

11 November 2020

Open Standards Everywhere (OSE)

Internet Society Portugal

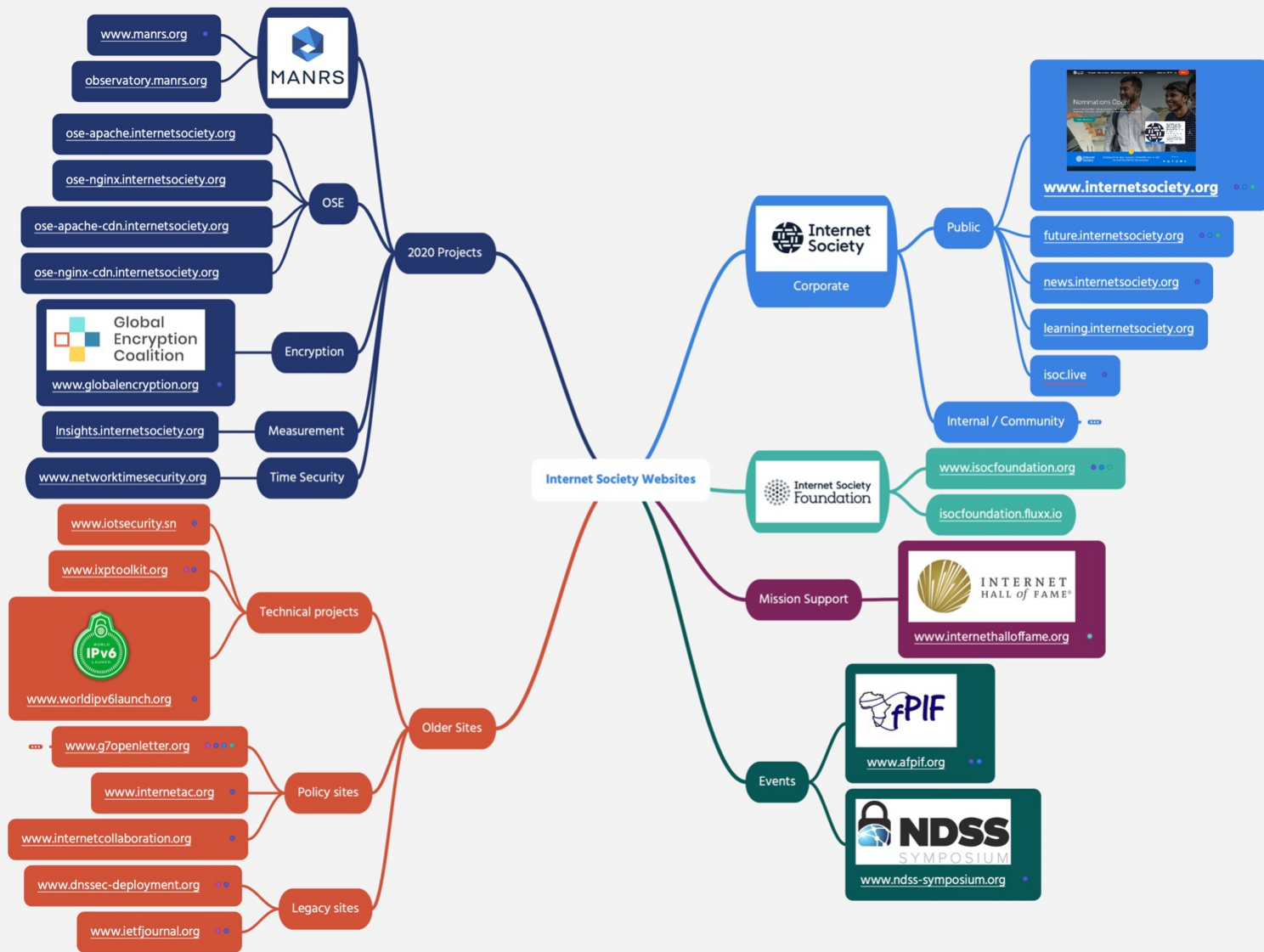
Workshop on Internet Security and Trust



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Once upon a time...







Internet.nl supported by Dutch Internet Standards Platform



Ministerie van Economische Zaken



RIPE NCC
RIPE NETWORK COORDINATION CENTRE



Nationaal Cyber Security Centrum
Ministerie van Veiligheid en Justitie



Modern Internet standards

Connection test

- IPv6
- DNSSEC

Website test

- IPv6
- DNSSEC
- HTTPS
- Application security & privacy options

Email test

- IPv6
- DNSSEC
- DMARC, DKIM, SPF
- STARTTLS + DANE



Running the Website Test (March 2019)...

