



Cybersecurity

Penetration Test Report Template

MegaCorpOne

Penetration Test Report

BigBox Security, LLC

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| | |
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Document History

| Version | Date | Author(s) | Comments |
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| 001 | 2/14/2024 | Dylan | |
| | | | |
| | | | |
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Introduction

In accordance with MegaCorpOne's policies, BigBox Security, LLC (henceforth known as BBS) conducts external and internal penetration tests of its networks and systems throughout the year. The purpose of this engagement was to assess the networks' and systems' security and identify potential security flaws by utilizing industry-accepted testing methodology and best practices. The project was conducted on a number of systems on MegaCorpOne's network segments by BBS during February of 2024.

For the testing, BBS focused on the following:

- Attempting to determine what system-level vulnerabilities could be discovered and exploited with no prior knowledge of the environment or notification to administrators.
- Attempting to exploit vulnerabilities found and access confidential information that may be stored on systems.
- Documenting and reporting on all findings.

All tests took into consideration the actual business processes implemented by the systems and their potential threats; therefore, the results of this assessment reflect a realistic picture of the actual exposure levels to online hackers. This document contains the results of that assessment.

Assessment Objective

The primary goal of this assessment was to provide an analysis of security flaws present in MegaCorpOne's web applications, networks, and systems. This assessment was conducted to identify exploitable vulnerabilities and provide actionable recommendations on how to remediate the vulnerabilities to provide a greater level of security for the environment.

BBS used its proven vulnerability testing methodology to assess all relevant web applications, networks, and systems in scope.

MegaCorpOne has outlined the following objectives:

Table 1: Defined Objectives

| Objective |
|--|
| Find and exfiltrate any sensitive information within the domain. |
| Escalate privileges to domain administrator. |
| Compromise at least two machines. |

Penetration Testing Methodology

Reconnaissance

BBS begins assessments by checking for any passive (open source) data that may assist the assessors with their tasks. If internal, the assessment team will perform active recon using tools such as Nmap and Bloodhound.

Identification of Vulnerabilities and Services

BBS uses custom, private, and public tools such as Metasploit, hashcat, and Nmap to gain perspective of the network security from a hacker's point of view. These methods provide MegaCorpOne with an understanding of the risks that threaten its information, and also the strengths and weaknesses of the current controls protecting those systems. The results were achieved by mapping the network architecture, identifying hosts and services, enumerating network and system-level vulnerabilities, attempting to discover unexpected hosts within the environment, and eliminating false positives that might have arisen from scanning.

Vulnerability Exploitation

BBS's normal process is to both manually test each identified vulnerability and use automated tools to exploit these issues. Exploitation of a vulnerability is defined as any action we perform that gives us unauthorized access to the system or the sensitive data.

Reporting

Once exploitation is completed and the assessors have completed their objectives, or have done everything possible within the allotted time, the assessment team writes the report, which is the final deliverable to the customer.

Scope

Prior to any assessment activities, MegaCorpOne and the assessment team will identify targeted systems with a defined range or list of network IP addresses. The assessment team will work directly with the MegaCorpOne POC to determine which network ranges are in-scope for the scheduled assessment.

It is MegaCorpOne's responsibility to ensure that IP addresses identified as in-scope are actually controlled by MegaCorpOne and are hosted in MegaCorpOne-owned facilities (i.e., are not hosted by an external organization). In-scope and excluded IP addresses and ranges are listed below.

| IP Address/URL | Description |
|---|---|
| 172.16.117.0/16 MCO.local *.Megacorpone.com | MegaCorpOne internal domain, range and public website |

