Security Assessment Findings Report

Final Report

Business Confidential

Date: April 18th, 2022
Project: Blunder_Tiffin_001
Version 2.0

Version History

Version	Date	Author	Description
1.0	April 14th 2022	Francesco Elisa	Initial Version
1.1	April 15th 2022	Francesco Elisa	Introductory Sections
1.2	April 16th 2022	Francesco Elisa	Penetration Test Findings and Annexes
1.3	April 17th 2022	Francesco Elisa	Executive Summary and Security Weaknesses
2.0	April 18th 2022	Francesco Elisa	Final Review

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Confidentiality Statement

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XPTO may share this document with auditors under non-disclosure agreements to display 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. XPTO prioritized the assessment to find the weakest security controls an attacker would exploit. XPTO recommends conducting similar assessments on an annual basis by internal or third-party assessors to ensure the continued success of the controls.

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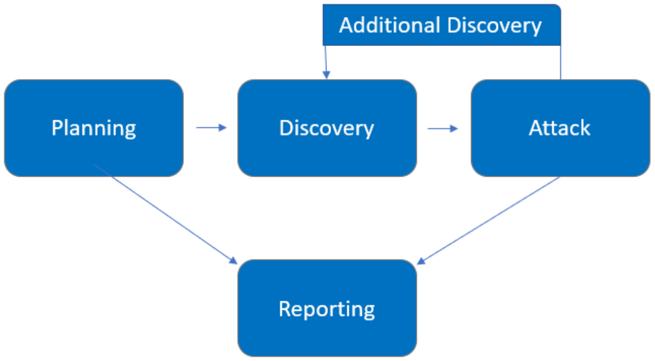
Assessment Overview

From April 9th, 2022, to April 18th, 2022, BT engaged XPTO to evaluate the security posture of its infrastructure compared to current industry best practices that included an internal penetration test. All testing performed is based on the NIST *SP 800-115 Technical Guide to Information Security Testing and Assessment, OWASP Testing Guide (v4)* which includes the *OWASP Web Security Testing Guide*, *OWASP Top Ten Web* and the *Common Vulnerability Scoring System (CVSS)*.

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 added discovery upon new access.
- Reporting – Document all found vulnerabilities and exploits, failed attempts, and company security weaknesses.



Assessment Components

Internal Penetration Test

An internal network penetration test is performed to help gauge what an attacker could achieve with initial access to a network. This assessment has the purpose of identifying what could be accomplished by an intruder who has gained internal access to the network. After the vulnerability identification stage, penetration testes exploit these vulnerabilities to gauge the impact of the vulnerability and highlight possible entry points. It usually comes into picture after the execution of an external penetration test, but in the case of our assessment, this phase was omitted since XPTO was granted access to the internal network.

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 V3 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.

Scope

Assessment	Details
Internal Penetration Test	10.10.11.143

- Full scope information provided in "**Blunder_Tiffin_001_Full_Findings.xslx**"

Scope Exclusions

XPTO deployed a vulnerability management tool to automatically detect common vulnerabilities which the server could be vulnerable to. The server holds a default Apache HTTP Test page, but since the main target of this assessment is not the HTTP server's test page, this report will focus on the remaining vulnerabilities.

Per client request, XPTO did not perform any Denial-of-Service attacks during testing.

Client Allowances

BT did not provide any allowances to assist the testing.

Executive Summary

XPTO evaluated BT's external security posture through an internal network penetration test from April 9th, 2022, to April 19th, 2022. By leveraging a series of attacks, XPTO found high level vulnerabilities that allowed complete control over BT's target machine. It is highly recommended that BT address these vulnerabilities as soon as possible as the vulnerabilities are easily found through basic reconnaissance and exploitable without much effort.

Attack Summary

The following table describes how XPTO gained root level access over the target system, step by step:

Step	Action	Recommendation
1	Discovered the "X-Backend-Server" Header that disclosed the internal/hidden domain **office.paper**	Reconfigure HTTP responses to not send this header
2	Simple enumeration techniques and HTML code inspection were able to **identify the WordPress version** in use by the web application. Additionally, despite not being directly relevant for this attack chain it was verified that an attacker can perform unrestricted login attempts to the web application in **office.paper.**	Installing the "WP-Hardening" plugin allows to easily hide the WordPress version in use. Alternatively, BT may also perform this step manually using "secure by obscure" mechanisms to remove the vulnerability. Restricting login attempts by setting a timeout or blacklisting the IP would be a recommended approach to tackle this vulnerability.
3	Through the identification of the WordPress version, we were able to identify that the web application was susceptible to CVE-2019-17671. This vulnerability allows the viewing of unauthenticated private posts which enabled us to discover a new subdomain **chat.office.paper**	XPTO recommends upgrading WordPress to version 5.2.4 or above (ideally the latest stable version)
4	Extracted "recyclops" credentials which were later used to **obtain a shell** through SSH	Restricting directory transversal and read access to the files outside the "sales" folder.

5	Leveraged valid credentials to **log into SSH**	Changing the password of the user "dwight" to a different and more secure one is recommended. It was verified that the current password is identical to the password of the user "recyclops" in the chat application. Furthermore, BT can also set up SSH to use multi-factor authentication.
6	Server's Polkit version vulnerable to **CVE-2021-3560**, which allows an authenticated user to gain a root level access on the system without passing the authentication requirements	To fix the exploit you can download the fixed packages from the Linux distribution websites. **NOTE: Recently it was discovered a new privilege escalation vulnerability (CVE-2021-4034). We highlight the importance of updating to the latest version.**

Security Weaknesses

Information Disclosure through Headers

During the information gathering phase of the assessment, XPTO was able to identify headers that disclosed information regarding server details, technologies, WordPress API and an internal domain.

- Server details: "Server" Header
- Technologies: "Powered-by" Header
- WordPress API: "Link" Header
- Internal domain: "X-Backend-Server" Header

Unrestricted Login Attempts

During the assessment, XPTO performed multiple authentication attacks against the login form found on the web application. For all logins, unlimited attempts were allowed, which serves as a proof-of-concept that an attacker with enough time and resource could login with valid account credentials to **office.paper**. This would further open the attack landscape as the attacker would be able to login in the web application.