Site	IPv6	DNSSEC	HTTPS	HSTS	Internet.nl	TLS 1.3	HTTP/2	Audit date
www.internetsociety.org	Y	Y	Y	Y	100%	N	Y	3/25/19
future.internetsociety.org	N	Y	Y	N	78%	N	N	3/25/19
assets.internetsociety.org	N	N	Y	Y	55%	N	Y	3/25/19
apps.internetsociety.org	Y	Y	Y	N	94%	N	N	3/25/19
inforum.internetsociety.org	N	Y	Y	Y	81%	Y	N	4/8/19
www.isocfoundation.org	N	N	Y	N	52%	N	Y	3/25/19
www.manrs.org	Y	N	Y	N	70%	N	Y	3/25/19
observatory.manrs.org	N	Y	Y	N	94%	N	N	3/26/19
www.internethalloffame.org	Y	Y	Y	Y	100%	N	N	3/26/19
www.afpif.org	Y	N	Y	N	70%	N	N	3/26/19
www.ndss-symposium.org	Y	N	Y	N	71%	N	Y	3/26/19
www.ietfjournal.org	Y	N	Y	N	70%	N	N	3/26/19
www.dnssec-deployment.org	Y	Y	Y	N	94%	N	N	3/26/19
www.internetac.org	Y	N	Y	N	70%	N	Y	3/26/19
www.ixptoolkit.org	Y	Y	Y	N	91%	N	N	3/26/19
www.iotsecurity2018.ca	N	N	Y	N	37%	N	N	3/26/19
www.iotsecurity.sn	Y	N	Y	N	70%	N	Y	3/26/19
www.worldipv6launch.org	Y	N	Y	N	68%	N	Y	3/25/19
Percentage compliant	67%	44%	100%	22%	76%	6%	44%	
The sites below are additional websites where changes may be made in the future.								
www.connect-smart.org	N	N	Y	N	52%	N	N	3/26/19
www.openwsis2015.org	Y	Y	Y	N	94%	N	N	4/8/19
www.otalliance.org	N	Y	Y	N	79%	N	N	4/8/19
Percentage compliant	33%	67%	100%	0%	76%	0%	0%	



“Oh, sure, we can fix those up!”





...



...



...

“So, about those web servers...”



“We need to make this easier for system administrators like me!”



The Open Standards Everywhere Project

An Internet Society Action Plan 2020 Project



Open standards are a fundamental
building block
of an
open Internet



IP TCP UDP HTTP(S)

SSH TLS SMTP FTP

QUIC NTP XMPP

DNS BGP SNMP

WebRTC SIP



Open Internet standards are...

... open to all to read/access

... open to all to create

... open / free to all to use



Open Architecture of Interoperable and Reusable Building Blocks

based on open standards
development processes voluntarily
adopted by a user community.

Internet Way of Networking (IWN) Critical Property #2



We want **open standards** to be **everywhere!**

(Including our own sites and services)



Open Standards Everywhere (OSE) Project Goals - 2020

Build and deploy reference web servers

- Show what a "good site" looks like

Document our work

- Explain how we configured the servers

Promote the documentation

- Share the documentation so that people can learn how to configure their web servers

Lead by example

- Configure as many Internet Society sites as possible



Open

- Based on agreed-upon, voluntary standards that anyone can use to connect with other systems

Globally-connected

- **IPv6** – Native connections for new networks (especially mobile)
- **HTTP/2** – Faster connections work better for low bandwidth, mobile

