Rethinking Connection Security Indicators

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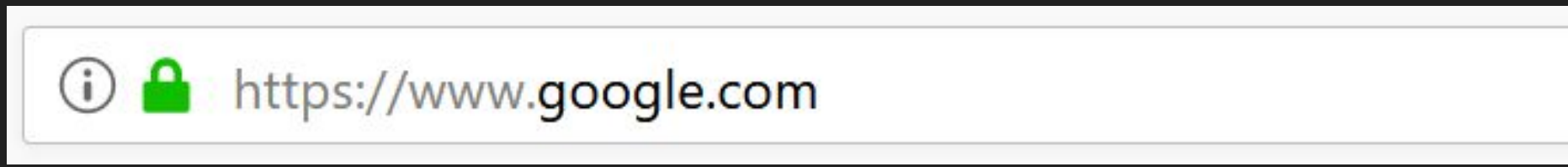
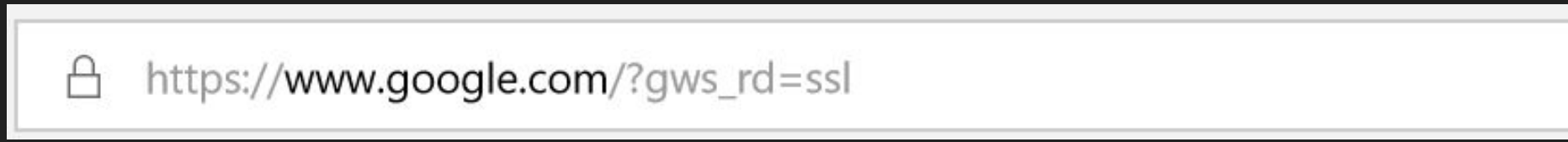
Connection Security Indicators

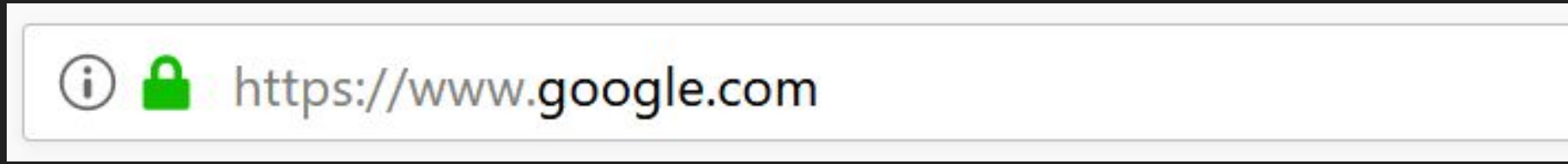




Connection Security Indicators

CHROME:

FIREFOX:



EDGE:

TLS and HTTPS

What guarantees do you get?

TLS and HTTPS

What guarantees do you get?

What assumptions do you make?

TLS and HTTPS

What guarantees do you get?

What assumptions do you make?

What guarantees do you *not* get?

Summarize all that in 100x100 pixels...

CHROME:

FIREFOX:

EDGE:

Miscommunication

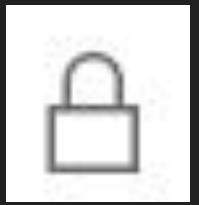
CHROME:

https://www.charmingcharlie.com/handbags

FIREFOX:

https://www.indiamart.com/proddetail/non-woven-shopping-bag-14414682991.html

EDGE:



https://www.freepik.com/free-vector/empty-shopping-bag-mockup_1177172.htm

How To Convey the Guarantees of TLS in UI

Grab paper and pen

Draw a full-page connection security indicator

What was missing in our design process?

Measurement of current state

Actual user input to identify helpful changes

Measurement of success after change is made

Research Question

How can we improve connection security indicators?

Research Question

What were their goals?

How do we know when connection security indicators are ‘improved’?

Research Question

Was it the right question?