Login Portal Username Enumeration

XPTO was able to detect the possibility of enumerating usernames in the **office.paper** web application login portal.

Password Recovery Username and Email Enumeration

XPTO was able to detect the possibility of enumerating usernames and email addresses in the **office.paper** web application password recovery portal.

Directory Transversal and Read access to Web Server Files

A user authenticated in the rocket chat web application (**chat.office.paper**) can leverage the "recyclops" bot functionalities to list and read some of the web server's files. This vulnerability was leveraged to extract credentials to login with SSH as user "dwight".

Password Reutilization

XPTO was able to successfully obtain a shell by logging into SSH, because of the existence of password reutilization between the system user "dwight" and the chat application user "recyclops".

Legacy Polkit Version

XPTO leveraged a vulnerability in Polkit to obtain root level access to the target system by escalating dwight's privileges in an SSH shell.

Legacy WordPress Version

XPTO leveraged a vulnerability in WordPress that returns all pages from the database (including password protected, pending and drafts), thus leaking its secret content. This vulnerability allowed to discover a new subdomain.

Default Apache HTTP Test Page and Files

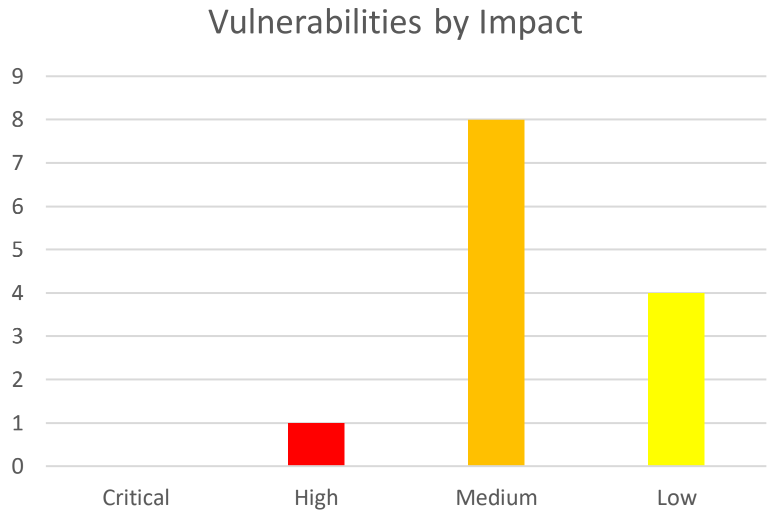
It is not recommended to have the default HTTP Apache Test Page or the default files of Apache in a live web server environment. This can be used to fingerprint the Apache version and even the operating system. To highlight this aspect, Nessus detected a wide array of vulnerabilities related to this test page and the files it exposes which can be consulted in the **Blunder_Tiffin_001_Full_Findings.xslx**.

Vulnerabilities by Impact

The following chart illustrates the vulnerabilities found by impact:

Figure 1: Bar chart distribution of Impact

displaying the Vulnerabilities by



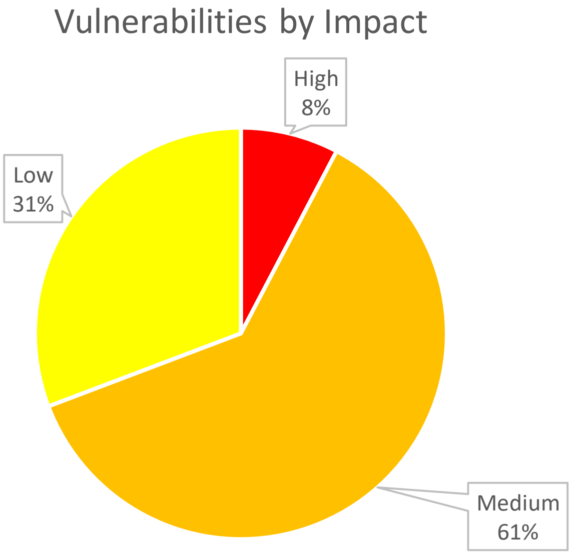


Figure 1: Pie chart displaying the distribution of Vulnerabilities by Impact

Internal Penetration Test Findings

Enumeration

The enumeration of information relating to BT's internal network was conducted using active recognition tools, such as port scanners, which allow for the mapping of all exposed services and ports of the asset being covered in this assessment.