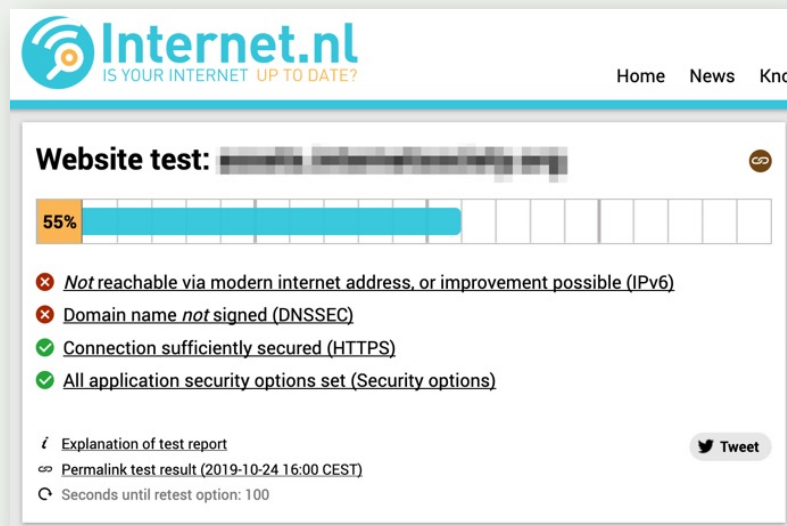
Secure and trustworthy

- **DNSSEC**
- **TLS 1.3, HSTS, and more**



Test framework – Internet.nl and http2.pro

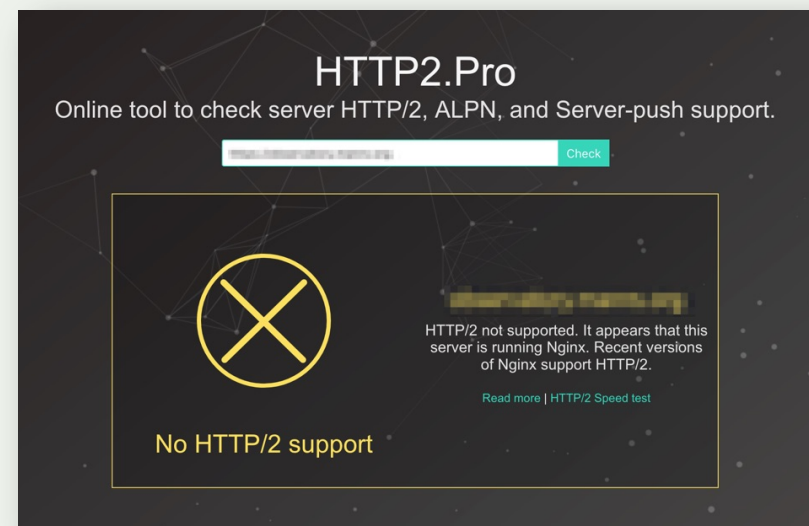
- <https://internet.nl/>
 - IPv6, DNSSEC, HTTPS/TLS, including TLS 1.3, HSTS, more
- <https://http2.pro/>
 - HTTP/2



The screenshot shows the Internet.nl website test results page. The header includes the logo and navigation links. The main content area displays a progress bar at 55% and a list of test results:

- ✗ *Not reachable via modern internet address, or improvement possible (IPv6)*
- ✗ *Domain name not signed (DNSSEC)*
- ✓ *Connection sufficiently secured (HTTPS)*
- ✓ *All application security options set (Security options)*

Additional information includes a link to the explanation of the test report, a permalink to the test result (dated 2019-10-24 16:00 CEST), and a timer showing 100 seconds until the next retest option.