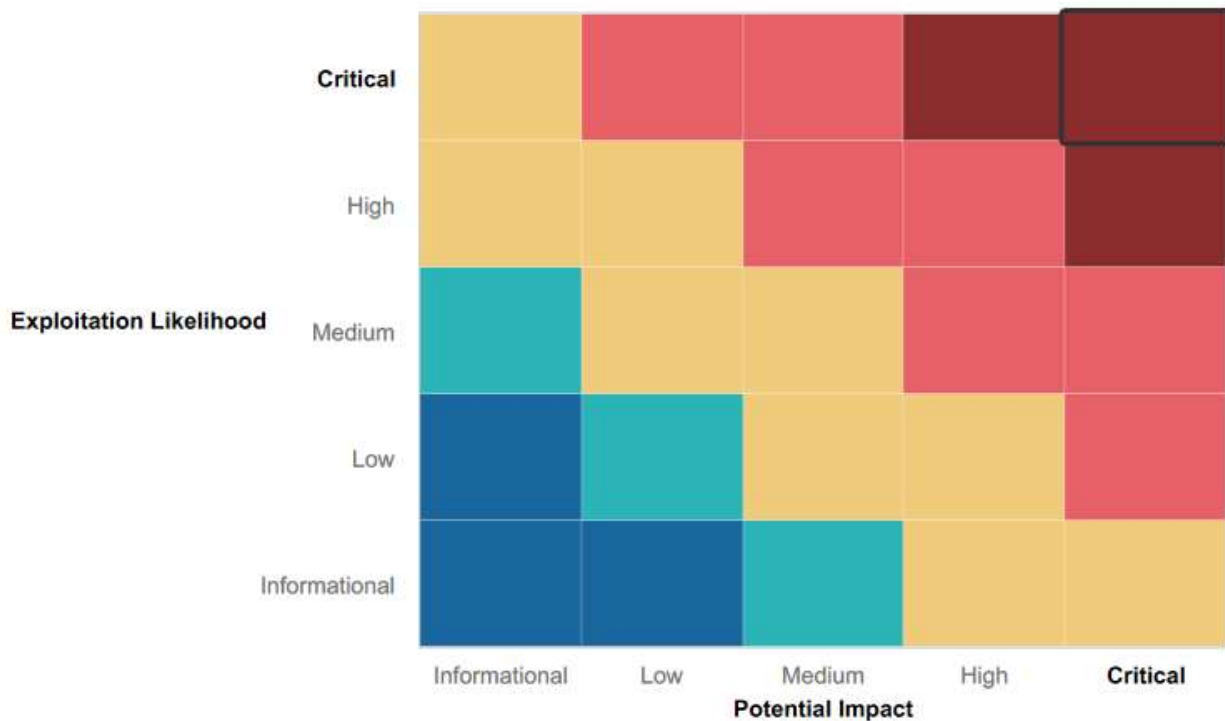
Executive Summary of Findings

Grading Methodology

Each finding was classified according to its severity, reflecting the risk each such vulnerability may pose to the business processes implemented by the application, based on the following criteria:

- Critical:** Immediate threat to key business processes.
- High:** Indirect threat to key business processes/threat to secondary business processes.
- Medium:** Indirect or partial threat to business processes.
- Low:** No direct threat exists; vulnerability may be leveraged with other vulnerabilities.
- Informational:** No threat; however, it is data that may be used in a future attack.

As the following grid shows, each threat is assessed in terms of both its potential impact on the business and the likelihood of exploitation:



Summary of Strengths

While the assessment team was successful in finding several vulnerabilities, the team also recognized several strengths within MegaCorpOne's environment. These positives highlight the effective countermeasures and defenses that successfully prevented, detected, or denied an attack technique or tactic from occurring.

- Debian used as the OS.
- Uses a VPN.

Summary of Weaknesses

BBS successfully found several critical vulnerabilities that should be immediately addressed in order to prevent an adversary from compromising the network. These findings are not specific to a software version but are more general and systemic vulnerabilities.

- Usernames and passwords are very weak.
- Port 22 was open during a Shodan scan, meaning weak SSH configuration and network is open to Port Scanning.
- A Machine on the network with an open port was vulnerable to backdoor exploitation.
- Weak firewall rules.
- Weak SMB settings.

