Multi-Post XSRF Web App Exploitation, total pwnage

Adrien de Beaupré
SANS ISC Handler
Tester of pens
Certified SANS Instructor
Intru-Shun.ca Inc.

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Introduction

- Web application vulnerabilities.
- What is XSRF?
- Code.
- Demo.

Founding member of the Fellowship Of Testers Of Pens #FOTOP

Doing a pentest

- I enjoy performing penetration tests, I also enjoy teaching how to do penetration testing correctly.
- Never consider the vulnerabilities in isolation, using them in combination truly demonstrates the risk and impact.
- Pillage and pivot!
- The list of things that one application was vulnerable to was quite impressive!

Vulnerabilities

- Content can be framed.
- Cross Site Scripting XSS.
- Method interchange (POST and GET).
- Cross Site Request Forgery XSRF.
- User enumeration via forgot password function.
- Administrators can disable their own account.
- ... and many others...

XSS

- Cross Site Scripting, aka XSS, script injection.
- The application had a help desk function.
- Any user could create a trouble ticket.
- Ticket will be first viewed by administrator.
- Script executes in the administrator browser.
- Administrator can perform all of the functions vulnerable to XSRF.

XSRF

- Cross-Site Request Forgery is an attack that forces an end user to execute unwanted actions on a web application in which they're currently authenticated (OWASP).
- This attack takes advantage of the application trusting any transaction coming from a browser where a user has an existing and valid session, or where one can be established automatically (SSO).

XSS + XSRF

- XSS and XSRF are like cousins, that get along very well, sneaky mischievous cousins.
- Persistent Admin XSS within the application guarantees the attacker that the administrator will execute the code, the code will execute the XSRF transaction(s).
- We want more than one transaction, hence the multi-post.

Requirements for XSRF

- The use has an existing or can create automatically a valid session.
- The transaction has predictable parameters.
- The victim click on a link, or types in a URL, or XSS.
- The transaction is attractive to the attacker ☺
- The attacker has knowledge of the above, or is very lucky.

XSRF Functions

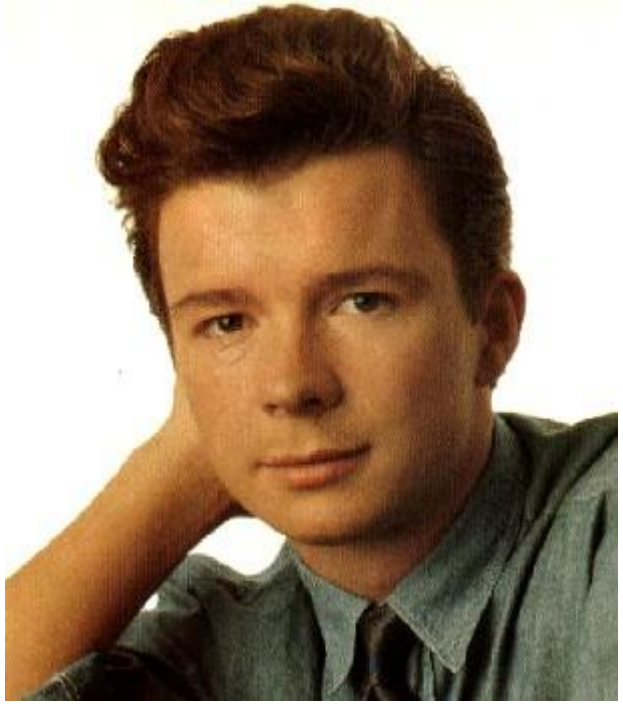
- All the interesting ones in this app are as admin.
    - Add a user.
    - Change user password.
    - Put user in group.
    - Enable user.
    - Disable user.
    - Logout.

What did we want to do?

- We needed a demo to show C-levels.
- Add a new user and in administrator group.
- Lockout the super-user account.
- Logout the super-user account.
- Did the functions in the correct order.
- Each function would wait for last to complete.
- Was all in one HTML page, one click shopping!
- Would force the administrator to view a certain Rick Astley video.