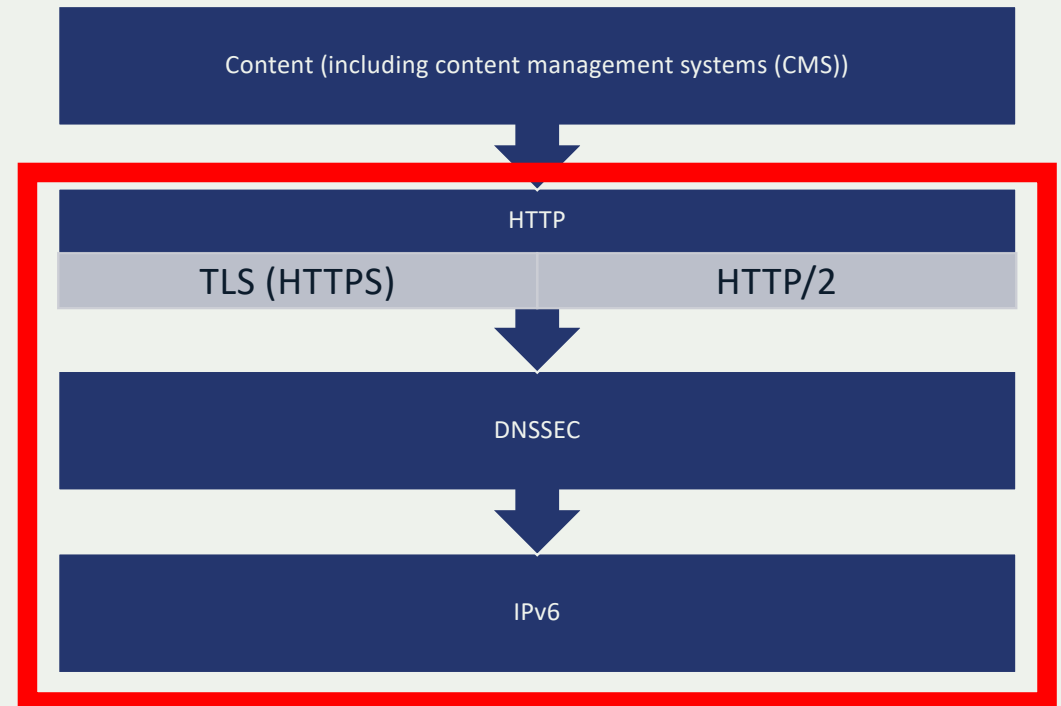


The screenshot shows the HTTP2.Pro website, which is an online tool to check server HTTP/2, ALPN, and Server-push support. The page features a search input field and a 'Check' button. Below the input field, a large yellow 'X' icon is displayed, indicating a failure. The text reads: "No HTTP/2 support". A detailed message explains: "HTTP/2 not supported. It appears that this server is running Nginx. Recent versions of Nginx support HTTP/2." There is also a link to "Read more | HTTP/2 Speed test".



Scope in 2020 – Web servers

- OSE project is focusing on security and standards of **the connections to a web server**
- **NOT** focused on **content** of web sites.
- Out of scope:
 - Web site design, presentation
 - Content management systems
 - Accessibility
 - Mobile usability
 - Page speed performance



Scope - Three types of web servers

"Self-hosted" on a server or virtual machine

- You have command-line access and can configure files.

Hosted with a website hosting provider

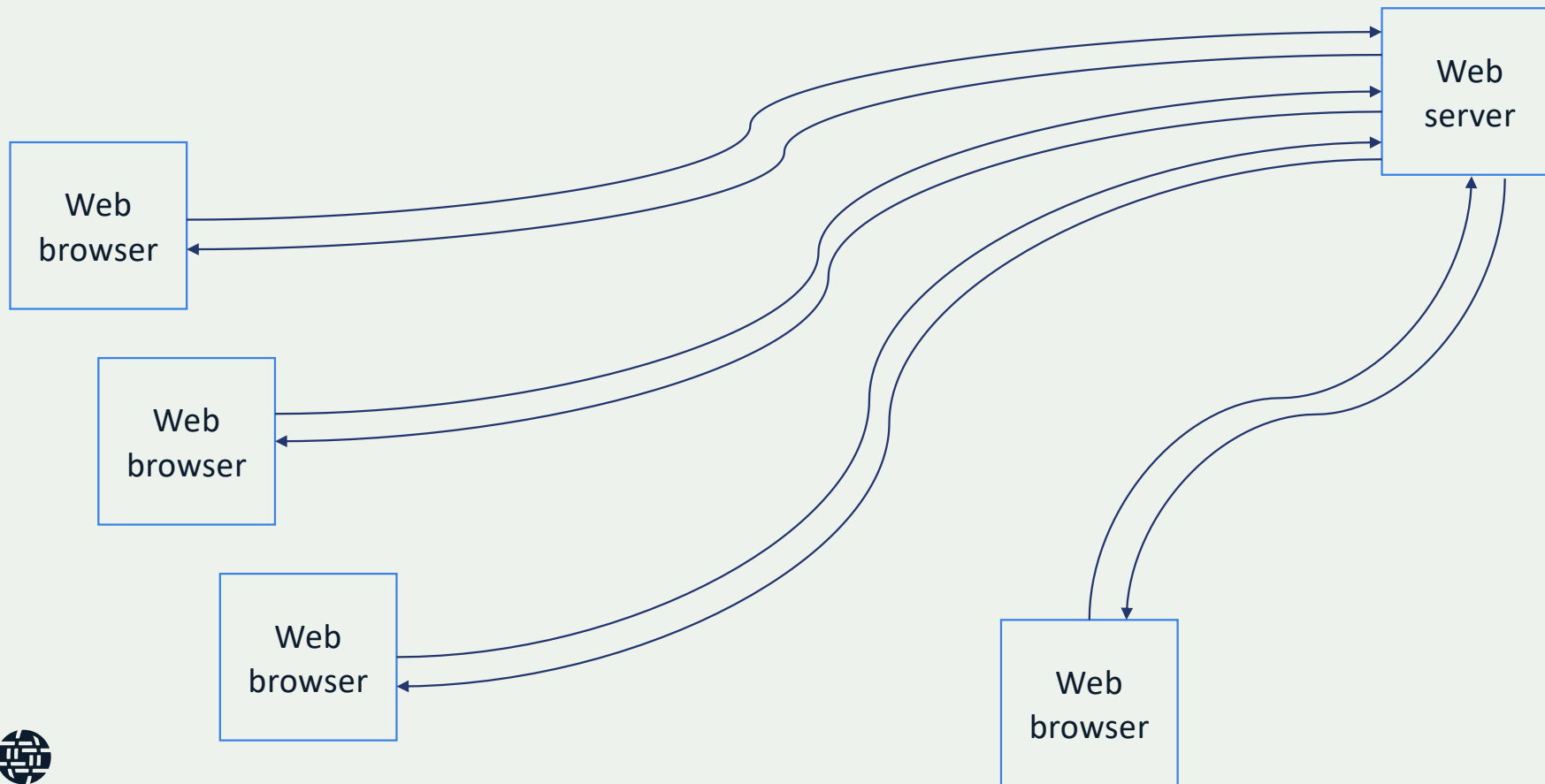
- You do NOT have command-line access. You typically use web administration forms and are limited in what you can do.

