PHP Security Audit HOWTO

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Chris Shiflett
Brain Bulb
chris@brainbulb.com

Talk Outline

- What Is a PHP Security Audit?
- Setting the Bar
- Analyzing the Design
- Analyzing the Configuration
- Searching the Source
- More Information
- Questions and Answers

What Is a PHP Security Audit?

- An audit is an **examination**.
- Nothing should be off-limits.
- A PHP security audit is primarily an **examination of the source**.
- Other points of interest are the **design** and **configuration**.

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Setting the Bar

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- How much security do you need?
- Start with a minimum level.
- At the very least, a PHP application should **filter input** and **escape output**.

What Is Input?

- Some input is obvious - form data (**$_GET** and **$_POST**), cookies (**$_COOKIE**), etc.
- Some input is hard to identify - **$_SERVER**
- Sometimes it depends on your perspective - **$_SESSION**, data from databases, etc.
- The key is to identify the **origin** of data. Data that originates anywhere else is input.

What Is Filtering?

- Filtering is an **inspection** process.
- **Prove** data to be **valid**.
- Consider everything else tainted.
- Ensure you can easily and reliably distinguish between **filtered** and **tainted** data.
- I use a strict naming convention.

Show Me the Code!

```php
<?php

$clean = array();

switch($_POST['color'])
{
    case 'red':
    case 'green':
    case 'blue':
        $clean['color'] = $_POST['color'];
        break;
}

?>
```

Show Me the Code!

```php
<?php

$clean = array();

if (ctype_alnum($_POST['username']))
{
    $clean['username'] = $_POST['username'];
}

?>
```

What Is Output?

- Some output is obvious - HTML, JavaScript, etc.
- The client isn't the only remote destination - databases, session data stores, feeds, etc.
- The key is to identify the **destination** of data. Data destined for anywhere else is output.

What Is Escaping?

- Escaping preserves data as it enters another context.
- Some characters need to be represented in a special way:
  - **O\'Reilly** (SQL)
  - **AT&T** (HTML)
- In most cases, there is a function you can use.
- If you must write your own, be **exhaustive**.

Show Me the Code!

```php
<?php

$html = array();

$html['username'] = htmlentities($clean['username'],
                    ENT_QUOTES, 'UTF-8');

echo "<p>Welcome back, {$html['username']}.</p>";

?>
```

Show Me the Code!

```php
<?php

$mysql = array();

$mysql['username'] =
    mysql_real_escape_string($clean['username']);

$sql = "SELECT *
        FROM   profile
        WHERE  username = '{$mysql['username']}'";

$result = mysql_query($sql);

?>
```

Analyzing the Design

- Have the design explained first.
- Avoid unnecessary complexity.
- Encourage distinction between **tainted** and **filtered** data.

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Analyzing the Configuration

- Mostly dictated by **php.ini**.
- Also consider **httpd.conf**, **.htaccess**, **ini_set()**.

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Analyzing the Configuration

- Things to avoid:
  - **register_globals**
  - **allow_url_fopen**
  - **magic_quotes_gpc**
  - **display_errors**

Searching the Source

- Identify input and trace it forward.
- Identify output and trace it backward.
- Ensure input is filtered and output is escaped.

Identifying Input

- HTML Forms:
  - **form**
  - **input**
  - **$_GET**
  - **$_POST**
  - **$_REQUEST**

Identifying Input

- Databases:
  - **mysql_query()**
  - **SELECT**
- HTTP Headers:
  - **$_COOKIE**
  - **$_SERVER**

Identifying Output

- Client:
  - **echo**
  - **print**
  - **<?=**

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Identifying Output

- Databases:
  - **mysql_query()**
- Commands:
  - **exec()**
  - **passthru()**
  - **system()**

Tracing Forward

```php
<?php

$action = $_POST['action'];

$query_string = "action=$action";

$link = "index.php?$query_string";

?>

<a href="<?php echo $link; ?>">
Click Here
</a>
```

Tracing Backward

```php
<?php

$username = $_COOKIE['username'];

$greeting = "Welcome back, $username.";

$html = "<p>$greeting</p>";

echo $html;

?>
```

Gotchas

- Trust of HTTP Headers:
  - **Referer**
- Trust of **$_SERVER**:
  - **$_SERVER['PHP_SELF']**
- Trust of Client-Side Restrictions:
  - **maxlength**

More Information

- PHP Security Consortium
  http://phpsec.org/
- My Business Web Site
  http://brainbulb.com/
- My Personal Web Site and Blog
  http://shiflett.org/

Thanks for Listening!

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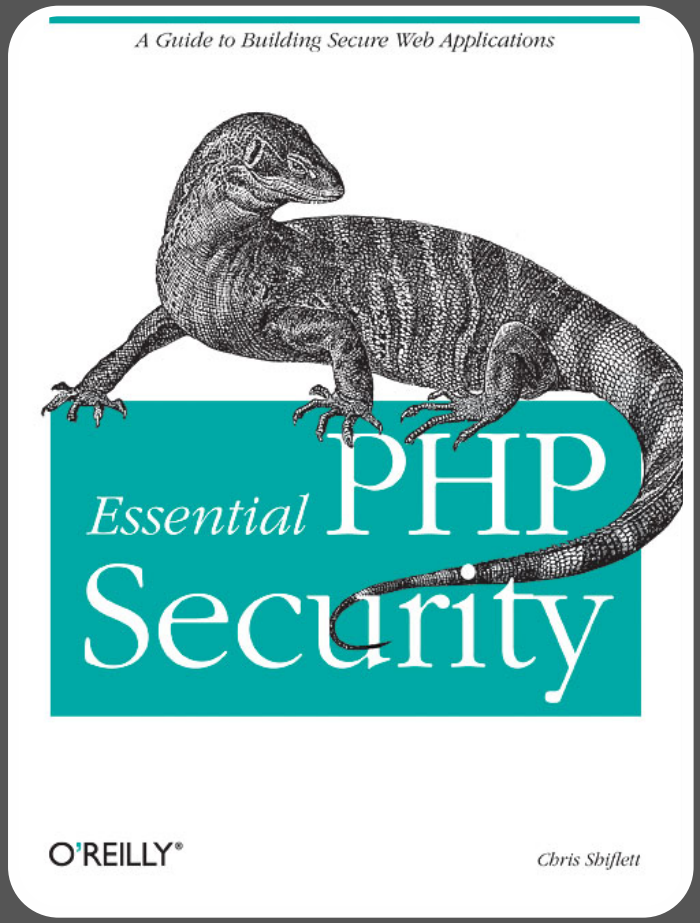

Chris Shiflett
chris@brainbulb.com