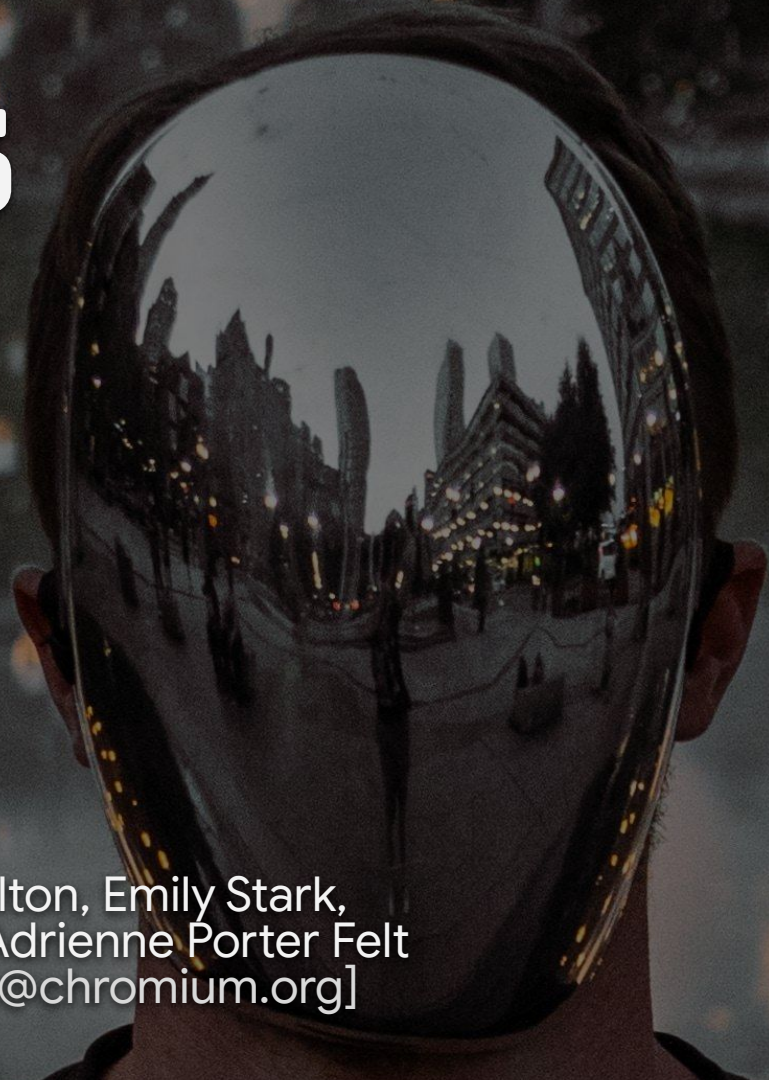


THE WEB'S IDENTITY CRISIS

Understanding the
effectiveness of
website identity
indicators

Christopher Thompson, Martin Shelton, Emily Stark,
Maximilian Walker, Emily Schechter, Adrienne Porter Felt
[Google Chrome -- security-enamel@chromium.org]



`https://example.com[:80]`



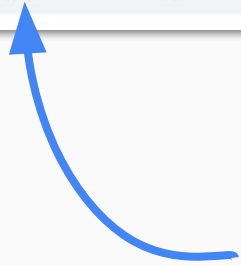
Scheme



Hostname




Port



**Organization name +
country of jurisdiction**

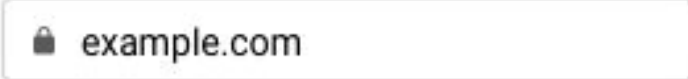
Treatment of HTTPS pages

Old (Chrome 67)



Secure | example.com

Current (Chrome 69+)



