Week 4 write up

web

Comment

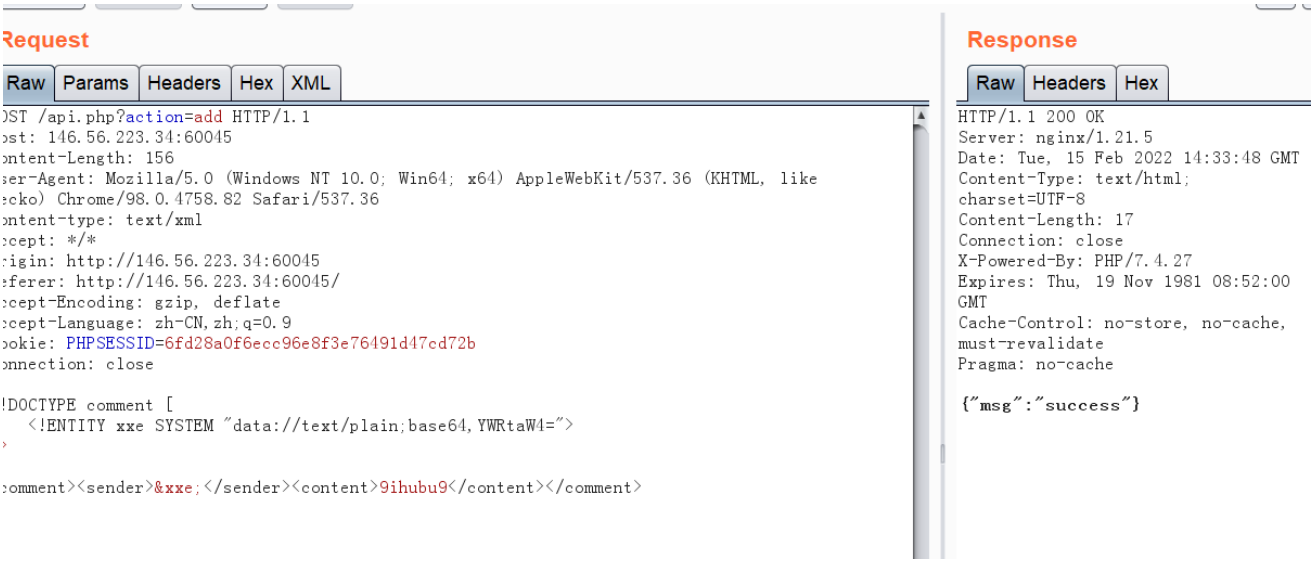
```
switch ($_GET['action']) {
    case 'get':
        get();
        break;
    case 'add':
        save();
        break;
    case 'info':
        echo json_encode(['unique_id' => $_SESSION['unique_id']]);
        break;
    default:
        http_response_code(400);
        echo json_encode(['error' => 'no such action']);
        break;
}
```

