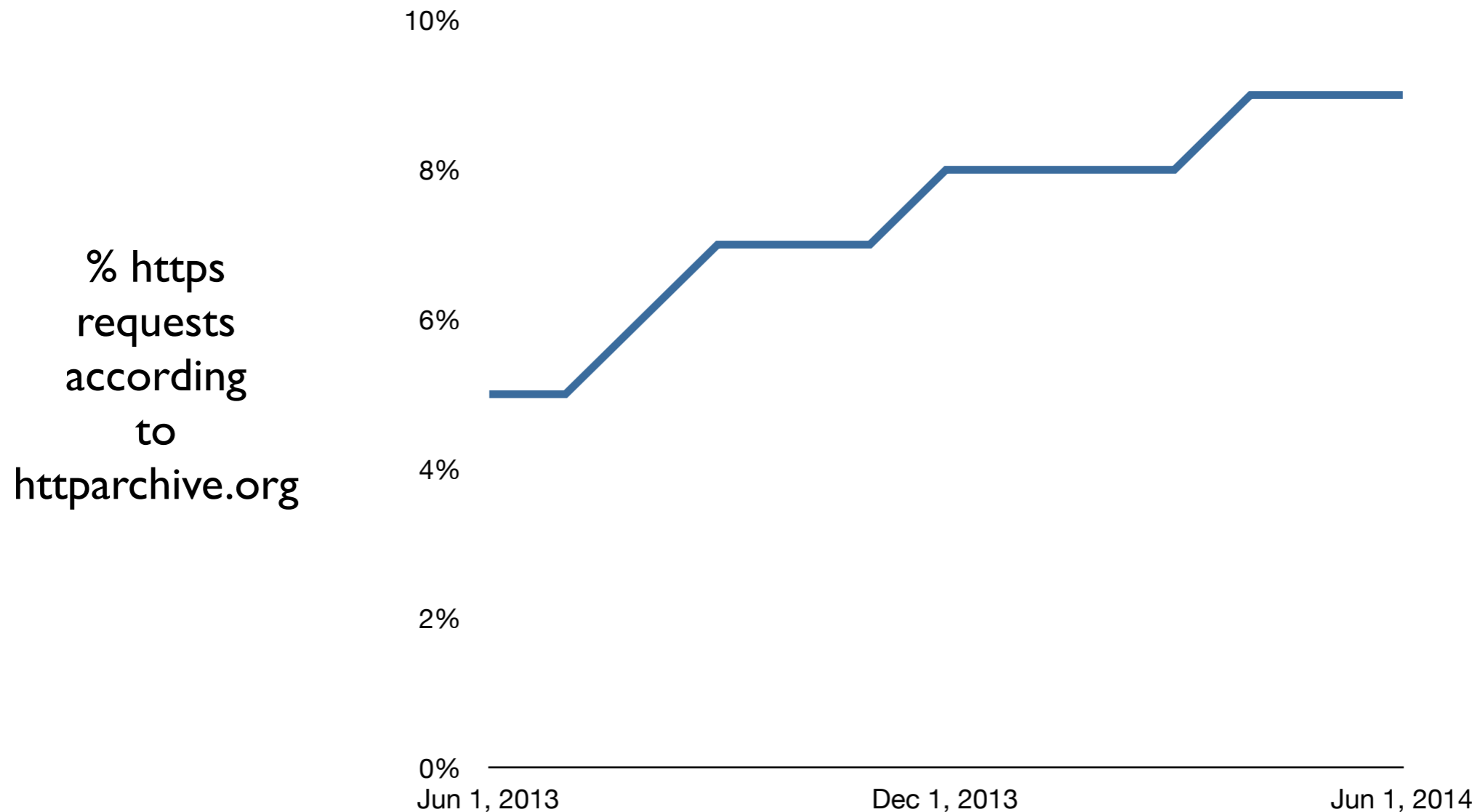
- With SPDY proxies, % encrypted traffic is still higher
- Mandatory TLS for HTTP/2 will accelerate this trend
- If rate of increase continues, the web will be mostly HTTPS within the next few years. What does this mean for compression, caching, acceleration?

Satellite Web without Acceleration

Encrypting Event	Plaintext/ accelerated (seconds)	Encrypted/ unaccelerated (seconds)
Yahoo.com switch to HTTPS	4	16
CNN.com via GCP	6	9

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

Browser address bar showing:
← → C ⊠ Exede | 🔒 Bank of America Corporation [US] https://www.bankofamerica.com
This is a secure website. Exede will be privy to any secure information you enter on this site.   No thank you, do not decrypt ⓘ
Personal | Small Business | Wealth Management
Bank of America
Locations ¦ Contact Us ¦ Help

- 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

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