Proof Of Concept: Overthewire: Bandit

Members: Purva Pawaskar (259)

Payal Singh (281)

Level 0 → Level 1

Tools Used: ssh, ls, cat

Objective: Connect to the Bandit server and find the password for the next level.

Commands Used: `cat readme`

Steps:

1. SSH to bandit.labs.overthewire.org on port 2220 with username bandit0 and password bandit0
2. Used `ls` to list files and found `readme`
3. Used `cat readme` to read the file contents

Credentials:

- Username: bandit1
- Password: ZjLjTmM6FvvyRnrb2rfNWOZOTa6ip5If

Learning: Basic SSH connection and file reading with cat command.

Level 1 → Level 2

Tools Used: cat

Objective: Read a file with an unusual name (hyphen `-`).

Commands Used: `cat ./-`

Steps:

1. Found file named `-` using `ls`

2. Used `cat ./-` to read the file (avoiding interpretation as command flag)

Credentials:

- Username: bandit2
- Password: 263JGJPfgU6LtdEvgfWU1XP5yac29mFx

Learning: Handle special character filenames using path prefixes to prevent flag interpretation.

Level 2 → Level 3

Tools Used: cat

Objective: Read a file with spaces in its name.

Commands Used: `cat -- "--spaces in this filename--"`

Steps:

1. Found file with spaces in name
2. Used quotes to handle spaces in filename

Credentials:

- Username: bandit3
- Password: MNk8KNH3Usiio41PRUEoDFPqfxLPlSmx

Learning: Handle filenames with spaces using quotes or escape characters.

Level 3 → Level 4

Tools Used: ls, cd, cat

Objective: Find password in a hidden file within the `inhere` directory.

Commands Used: `ls -a`, `cat .hidden`

Steps:

1. Navigated to `inhere` directory with `cd inhere`
2. Used `ls -a` to show hidden files
3. Found `.hidden` file and read it with `cat .hidden`

Credentials:

- Username: bandit4
- Password: 2WmrDFRmJIq3IPxneAaMGhap0pFhF3NJ

Learning: Use `ls -a` to display hidden files starting with dots.

Level 4 → Level 5

Tools Used: find, file, cat

Objective: Find human-readable file among many files in `inhere` directory.

Commands Used: `find . -type f -exec file {} \;`, `cat ./-file07`

Steps:

1. Used `find` with `file` command to identify file types
2. Located the ASCII text file among binary files
3. Read the human-readable file

Credentials:

- Username: bandit5
- Password: 4oQYVPkxZOOEOO5pTW81FB8j8lxXGUQw

Learning: Use `file` command to identify file types and find human-readable files.

Level 5 → Level 6

Tools Used: find

Objective: Find file with specific properties: human-readable, 1033 bytes, not executable.

Commands Used: `find . -type f -size 1033c ! -executable`

Steps:

1. Used `find` with multiple conditions to locate specific file
2. Found file in `./maybehere07/.file2`
3. Read the file contents

Credentials:

- Username: bandit6
- Password: HWasnPhtq9AVKe0dmk45nxy20cvUa6EG

Learning: Combine multiple find conditions using size, type, and permission flags.

Level 6 → Level 7

Tools Used: find

Objective: Find file owned by bandit7:bandit6 with size 33 bytes.

Commands Used: `find / -user bandit7 -group bandit6 -size 33c 2>/dev/null`

Steps:

1. Searched entire filesystem from root with ownership and size criteria
2. Suppressed permission errors with `2>/dev/null`
3. Found file at `/var/lib/dpkg/info/bandit7.password`

Credentials:

- Username: bandit7
- Password: morbNTDkSW6jIlUc0ymOdMaLnOlFVAaj

Learning: Search files by ownership and redirect errors to suppress permission denials.

Level 7 → Level 8

Tools Used: grep

Objective: Find password next to word "millionth" in data.txt.

Commands Used: `grep millionth data.txt`

Steps:

1. Used `grep` to search for specific keyword in large file
2. Found password on the same line as "millionth"

Credentials:

- Username: bandit8
- Password: dfwvzFQi4mU0wfNbFOe9RoWskMLg7eEc

Learning: Use grep to quickly search for patterns in large text files.

