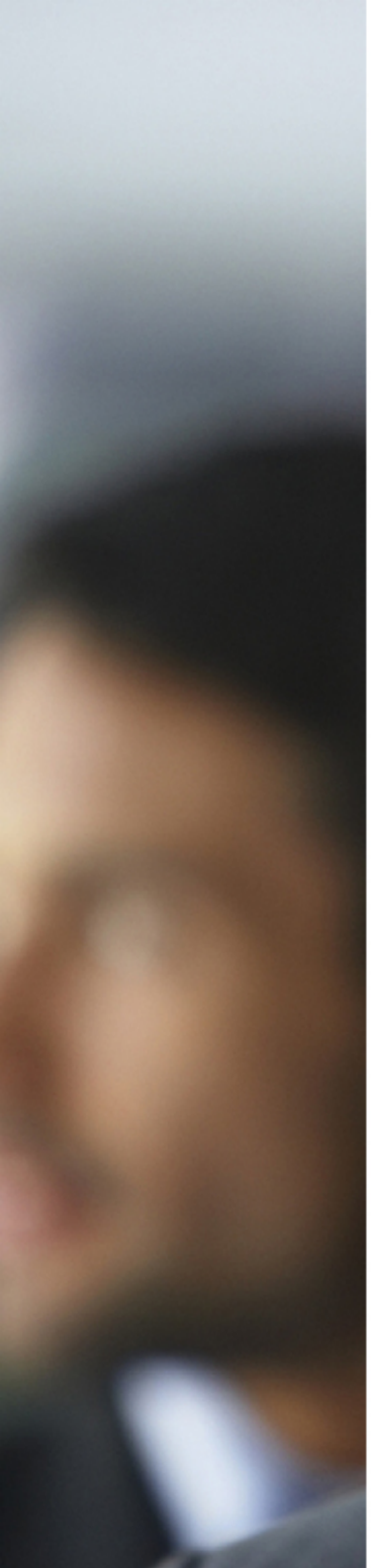
Wordpress Security

Not ~~just~~an oxymoron - Steve Lord

MANDALORIAN
SECURITY SERVICES LTD

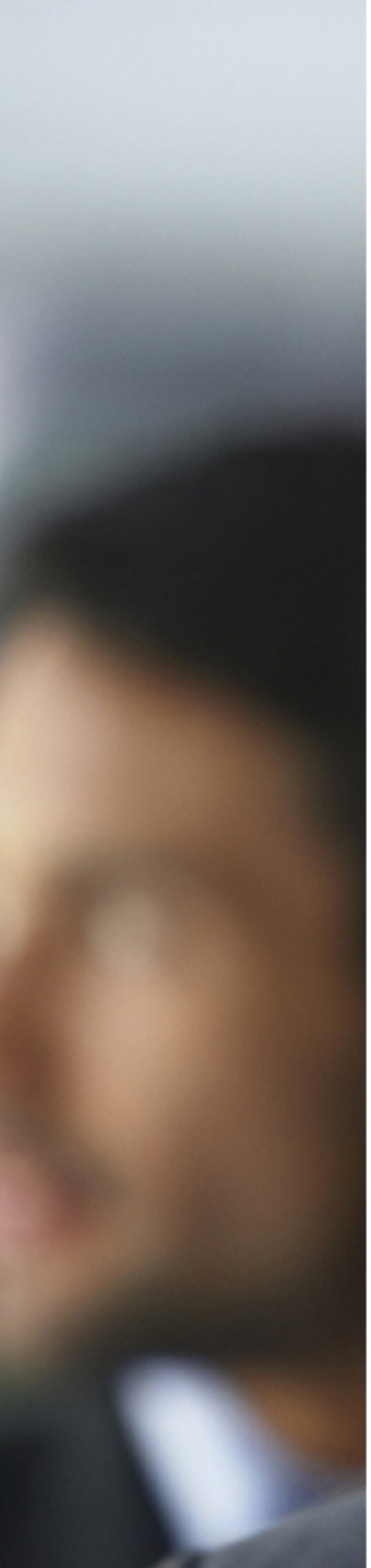


Wordpress ~~Vuln~~Security?

What you talking about, Willis?

- Who is this guy?
  - slord@mandalorian.com
  - @stevelord on twitter
  - http://www.mandalorian.com/

- I test pens and kick out the bad guys



A Word about WordPress

.com that is

- It's easy to point and laugh
  - Good incident handling
  - Open responses
  - Passwords encrypted
  - 'low level root exploit' used
- Wordpress.org not affected

Who uses it?

How to spot Wordpress

inurl:wp-content sit...

www.google.co.uk/#sclient=psy&hl=en&q=inurl:wp-content+site%3A.gov.uk&aq=f&aqi=&aql=&o

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Google

inurl:wp-content site:.gov.uk

Search

Instant is on

About 36,700 results (0.06 seconds)

Advanced search

Everything
Images
Videos
News
Shopping
More

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Who uses it?

How to spot Wordpress

WordPress › ReadMe

www.mandalorian.com/readme.html

Read Later | Post to Infosec ... | post to News.YC | Subscribe to GR... | Drag this link to... | Save Page as PDF | Other bookmarks

WordPress

Version 3.1.1

Semantic Personal Publishing Platform

First Things First

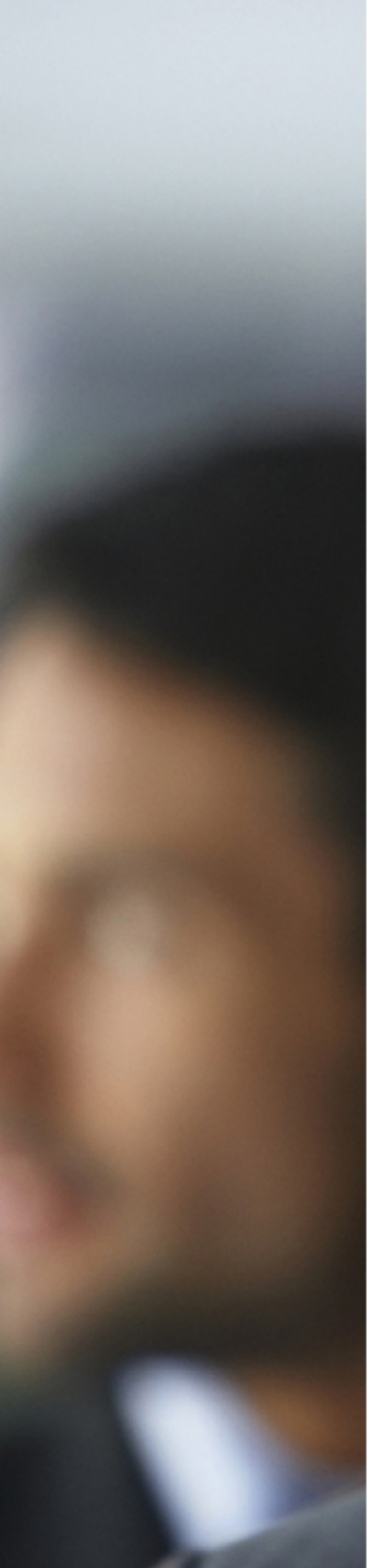
Welcome. WordPress is a very special project to me. Every developer and contributor adds something unique to the mix, and together we create something beautiful that I'm proud to be a part of. Thousands of hours have gone into WordPress, and we're dedicated to making it better every day. Thank you for making it part of your world.