Executive Summary

Using Google Hacking, I found a list of contact information for several employees. I also found a page showing a list of assets as well as information about what OS is used for the website. Next, I used Shodan to determine what ports were open, the version of SSH it uses, the version of the web server, the OS, a list of its vulnerabilities, and the location of the server. Using Recon-ng, I compiled a report of available OSINT information. Using the information I found when looking for contact info on employees, I was able to successfully guess a password for user thudson and login to the website. I then identified the subnet and used Zenmap to identify an IP address with port 21 open and vulnerable to a backdoor exploit.

Google search results for `site:megacorpone.com intext:Email`.

About 2 results (0.20 seconds)

megacorpone.com
<https://www.megacorpone.com/about>

About Us
 Email: thudson@megacorpone.com. Twitter: @TomHudsonMCO. Contact Me: Tanya Rivera. SENIOR DEVELOPER. Email: trivera@megacorpone.com. Twitter: @TanyaRiveraMCO ...

megacorpone.com
<https://www.megacorpone.com/contact>

Contact Us - MegaCorp One
 Our Address: MegaCorp One 2 Old Mill St Rachel, NV 89001. United States. Email: sales@megacorpone.com

78750, Austin, TX - From your IP address - Update location
 More options in [Quick settings](#)

Index of /assets/img/team

| Name | Last modified | Size | Description |
|----------------------------------|-------------------------------|----------------------|-----------------------------|
| Parent Directory | - | - | - |
| james.png | 2016-08-21 11:21 | 2.6M | |
| joe.jpg | 2016-08-21 11:21 | 159K | |
| mary.jpg | 2016-08-21 11:21 | 271K | |
| matt.jpg | 2016-08-21 11:21 | 3.5M | |
| mega.jpg | 2016-08-21 11:21 | 3.7M | |
| orig/ | 2016-08-21 11:21 | - | |
| team01.jpg | 2016-08-21 11:21 | 94K | |
| team02.jpg | 2016-08-21 11:21 | 116K | |
| team03.jpg | 2016-08-21 11:21 | 144K | |
| team04.jpg | 2016-08-21 11:21 | 111K | |

Apache/2.4.38 (Debian) Server at www.megacorpone.com Port 443

The screenshot displays a web application security tool interface. At the top, a map of Montreal is shown with a search bar and a red 'Q' icon. Below the map, the IP address 149.56.244.87 is displayed, along with a 'Regular View' button and a 'Raw Data' link. The main content area is divided into several panels:

- General Information:** Hostnames: www.megacorpone.com; Domains: MEGACORPONE.COM; Country: Canada; City: Montréal; Organization: OVH Hosting, Inc.; ISP: OVH SAS; ASN: AS16276.
- Open Ports:** 80, 443. // LAST SEEN: 2024-01-22.
- Web Technologies:** CDN: Google Hosted Libraries; UI Frameworks: Bootstrap; JavaScript Libraries: jQuery, prettyPhoto.
- Apache httpd 2.4.38:** HTTP/1.1 200 OK; Date: Thu, 18 Jan 2024 21:22:29 GMT; Server: Apache/2.4.38 (Debian); Last-Modified: Wed, 06 Nov 2019 15:04:14 GMT; ETag: "390b-596aedca79780"; Accept-Ranges: bytes; Content-Length: 14603; Vary: Accept-Encoding; Content-Type: text/html.
- SSL Certificate:** Certificate: Data: Version: 3 (8x2).

```
77.74.100.100 - [2024-01-22 12:22:42]
www.blackhillsinfosec.com

PRACTISEC
www.practisec.com

[recon-ng v5.1.2, Tim Tones (@lanmaster53)]


?) Recon modules
recon-ng[default] > modules search
Recon
recon/companies-multi/shodan_org
recon/domains-hosts/hackertarget
recon/domains-hosts/shodan_hostname
recon/hosts-ports/shodan_ip
recon/locations-pushpins/shodan
recon/netblocks-hosts/shodan_net
recon/ports-hosts/migrate_ports

recon-ng[default] > modules load recon/domains-hosts/hackertarget
[!] Invalid module name
recon-ng[default] > modules load recon/domains-hosts/hackertarget
recon-ng[default][hackertarget] > info
Name: HackerTarget Lookup
Author: Michael Henriksen (@michenriksen)
Version: 1.1
Description:
  Uses the HackerTarget.com API to find host names. Updates the 'hosts' table with the results.
Options:
  Name      Current Value      Required      Description
  SOURCE    megacorpone.com      yes           source of input (see 'info' for details)
Source Options:
  default      SELECT DISTINCT domain FROM domains WHERE domain IS NOT NULL
  <string>      string representing a single input
  <path>        path to a file containing a list of inputs
  query <sql>   database query returning one column of inputs

recon-ng[default][hackertarget] > options set SOURCE megacorpone.com
SOURCE => megacorpone.com
recon-ng[default][hackertarget] > run

MEGACORPONE.COM
+ Country: None
+ Host: admin.megacorpone.com
+ Ip Address: 51.222.169.208
```