Level 8 → Level 9

Tools Used: sort, uniq

Objective: Find the only unique line in data.txt.

Commands Used: `sort data.txt | uniq -u`

Steps:

1. Sorted the file contents alphabetically
2. Used `uniq -u` to find lines that appear only once
3. Found the unique password line

Credentials:

- Username: bandit9
- Password: 4CKMh1JI91bUIZZPXDqGanal4xvAg0JM

Learning: Combine sort and uniq commands to find unique entries in text files.

Level 9 → Level 10

Tools Used: strings

Objective: Find human-readable strings in binary data file.

Commands Used: `strings data.txt`

Steps:

1. Used `strings` to extract printable characters from binary file
2. Located password among the readable strings

Credentials:

- Username: bandit10
- Password: FGUW5ilLVJrxX9kMYMmlN4MgbpfMiqey

Learning: Extract readable text from binary files using the strings command.

Level 10 → Level 11

Tools Used: base64

Objective: Decode Base64 encoded data.

Commands Used: `base64 -d data.txt`

Steps:

1. Identified Base64 encoded content
2. Used `base64 -d` to decode the content
3. Retrieved the decoded password

Credentials:

- Username: bandit11
- Password: dtR173fZKb0RRsDFSGsg2RWnpNVj3qRr

Learning: Recognize and decode Base64 encoded data using base64 command.

Level 11 → Level 12

Tools Used: tr

Objective: Decode ROT13 cipher.

Commands Used: `cat data.txt | tr 'A-Za-z' 'N-ZA-Mn-za-m'`

Steps:

1. Identified ROT13 encoded text
2. Used `tr` to translate characters with ROT13 mapping
3. Decoded the password

Credentials:

- Username: bandit12
- Password: 7x16WNeHIi5YkIhWsfFIqoognUTyj9Q4

Learning: Use tr command for character translation and ROT13 decoding.

Level 12 → Level 13

Tools Used: xxd, gzip, bzip2, tar

Objective: Extract password from repeatedly compressed hex dump.

Commands Used:

- `xxd -r data.txt > data.bin` - Multiple instances of:

1. mv <filename> <new filename>
2. gzip -d <new filename in .gz >
3. bzip2 -d <new filename in .bz2 >
4. tar -xf data.bin

Steps:

1. Reversed hex dump using `xxd -r`
2. Performed 9 extraction operations alternating between gzip, bzip2, and tar

3. Used `file` command to identify compression type at each step

Credentials:

- Username: bandit13
- Password: FO5dwFsc0cbaIiH0h8J2eUks2vdTDwAn

Learning: Handle multiple compression layers and use file command to identify formats.

Level 13 → Level 14

Tools Used: ssh (private key authentication)

Objective: Use SSH private key to access next level.

Commands Used: `ssh -i sshkey.private bandit14@localhost -p 2220`
ed /etc/bandit_pass

Steps:

1. Found SSH private key file
2. Used key-based authentication instead of password
3. Accessed `/etc/bandit_pass/bandit14` for password

Credentials:

- Username: bandit14
- Password: MU4VWeTyJk8ROof1qqmcBPaLh7lDCPvS

Learning: Use SSH private keys for authentication and understand key-based access.

Level 14 → Level 15

Tools Used: netcat (nc)

Objective: Connect to localhost port 30000 to retrieve password.

Commands Used: `nc localhost 30000`

Steps:

1. Used netcat to establish TCP connection to port 30000
2. Server immediately returned the password

Credentials:

- Username: bandit15
- Password: 8xCjnmgoKbGLhHFAZlGE5Tmu4M2tKJQo

Learning: Use netcat for basic network connections and port communication.

Level 15 → Level 16

Tools Used: openssl

Objective: Connect to port 30001 using SSL encryption.

Commands Used: `openssl s_client -connect localhost:30001 -quiet`

Steps:

1. Established SSL connection using openssl s_client
2. Server returned password over secure connection

Credentials:

- Username: bandit16
- Password: kSkvUpMQ7lBYyCM4GBPvCvT1BfWRy0Dx

Learning: Use openssl for secure SSL/TLS connections.