— Matt Mullenweg

Installation: Famous 5-minute install

1. Unzip the package in an empty directory and upload everything.
2. Open wp-admin/install.php in your browser. It will take you through the process to set up a `wp-config.php` file with your database connection details.
    1. If for some reason this doesn't work, don't worry. It doesn't work on all web hosts. Open up `wp-config-sample.php` with a text editor like WordPad or similar and fill in your database connection details.
    2. Save the file as `wp-config.php` and upload it.
    3. Open wp-admin/install.php in your browser.
3. Once the configuration file is set up, the installer will set up the tables needed for your blog. If there is an error, double check your `wp-config.php` file, and try again. If it fails again, please go to the support forums with as much data as you can gather.
4. **If you did not enter a password, note the password given to you.** If you did not provide a username, it will be `admin`.
5. The installer should then send you to the login page. Sign in with the username and password you chose during the installation. If a password was generated for you, you can then click on 'Profile' to change the

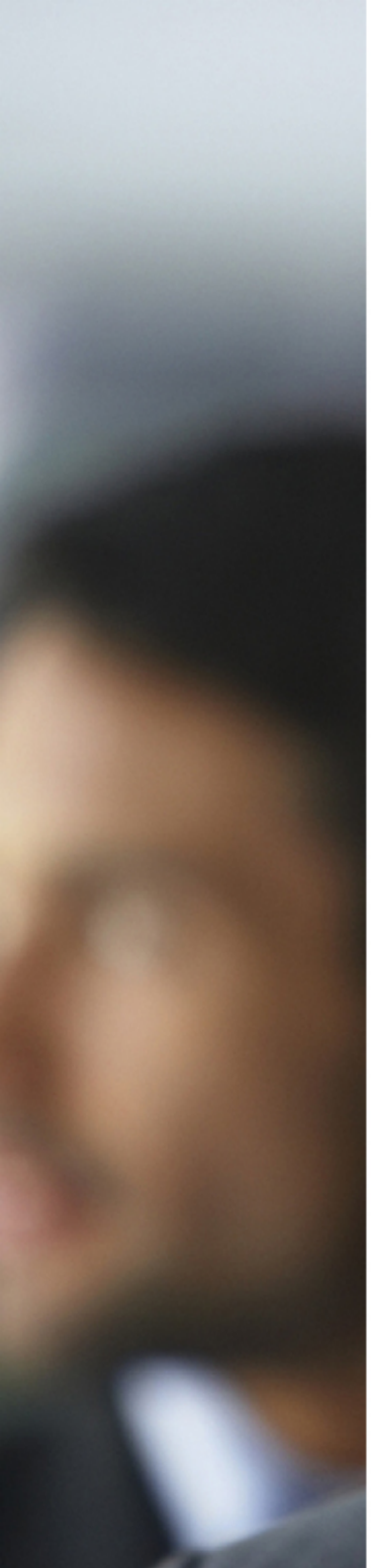
Common Wordpress Security Fail (and how to avoid it)



PHP Error Reporting

Start at the bottom of the barrel

- Obligatory Google Dork
  - "php fatal error" inurl:wp-content -error_log -php_errorlog
- The fix (in php.ini)
  - display_errors = Off
  - Restart HTTP server daemon



Roll Your Own Auth

Please don't

- “We can't use the standard login/registration page for our users!”
  - Enterprise Solution: Rewrite the login/registration mechanism from scratch
  - Better: Let's download a plugin that lets us change the page
- The fix:
  - ~~Rape~~Modify wp-login.php HTML
  - ~~Pillage~~Change wp-register.php HTML
  - ~~Defile~~Tweak wp-admin/wp-admin.css

SQL Injection

Someone get mustlive on the phone quick!

SQL Injection

The 90s called and want their framework back

- Wrong

```
<?php
   $wpdb->query(
      “UPDATE $wpdb->posts
      SET post_title = '$title'
      WHERE ID = $id”
   );
?>
```

SQL Injection

The 90s called and want their framework back

- Less Wrong

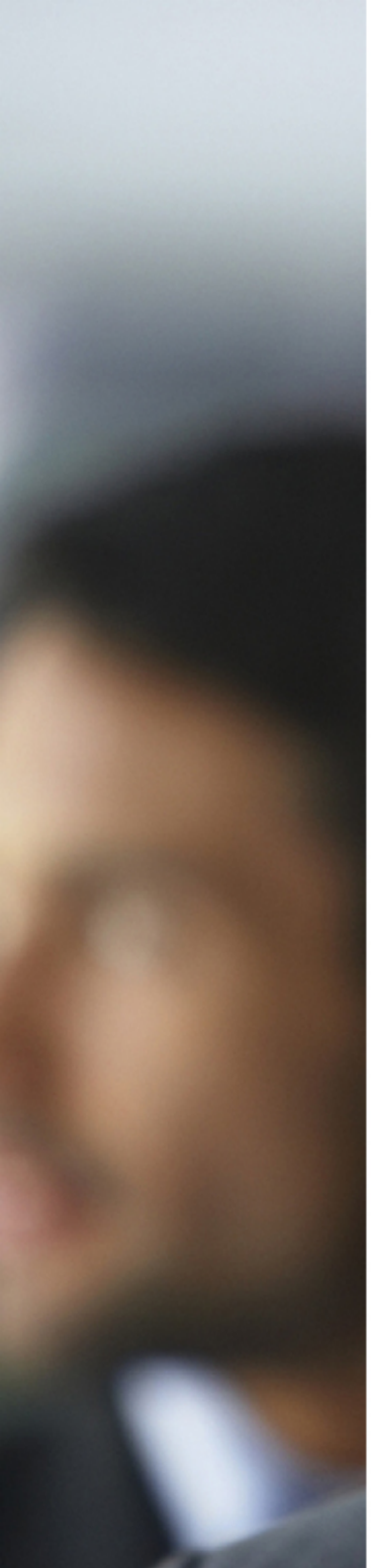
```
<?php
    $title = esc_sql($title);
    $id = absint($id);
    $wpdb->query(
        "UPDATE $wpdb->posts
        SET post_title = '$title'
        WHERE ID = $id"
    );
?>
```

SQL Injection

The 90s called and want their framework back

- Right

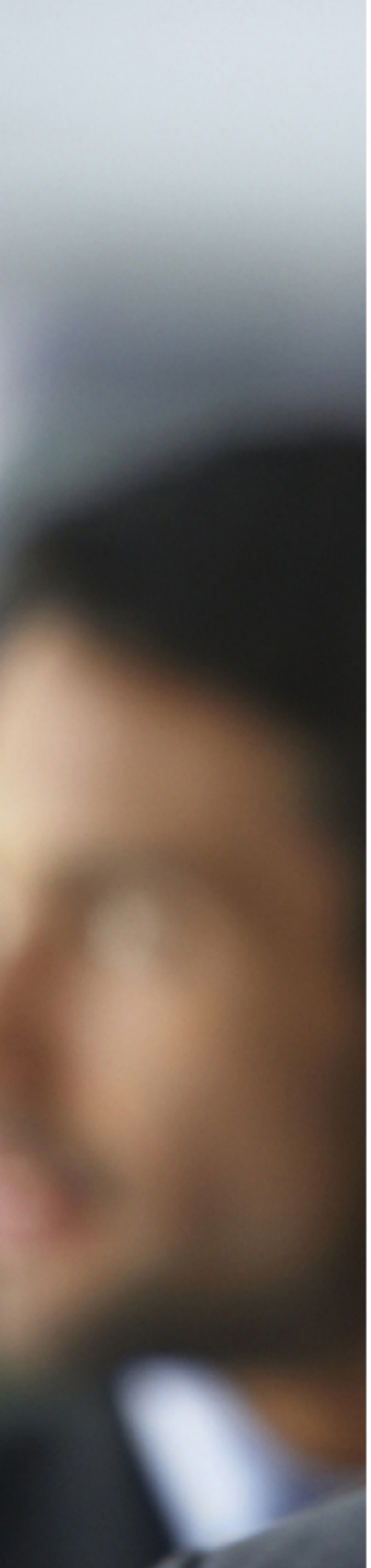
```
<?php
   $wpdb->update(
      $wpdb->posts,
      array('post_title' => '$title'),
      array('ID' => $id)
   );
?>
```