Index of /

| <u>Name</u> | <u>Last modified</u> | <u>Size</u> | <u>Description</u> |
|---|----------------------|-------------|--------------------|
|  index.nginx-debian.html | 2022-01-04 14:25 | 612 | |
|  password.lst | 2022-01-18 22:38 | 26K | |
|  vpn.sh | 2021-06-28 15:25 | 1.3K | |

Apache/2.4.46 (Debian) Server at vpn.megacorpone.com Port 80

```
(root@kali) - [~/Downloads]
# chmod +x vpn.sh
```

```
(root@kali) - [~]
# ip addr
lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:02:04:03 brd ff:ff:ff:ff:ff:ff
    inet 172.29.97.70/20 brd 172.29.111.255 scope global dynamic noprefixroute eth0
        valid_lft 85157sec preferred_lft 85157sec
    inet6 fe80::215:5dff:fe02:403/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:02:04:12 brd ff:ff:ff:ff:ff:ff
    inet 172.22.117.100/16 brd 172.22.255.255 scope global noprefixroute eth1
        valid_lft forever preferred_lft forever
    inet6 fe80::646d:b122:9b00:ee1b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:5b:e2:3f:e4 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:5bff:fe02:3fe4/64 scope link
        valid_lft forever preferred_lft forever
veth80bac440if5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether ce:f3:7c:22:a1:fa brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::ccf3:7cfe:fe22:a1fa/64 scope link
        valid_lft forever preferred_lft forever
veth849a33b0if7: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether c6:18:97:d0:23:07 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet6 fe80::c418:97ff:fed0:2307/64 scope link
        valid_lft forever preferred_lft forever
```

```
(root@kali) - [~]
# nmap -sV 172.22.117.150
Starting Nmap 7.92 ( https://nmap.org ) at 2024-02-17 15:15 EST
Nmap scan report for 172.22.117.150
Host is up (0.0065s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE SERVICE      VERSION
21/tcp    open  ftp          vsftpd 2.3.4
22/tcp    open  ssh          OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp    open  telnet       Linux telnetd
25/tcp    open  smtp         Postfix smtpd
53/tcp    open  domain       ISC BIND 9.4.2
80/tcp    open  http         Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp   open  rpcbind      2 (RPC #100000)
139/tcp   open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp   open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp   open  exec         netkit-rsh rexecd
513/tcp   open  login?
514/tcp   open  shell        Netkit rshd
1099/tcp  open  java-rmi     GNU Classpath grmiregistry
1524/tcp  open  bindshell    Metasploitable root shell
2049/tcp  open  nfs          2-4 (RPC #100003)
2121/tcp  open  ftp          ProFTPD 1.3.1
3306/tcp  open  mysql?
5432/tcp  open  postgresql   PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp  open  vnc          VNC (protocol 3.3)
6000/tcp  open  X11          (access denied)
6667/tcp  open  irc          UnrealIRCd
8009/tcp  open  ajp13        Apache Jserv (Protocol v1.3)
8180/tcp  open  http         Apache Tomcat/Coyote JSP engine 1.1
MAC Address: 00:15:5D:02:04:10 (Microsoft)