Level 16 → Level 17

Tools Used: nmap, openssl

Objective: Find correct SSL port among port range 31000-32000.

Commands Used:

- `nmap -p 31000-32000 localhost`

- `openssl s_client -connect localhost:31790 -quiet`
- nano sshkey.private //paste the key here
- chmod 600 sshkey.private
- ssl -i sshkey.private bandit17@localhost -p 2220

Steps:

1. Used nmap to scan port range and identify open ports
2. Connected to SSL-enabled port 31790
3. Received SSH private key for next level
4. Set up key file with proper permissions (`chmod 600`)

Credentials: - Username: bandit17 - SSH Key:

```
-----BEGIN RSA PRIVATE KEY-----

MIIEogIBAAKCAQEAvmOkuifmMg6HL2YPIOjon6iWfbp7c3jx34YkYWqUH57SUdy
J imZzeyGC0gtZPGujUSxiJSWI/oTqexh+cAMTSMlOJf7+BrJObArnxd9Y7YT2bRPQ
Ja6Lzb558YW3FZl87ORiO+rW4LCDCNd2lUvLE/GL2GWyuKN0K5iCd5TbtJzEkQTu

DSt2mcNn4rhAL+JFr56o4T6z8WWAW18BR6yGrMq7Q/kALHYW3OekePQAzL0V
UYbW
JGTi65CxbCnzc/w4+mqQyvmzpWtMAzJTzAzQxNbkR2MBGySxDLrjg0LWN6sK7w
NX
x0YVztz/zbIkPjfkU1jHS+9EbVNj+D1XFOJuaQIDAQABAoIBABagpxpM1aoLWfvD
KHcj10nqcoBc4oE11aFYQwik7xfW+24pRNuDE6SFthOar69jp5RlLwD1NhPx3iBl
J9nOM8OJ0VToum43UOS8YxF8WwhXriYGnc1sskbwpXOUDc9uX4+UESzH22P29
ovd
d8WErY0gPxun8pbJLmxkAtWNhpMvfe0050vk9TL5wqbu9AlbssgTcCXkMQnPw9
nC
YNN6DDP2lbcBrvgT9YCNL6C+ZKufD52yOQ9qOkwFTEQpjtF4uNtJom+asvlpmS8
A
vLY9r60wYSvmZhNqBUrj7lyCtXMIu1kkd4w7F77k+DjHoAXyxcUp1DGL51sOmam
a
+TOWWgECgYEA8JtPxP0GRJ+IQkX262jM3dEIkza8ky5moIwUqYdsx0NxHgRRhOR
T
```

```
8c8hAuRBb2G82so8vUHk/fur85OEfc9TncnCY2crpoqsghifKLxrLgtT+qDpfZnx
SatLdt8GfQ85yA7hnWWJ2MxF3NaeSDm75Lsm+tBbAiyc9P2jGRNtMSkCgYEAyp
Hd
HCctNi/FwjulhttFx/rHYKhLidZDFYeiE/v45bN4yFm8x7R/b0iE7KaszX+Exdvt
SghaTdcG0Knyw1bpJVyusavPzpaJMjdJ6tcFhVAbAjm7enCIvGCSx+X3l5SiWg0A
R57hJglezIiVjv3aGwHwvlZvtszK6zV6oXFAu0ECgYAbjo46T4hyP5tJi93V5HDi
Ttiek7xRVxUl+iU7rWkGAXFpMLFteQEsRr7PJ/lemmEY5eTDAFMLy9FL2m9oQWC
g
R8VdwSk8r9FGLS+9aKcV5PI/WEKlwgXinB3OhYimtiG2Cg5JCqIZFHxD6MjEGOiu
L8ktHMPvodBwNsSBULpG0QKBgBAplTfC1HOnWiMGOU3KPwYWt0O6CdTkmJ
OmL8Ni
blh9elyZ9FsGxsgtRBXRsqXuz7wtsQAgLHxbdLq/ZJQ7YfzOKU4ZxEnabvXnvWkU
YOdjHdSOoKvDQNWu6ucyLRAWFuISeXw9a/9p7ftpxm0TSgyvmfLF2MIAEwyzRq
aM
77pBAoGAMmjmIJdjp+Ez8duyn3ieo36yrttF5NSsJLAbxFpdlc1gvtGCWW+9Cq0b
dxviW8+TFVEBl1O4f7HVm6EpTscdDxU+bCXWkfjuRb7Dy9GOtt9JPsX8MBTakzh3
vBgsyi/sN3RqRBcGU40fOoZyfAMT8s1m/uYv52O6IgeuZ/ujbjY=
-----END RSA PRIVATE KEY-----
```

Learning: Use nmap for port scanning and handle SSH key setup with proper permissions.