SQL Injection

Getting it right

- Useful functions
  - esc_sql() - escape SQL queries
  - absint() - convert id to positive integer
  - $wpdb->update()
  - $wpdb->insert()
  - $wpdb->prepare()
  - $wpdb->get_var()



SQL Injection

wpdb->prepare() hotness

```
<?php
   $key = “some input”
   $val = 1337
   $wpdb->prepare(“
      INSERT INTO $wpdb->postmeta
      (post_id, key, val)
      VALUES (%d, %s, %s)”,
      array(10, $key, $val))
   );
?>
```

Cross-Site Scripting

When input validation gets too hard

XSS

Not just a way for appsec guys to earn ££££s

- Wrong

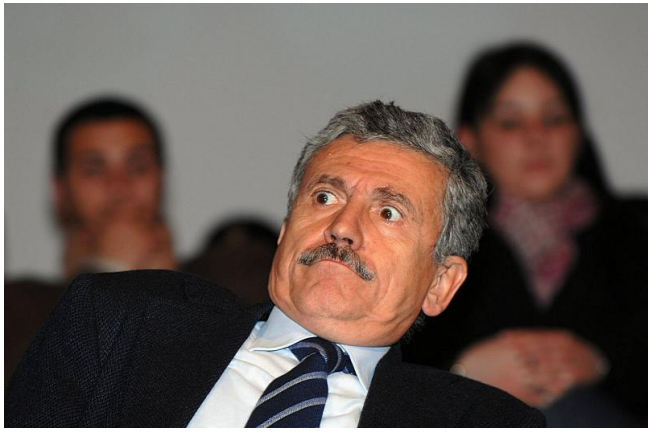
```
<?php
    $foo = $_GET[“echo”];
    echo 'You submitted:' . $foo;
    );
?>
```

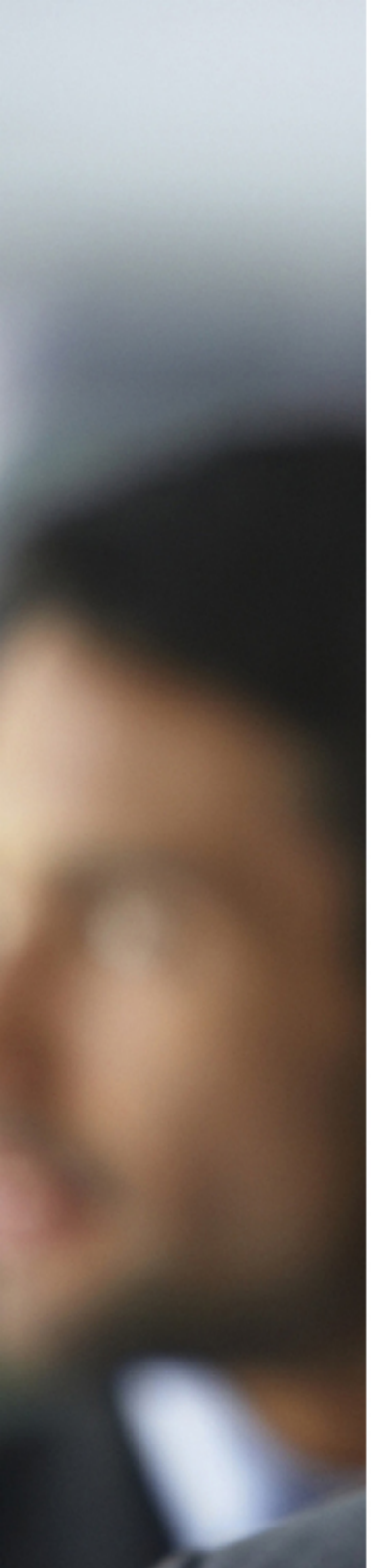
XSS

Not just a way for appsec guys to earn ££££s

- Less wrong

```
<?php
   $foo = htmlspecialcharacters(
   $_GET[“echo”]);
   echo 'You submitted:' . $foo;
   );
?>
```



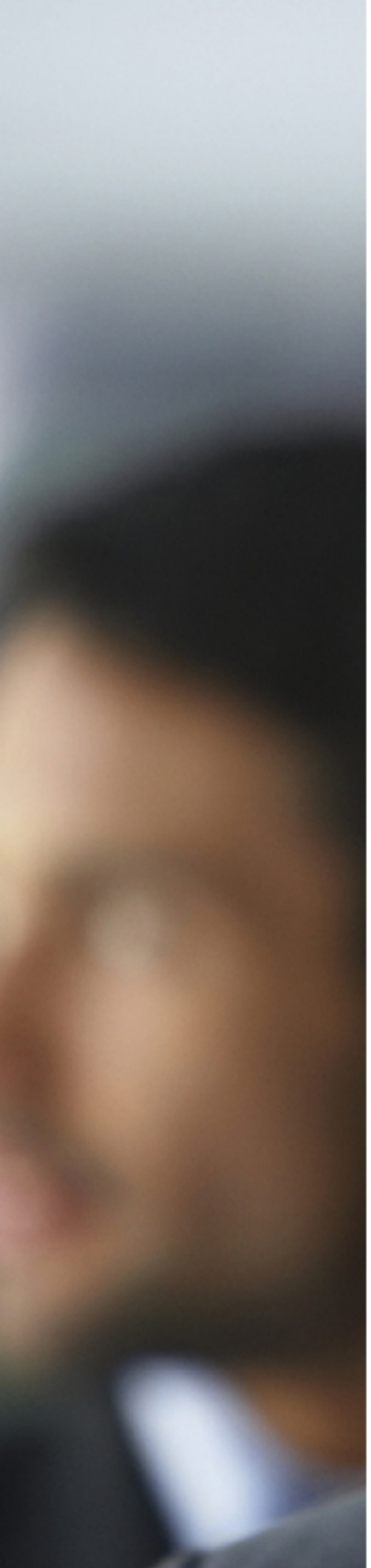


XSS

Not just a way for appsec guys to earn ££££s

- Right

```
<?php
    $foo = $_GET["echo"];
    echo 'You submitted:' .
    esc_html($foo);
    );
?>
```