IP Address	Ports/Protocols
10.10.11.143	22/tcp, 80/tcp, 443/tcp, 5353/udp

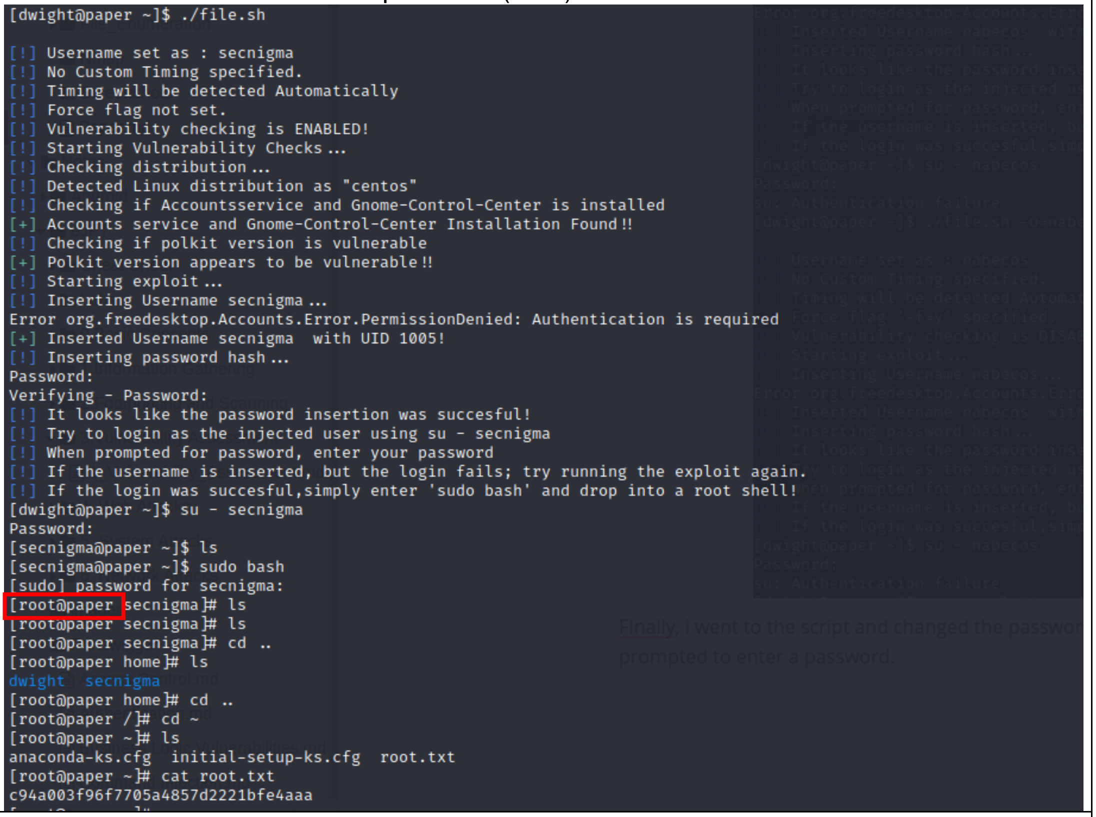
Vulnerabilities

For the process of enumeration, vulnerability assessment and exploitation, BT provided XPTO with a VPN access to conduct their tests.

Legacy Polkit Version Vulnerable to CVE-2021-3560

Severity	High	**CVSSv3 Classification**	7.8
Description	Polkit is a small toolkit used for defining and handling authorizations on Unix/Linux platforms. In short, by helping unprivileged process securely communicate with privileged processes, it stops unprivileged users from executing admin tasks.		
CVSSv3 Criteria	**Attack Vector**: Local **Attack Complexity**: Low **Privileges Required**: Low **User Interaction**: None **Scope**: Unchanged **Confidentiality**: High **Integrity**: High **Availability**: High		
System	10.10.11.143		
Risk	If the attacker has local access to the machine (e.g., SSH) and the machine is vulnerable to the exploit, the attacker can obtain root level access without passing the authentication.		
Proof-of-Concept	XPTO took advantage of this proof-of-concept script to get root level access on the victim. Basically, the script tricks the system into executing a request as UID		

	0 (root) by taking advantage of how polkit treats the UID of a connection with a bus identifier that no longer exists. Steps: • Execute the script (creates a new username in the system) • Switch user to the created username • Run "bash" as the super user (root)



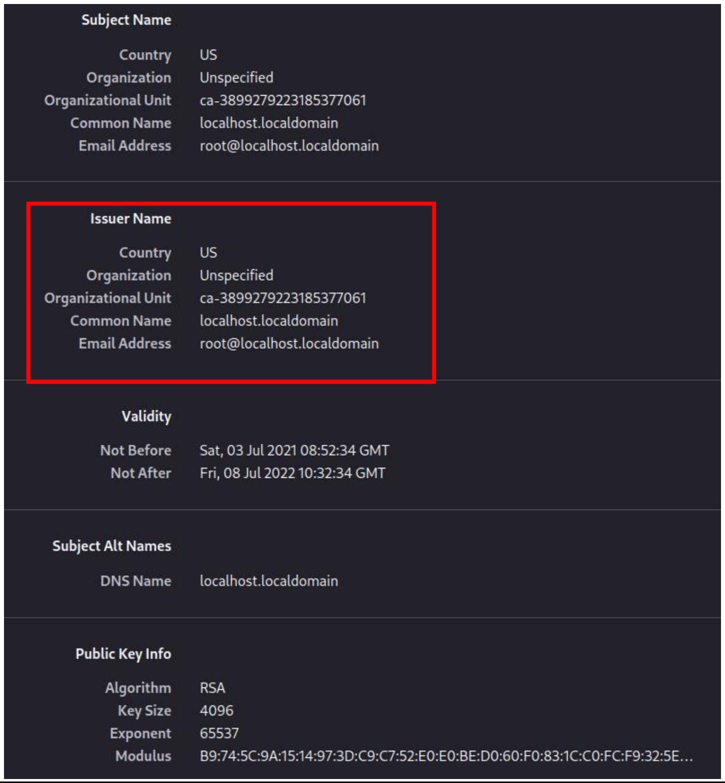
```
[dwight@paper ~]$ ./file.sh

[!] Username set as : secnigma
[!] No Custom Timing specified.
[!] Timing will be detected Automatically
[!] Force flag not set.
[!] Vulnerability checking is ENABLED!
[!] Starting Vulnerability Checks...
[!] Checking distribution...
[!] Detected Linux distribution as "centos"
[!] Checking if Accountsservice and Gnome-Control-Center is installed
[+] Accounts service and Gnome-Control-Center Installation Found!!
[!] Checking if polkit version is vulnerable
[+] Polkit version appears to be vulnerable!!
[!] Starting exploit...
[!] Inserting Username secnigma...
Error org.freedesktop.Accounts.Error.PermissionDenied: Authentication is required
[+] Inserted Username secnigma  with UID 1005!
[!] Inserting password hash...
Password:
Verifying - Password:
[!] It looks like the password insertion was succesful!
[!] Try to login as the injected user using su - secnigma
[!] When prompted for password, enter your password
[!] If the username is inserted, but the login fails; try running the exploit again.
[!] If the login was succesful,simply enter 'sudo bash' and drop into a root shell!
[dwight@paper ~]$ su - secnigma
Password:
[secnigma@paper ~]$ ls
[secnigma@paper ~]$ sudo bash
[sudo] password for secnigma:
[root@paper secnigma]# ls
[root@paper secnigma]# ls
[root@paper secnigma]# cd ..
[root@paper home]# ls
dwight  secnigma
[root@paper home]# cd ..
[root@paper /]# cd ~
[root@paper ~]# ls
anaconda-ks.cfg  initial-setup-ks.cfg  root.txt
[root@paper ~]# cat root.txt
c94a003f96f7705a4857d2221bfe4aaa
```