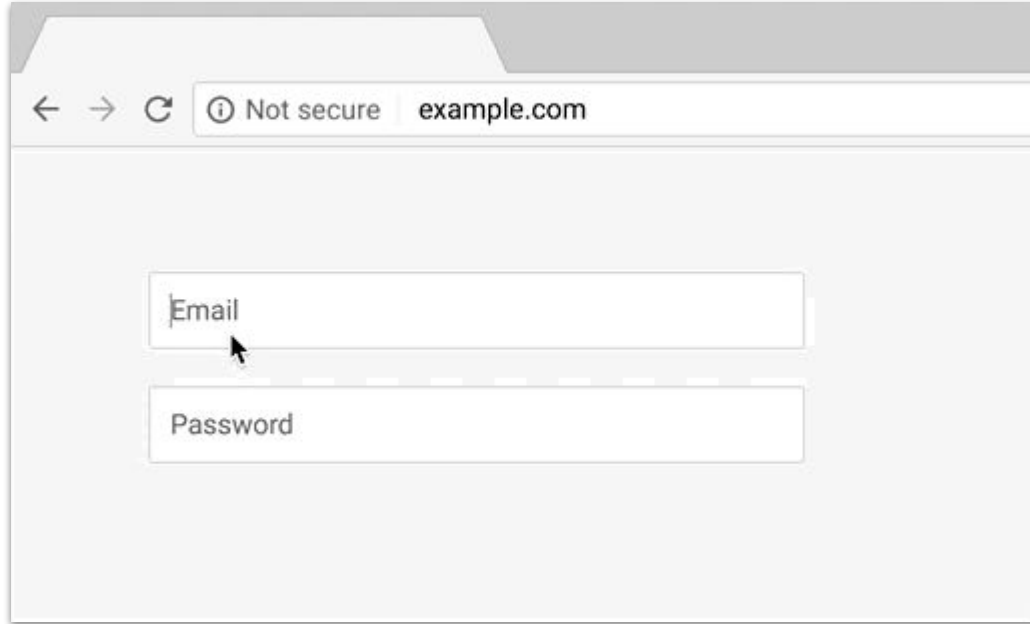
example.com

Eventually



example.com

Treatment of HTTP pages





Deceptive site ahead

Attackers on **example.com** may trick you into doing something dangerous like installing software or revealing your personal information (for example, passwords, phone numbers, or credit cards). [Learn more](#)

Details

Back to safety

**CHECK
ENGINE**



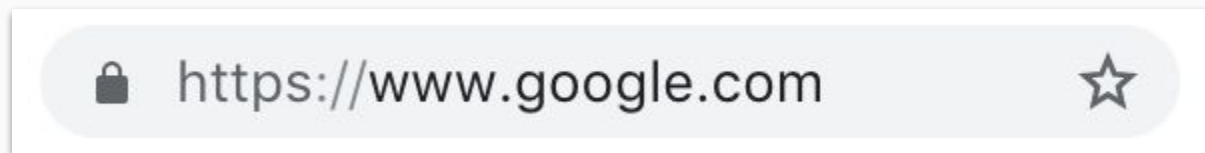
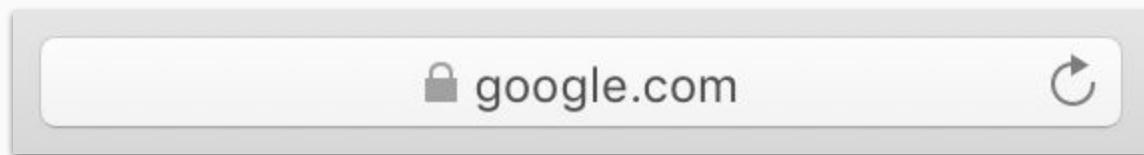
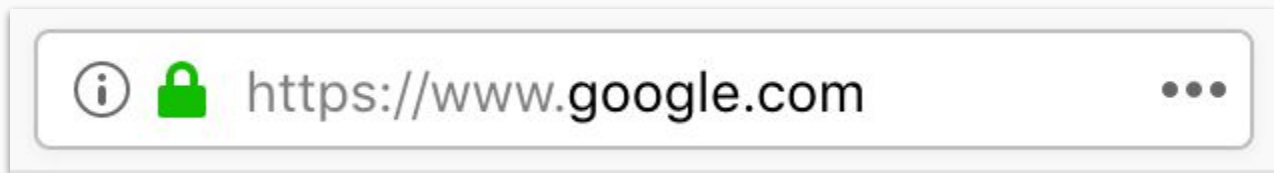
**CHECK
ENGINE**

versus

**ENGINE
OK**



**ENGINE
OK**



   PayPal, Inc. (US) | <https://www.paypal.com/us/home>



 paypal.com



 PayPal, Inc. [US] | <https://www.paypal.com/us/home>



   PayPal, Inc. (US) | <https://www.paypal.com/us/home>



 paypal.com



 PayPal, Inc. [US] | <https://www.paypal.com/us/home>



The image shows a web browser window with a dark title bar containing window control buttons (red, yellow, green) and a tab labeled "Stripe". The address bar shows a green padlock icon, the text "Stripe, Inc (US)", and the URL "https://stripe.ian.sh". Below the address bar, a security information popup is displayed. The popup has a blue header with a back arrow and a green padlock icon. The main text in the popup reads: "Stripe, Inc", "Secure Connection", "You are securely connected to this site, owned by:", "Stripe, Inc", "Richmond", "Kentucky, US", and "Verified by: COMODO CA Limited". At the bottom of the popup is a grey button labeled "More Information". The background of the browser shows a blue gradient with the "stripe" logo and the word "Developers".