Level 17 → Level 18

Tools Used: diff

Objective: Find password by comparing two password files.

Commands Used: `diff passwords.old passwords.new`

Steps:

1. Compared two password files using diff
2. Identified the changed line showing new password

Credentials:

- Username: bandit18
- Password: x2gLTTjFwMOhQ8oWNbMN362QKxfRqGlO

Learning: Use diff command to compare files and identify changes.

Level 18 → Level 19

Tools Used: ssh (command execution)

Objective: Execute command via SSH when login shell is restricted.

Commands Used: `ssh bandit18@bandit.labs.overthewire.org -p 2220 cat readme`

Steps:

1. Bypassed restricted shell by executing command directly via SSH
2. Read readme file without interactive login

Credentials:

- Username: bandit19
- Password: cGWpMaKXVwDUNgPAVJbWYuGHVn9zl3j8

Learning: Execute commands through SSH without interactive shell access.

Level 19 → Level 20

Tools Used: setuid binary

Objective: Use setuid binary to read password file as different user.

Commands Used: `./bandit20-do cat /etc/bandit_pass/bandit20`

Steps:

1. Found setuid binary that executes commands as bandit20
2. Used it to read bandit20's password file

Credentials:

- Username: bandit20
- Password: 0qXahG8ZjOVMN9Ghs7iOWsCfZyXOUbYO

Learning: Understand setuid binaries and privilege escalation concepts.

Level 20 → Level 21

Tools Used: netcat, setuid binary

Objective: Use network client that validates password before giving next one.

Commands Used:

- `nc -l -p 12345 < /etc/bandit_pass/bandit20 &`
- `./suconnect 12345` (2 times)

Steps:

1. Started netcat listener serving current password
2. Used suconnect binary to connect and validate
3. Received next level password

Credentials:

- Username: bandit21
- Password: EeoULMCra2q0dSkYj561DX7s1CpBuOBt

Learning: Coordinate network services and understand client-server validation.

Level 21 → Level 22

Tools Used: cron analysis

Objective: Find password by examining cron job output.

Commands Used:

- `ls -l /etc/cron.d/`

- `cat /etc/cron.d/cronjob_bandit22`
- `cat /tmp/<tempfilename>`

Steps:

1. Examined cron job configuration
2. Found script that writes password to temporary file
3. Read the password from temp file

Credentials:

- Username: bandit22
- Password: tRae0UfB9v0UzbCdn9cY0gQnds9GF58Q

Learning: Understand cron jobs and how scheduled tasks can expose information.

Level 22 → Level 23

Tools Used: cron analysis, md5sum

Objective: Predict filename generated by script using username.

Commands Used:

- ` ls -l /etc/cron.d/`
- ` cat /etc/cron.d/cronjob_bandit23`
- `cat /usr/bin/cronjob_bandit23.sh`
- `echo I am user bandit23 | md5sum | cut -d ' ' -f 1`
- ` cat /tmp/<generated md5hash>`

Steps:

1. Analysed cron script that generates filename from username hash
2. Computed MD5 hash for "I am user bandit23"
3. Read password from predicted filename

Credentials:

- Username: bandit23
- Password: 0Zf11ioIjMVN551jX3CmStKLYqjk54Ga

Learning: Reverse engineer script logic to predict filenames and understand hashing.

Level 23 → Level 24

Tools Used: script creation, cron exploitation

Objective: Create script that will be executed by cron job.