Content delivery networks (CDNs)

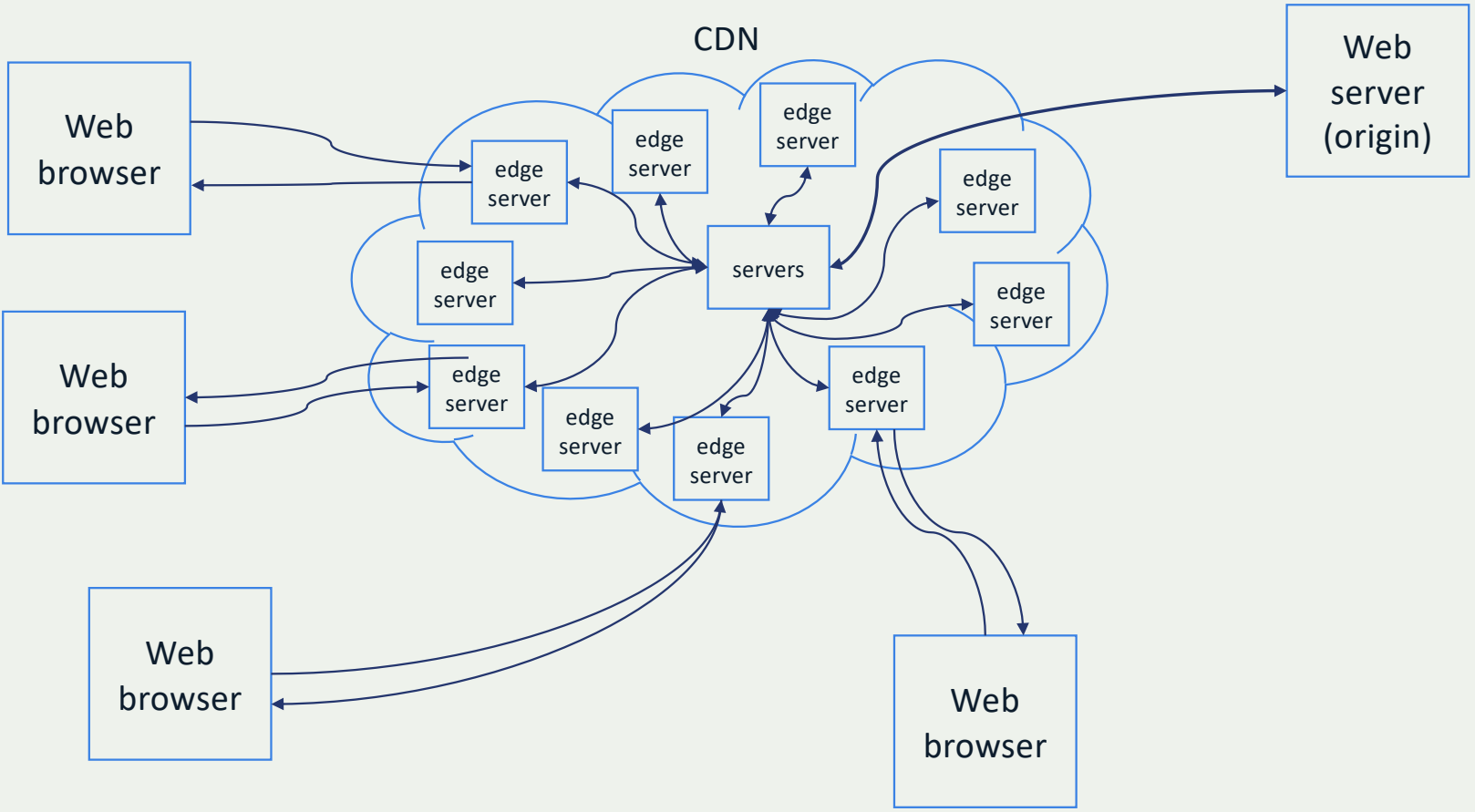
- You use a CDN in front of your self-hosted or hosted website.