Stripe

Stripe, Inc (US) | https://stripe.ian.sh

Stripe, Inc
Secure Connection

You are securely connected to this site, owned by:

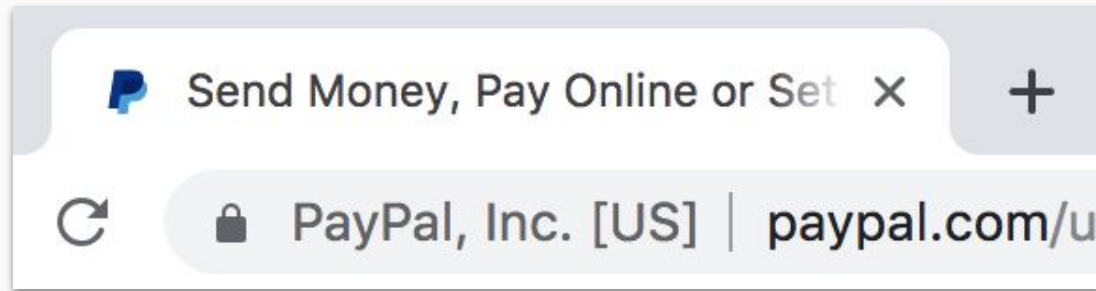
Stripe, Inc
Richmond
Kentucky, US

Verified by: COMODO CA Limited

More Information

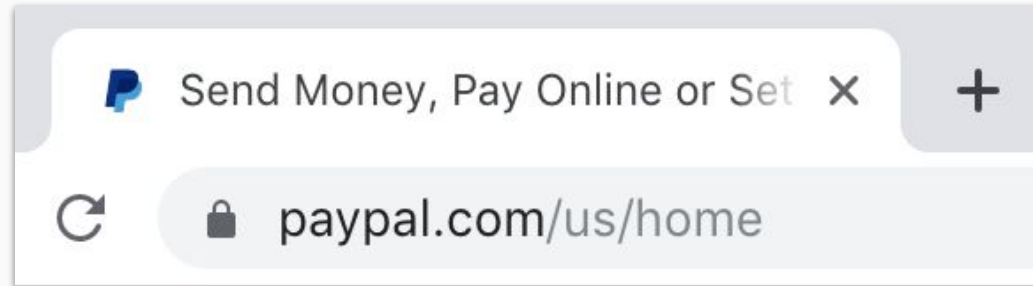
**DO CURRENT SITE IDENTITY
INDICATORS HELP USERS?**

Does the absence of the EV UI affect user behavior?

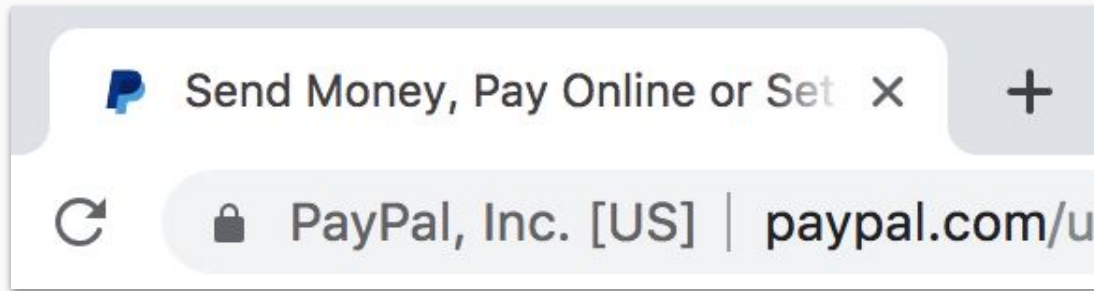


Control
Show the EV UI.

Treatment
Don't.

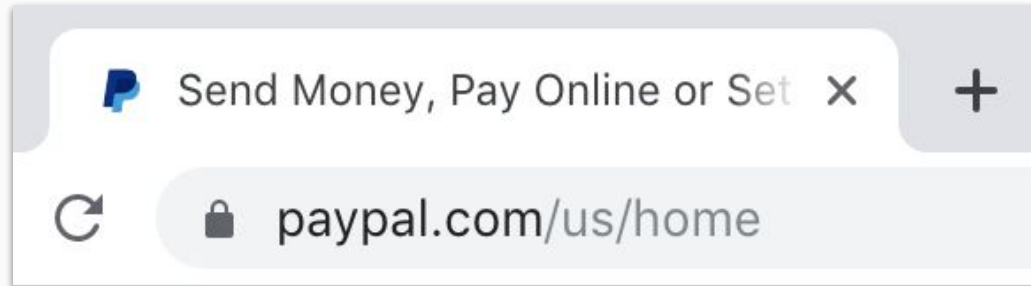


Does the absence of the EV UI affect user behavior? *(Not really.)*



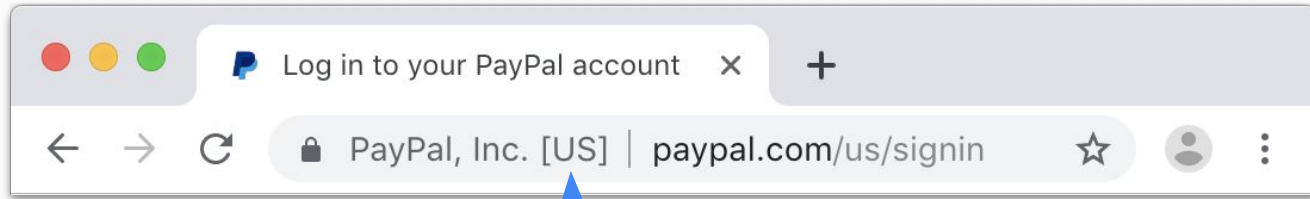
Control
Show the EV UI.

