How to get your code deployed: Security

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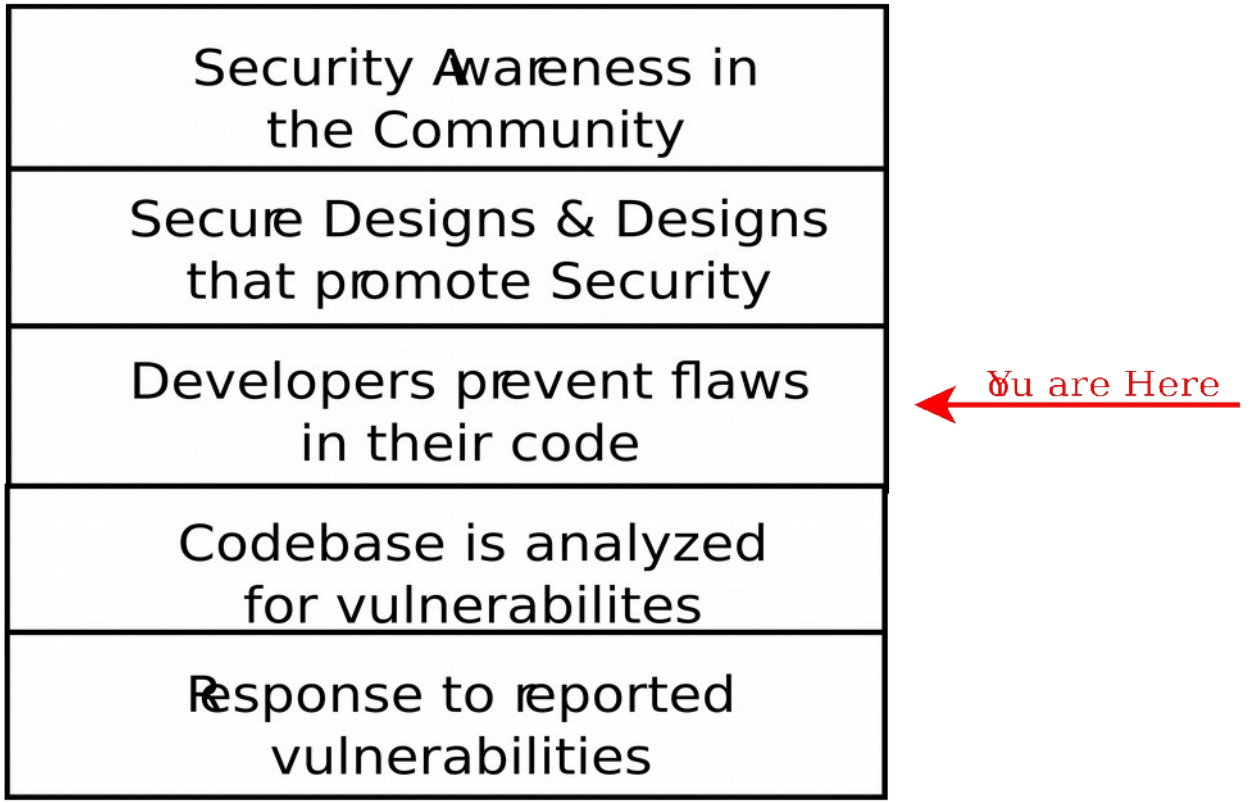
Application Security



Don't do these:

- [[Security_for_developers]]
  - Cross-site Scripting (XSS)
  - Cross-site Request Forgery (CSRF)
  - Register Globals
  - SQL Injection
- And..
  - XML External Entity (XXE) Processing
  - Protect Confidential Information

XSS

- An attacker is able to inject client-side scripting into a web page viewed by other users
- Results in:
  - Attacker controls everything you do and see in your browser
- Types
  - Reflected
  - Stored
  - DOM

Examples

Reflected XSS (1st Order)

```
<input type="text" name="search_term" value="<? echo $_GET['search_term']; ?>" />
```

Stored XSS (2nd Order)

```
<?php
  $articles = $dbr->query("SELECT id, title FROM `articles`");
  foreach ($articles as article) {
     echo "<a href='read.php?id={$article['id']}'>{$article['title']}</a>";
  }
?>
```

Dom-based XSS (3rd Order)

```
<script>
  document.write("<a href='"+document.referrer+"'>Go Back</a>");
</script>
```

Best Practices

- Validate Input, Escape Output
- Trust No Input (including cookies, database, stuff you wrote in the dom)
- Use HTML/XML objects, know which functions escape and which don't
- Escape as close to the output as possible
- In javascript use: document.createElement(), element.setAttribute(), element.appendChild(); avoid element.html(), element.innerhtml(), document.href; avoid $ (“untrusted data”)
- Always keep in mind the dom context where you are writing out user-controlled data!