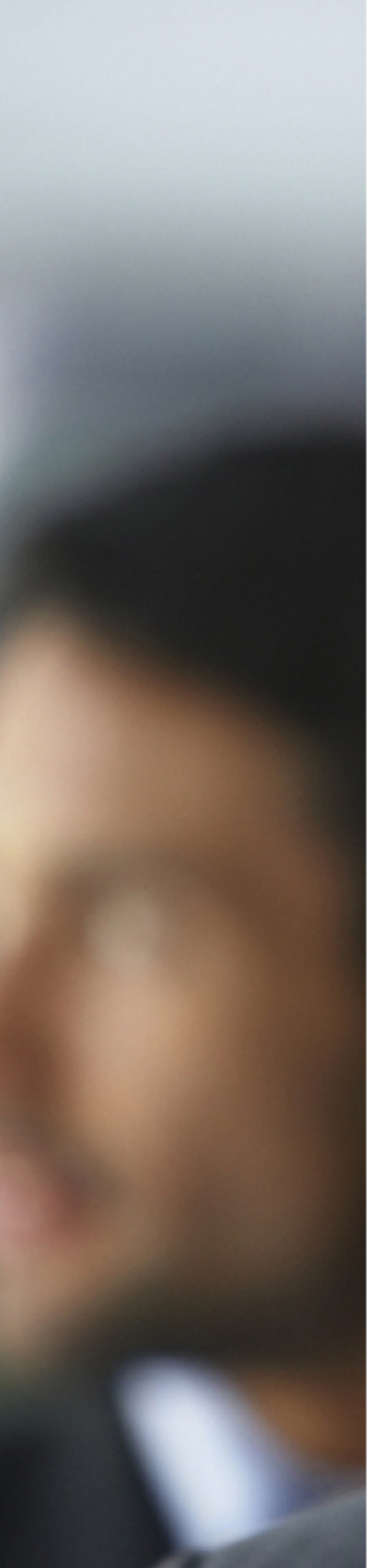
XSS

Getting it right

- Useful functions
  - esc_attr_e() - for translated tag attributes
  - esc_html() - for general HTML
  - esc_attr() - tag attributes
  - esc_url()
  - esc_js()

CSRF

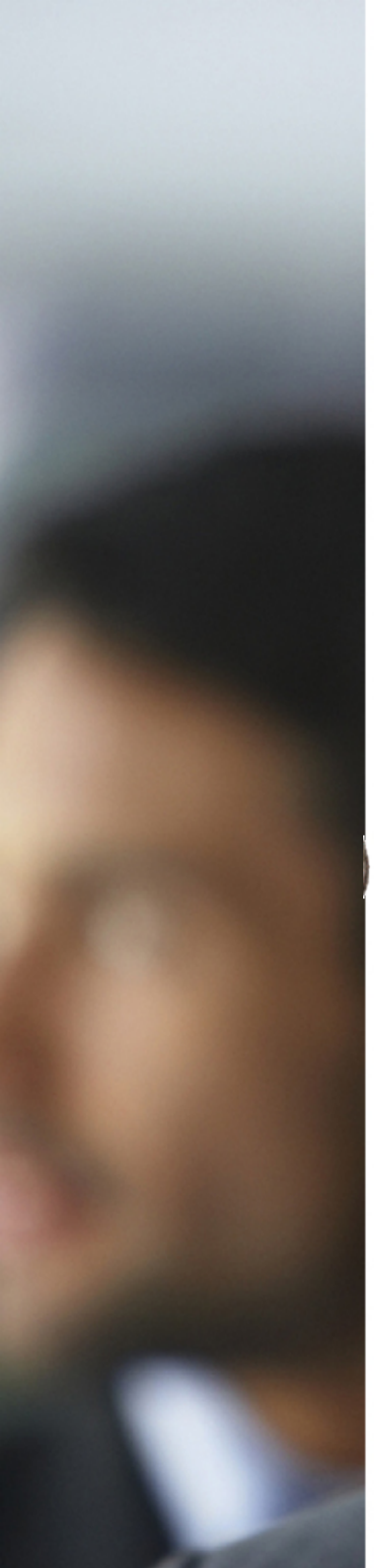
Serious business



CSRF

Pronounced 'Sea Surf' according to the Internet

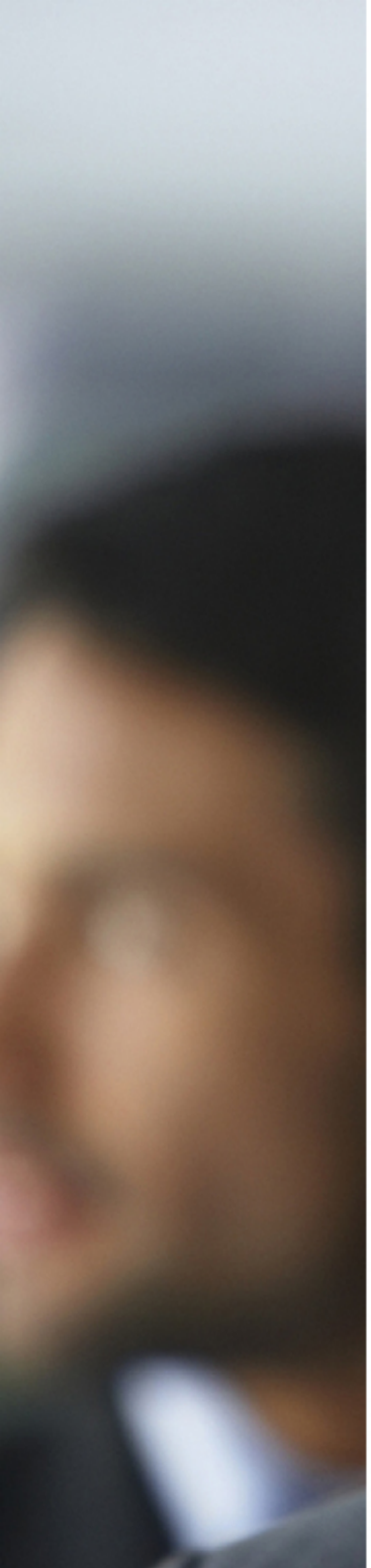
- Cross Site Request Forgery ({C|X}SRF)
  - User is tricked into what looks like action A
  - Site receives request for action B
    - Doesn't distinguish between action and intent
  - Action B happens
- e.g: http://bank.com/transfer.php?amount=10000&to=steve



CSRF

Nonces and other HTTP perversions

- The fix:
  - 'Nonces'
    - One-off user-specific time-limited secret keys
    - Used where actions occur (e.g. CRUD)
      - This is what POST is for, but is not exclusive

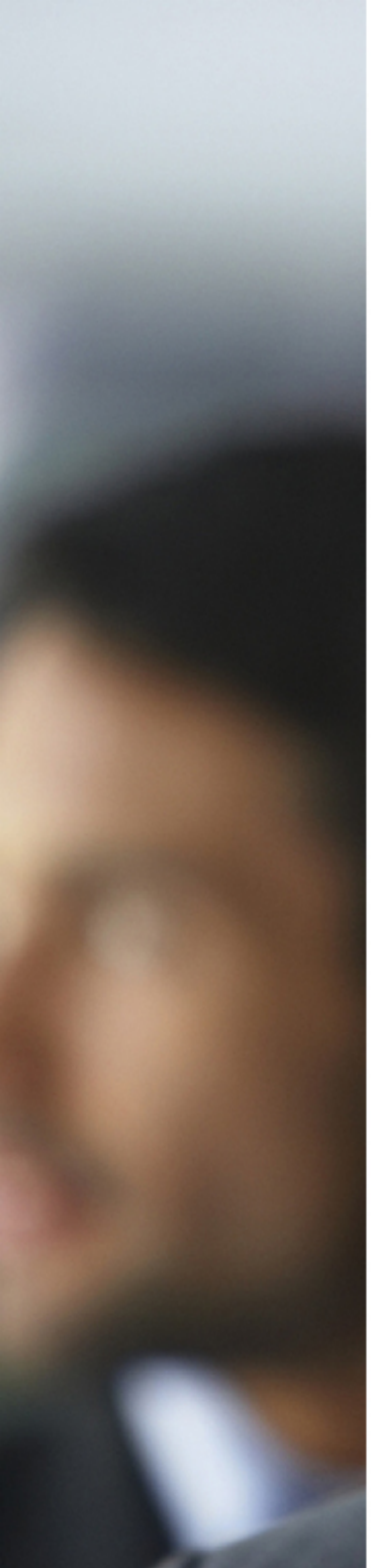


CSRF

Getting to grips with Wordpress Nonces

```
<?php wp_nonce_field(
    $action, $name, $referrer, $echo)
    ?>
```