Commands Used:

- ls -l /etc/cron.d/
- cat /etc/cron.d/cronjob_bandit24
- cat /usr/bin/cronjob_bandit24.sh
- echo '#!/bin/bash' > getpass.sh
- echo 'cat /etc/bandit_pass/bandit24 > /tmp/bandit24_pass' >> getpass.sh
- chmod +x getpass.sh
- cp getpass.sh /var/spool/bandit24/foo/
- cat /tmp/bandit24_pass

Steps:

1. Created script to dump password to accessible location
2. Placed script in directory monitored by cron job
3. Waited for execution and read password

Credentials:

- Username: bandit24
- Password: gb8KRRCsshuZXI0tUuR6ypOFjiZbf3G8

Learning: Exploit cron job execution to run custom scripts and extract information.

Level 24 → Level 25

Tools Used: brute force scripting, netcat

Objective: Find 4-digit pincode by brute force attack.

Commands Used:

- password=$(cat /etc/bandit_pass/bandit24)
- for i in $(seq -w 0 9999); do echo "$password $i" | nc -q1 localhost 30002; done

result obtained:

- I am the pincode checker for user bandit25. Please enter the password for user bandit24 and the secret pincode on a single line, separated by a space.
- Correct!
- The password of user bandit25 is iCi86ttT4KSNe1armKiwbQNmB3YJP3q4

Steps:

1. Created loop to try all 4-digit combinations (0000-9999)
2. Used netcat to submit password and pincode combinations
3. Found correct combination and received password

Credentials:

- Username: bandit25
- Password: iCi86ttT4KSNe1armKiwbQNmB3YJP3q4

Learning: Implement brute force attacks and understand the importance of rate limiting.

Level 25 → Level 26

Tools Used: vi/vim, shell escape

Objective: Escape restricted shell through text editor.

Commands Used:

- ls -la
- cat /etc/passwd | grep bandit26
- ssh bandit26@localhost -p 2220 -i bandit26.sshkey - :set shell? - :set shell=/bin/bash - :set shell?
- :ls
- cat /etc/bandit_pass/bandit26

Steps:

1. Connected but was dropped into restricted `more` command
2. Pressed `v` in more to enter vi editor
3. Changed shell setting and escaped to bash
4. Read password file

Credentials:

- Username: bandit26
- Password: s0773xxkk0MXfdqOfPRVr9L3jJBUOgCZ

Learning: Escape restricted environments using text editor capabilities.

Level 26 → Level 27

Tools Used: setuid binary

Objective: Use setuid binary to access bandit27 password.

Commands Used: `./bandit27-do cat /etc/bandit_pass/bandit27`

Steps:

1. Found setuid binary for bandit27
2. Used it to read protected password file

Credentials:

- Username: bandit27
- Password: upsNCc7vzaRDx6oZC6GiR6ERwe1MowGB

Learning: Apply setuid binary knowledge from previous levels.

Level 27 → Level 28

Tools Used: git

Objective: Clone git repository to find password.

Commands Used: `mktemp -d`, `git clone ssh://bandit27-git@localhost:2220/home/bandit27git/repo`

Steps:

1. Cloned git repository using SSH
2. Found README file containing password

Credentials:

- Username: bandit28
- Password: Yz9IpL0sBcCeuG7m9uQFt8ZNpS4HZRcN

Learning: Basic git repository cloning and file examination.

Level 28 → Level 29

Tools Used: git log, git show

Objective: Find password in git commit history.

Commands Used:

- `mktemp -d`

- `git clone ssh://bandit28-git@localhost:2220/home/bandit28-git/repo`
- `git log`
- `git show f257900db7c134cb5224c91013817e76d18457e0`

Steps:

1. Examined git commit history
2. Found commit that removed password from README
3. Viewed commit diff to see original password

Credentials:

- Username: bandit29
- Password: 4pT1t5DENaYuqnqvadYs1oE4QLCdjmJ7

Learning: Investigate git history to find accidentally committed sensitive information.

Level 29 → Level 30

Tools Used: git branch, git checkout

Objective: Find password in different git branch.