Treatment
Don't.



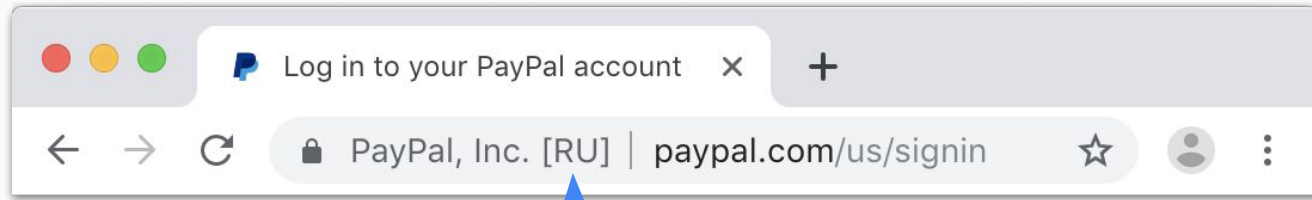
Does EV help users detect cross-jurisdiction collision attacks?

Does EV help users detect cross-jurisdiction collision attacks?

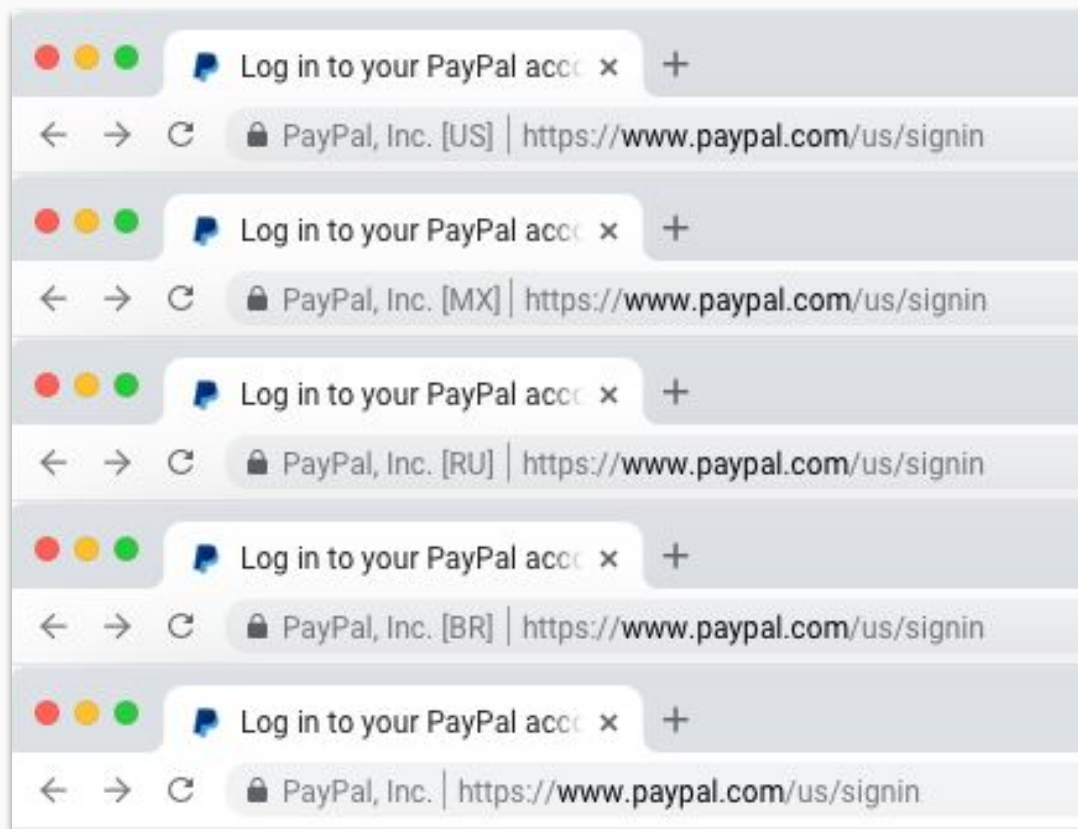


The real PayPal is a US company.

Does EV help users detect cross-jurisdiction collision attacks?



Do users notice when the country code doesn't match?



Log on To Online Banking x +

Holdings plc [RU] https://www.security.hsbc.co.uk/gsa?idv_cmd=idv.SaaSSecurityCommand ☆ M

Personal **English** United Kingdom

HSBC UK **Everyday Banking** **Borrowing** **Investing** **Insurance** **Life events**
Accounts & services Loans & mortgages Products & analysis Property & family Help and support

Log on to Online Banking

Online Banking

Please enter your username eg IB1234567890 or John123

 Remember my username
Forgot your username? >

Register for Online Banking

Manage your money online with our secure Online Banking service.

Business customers

- [Log on to Business Internet Banking](#)

Mobile Banking

Manage your personal accounts easily and securely with our Mobile Banking app. Set up new payments, scan cheques directly into your account and place a temporary block on your card. Mobile Banking your way.