- $action – What you're doing (default -1)
- $name – Nonce field name (default _wpnonce
- $referer – Set referer field for validation (default true)
- $echo – return hidden form field? (default true)



CSRF

Verifying the Nonce

```
<?php wp_nonce_field(
   if ( empty($_POST) || !
   wp_verify_nonce($_POST['name'],
   'action') )
   {
      die ('Bad nonce.');
   }
   else
   {
      // process form data
   }
?>
```

CSRF

Some extra value

- When in admin
  - Use check_admin_referer()
- When not in admin
  - Check referer generally
- AJAX submission?
  - $nonce = wp_create_nonce('action');
  - &ajax_nonce=$nonce
  - check_ajax_referer('action');

3rd Party Plugins/Themes

Would you trust code written by these guys?

3rd Party Plugins/Themes

A quick and dirty sanity check

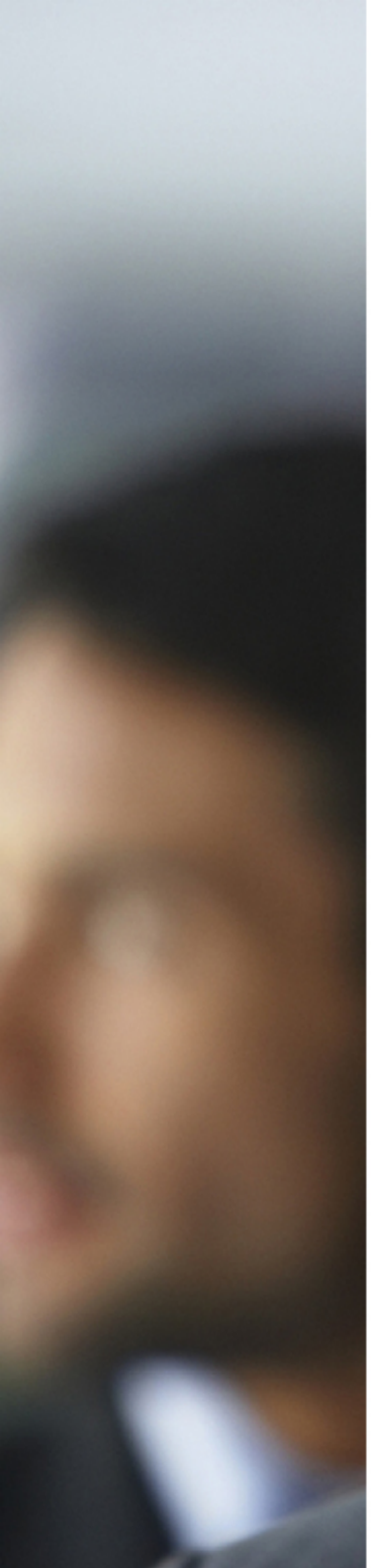
- Did you write it yourself?
- Did you get it from Wordpress.org?
- Have you had direct contact with the author?
- Did you have to pay for it?
- Have you got the 'pro' version?
- Has the author released an update in the past year?
- Is it compatible with current wordpress?

- The more you answered no to, the more you need to audit *all* of the code

3rd Party Plugins/Themes

A quick and dirty sanity check

- Check for code obfuscation
  - `find . | xargs grep -i base64 > base64.txt`
- Check for links to external sites
  - `find . | xargs grep '\<[[:alpha:]]*://[^/]*' > urls.txt`
- Check for potentially malicious content
  - `find . | xargs grep -Ei 'iframe|src|javascript:|eval|include' > dodgy.txt`

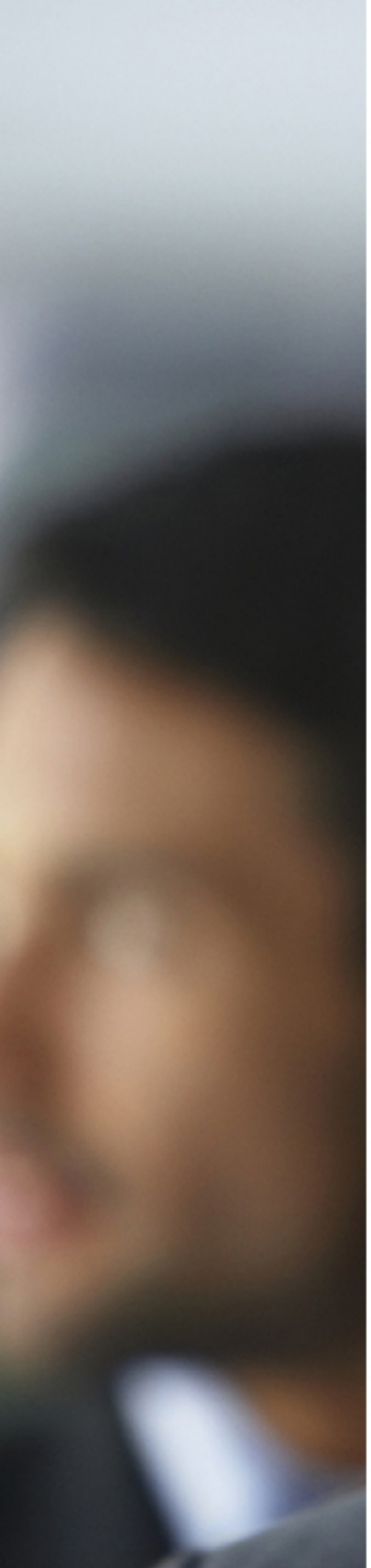


3rd Party Plugins/Themes

A quick and dirty sanity check

- Use the previous slide as a starting point
  - Things can be hidden anywhere
    - Don't assume a .gif is a .gif until you've seen it in a text/hex editor
  - Make sure you cover all code (php, JS) and data

- http://wpmu.org/why-you-should-never-search-for-free-wordpress-themes-in-google-or-anywhere-else/