About CDNs – A website connection without a CDN



About CDNs – A website connection WITH a CDN



About CDNs

- A CDN can provide IPv6, HTTP/2, TLS, DNSSEC, *even if your original web server does not*
- CDNs can dramatically improve speed of your site, and protection from some attacks
- Some CDNs offer free services, others require payment for some or all services
- Long list, including: Akamai, Amazon CloudFront, Cloudflare, Fastly, Google Cloud, Microsoft Azure, *many more*



BUILD reference servers

- Four servers using two major open source web servers, with and without a Content Delivery Network (CDN)
- Standards/practices supported:
 - IPv6
 - DNSSEC
 - TLS 1.3 (using Let's Encrypt certificates)
 - HSTS
 - HTTP/2

Apache

Apache with
CDN

NGINX

NGINX with
CDN



DOCUMENT how we set up those servers

- Easy-to-understand (and easy-to-find) documentation will be key.
- Current plans include:
 - Web pages with step-by-step tutorials
 - Videos / "screencasts" showing the precise configuration steps
 - Links to testing tools and environments
 - Links to more details on specific standards, protocols, and practices
 - Materials about why this is important, including business cases

Where we are RIGHT NOW!



DOCUMENTATION – Available on GitHub

- We are developing the documentation on GitHub:
- **<https://github.com/internetsociety/ose-documentation>**
- Developed in English. Will be translated into French and Spanish.
- Using GitHub issue tracker to track our work.

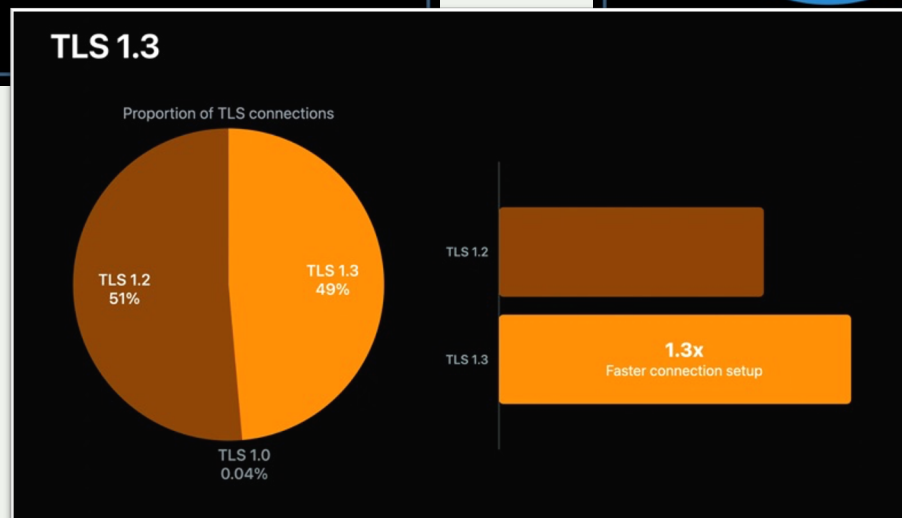
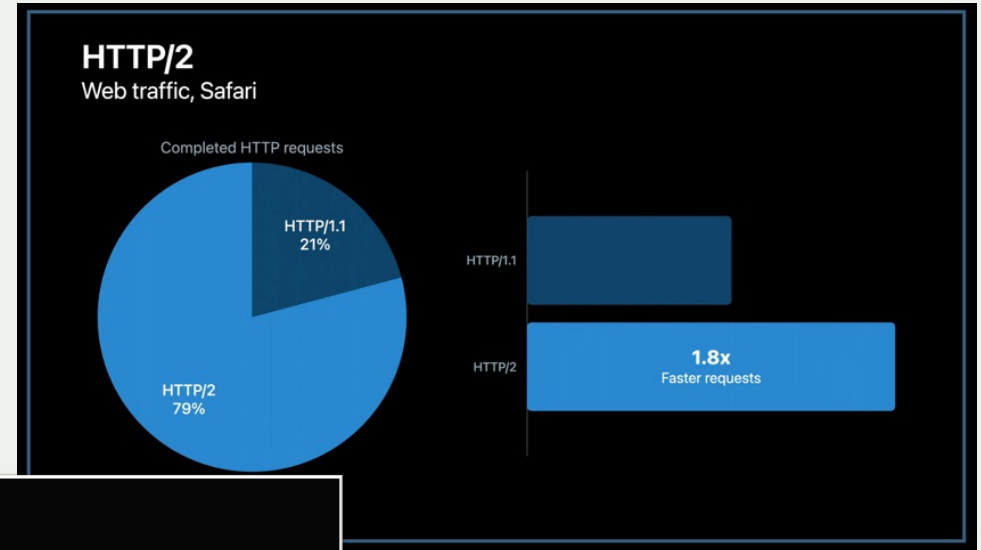
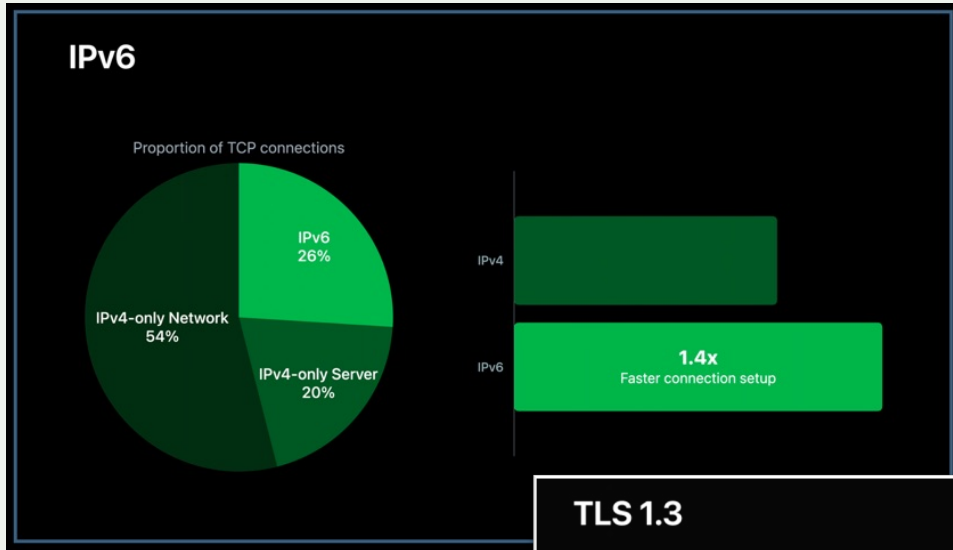