Problems to Be Solved

How to measure current security indicator effectiveness

How to improve connection security indicators

~~Measure effectiveness after deployment~~

Historical Indicators

Browser	HTTPS	HTTPS minor error	HTTPS major error	HTTP	EV	Malware
Chrome 48 Win	https://www	https://mixe	~~https~~://wro	www.exam	Symantec Co	https://dow
Edge 20 Win	example.	https://mix	wrong.host.badss	example.com	Symantec Co	Unsafe website dem
Firefox 44 Win	https://www.e	https://mixec	https://expire	www.example	Symantec Corpo	https://spacet
Safari 9 Mac	example.com	mixed.badssl.c	*URL hidden*	example.com	Symantec Cor	downloadgam
Chrome 48 And	https://v	https://mixe	~~https~~://v	www.examp	https://v	https://spac
Opera Mini 14 And	www.exam	mixed.badssl.c	wrong.host.ba	www.example	www.syma	*Unavailable*
UC Mini 10 And	Example D	mixed.bads	*Blocked*	Example D	Endpoint, C	*Blocked*
UC Browser 2 iOS	Example Do.	mixed.bads..	wrong.host..	Example Do.	Endpoint, C.	*Unavailable*
Safari 9 iOS	example.c	mixed.badss	wrong.host	example.com	Symantec	*Unavailable*

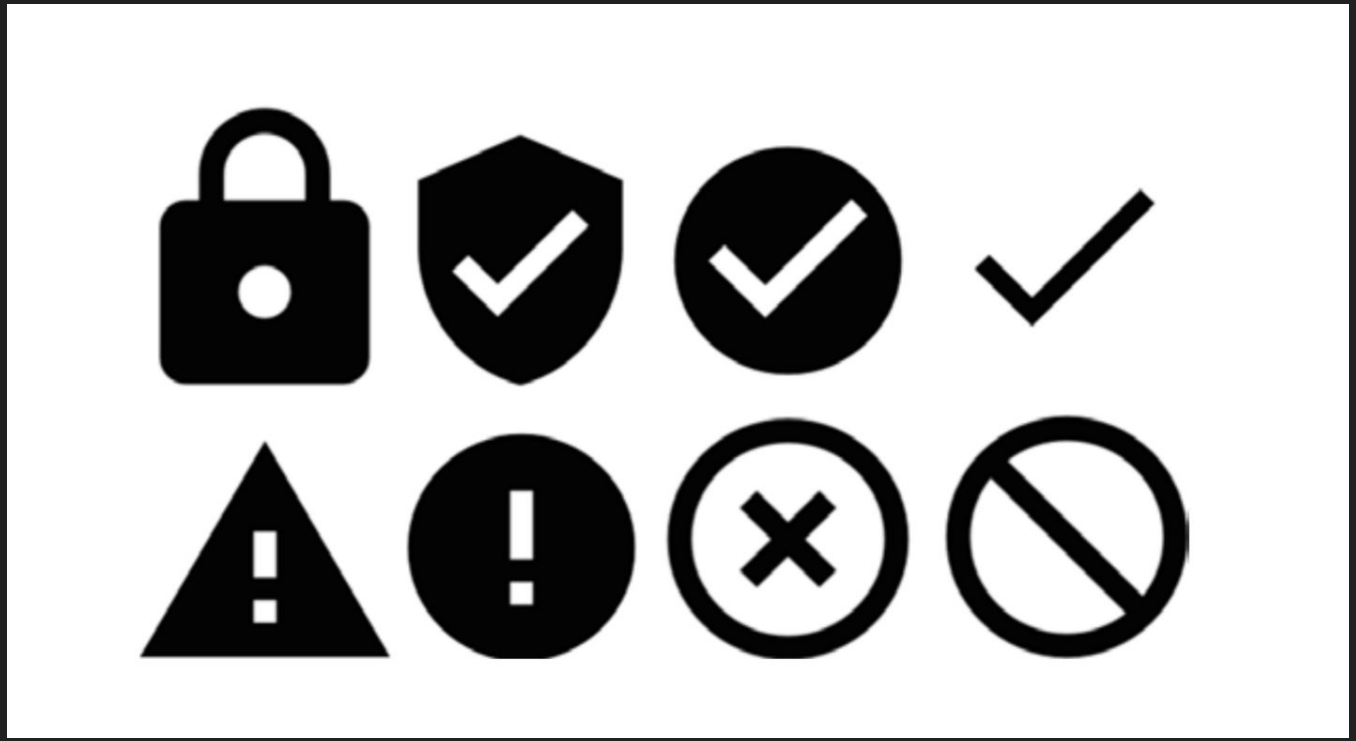
Figure 2: Security indicators for major browsers on Windows (Win), Mac, Android (And), and iOS. For categories that trigger warnings (e.g., malware), we include the security indicator state during the warning.