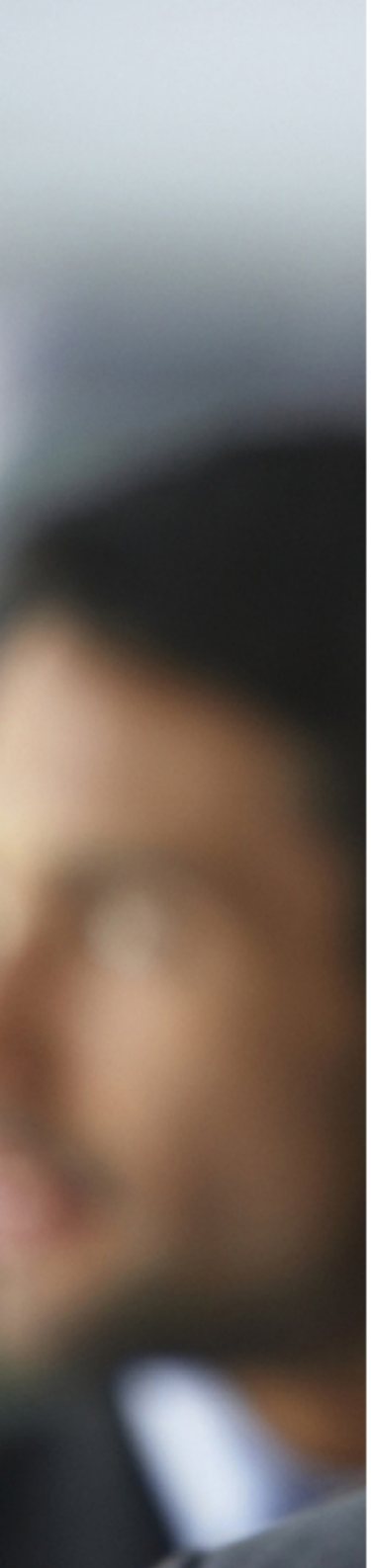


Miscellaneous Mistakes

Entering the mouth of madness

Miscellaneous Mistakes

Entering the mouth of madness

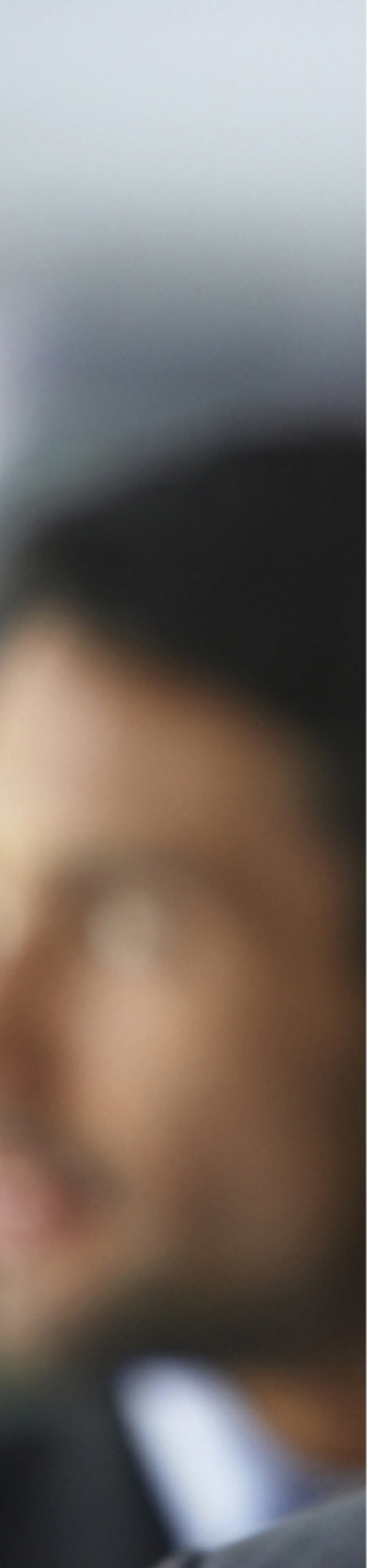


Can the user do that?

Authentication != Authorization

```
<?php current_user_can($capability);?>
```

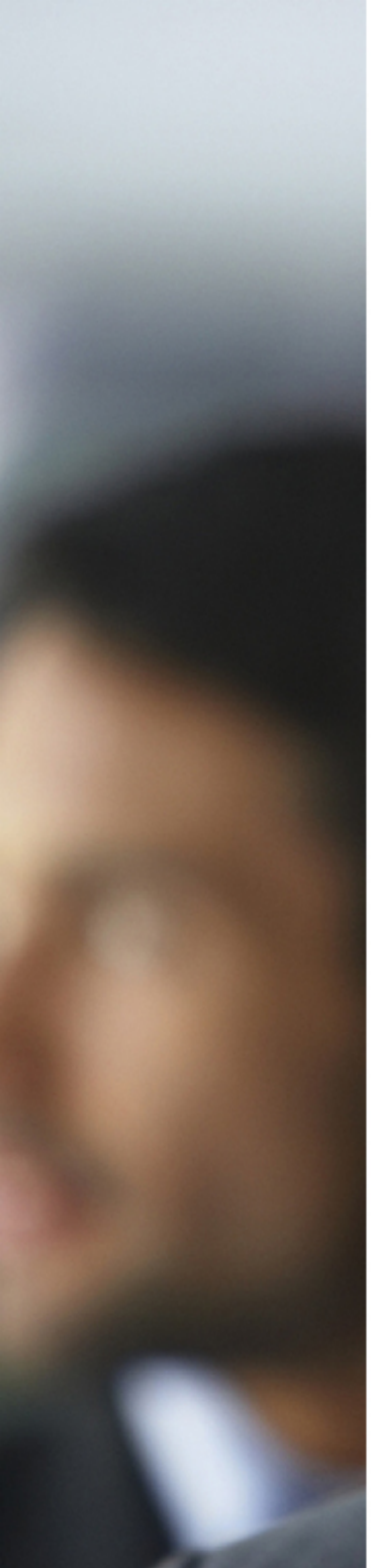
- $capability – the capability you're checking for e.g. 'manage_options'
- Use this everywhere if you don't want public access
- Options for more granularity
  - Role scoper plugin
  - Members plugin
- User levels deprecated in 3.0



Exec() and it's kin

Here be dragons

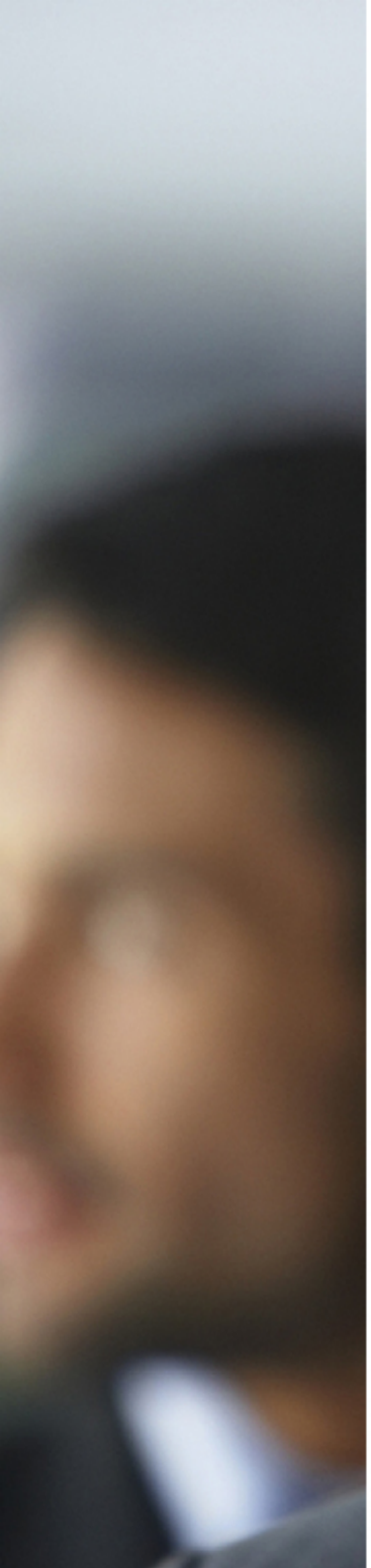
- exec(), passthru(), proc_*, shell_exec(), system(), popen() and backticks (`) are evil
  - Do not use them