PROMOTE the information

- Sharing this information, incorporating feedback, and helping more people:
 - Presentations to online conferences
 - Network operator groups (NOGs) meetings
 - Websites and media channels focused on
 - website operators and developers
 - open source / free software
 - security and privacy
 - Events within the web community (ex. WordCamp events for WordPress)
 - Events within the open source community
 - Events within the security community
 - Podcasts (audio and video) on these topics
- If you have ideas – york@isoc.org



PROMOTION – the performance business case



Source: Apple WWDC 2020

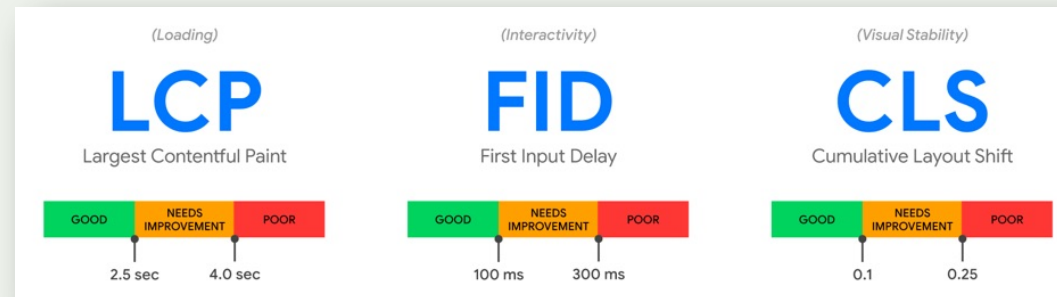


PROMOTION – the performance business case



Results showed that **by decreasing load time by 0.1s**, the average conversion rate **grew by 8%** for retail sites and **by 10%** for travel sites.

- Deloitte study commissioned by Google



Google search ranking factor in 2021.
<https://web.dev/vitals/>



LEAD BY EXAMPLE – our Internet Society sites

- We will “practice what we promote”
- Audit of all of our corporate sites
- Working on changes