Rick Astley

OK, we didn't do the last one, that would be WAY too mean.



Google-Foo

- Needed to find multi-post XSRF code.
- Found Tim Tomes @lanmaster53

http://www.lanmaster53.com/2013/07/multi-post-csrf/

- We based our code on his. He and Ethan Robish based their code on

http://ceriksen.com/2012/09/29/two-stage-csrf-attacks/

Pseudo code

- HTML to inject in XSS.
- 1 form per transaction.
- 1 iframe per form.
- <body onload="runme();">
- JavaScript:
  - The runme submits the forms one by one, in order, waiting for each one to complete.

Needed a vulnerable app

- Back to Google.
- I needed an app that was vulnerable for the live demo -> Omeka.

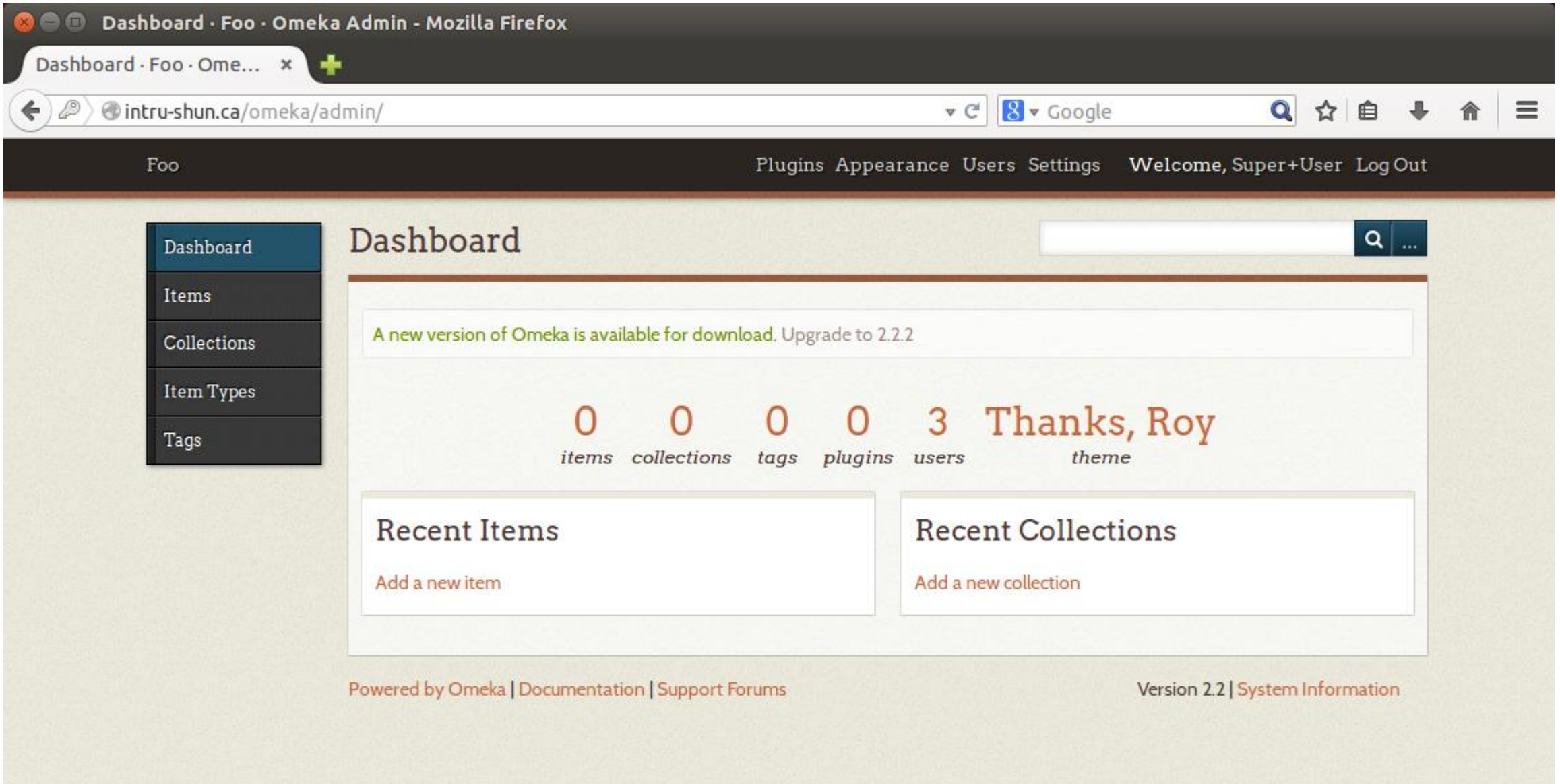
http://www.zeroscience.mk/en/vulnerabilities/ZSL-2014-5193.php