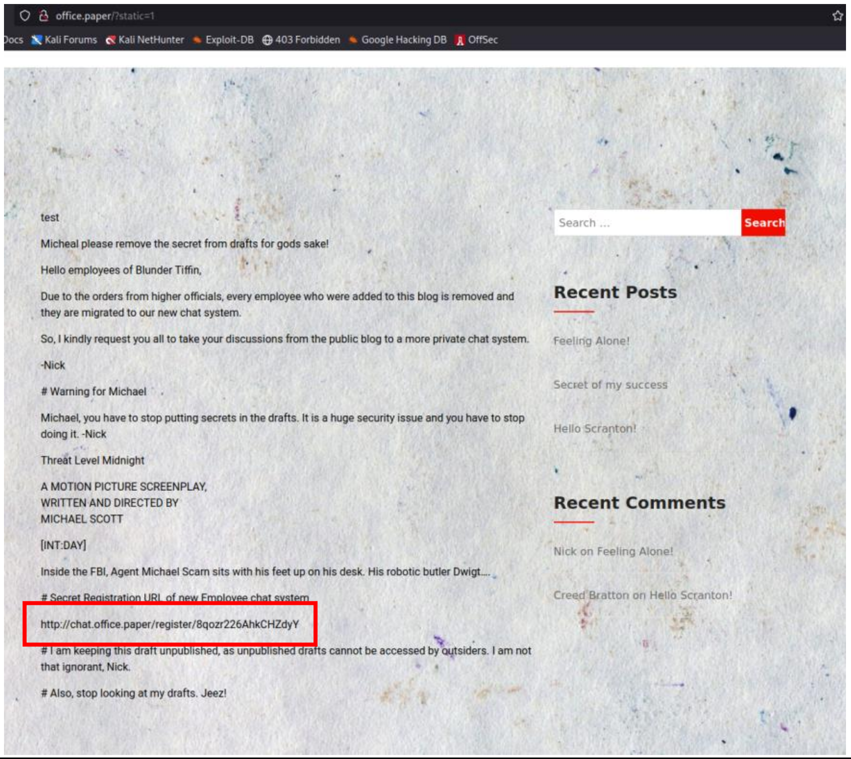
Part played towards Flag	By being able to gain root level access to the machine XPTO was able to read the content of the /root/root.txt flag.
Recommendation	BT can patch the vulnerability by downloading the fixed packages from the Linux distribution websites. **NOTE**: Recently it was discovered a new privilege escalation vulnerability (CVE-2021-4034). XPTO highlights the importance of updating to the latest version.
References	https://github.com/secnigma/CVE-2021-3560-Polkit-Privilege-Esclation

SSL Self-Signed Certificate/SSL Certificate Cannot Be Trusted

Severity	Medium	**CVSSv3 Classification**	6.5
Description	The server's X.509 certificate cannot be trusted because it is self-signed.		

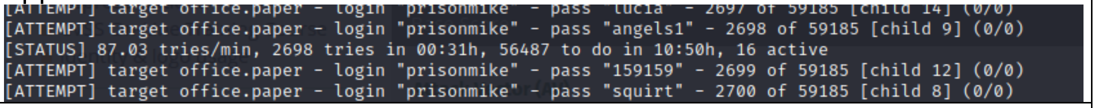
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: Low **Privileges Required:** None **User Interaction**: None **Scope**: Unchanged **Confidentiality**: Low **Integrity**: Low **Availability**: None
System	10.10.11.143
Risk	The X.509 certificate chain for this service is not signed by a recognized certificate authority. If the remote host is a public host in production , this nullifies the use of SSL as anyone could establish a man-in-the-middle attack against the remote host.
Proof-of-Concept	The following certificate was found at the top of the certificate chain sent by the remote host, but it is self-signed and was not found in the list of known certificate authorities.  **Subject Name** Country US Organization Unspecified Organizational Unit ca-3899279223185377061 Common Name localhost.localdomain Email Address root@localhost.localdomain **Issuer Name** Country US Organization Unspecified Organizational Unit ca-3899279223185377061 Common Name localhost.localdomain Email Address root@localhost.localdomain **Validity** Not Before Sat, 03 Jul 2021 08:52:34 GMT Not After Fri, 08 Jul 2022 10:32:34 GMT **Subject Alt Names** DNS Name localhost.localdomain **Public Key Info** Algorithm RSA Key Size 4096 Exponent 65537 Modulus B9:74:5C:9A:15:14:97:3D:C9:C7:52:E0:E0:BE:D0:60:F0:83:1C:C0:FC:F9:32:5E...
Part played towards Flag	N/a
Recommendation	BT may purchase or generate a proper SSL certificate for this service from a Certified Authority if thXPTO plan to publish this application to be accessible via the Internet.
References	[OWASP Web Security Testing Guide: Testing for Weak SSL TLS Ciphers Insufficient Transport Layer Protection]()

Legacy WordPress Version Vulnerable to CVE-2019-17671

Severity	Medium	CVSSv3 Classification	5.3
Description	Unauthenticated viewing of certain content is possible because the static query property is mishandled.		
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: Low **Privileges Required**: None **User Interaction**: None **Scope**: Unchanged **Confidentiality**: Low **Integrity**: None **Availability**: None		
System	10.10.11.143 (http://office.paper/)		
Risk	Adding ?static=1 to a WordPress URL returns all pages from the database (including password protected, pending and drafts), thus leaking its secret content.		
Proof-of-Concept	XPTO detected that the Wordpress version being used by the web application was vulnerable to CVE-2019-17671. Hence, by adding the static query parameter with value 1 XPTO was able to discover a registration page for the web application stored in the subdomain **chat.paper.office**, further widening their attack surface.  office.paper/?static=1 test Micheal please remove the secret from drafts for gods sake! Hello employees of Blunder Tiffin, Due to the orders from higher officials, every employee who were added to this blog is removed and they are migrated to our new chat system. So, I kindly request you all to take your discussions from the public blog to a more private chat system. -Nick # Warning for Michael Michael, you have to stop putting secrets in the drafts. It is a huge security issue and you have to stop doing it. -Nick Threat Level Midnight A MOTION PICTURE SCREENPLAY, WRITTEN AND DIRECTED BY MICHAEL SCOTT [INT:DAY] Inside the FBI, Agent Michael Scam sits with his feet up on his desk. His robotic butler Dwigt.... # Secret Registration URL of new Employee chat system http://chat.office.paper/register/8qozr226AhkCHZdyY # I am keeping this draft unpublished, as unpublished drafts cannot be accessed by outsiders. I am not that ignorant, Nick. # Also, stop looking at my drafts. Jeez! Docs Kali Forums Kali NetHunter Exploit-DB 403 Forbidden Google Hacking DB OffSec Search ... Search Recent Posts Feeling Alone! Secret of my success Hello Scranton! Recent Comments Nick on Feeling Alone! Creed Bratton on Hello Scranton!		
Part played towards Flag	By having access to the chat web application, XPTO was later able to meet "recyclops", a bot developed by Dwight. Through chatting with the bot, XPTO was able to extract user credentials (username and **password** of recyclops in the		