Live Chat

Log on To Online Banking x +

Holdings plc [GB] | https://www.security.hsbc.co.uk/gsa?idv_cmd=idv.SaaSSecurityCommand

English United Kingdom

HSBC UK **Everyday Banking** **Borrowing** **Investing** **Insurance** **Life events**
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Online Banking

Please enter your username eg IB1234567890 or John123

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[Forgot your username? >](#)

Register for Online Banking

Manage your money online with our secure Online Banking service.

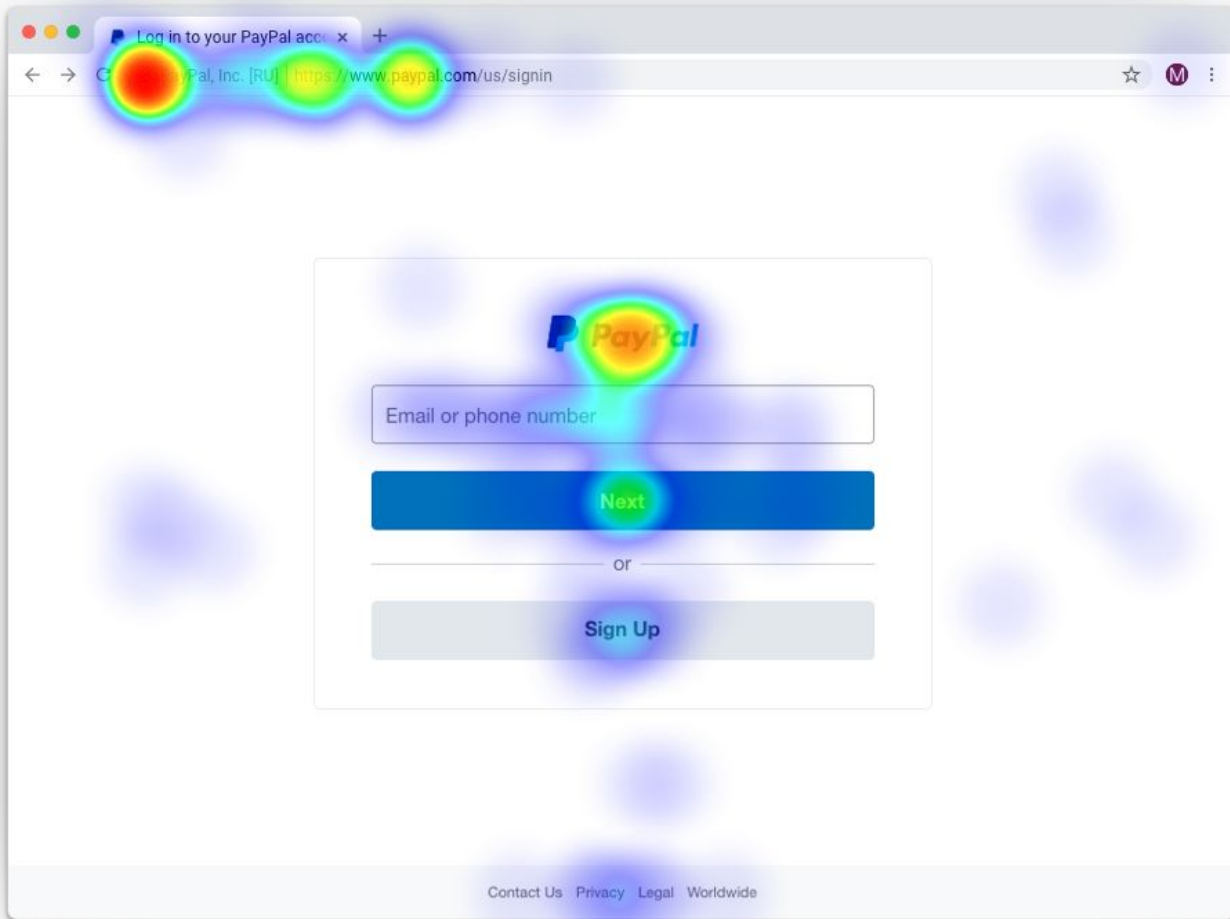
Live Chat

Business customers

- [Log on to Business Internet Banking](#)

Mobile Banking

Manage your personal accounts easily and securely with our Mobile Banking app. Set up new payments, scan cheques directly into your account and place a temporary block on your card. Mobile Banking your way.



“PayPal is well known so it makes me feel somewhat comfortable.”

“the https along with the padlock in the address bar”

“I never noticed the MX on a PayPal page, but it seems legit.”

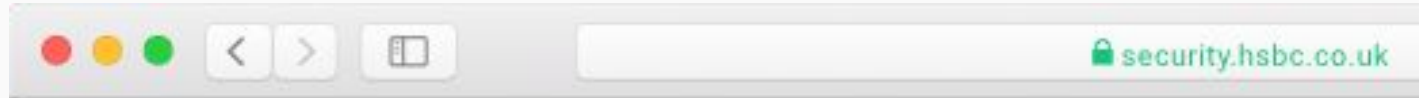
How do users react to EV UI in other modern browsers?