Site	IPv6	DNSSEC	HTTPS	HSTS	NOT TLS 1.0/1.1	Cipher Order	Internet.nl	TLS 1.3	HTTP/2
www.internetsociety.org	Y	Y	Y	Y	Y	N	97%	N	Y
future.internetsociety.org	Y	Y	Y	Y	Y	N	97%	N	Y
apps.internetsociety.org	Y	Y	Y	Y	N	N	97%	N	N
www.isocfoundation.org	Y	N	Y	Y	Y	N	70%	N	Y
news.internetsociety.org	Y	Y	Y	Y	Y	N	97%	N	Y
www.manrs.org	Y	Y	Y	Y	Y	N	97%	N	Y
observatory.manrs.org	Y	Y	Y	Y	N	N	92%	N	N
ose.apache.internetsociety.org	Y	Y	Y	Y	Y	Y	100%	Y	Y
ose.apache-cdn.internetsociety.org	Y	Y	Y	Y	Y	N	97%	Y	Y
ose.nginx.internetsociety.org	Y	Y	Y	Y	Y	Y	100%	Y	Y
ose.nginx-cdn.internetsociety.org	Y	Y	Y	Y	Y	N	97%	Y	Y
www.internethalloffame.org	Y	Y	Y	Y	N	N	97%	N	N
www.afpif.org	Y	N	Y	Y	Y	N	70%	N	Y
www.ndss-symposium.org	Y	N	Y	N	Y	N	69%	N	Y
www.ietfjournal.org	Y	N	Y	N	N	N	68%	N	Y
www.dnssec-deployment.org	Y	Y	Y	N	N	N	95%	N	Y
www.internetac.org	Y	Y	Y	Y	Y	N	97%	N	Y
www.internetcollaboration.org	Y	Y	Y	Y	Y	N	97%	N	Y
www.ixptoolkit.org	Y	N	Y	N	N	N	68%	N	Y
www.networktimesecurity.org	Y	Y	Y	Y	Y	Y	100%	Y	Y
www.worldipv6launch.org	Y	N	Y	Y	Y	N	68%	Y	Y
Percentage compliant	100%	71%	100%	81%	71%	14%	89%	29%	86%



Keeping Documentation Up-to-date

- We will continue to update the documentation throughout 2020 and 2021.
- Expanding web server documentation as standards evolve:
 - **HTTP/3** (also known as QUIC)
- Open to community involvement!
 - Additional hosted instructions
 - Community translations (beyond English, French, and Spanish)



How You Can Help

- **Test your site with Internet.nl** – and help spread the word about site
- **Review / comment on the documentation on GitHub:**
 - **<https://github.com/internetsociety/ose-documentation>**
- **Share this info and encourage others to join in**
 - **<https://www.internetsociety.org/ose/>**
 - **Invite our team to participate in events, podcasts, articles, more**



An open Internet is based on
open standards

Please join us!



?



Thank you.

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GitHub: [danyork](https://github.com/danyork)

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Nepean, Ontario, K2G 6J5
Canada

3 Temasek Avenue, Level 21
Centennial Tower
Singapore 039190

internet-society.org
[@internetsociety](https://twitter.com/internetsociety)



You are NOT alone! A survey of the Alexa Top 25 sites

Alexa Top 25 Sites - 19 Feb 2020 - OSE Standards Audit										
#	Site	IPv6	DNSSEC	HTTPS	HSTS	NOT TLS 1.0/1.1	Cipher Order	Internet.nl	TLS 1.3	HTTP/2
1	Google.com	Y	N	Y	N	N	N	66%	Y	Y
2	YouTube.com	Y	N	Y	Y	N	N	70%	Y	Y
3	Tmall.com	N	N	Y	N	N	N	32%	N	Y
4	Facebook.com	Y	N	Y	Y	N	N	68%	Y	Y
5	Baidu.com	N	N	Y	N	N	N	28%	N	N
6	Qq.com	N	N	Y	N	N	N	37%	N	Y
7	Sohu.com	N	N	Y	N	N	N	32%	Y	Y
8	Login.tmall.com	N	N	Y	N	N	N	35%	N	Y
9	Taobao.com	N	N	Y	N	N	N	32%	N	Y
10	360.cn	N	N	Y	N	N	N	28%	N	N
11	jd.com	N	N	Y	N	N	N	32%	Y	N
12	Yahoo.com	Y	N	Y	Y	N	N	73%	N	Y
13	Wikipedia.org	N (NS)	N	Y	Y	Y	Y	58%	N	Y
14	Amazon.com	N	N	Y	N	N	Y	52%	N	Y
15	Sina.com.cn	N	N	Y	N	N	N	28%	Y	Y
16	Weibo.com	N	N	Y	N	N	N	28%	N	Y
17	Pages.tmall.com	N	N	Y	Y	N	N	37%	N	Y
18	Live.com	N	N	Y	N	N	N	47%	N	Y
19	Reddit.com	N	N	Y	Y	N	N	52%	N	Y
20	Vk.com	N	N	Y	Y	N	N	52%	Y	Y
21	Netflix.com	Y	N	Y	Y	N	N	63%	N	N
22	Xinhuanet.com	N	N	N	N	N	N	21%	N	N
23	Okezone.com	N	N	Y	N	N	N	30%	N	Y
24	Bongacams.com	N	N	Y	N	N	N	30%	N	Y
25	Blogspot.com	Y	N	Y	N	N	N	66%	Y	Y
Percentage compliant		22%	0%	96%	35%	4%	9%	44%	30%	78%

List from <https://www.alex.com/topsites> on 19 Feb 2020