	rocket chat application) that could be used in combination with **“dwight”** username to obtain an SSH shell and read the user flag stored in the user.txt file.
Recommendation	BT should update Wordpress to the latest version so that the web application is no longer vulnerable to this exploit.
References	NIST: CVE-2019-17671 Exploit Database: CVE-2019-17671

Possibility to Brute Force User Credentials in the Login Portal

Severity	Medium	**CVSSv3 Classification**	6.5
Description	BT does not restrict the number of authentication attempts against their **office.paper** web application login portal. This configuration allows the possibility to brute force user credentials.		
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: Low **Privileges Required:** None **User Interaction**: None **Scope:** Unchanged **Confidentiality**: Low **Integrity**: Low **Availability**: None		
System	10.10.11.143 (http://office.paper/wp-login.php)		
Risk	The risk of being able to brute force user credentials is that an attacker may be able to compromise all user accounts including ones with higher privileges. This is especially dangerous because it compromises the principles of confidentiality, integrity, and availability of data.		
Proof-of-Concept	For demonstration purposes, through Hydra XPTO was able to perform an authentication attack using a large wordlist. As you can see in the image below the target did not perform any type of filtering or apply any restriction to the attacker’s IP. Hence, if an threat actor performed a brute force attack instead, he would eventually be able to gain access to every user’s account. Furthermore, the attacker would not even have to try to brute force usernames, since the web application is also vulnerable to user enumeration.  [ATTEMPT] target office.paper - login "prisonmike" - pass "lucia" - 2697 of 59185 [child 14] (0/0) [ATTEMPT] target office.paper - login "prisonmike" - pass "angels1" - 2698 of 59185 [child 9] (0/0) [STATUS] 87.03 tries/min, 2698 tries in 00:31h, 56487 to do in 10:50h, 16 active [ATTEMPT] target office.paper - login "prisonmike" - pass "159159" - 2699 of 59185 [child 12] (0/0) [ATTEMPT] target office.paper - login "prisonmike" - pass "squirt" - 2700 of 59185 [child 8] (0/0)		
Part played towards Flag	N/a		

Recommendation	Mitigation techniques recommended to implement: - Locking out accounts after a certain number of incorrect password attempts; - Limit failed login attempts; - Use a Captcha mechanism; - Limit logins to a specified IP address or range; - Employ Multi-factor authentication.
References:	OWASP TOP 10 A07 2021- Identification and Authentication Failures NIST SP800-53r5 AC-7 - Unsuccessful Logon Attempts |Automatic Account Lock

HTTP TRACE / TRACK Methods Allowed

Severity	Medium	**CVSSv3 Classification**	5.3
Description	The remote web server supports the TRACE and/or TRACK methods. TRACE and TRACK are HTTP methods which are used to debug web server connections.		
CVSSv3 Criteria	**Attack Vector:** Network **Attack Complexity:** Low **Privileges Required:** None **User Interaction:** None **Scope:** Unchanged **Confidentiality:** Low **Integrity:** None **Availability:** None		
System	10.10.11.143		
Risk	An attacker could steal credentials by using a client-side attack, such as cross-site scripting to steal a cookie even being able to bypass the HTTPOnly header.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	BT should disable these HTTP methods by adding the following to the Apache httpd.conf file: "TraceEnable Off"		
References	N/a		

Browsable Web Directories

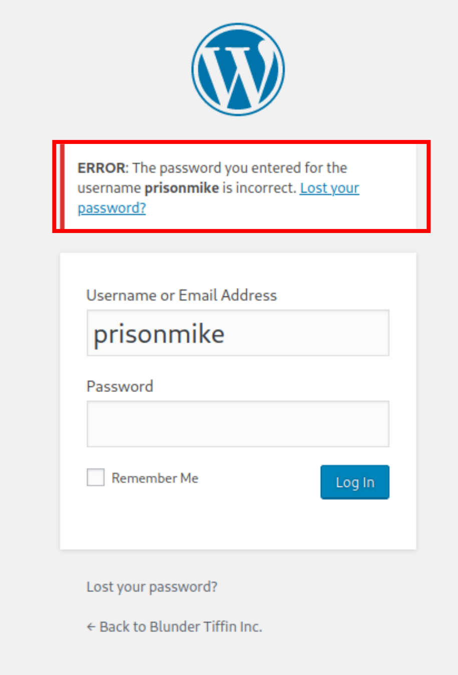
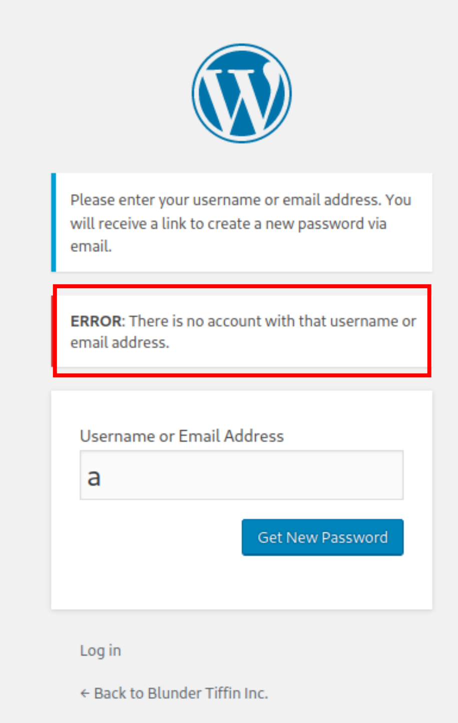
Severity	Medium	**CVSSv3 Classification**	5.3
Description	Directories on the remote web server are browsable.		