How do users react to EV UI in other modern browsers?

Old UI
Org name



New UI
Hostname



Holdings plc

Personal Business English United Kingdom

HSBC UK **Everyday Banking** **Borrowing** **Investing** **Insurance** **Life events**
Accounts & services Loans & mortgages Products & analysis Property & family Help and support

Log on to Online Banking

Online Banking

Please enter your username eg IB1234567890 or John123

Remember my username

[Forgot your username? >](#)

Register for Online Banking

Manage your money online with our secure Online Banking service.

Live Chat



Business customers

- [Log on to Business Internet Banking](#)


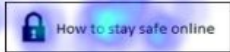
Mobile Banking

Manage your personal accounts easily and securely with our Mobile Banking app. Set up new payments, scan cheques directly into your account and place a temporary block on your card. Mobile Banking your way.

Download the app

[Find out more about Mobile Banking](#)

Protecting Your Money  

Personal Business English United Kingdom

HSBC UK **Everyday Banking** **Borrowing** **Investing** **Insurance** **Life events**
Accounts & services Loans & mortgages Products & analysis Property & family Help and support

Log on to Online Banking

Online Banking

Please enter your username eg IB1234567890 or John123

Remember my username

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Live Chat



Business customers

- [Log on to Business Internet Banking](#)



Mobile Banking

Manage your personal accounts easily and securely with our Mobile Banking app. Set up new payments, scan cheques directly into your account and place a temporary block on your card. Mobile Banking your way.