Commands Used:

mktemp -d

- git clone ssh://bandit29-git@localhost:2220/home/bandit29-git/repo
- cd repo
- ls
- cat README.md
- git log
- git checkout 57d7
- git branch

- git checkout master
- git status
- git branch -a
- git checkout dev
- git status
- ls
- cat README.md

Steps:

1. Listed all branches including remote ones
2. Switched to dev branch
3. Found password in README file on dev branch

Credentials:

- Username: bandit30
- Password: qp30ex3VLz5MDG1n91YowTv4Q8l7CDZL

Learning: Explore git branches to find information not present in main branch.

Level 30 → Level 31

Tools Used: git tag, git show

Objective: Find password in git tag.

Commands Used:

- mktemp -d
- git clone ssh://bandit30-git@localhost:2220/home/bandit30-git/repo
- cd repo
- ls
- cat README.md

- git log
- git branch
- git branch -a
- git tag
- git show secret

Steps:

1. Listed available git tags
2. Examined "secret" tag contents
3. Found password in tag annotation

Credentials:

- Username: bandit31
- Password: fb5S2xb7bRyFmAvQYQGEqsbhVyJqhnDy

Learning: Use git tags to mark and store additional information in repositories.

Level 31 → Level 32

Tools Used: git add, git commit, git push

Objective: Push specific file to remote repository despite gitignore.

Commands Used:

- mktemp -d
- git clone ssh://bandit30-git@localhost:2220/home/bandit30-git/repo
- cd repo
- cat README.md
- nano key.txt
- git add key.txt
- rm .gitignore

- git add key.txt
- git commit -m "text"
- git push

Steps:

1. Created required key.txt file with specified content
2. Removed .gitignore that was blocking the file
3. Added, committed, and pushed the file
4. Received password from remote repository

Credentials:

- Username: bandit32
- Password: 3O9RfhqyAlVBEZpVb6LYStshZoqoSx5K

Learning: Understand git workflow and how gitignore affects file tracking.

Level 32 → Level 33

Tools Used: shell variable exploitation

Objective: Break out of uppercase shell restriction.

Commands Used:

- `$0` (to get normal shell)
- `whoami
- `cat /etc/bandit_pass/bandit33`

Steps:

1. Found shell that converts all input to uppercase
2. Used `$0` variable to spawn new shell
3. Read final password

Credentials:

- Username: bandit33
- Password: tQdtbs5D5i2vJwDUNgPAVJbWYuGHVn9zl3j8

Learning: Exploit shell variables to bypass input restrictions and escape constrained environments.

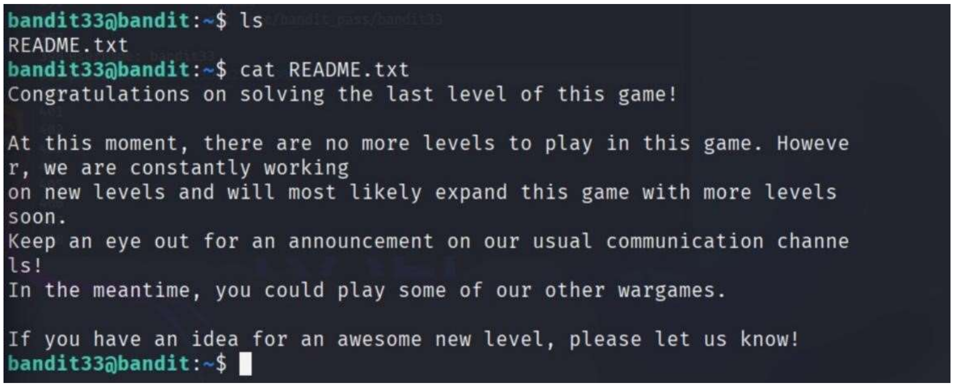
Level 33 → Level 34

Objective: Obtain the final message.

Commands Used:

- "ls" to list the files.
- "cat README.md" to showcase the final message.

Message:



```
bandit33@bandit:~$ ls
README.txt
bandit33@bandit:~$ cat README.txt
Congratulations on solving the last level of this game!

At this moment, there are no more levels to play in this game. Howeve
r, we are constantly working
on new levels and will most likely expand this game with more levels
soon.
Keep an eye out for an announcement on our usual communication channe
ls!
In the meantime, you could play some of our other wargames.

If you have an idea for an awesome new level, please let us know!
bandit33@bandit:~$
```