- Free open source content management application.

http://omeka.org/

Omeka

- Is vulnerable to XSRF in admin functions.
- I could not use the application that I did the pen test for as a demonstration or public PoC.
- Omeka is easy to install and easy to exploit!


Dashboard · Foo · Omeka Admin - Mozilla Firefox
Dashboard · Foo · Ome...
intru-shun.ca/omeka/admin/
Google
Foo
Plugins Appearance Users Settings
Welcome, Super+User Log Out
Dashboard
Items
Collections
Item Types
Tags
Dashboard
A new version of Omeka is available for download. Upgrade to 2.2.2
0 items
0 collections
0 tags
0 plugins
3 users
Thanks, Roy
theme
Recent Items
Add a new item
Recent Collections
Add a new collection
Powered by Omeka | Documentation | Support Forums
Version 2.2 | System Information

* required field

Add User

Username* Username must be 30 characters or fewer. Whitespace is not allowed.

foo

Display Name* Name as it should be displayed on the site

bar

Email*

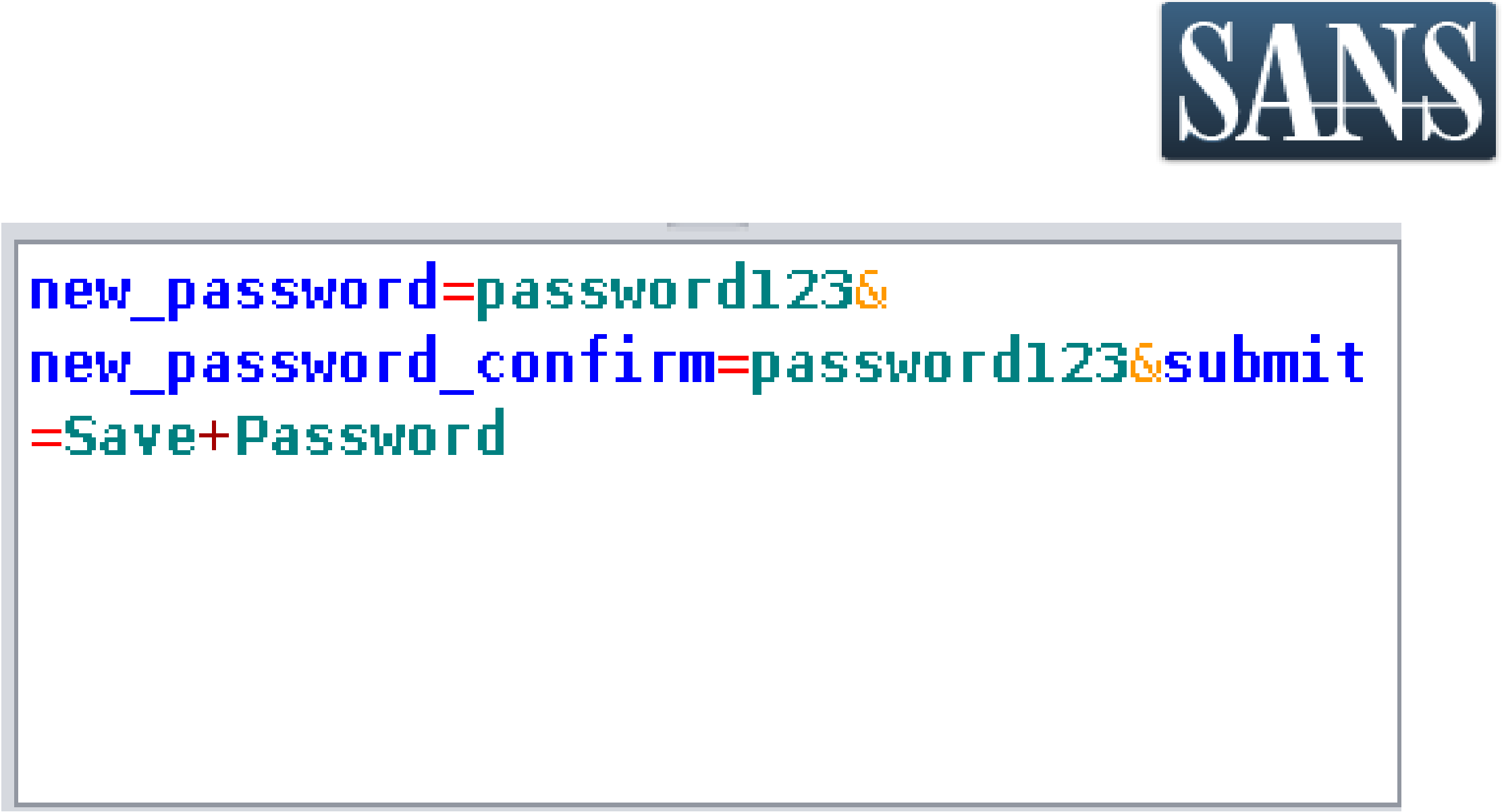
foo@intru-shun.ca

Role* Roles describe the permissions a user has. See documentation for details.

Super


```
username=foo&name=bar&email=
foo%40intru-shun.ca&role=super&active=0
&active=1&submit=Save+Changes
```


Change Password
New Password*
Password must be at least 6 characters long.
Repeat New Password*
Save Password


new_password=password1236&
new_password_confirm=password1236&submit
=Save+Password