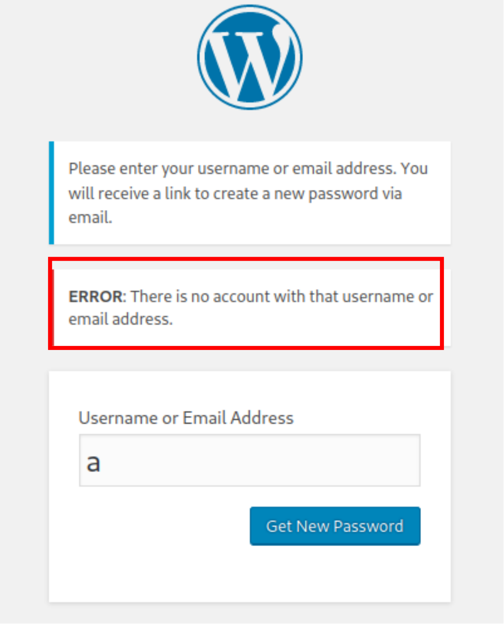
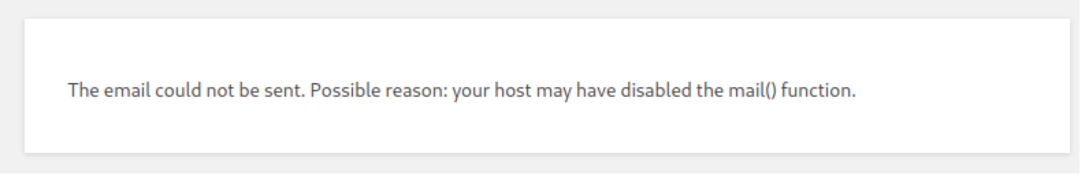
CVSSv3 Criteria	**Attack Vector:** Network **Attack Complexity:** Low **Privileges Required:** None **User Interaction:** None **Scope:** Unchanged **Confidentiality:** Low **Integrity:** None **Availability:** None
System	10.10.11.143
Risk	Could allow XPTO to perform directory transversal attacks by viewing "hidden files", such as CGI scripts, data files or backup pages.
Proof-of-Concept	XPTO detected that a couple of resources of the web application were browsable such as: • http://10.10.11.143/icons/ • http://10.10.11.143/manual/ • http://10.10.11.143/manual/images/ • http://10.10.11.143/manual/style/ • http://10.10.11.143/manual/style/css/ • http://10.10.11.143/manual/style/lang/ • http://10.10.11.143/manual/style/latex/ • http://10.10.11.143/manual/style/scripts/ • http://10.10.11.143/manual/style/xsl/
Part played towards Flag	N/a
Recommendation	BT should ensure that those directories do not leak confidential information or give access to sensitive resources. Additionally, use access restrictions or disable directory indexing is recommended.
References	N/a

WordPress User and Email Enumeration

Severity	Medium	CVSSv3 Classification	5.3
Description	The remote web server contains a PHP application that is affected by an information disclosure vulnerability.		
CVSSv3 Criteria	**Attack Vector:** Network **Attack Complexity:** Low **Privileges Required:** None **User Interaction:** None **Scope:** Unchanged **Confidentiality:** Low **Integrity:** None **Availability:** None		

System	10.10.11.143 (http://office.paper/wp-login.php) 10.10.11.143 (http://office.paper/wp-login.php?action=lostpassword)
Risk	The version of WordPress hosted on the remote web server is affected by a user enumeration vulnerability. An unauthenticated, remote attacker can exploit this to learn the names of valid WordPress users and emails.

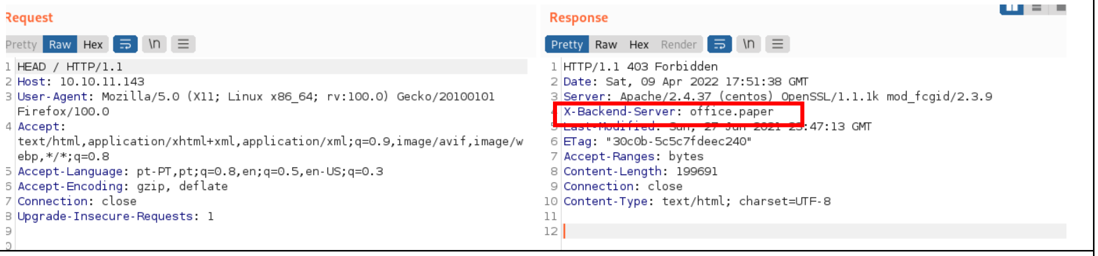
Proof-of-Concept	**Login Portal** The web application returns different errors in the login portal if the username exists or not. Logging in as “prisonmike”:  **ERROR**: The password you entered for the username **prisonmike** is incorrect. Lost your password? Username or Email Address: prisonmike Password: ☐ Remember Me Log In Lost your password? ← Back to Blunder Tiffin Inc. Logging in as an invalid username:  Please enter your username or email address. You will receive a link to create a new password via email. **ERROR**: There is no account with that username or email address. Username or Email Address: a

	Password Recovery Application returns different error if the username/email address exist or not. Testing with an invalid username:  Please enter your username or email address. You will receive a link to create a new password via email. **ERROR**: There is no account with that username or email address. Username or Email Address: a Testing with “prisonmike”:  The email could not be sent. Possible reason: your host may have disabled the mail() function.
Part played towards Flag	N/a
Recommendation	Installing the “WP-Hardening” or the “Stop User Enumeration” plugins help to mitigate this vulnerability. Alternatively, BT may also provide generic response to every failed login attempt (“Invalid credentials”) and for every password reset (“If your username/email exists check your inbox to reset your password”).
References	[OWASP TOP 10 A07 2021- Identification and Authentication Failures]()

Information Disclosure through the “X-Backend-Server” Header

Severity	Medium	**CVSSv3 Classification**	5.3
Description	Information Disclosure through the “X-Backend-Server” header discloses hidden resource.		