Exec() and it's kin

Here be dragons

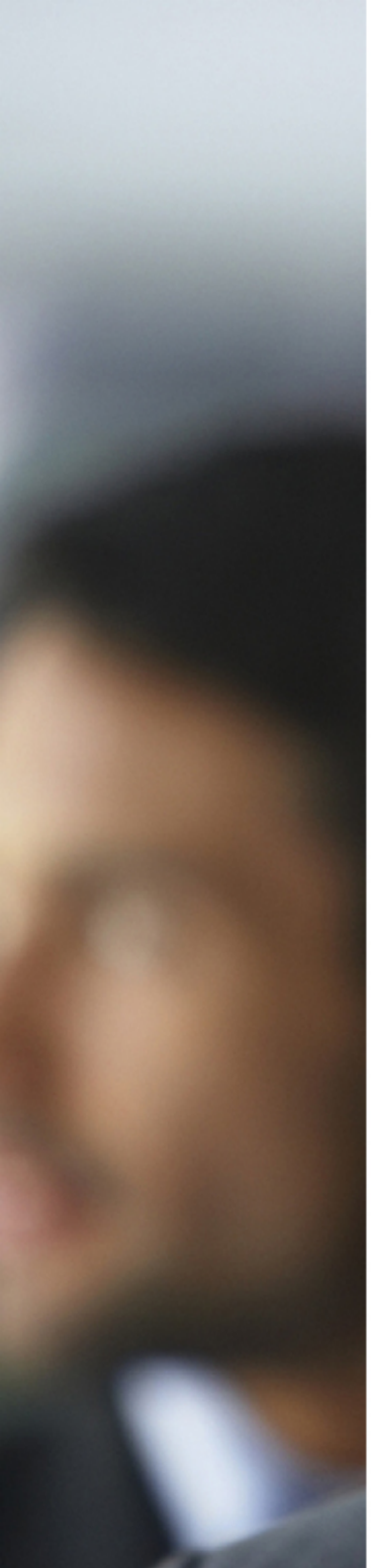
- If you must use them
  - Don't use user-input for arguments
  - Set safe_mode_exec_dir in php.ini
  - Specify the full executable path
  - Use escapeshellcmd() on $cmd before execution



Exec() and it's kin

Here be dragons

- If you must ~~use~~pass them user-supplied input
  - Set safe_mode_exec_dir in php.ini
  - Specify the full executable path
  - Use escapeshellcmd() on $cmd before execution
  - Use escapeshellarg() on arguments before execution



Exec() and it's kin

Here be dragons

- If you must ~~use~~pass them user-supplied input
  - Set safe_mode_exec_dir in php.ini
  - Specify the full executable path
  - Use escapeshellcmd() on $cmd before execution
  - Use escapeshellarg() on arguments before execution
  - Consider a career change

Remote File Include (RFI)

Or week 2 of Learn PHP in 21 days

```
<?php
   $inc = $_GET['inc'];
   include($inc);
;?>
```

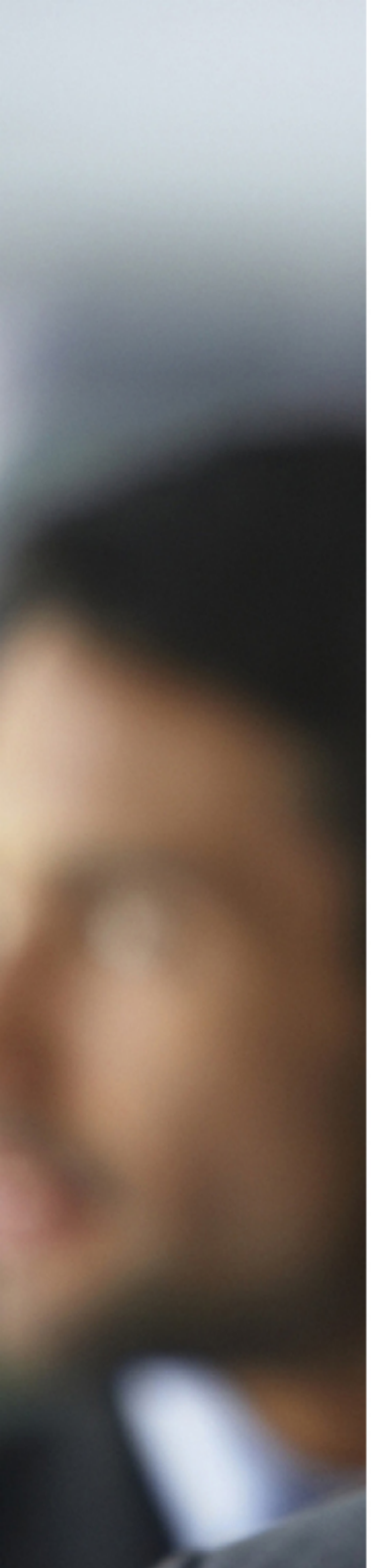
- Don't do it. Ever.
- Use switch/case with hardcoded (from a config file) values

Fun with .htaccess

A few bits to take away

```
Order Allow,Deny
Deny from all
<Files ~ "\.(css|jpe?g|png|gif|js)$">
 Allow from all
</Files>
ServerSignature Off
```

- Limits access to specific file extensions
- Add your own extensions as needed
- Tells Apache not to report version



Fun with .htaccess

Add to /wp-admin/.htaccess

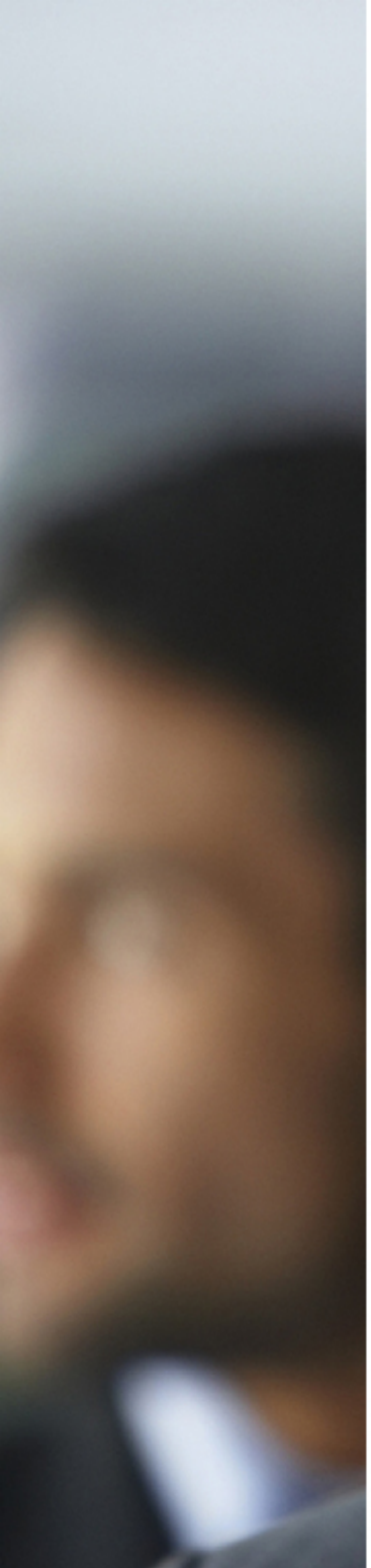
```
<Files ~ "\.(php)$">
Order Deny,Allow
Allow from 127.0.0.1
Deny from all
</Files>
```