根据源码大致三个状态，同时根据hint 得知要用到伪协议

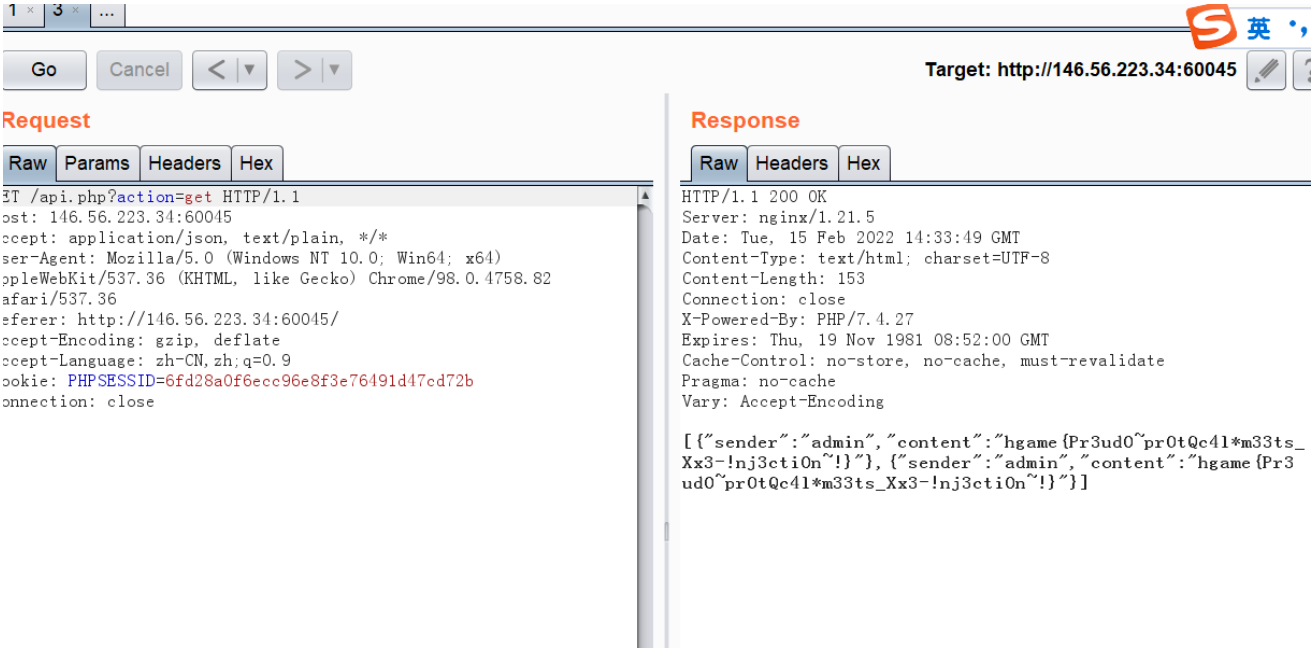
观察代码

```
function waf($str): bool {
    if (preg_match('/file|glob|http|dict|gopher|php|ftp|ssh|phar/i',
$str)) {
        return true;
    }
    return false;
}



    if ($attrs->sender == 'admin' && !preg_match('/admin/i', $str)) {
        $flag = 'hgame{xxxxx}';
        $attrs->content = $flag;
    }
```

发现伪协议中 data没有被过滤，而且在$str中不包含‘admin’但是sender中有于是用伪协议做封装数据



拿到flag



crypto

ECC

得知是椭圆曲线加密于是学习相关知识后可以用sagemath解题

```
SageMath version 9.3, Release Date: 2021-05-09
Using Python 3.7.10. Type "help()" for help.

sage: p = 749970215594340659752724316266187207258384730917219366165603590006486518915 07
....: a =  617390437303328599782364690079486669975105442123623866290620320949253535196 57
....: b =  878217828184778176098825263164797214909198150136680967719923600024676578273 19
....: k = 9365387427217610758445998205852708160408387118279781620477264450962327106123 1
....: E = EllipticCurve(GF(p),[a,b])
....: c1 = E(144556136662118995760188351651324381020119882646071465119382497448719649460 84,255065825705812897146126404932582998138031575617962473306937681467630357919 42)
....: c2 = E(375548711626194567091835091226739296364576222518801992350547345237824838699 31,713920555406167365392679609893042870836292885303984745907823663848738144778 06)
....: m = c1*c2
....: cipher_left = 68208062402162616009217039034331142786282678107650228761709584478779998734710
....: cipher_right = 27453988545002384546706933590432585006240439443312571008791835203660152890619
....: print(cipher_left/m[0])
49303314923700944603626 0
sage: print(cipher_right/m[1])
12748090025655102209539391 7
```

```
C:\Users\pc\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/pc/PycharmProjects/pythonProject/16.prng.py
b'hgam'b'e{me'b'Rsen'b'ne!t'b'WisT'b'ER~i'b'S^A*'b'WIDe'b'lY-U'b'SEd^'b'pSEU'b'Do&r'b'AndO'b'M:nU'b'mBEr'b'!GeN'b'ErAT'b'Ion?'b'Algo'b'rITh'b'M}'
Process finished with exit code 0
```