Measuring Current Indicators

Most people understand at least partially the green lock

More people are confused what the HTTP indicators are telling them

Icon/Color Selection



Icon/Color Selection

	Positive icons				*Negative icons*			
								
...IS secure?								
Black	**23%**	20%	18%	13%	8%	8%	5%	5%
Blue	20%	**21%**	17%	17%	7%	7%	5%	6%
Green	**23%**	20%	16%	12%	8%	10%	6%	4%
Orange	19%	**20%**	18%	18%	6%	9%	6%	4%
Red	19%	**20%**	19%	18%	7%	7%	5%	5%
...is NOT secure?								
Black	4%	8%	10%	6%	19%	14%	**21%**	19%
Blue	5%	8%	7%	8%	**21%**	19%	16%	16%
Green	3%	10%	7%	8%	19%	17%	**20%**	16%
Orange	6%	8%	9%	7%	**19%**	17%	17%	16%

Text Selection

“secure”

“https”

“not secure”

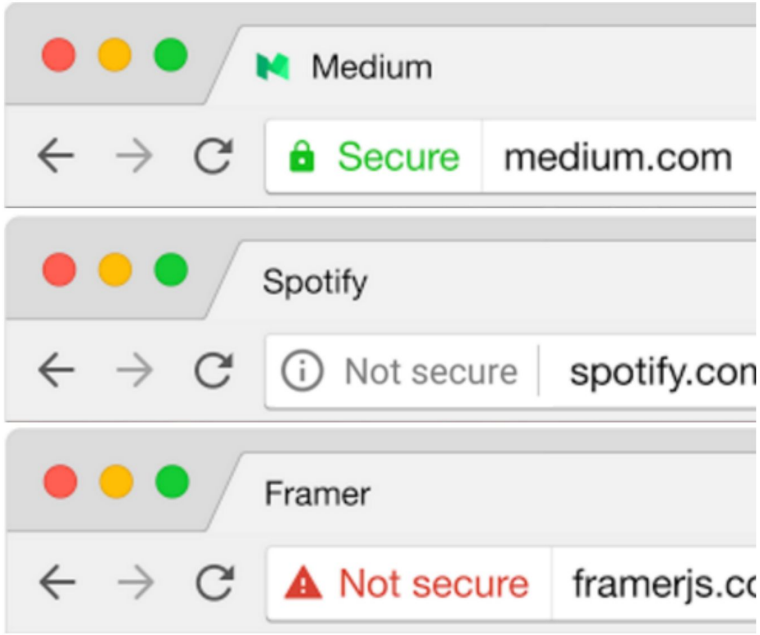


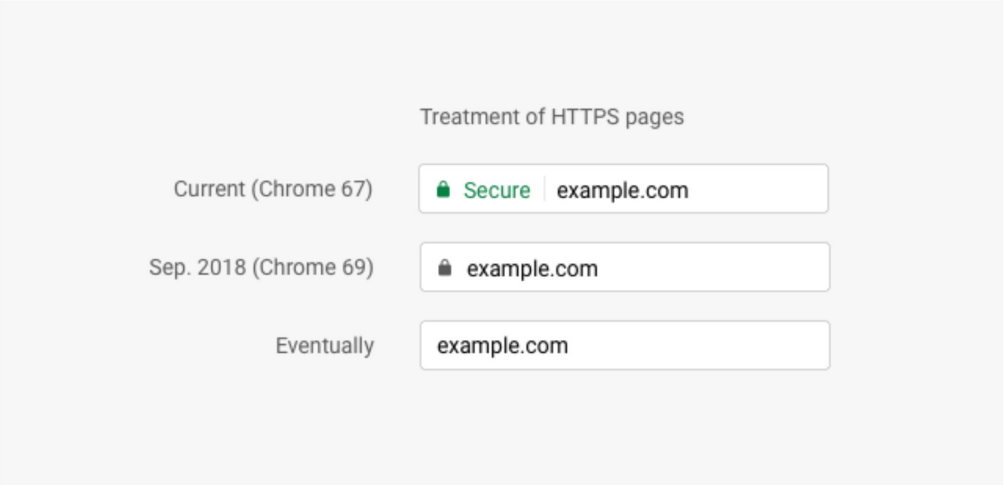
Figure 4: Proposed connection security indicators.

Why Does Chrome Not Use These Indicators Today?

What changed?

Why Does Chrome Not Use These Indicators?

Users should expect that the web is safe by default, and they'll be warned when there's an issue. Since we'll soon start marking all HTTP pages as "not secure", we'll step towards removing Chrome's positive security indicators so that the default unmarked state is secure. Chrome will roll this out over time, starting by removing the "Secure" wording and HTTPS scheme in September 2018 (Chrome 69).



Chrome treatment for HTTPS pages

https://blog.chromium.org/2018/05/evolving-chromes-security-indicators.html

What Will Future Work Look Like?