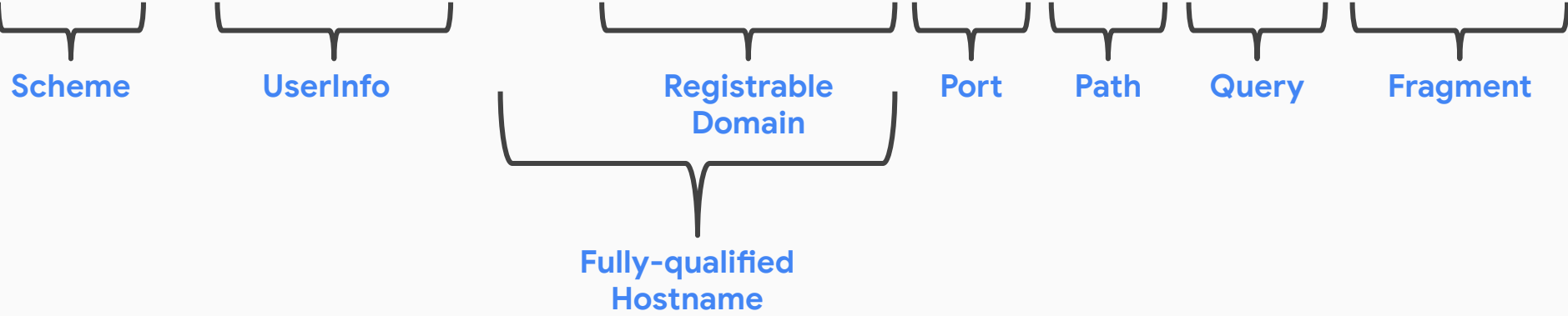
Download the app

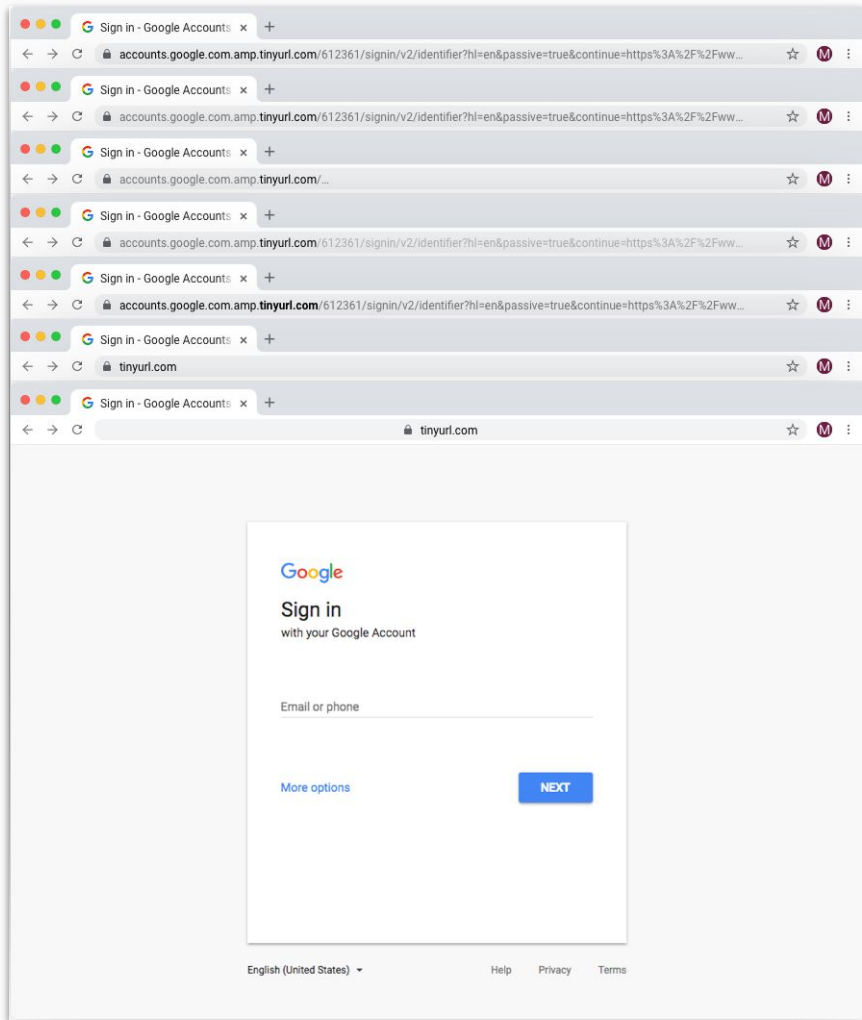
 

[Find out more about Mobile Banking](#)

Protecting Your Money  

https://user:pass@sub.example.com:8080/path?query#fragment





**Does
highlighting
parts of the
URL help users
understand
site identity?**

The image shows a browser window with seven tabs. Each tab is titled "Sign in - Google Accounts" and includes a close button (x) and a plus sign (+). The address bars for the first six tabs contain the URL: `accounts.google.com.amp.tinyurl.com/612361/signin/v2/identifier?hl=en&passive=true&continue=https%3A%2F%2Fww...`. The seventh tab's address bar is partially visible and shows `tinyurl.com`. The browser's address bar at the bottom displays `tinyurl.com` with a lock icon on the left and a star icon on the right.



Sign in

with your Google Account

Email or phone

[More options](#)

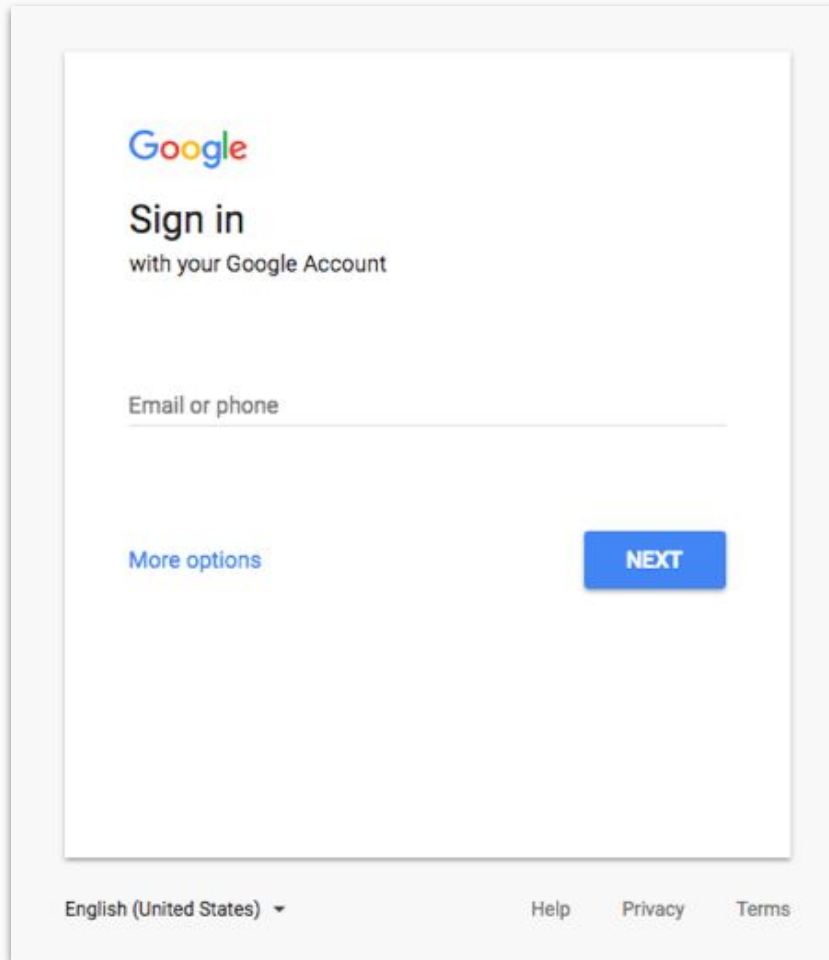
NEXT

English (United States) ▾

[Help](#)

[Privacy](#)

[Terms](#)



“Because it’s familiar. I’ve seen it plenty of times.”