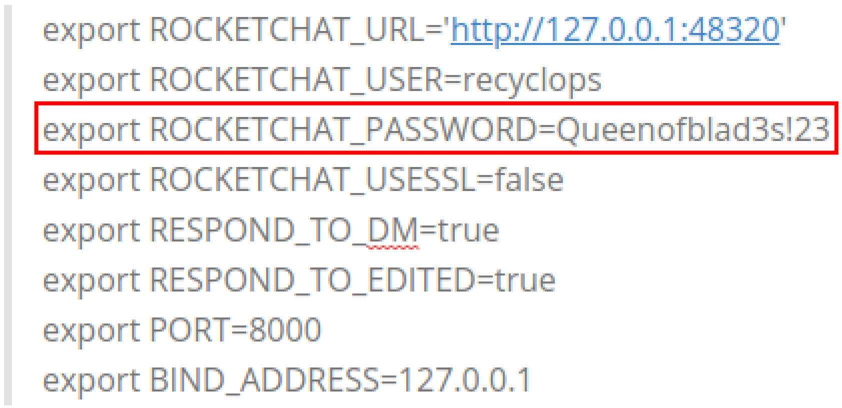
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: Low **Privileges Required**: None **User Interaction**: None **Scope**: Unchanged **Confidentiality**: Low **Integrity**: None **Availability**: None
System	10.10.11.143
Risk	XPTO was able to further widen the attack surface by extracting the existing domain **office.paper** through the header “X-Backend-Server”.

Proof-of-Concept	Performing a simple HTTP request to the server provides a response which contains the “X-Backend-Server” Header.
	
	 Request
	Pretty Raw Hex \n
	`HEAD / HTTP/1.1`
	`Host: 10.10.11.143`
	`User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:100.0) Gecko/20100101 Firefox/100.0`
	`Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8`
	`Accept-Language: pt-PT,pt;q=0.8,en;q=0.5,en-US;q=0.3`
	`Accept-Encoding: gzip, deflate`
	`Connection: close`
	`Upgrade-Insecure-Requests: 1`
	 Response
	Pretty Raw Hex Render \n
	`HTTP/1.1 403 Forbidden`
	`Date: Sat, 09 Apr 2022 17:51:38 GMT`
	`Server: Apache/2.4.37 (centos) OpenSSL/1.1.1k mod_fcgid/2.3.9`
	`X-Backend-Server: office.paper`
	`Last-Modified: Sun, 27 Jun 2021 23:47:13 GMT`
	`ETag: "30c0b-5c5c7fdeec240"`
	`Accept-Ranges: bytes`
	`Content-Length: 199691`
	`Connection: close`
	`Content-Type: text/html; charset=UTF-8`

Part played towards Flag	This was the first major step towards indirectly being able to exploit the server. This allowed XPTO to discover a resource which later was found to be vulnerable to an exploit.
Recommendation	BT should ensure that those directories do not leak confidential information or give access to sensitive resources. Additionally, use access restrictions or disable directory indexing is recommended.
References	[OWASP TOP 10 A05 2021 – Security Misconfiguration]

Directory Transversal and Read access to Web Server Files

Severity	Medium	CVSSv3 Classification	5
Description	Directories on the remote web server are browsable and files are readable through exploiting the rocket chat bot’s functionalities.		
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: Low **Privileges Required**: Low **User Interaction**: None **Scope**: Changed **Confidentiality**: Low **Integrity**: None **Availability**: None		
System	10.10.11.143 (chat.office.paper)		

Risk	Through this vulnerability XPTO was able to have read access to the ".env" file stored in the "hubot" folder which holds **"recyclops"'s credentials** in the rocket chat app.
Proof-of-Concept	By running the command "list ../hubot/" XPTO was able to list the folder contents. Afterwards using the command "file .env" we extract the bot's credentials.  export ROCKETCHAT_URL='http://127.0.0.1:48320' export ROCKETCHAT_USER=recyclops export ROCKETCHAT_PASSWORD=Queenofblad3s!23 export ROCKETCHAT_USESSL=false export RESPOND_TO_DM=true export RESPOND_TO_EDITED=true export PORT=8000 export BIND_ADDRESS=127.0.0.1
Part played towards Flag	The bot's password is the same as Dwight's password in the server. Therefore, XPTO was able to obtain shell using SSH.
Recommendation	BT should ensure that the bot is only able to list and read the files inside the sales directory.
References	N/a

SSH Weak KXPTO Exchange Algorithms Enabled

Severity	Low	**CVSSv3 Classification**	3.7
Description	The remote SSH server is configured to allow weak kXPTO exchange algorithm diffie-hellman-group-exchange-sha1.		
CVSSv3 Criteria	**Attack Vector:** Network **Attack Complexity:** High **Privileges Required:** None **User Interaction:** None **Scope:** Unchanged **Confidentiality:** Low **Integrity:** None **Availability:** None		
System	10.10.11.143		
Risk	The IETF draft document KXPTO Exchange (KEX) Method Updates and Recommendations for Secure Shell (SSH) states that the diffie-hellman-group-exchange-sha1 should not be enabled. This is because SHA-1 is considered deprecated and has security concerns.		
Proof-of-Concept	N/a		
Part played	N/a		

towards Flag	
Recommendation	BT should disable the weak algorithms.
References	KXPTO Exchange (KEX) Method Updates and Recommendations for Secure Shell (SSH) Security Considerations for the SHA-0 and SHA-1 Message-Digest Algorithms OWASP Web Security Testing Guide: Testing for Weak SSL TLS Ciphers Insufficient Transport Layer Protection

Web Server Transmits Cleartext Credentials

Severity	Low	CVSSv3 Classification	3.1
Description	The remote web server contains HTML form fields containing an input of type 'password' which transmit their information to a remote web server in cleartext.		
CVSS Vector String	**Attack Vector:** Network **Attack Complexity:** High **Privileges Required:** None **User Interaction:** Required **Scope:** Unchanged **Confidentiality:** Low **Integrity:** None **Availability:** None		
System	10.10.11.143		
Risk	An attacker eavesdropping the traffic between web browser and server may obtain logins and passwords of valid users.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	Make sure that every sensitive form transmits content over HTTPS. Enforce encryption using directives like HTTP Strict Transport Security (HSTS).		
References	OWASP TOP 10 A02 2021 – Cryptographic Failures		

Web Server Allows Password Auto-Completion

Severity	Low	CVSSv3 Classification	3.1
Description	The 'autocomplete' attribute is not disabled on password fields.		

CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: High **Privileges Required**: None **User Interaction**: Required **Scope**: Unchanged **Confidentiality**: Low **Integrity**: None **Availability**: None
System	10.10.11.143
Risk	Could lead to a loss of confidentiality on their saved passwords if any of the users use a shared host or if their machine is compromised at some point.
Proof-of-Concept	N/a
Part played towards Flag	N/a
Recommendation	BT should add the attribute 'autocomplete=off' to password fields to prevent browsers from caching credentials.
References	[CWE-200: Information Exposure]()

SSH Server CBC Mode Ciphers Enabled

Severity	Low	CVSSv3 Classification	3.1
Description	The SSH server is configured to use Cipher Block Chaining, which historically has been proven insecure.		
CVSSv3 Criteria	**Attack Vector**: Network **Attack Complexity**: High **Privileges Required**: None **User Interaction**: Required **Scope**: Unchanged **Confidentiality**: Low **Integrity**: None **Availability**: None		
System	10.10.11.143		
Risk	Usage of CBC makes it easier for remote attackers to recover certain plaintext data from an arbitrary block of ciphertext in an SSH session.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	BT should disable CBC mode cipher encryption and enable CTR or GCM cipher mode encryption.		
References	OWASP TOP 10 A02 2021 – Cryptographic Failures NIST Vulnerability Database: CVE-2008-5161		

HSTS Missing from HTTPS Server

Severity	Informational	CVSSv3 Classification	-
Description	The remote HTTPS server is not enforcing HTTP Strict Transport Security (HSTS). HSTS is an optional response header that can be configured on the server to instruct the browser to only communicate via HTTPS.		
CVSSv3 Criteria	N/a		
System	10.10.11.143		
Risk	The lack of HSTS allows downgrade attacks, SSL-stripping man-in-the-middle attacks and weakens cookie-hijacking protections.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	Configure the remote web server to use HSTS ("Strict-Transport-Security" header).		
References	OWASP TOP 10 A02 2021 – Cryptographic Failures OWASP Web Security Testing Guide: Testing for Weak SSL TLS Ciphers Insufficient Transport Layer Protection		

HTTP Cookies Web Application Cookies Not Marked HttpOnly

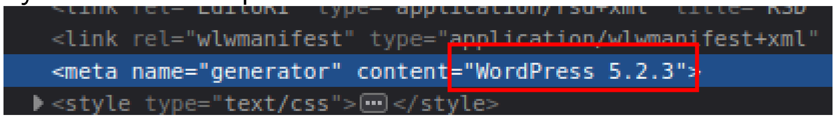
Severity	Informational	CVSSv3 Classification	-
Description	The HttpOnly flag is a security mechanism to protect against cross-site scripting attack.		
CVSSv3 Criteria	N/a		
System	10.10.11.143		
Risk	HTTP session cookies might be vulnerable to cross-site scripting attacks. A malicious client-side script, such as JavaScript, could read a user's cookies.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	BT should review each cookie to determine if it contains sensitive data or is relied upon for a security decision. If possible, add the 'HttpOnly' attribute to all session cookies and any cookies containing sensitive data.		
References	CWE:1004 OWASP HTTPOnly OWASP Web Security Testing Guide: Testing for Weak SSL TLS Ciphers Insufficient Transport Layer Protection		

HTTP Cookies Web Application Cookies Not Marked Secure

Severity	Informational	CVSSv3 Classification	-
Description	The Secure flag is a security mechanism to prevent the transmission of a cookie over an unencrypted channel.		
CVSSv3 Criteria	N/a		
System	10.10.11.143		
Risk	HTTP session cookies are transmitted in cleartext which would let a remote attacker intercept them.		
Proof-of-Concept	N/a		
Part played towards Flag	N/a		
Recommendation	BT should review each cookie to determine if it contains sensitive data or is relied upon for a security decision. If possible, add the 'Secure' attribute to all session cookies and any cookies containing sensitive data.		
References	OWASP Secure Cookie Attribute OWASP Web Security Testing Guide: Testing for Weak SSL TLS Ciphers Insufficient Transport Layer Protection		

WordPress Detection

Severity	Informational	CVSSv3 Classification	-
Description	The remote web server contains a blog application written in PHP.		
CVSSv3 Criteria	N/a		
System	10.10.11.143		
Risk	The remote host is running WordPress, a free blog application written in PHP with a MySQL back-end.		

Proof-of-Concept	XPTO was able to retrieve the technology and version used by the web application by HTML code inspection.
	
	`<link rel="EditURI" type="application/rsd+xml" title="RSD"`
	`<link rel="wlwmanifest" type="application/wlwmanifest+xml"`
	`<meta name="generator" content="WordPress 5.2.3">`
	`<style type="text/css">…</style>`		

Part played towards Flag	XPTO was able to later find a vulnerability through this information.		
Recommendation	Installing the "WP-Hardening" plugin allows to easily hide the WordPress version in use. Alternatively, BT may also perform this step manually using "secure by obscure" mechanisms to mitigate the vulnerability.		
References	N/a		

Additional Reports and Scans (Informational)

XPTO provides all clients with all report information gathered during testing. This includes vulnerability scans and a detailed findings spreadsheet. For more information, please see the following documents:

Vulnerability Scans:

- Blunder_Tiffin_001_Full_Findings.xslx
- Blunder_Tiffin_001_Vulnerability_Scan_Summary.pdf
- Blunder_Tiffin_001_Vulnerability_Scan_By_Host.pdf

Enumeration of Services and Open ports:

- initial_paper_scan.nmap
- full_paper_tcp_scan.nmap
- scripted_scan.nmap
- paper_nmap_http_enum.nmap

File Directory Enumeration:

- gobuster_enum_office.txt

Scripts for Privilege Escalation:

- LinEnum.sh
- Linpeas.sh
- file.sh

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