XSS

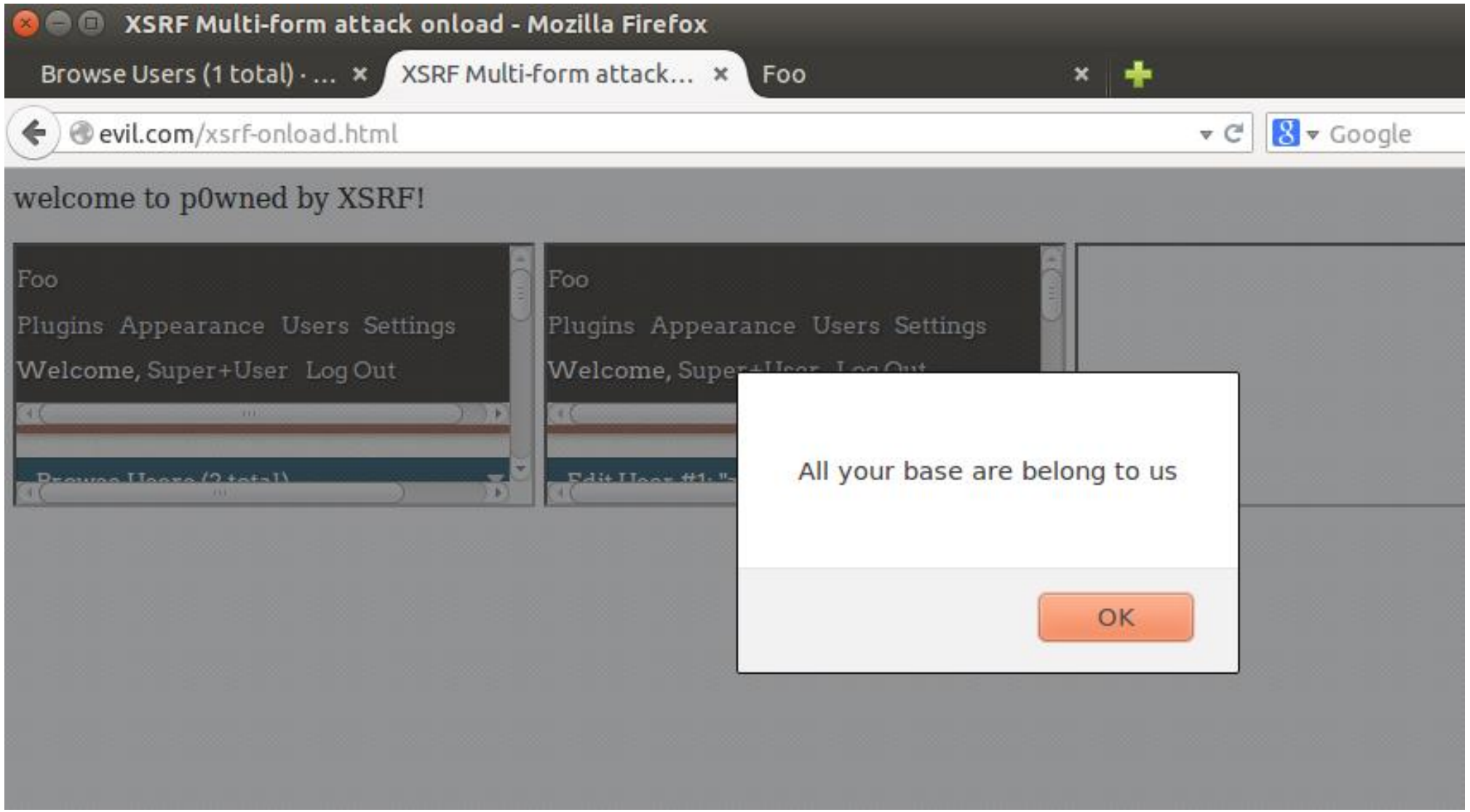
- The persistent XSS in Omeka is in the API keys function.

```
<form action="http://omeka/admin/users/api-keys/1" method="POST">

<input type="hidden" name="api_key_label" value='<script>location.href="http://omeka/xsrf-code.html"</script>' />

<input type="hidden" name="update_api_keys" value="Update+API+Keys" />

<input type="submit" value="Insert" /></form>
```


XSRF Multi-form attack onload - Mozilla Firefox
Browse Users (1 total) · ...
XSRF Multi-form attack...
Foo
evil.com/xsrf-onload.html
Google
welcome to p0wned by XSRF!
Foo
Plugins Appearance Users Settings
Welcome, Super+User Log Out
Foo
Plugins Appearance Users Settings
All your base are belong to us
OK


CATS: ALL YOUR BASE ARE BELONG
TO US.

Demo showed the attack

- We used visible iframes for the demo.
- We didn’t have to, could have easily made them invisible and have the happy victim watching a video.
- No not that one, rickrolling is mean, and unprofessional in this case.

OWASP ZAP

- The OWASP Zed Attack Proxy (ZAP) is an easy to use integrated penetration testing tool for finding vulnerabilities in web applications.
- I used the Zed Attack Proxy both to identify the XSRF issue and to create the PoC code.

XSRF Defences

- Add a random nonce/token to important forms. The only real defence, performance issues.
- referer HTTP header, Origin header, Captcha, reauth, OTP. UX!!!!!
- Use multiple forms, easily bypassed by multi-post technique.

Demo

Now we cross our fingers

https://isc.sans.edu/forums/diary/18507

Note: no goats were harmed in the demo gods sacrifice!

Thanks!

Adrien de Beaupré
SANS ISC Handler
Certified SANS Instructor
Independent Consultant
Intru-Shun.ca Inc.
#BSidesOttawa
@adriendb
adrien@intru-shun.ca