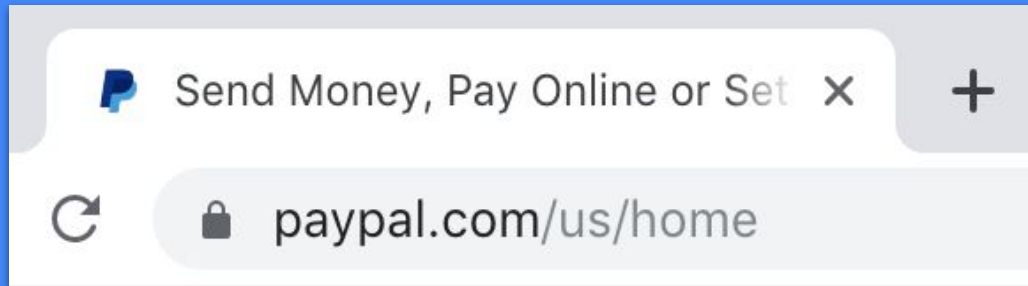
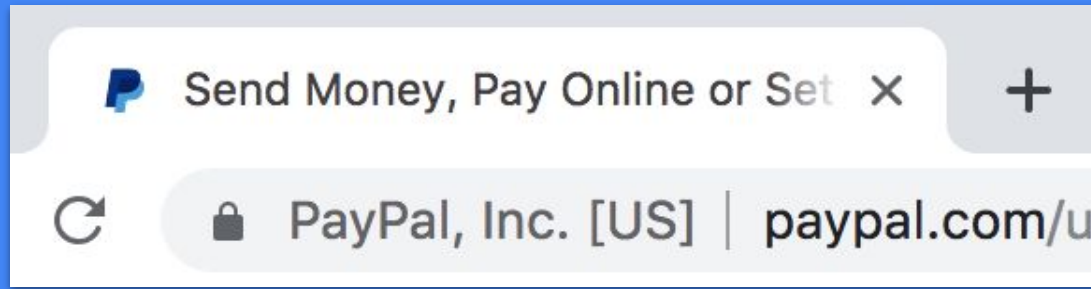
“Google is a secure company”

“Because the URL looks like a Google page should.”





SO WHAT NOW?



The image shows a web browser window with a single tab titled "Stripe". The address bar displays "https://stripe.ian.sh" with a green padlock icon and the text "Stripe, Inc (US)". A security information popup is open, showing a green padlock icon and the text "Stripe, Inc" and "Secure Connection". The popup also displays the following information:

- You are securely connected to this site, owned by:
- Stripe, Inc**
- Richmond
- Kentucky, US
- Verified by: COMODO CA Limited

At the bottom of the popup is a button labeled "More Information". The background of the browser shows the Stripe logo and the word "Developers".

accounts.google.com.amp.tinyurl.com/612361/signin/v2/...

accounts.google.com.amp.tinyurl.com/612361/signin/v2/...

accounts.google.com.amp.tinyurl.com/...

accounts.google.com.amp.tinyurl.com/612361/signin/v2/...

accounts.google.com.amp.**tinyurl.com**/612361/signin/v2/...

tinyurl.com

tinyurl.com

**CHECK
ENGINE**

versus

**ENGINE
OK**

Negative Indicators



Continue to [example.com](#)?

The link you opened goes to a site you don't usually visit. It might be trying to confuse you.

Ignore

Continue

$$\frac{dN}{dt} = \frac{1}{q_{\text{fact}}} - \sigma_0(N - N_0)(1 - \epsilon S)S + \frac{N_e}{T_n} - \frac{N}{T_p}$$

$$\frac{dS}{dt} = T_0 \sigma_0(N - N_0)(1 - \epsilon S)S + \frac{P_0 N}{T_n} - \frac{S}{T_p}$$

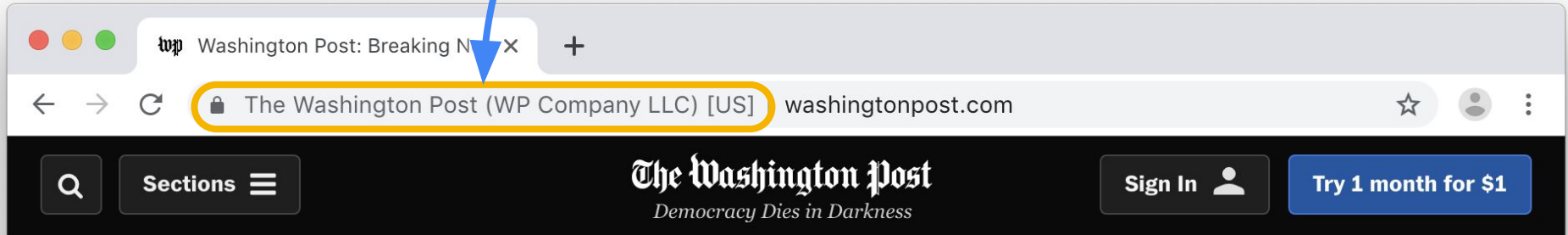
$$\frac{S}{P_0} = \frac{T_p \lambda_0}{T_{\text{fact}} \mu_0} = \Theta$$

$$S \leq \frac{1}{\epsilon}$$

$$\left. \begin{aligned} N &= N_0 \\ P_0 &= (m) \end{aligned} \right\}$$

User Education

**EV UI can take up
a lot of space in
the Omnibox.**





User Research



THANK YOU!

security-enamel@chromium.org