PRNG

此题是梅森旋转算法

观察脚本后将第一次旋转后的数据代入

然后即可模拟之后的输出

```
data=[888058162, 3094055443, 1404990361, 1012543603, 448723884,
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184187381, 3837095155, 3363256702, 751966993, 3419533016, 4028456468,
1156797460]
class MersenneTwister:
    __n = 624
    __m = 397
    __a = 0x9908b0df
    __b = 0x9d2c5680
    __c = 0xefc60000
    __kInitOperand = 0x6c078965
    __kMaxBits = 0xffffffff
    __kUpperBits = 0x80000000
    __kLowerBits = 0x7fffffff

    def __init__(self, seed = 0):
        self.__register = [0] * self.__n
        self.__state = 0

        self.__register[0] = seed
        for i in range(1, self.__n):
            prev = self.__register[i - 1]
            temp = self.__kInitOperand * (prev ^ (prev >> 30)) + i
            self.__register[i] = temp & self.__kMaxBits

    def __twister(self):
        for i in range(self.__n):
            y = (self.__register[i] & self.__kUpperBits) + \
                    (self.__register[(i + 1) % self.__n] &
self.__kLowerBits)
            self.__register[i] = self.__register[(i + self.__m) %
self.__n] ^ (y >> 1)
            if y % 2:
                self.__register[i] ^= self.__a
        return None

    def __temper(self):
        if self.__state == 0:
            self.__twister()

        y = self.__register[self.__state]
        y = y ^ (y >> 11)
        y = y ^ (y << 7) & self.__b
        y = y ^ (y << 15) & self.__c
        y = y ^ (y >> 18)
```

```
        self.__state = (self.__state + 1) % self.__n

        return y

    def __call__(self):
        return self.__temper()

    def load_register(self, register):
        self.__state = 0
        self.__register = register


class TemperInverser:
    __b = 0x9d2c5680
    __c = 0xefc60000
    __kMaxBits = 0xffffffff

    def __inverse_right_shift_xor(self, value, shift):
        i, result = 0, 0
        while i * shift < 32:
            part_mask = ((self.__kMaxBits << (32 - shift)) &
self.__kMaxBits) >> (i * shift)
            part = value & part_mask
            value ^= part >> shift
            result |= part
            i += 1
        return result

    def __inverse_left_shift_xor(self, value, shift, mask):
        i, result = 0, 0
        while i * shift < 32:
            part_mask = (self.__kMaxBits >> (32 - shift)) << (i * shift)
            part = value & part_mask
            value ^= (part << shift) & mask
            result |= part
            i += 1
        return result

    def __inverse_temper(self, tempered):
        value = tempered
        value = self.__inverse_right_shift_xor(value, 18)
        value = self.__inverse_left_shift_xor(value, 15, self.__c)
        value = self.__inverse_left_shift_xor(value, 7, self.__b)
        value = self.__inverse_right_shift_xor(value, 11)
        return value

    def __call__(self, tempered):
        return self.__inverse_temper(tempered)
```

```
class MersenneTwisterCracker:
    __n = 624
    def __init__(self):
        inverser  = TemperInverser()
        register  = [inverser(data[i]) for i in range(self.__n)]
        self.__mt = MersenneTwister(0)
        self.__mt.load_register(register)

    def __call__(self):
        return self.__mt()
from libnum import n2s
if __name__ == "__main__":
    a=[]
    flag=[3437104340, 508103176, 1635844121, 878522509, 1923790547,
1727955782, 1371509208, 3182873539, 156878129,1757777801, 1472806960,
3486450735, 2307527058, 2950814692, 1817110380, 372493821, 729662950,
2366747255,774823385, 387513980, 1444397883]
    mtc = MersenneTwisterCracker()
    for i in range(21):
       print(n2s(flag[i] ^ mtc()),end="")
```

解密即可