(+) Examples

```
$attribs = array(
        'name' => 'wpSourceType',
        'type' => 'radio',
        'id' => $id,
        'value' => $this->mParams['upload-type'],
);
if ( !empty( $this->mParams['checked'] ) ) {
        $attribs['checked'] = 'checked';
}
$label .= Html::element( 'input', $attribs );
```

```
$out .= Xml::openElement( 'div', array( 'class' => 'search-types' ) );
$out .= Xml::openElement( 'ul' );
...
$out .= Xml::closeElement( 'ul' );
$out .= Xml::closeElement( 'div' );
```

CSRF

- Attacker sends unauthorized commands from a user to a website that trusts that user.
- Abuses the way that web browsers send cookies with all requests to a domain, even when possibly initiated from another website

CSRF

```
// a page on funnykitties.com
<img src='cat1.jpg' />
...
<img src='http://en.wikipedia.com/wiki/index.php?title=some_thing&action=delete' />
...
```

Or more likely:

```
<form name="wikiedit" method="POST"
      target="hiddenframe"
      action="http://en.wikipedia.com/wiki/index.php?title=some_thing&action=submit" >
<input type="hidden" name="wpTextbox1" value="whatever the attacker wants to say" />
...
</form>
<iframe name="hiddenframe" style="display: none"></iframe>
<script>
  document.wikiedit.submit();
</script>
```

CSRF Prevention

- Add a random token to forms, and check the form when processing it
  - If you parse a form, you should be using $user->matchEditToken() in your code
    - Login code has a slightly different token
  - Use api.php, and return true from needsToken();
  - Use 'private' group for ResourceLoader
  - Cookies are **not** csrf protection
  - Requiring POST is **not** csrf protection

Prevention

```
$token = $request->getVal( 'wpEditToken' );
$this->mTokenOk = $this->getUser()->matchEditToken( $token );
```

Register Globals

- mostly not an issue (deprecated in php 5.4)
- But still make sure you don't introduce it in your code

SQL Injection

- $qry = "SELECT user_id, user_password FROM user WHERE user_name = '$userName' ";

Prevention

```
$result = $dbw->select(
        'user',                                 // table
        array( 'user_id', user_password ),      // columns
        array( 'user_name' => $userName ),      // where clause
        __METHOD__
);
```

Prevention

- use builders, but make sure you understand the functions!

```
$blockerId = $wgRequest->getVal( 'id', false );
$row = $dbr->selectRow(
        'extTable',
        '*',
        "p_id = $blockerId",
        __METHOD__
);
```

Time for Exercise!

- https://www.mediawiki.org/wiki/User:CSteipp/Training

XXE

- Most XML processing libraries follow the XML standard, and allow resolving / including references in XML by URI
- http://, file://, expect://
- Can result in:
  - Server making requests, abusing network segmentation
  - Server including local files in output
  - Local code execution

XXE Prevention

- When processing XML with libxml2-based classes, disable external entity processing
  - libxml_disable_entity_loader(true);

Failure to Protect Confidential Data

- Some data on the wiki needs to be protected (privacy and legal reasons)
- Private Data: IP address, User Agent, Authentication Data
  - Don't store it unless you have to
- For legal compliance: Any contributed data can be deleted or suppressed
  - Usernames, Revisions, Page Titles, Images

Check if it's deleted

- Core
  - archive.ar_deleted
  - filearchive.fa_deleted
  - ipblocks.ipb_deleted
  - logging.log_deleted
  - revision.rev_deleted
- Common WMF Extensions
  - CentralAuth
    - globaluser.gu_hidden
  - Abuse Filter
    - ip/ua of logs (always)
    - abuse_filter.af_hidden
    - abuse_filter_log.afl_deleted
  - CheckUser
    - cu_log

Questions?