- Limit /wp-admin/ access to localhost
- Access via SSH tunnel
- Change/Add IP for remote access from fixed network

Testing Wordpress

Yes, you can

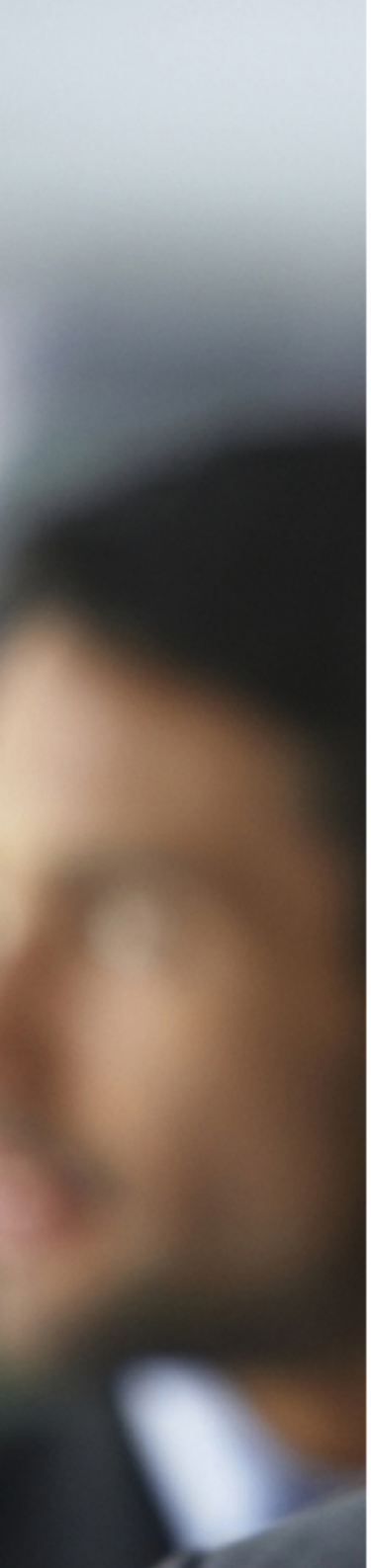
- Useful tools
  - Plecost
    - http://code.google.com/p/plecost/
  - Netsparker
    - http://www.mavitunasecurity.com/
  - Acunetix (free edition, XSS only)
    - http://www.acunetix.com/
  - Burp Suit Pro
    - http://www.portswigger.net/
  - OpenVAS (with local checks)
    - http://www.openvas.org/index.html



Before you go live

Things to do

- Some ideas
  - Use rewrite rules to redirect wp-login.php and /wp-admin to SSL only
  - Lock down wp-admin, phpmyadmin etc.
  - Minimise use of 3rd party plugins and themes
- Must do's before going live
  - Audit your own code
  - Audit 3rd party plugins and themes



After you go live

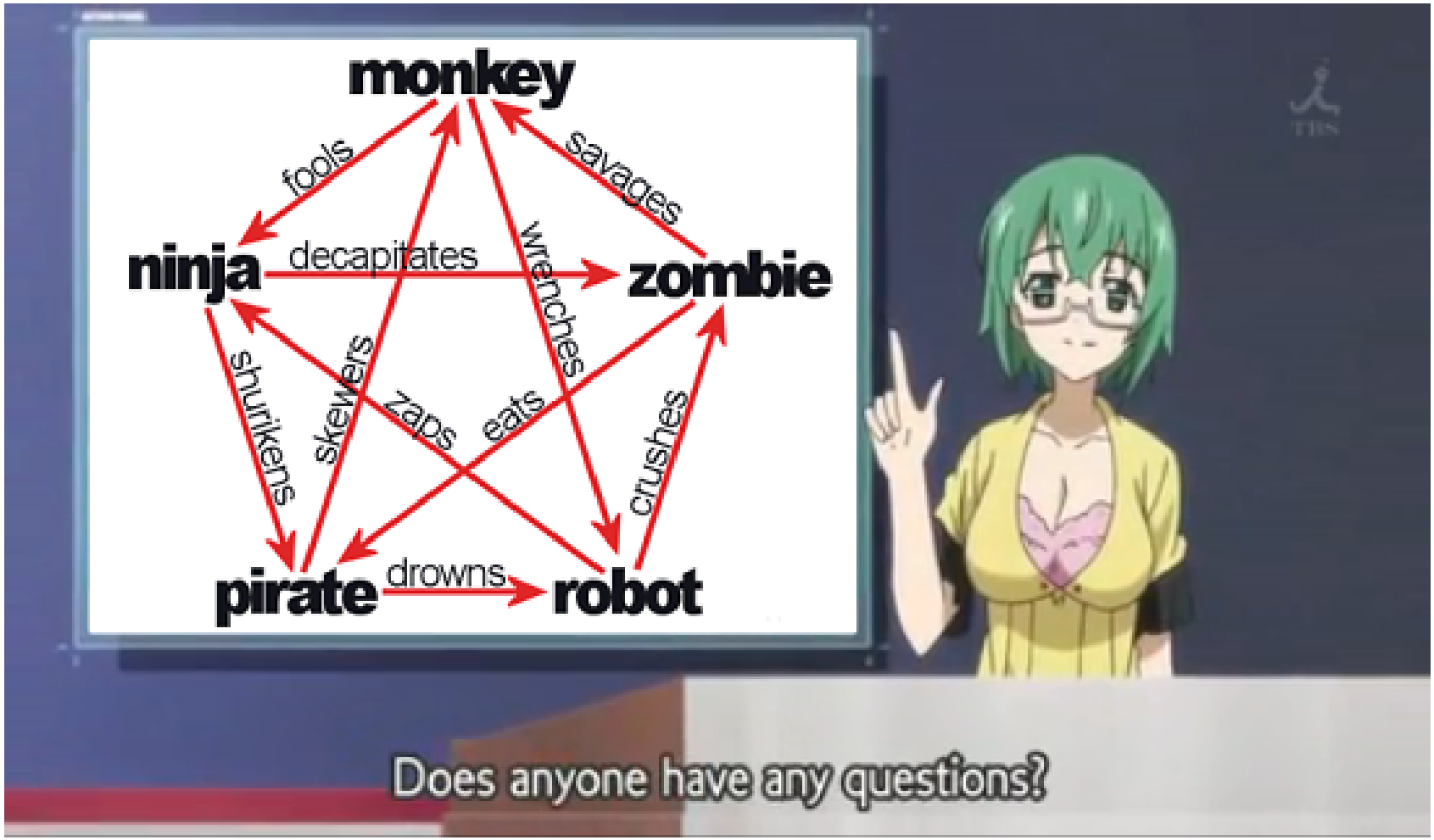
Things to do

- Audit plugin/theme upgrades prior to application
  - At least have a security process
- App test on major upgrades
- Read the changelog
  - Hunt the bug
  - Verify the fix

- **<u>Use liberal volumes of common sense</u>**

Thanks for having me

It keeps me off the streets



This presentation brought to you by DJ Shadow, UNKLE, Death in Vegas and Caffeine. Lots of sweet, sweet caffeine. My next talk will be at Bsides London on Breaking, Entering and Pentesting on April 20th and at DC4420 that evening about evading defences.