Service Info: Hosts: metasploitable.localdomain, irc.Metasploitable.LAN; OSs:
```

```

Nmap scan report for 172.22.117.150
Host is up (0.0011s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE SERVICE      VERSION
21/tcp    open  ftp          vsftpd 2.3.4
| ftp-vsftpd-backdoor:
| VULNERABLE:
| vsFTPD version 2.3.4 backdoor
| State: VULNERABLE (Exploitable)
| IDs: BID:48539 CVE:CVE-2011-2523
| vsFTPD version 2.3.4 backdoor, this was reported on 2011-07-04.
| Disclosure date: 2011-07-03
| Exploit results:
|   Shell command: id
|   Results: uid=0(root) gid=0(root)
| References:
|   http://scarybeastsecurity.blogspot.com/2011/07/alert-vsftpd-download-backdoored.html
|   https://www.securityfocus.com/bid/48539
|   https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2011-2523
|   https://github.com/rapid7/metasploit-framework/blob/master/modules/exploits/unix/ftp/vsftpd_234_backdoor.rb
22/tcp    open  ssh          OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp    open  telnet       Linux telnetd
25/tcp    open  smtp         Postfix smtpd
53/tcp    open  domain       ISC BIND 9.4.2
80/tcp    open  http         Apache httpd 2.2.8 ((Ubuntu) DAV/2)
|_ http-server-header: Apache/2.2.8 (Ubuntu) DAV/2
111/tcp   open  rpcbind      2 (RPC #100000)
|_ rpcinfo:
|_  program version  port/proto  service
|_  100000  2             111/tcp     rpcbind
|_  100000  2             111/udp     rpcbind
|_  100003  2,3,4         2049/tcp    nfs
|_  100003  2,3,4         2049/udp    nfs
|_  100005  1,2,3         41475/udp   mountd
|_  100005  1,2,3         41787/tcp   mountd
|_  100021  1,3,4         45035/udp   nlockmgr
|_  100021  1,3,4         47719/tcp   nlockmgr
|_  100024  1             42605/tcp   status
|_  100024  1             59303/udp   status
139/tcp   open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp   open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp   open  exec         netkit-rsh rexecd
513/tcp   open  login?
514/tcp   open  shell        Netkit rshd
1099/tcp  open  java-rmi     GNU Classpath grmiregistry
1524/tcp  open  bindshell    Metasploitable root shell
2049/tcp  open  nfs          2-4 (RPC #100003)

```

Summary Vulnerability Overview

| Vulnerability | Severity |
|--|----------|
| Weak password on public web application | Critical |
| Weak firewall rules. | Critical |
| Weak SSH configuration. | High |
| A Machine on the network with an open port was vulnerable to VSFTPD backdoor exploitation. | High |
| Network is open to Port Scanning. | Medium |

The following summary tables represent an overview of the assessment findings for this penetration test:

| Scan Type | Total |
|-----------|-----------------------------------|
| Hosts | 117.22..117.100 117.22.117.150 |
| Ports | 80, 5901, 6001, 8080 |

| Exploitation Risk | Total |
|-------------------|-------|
| Critical | 2 |
| High | 2 |
| Medium | 1 |
| Low | 0 |

Vulnerability Findings

Weak Password on Public Web Application

Risk Rating: Critical

Description:

The site **vpn.megacorpone.com** is used to host the Cisco AnyConnect configuration file for MegaCorpOne. This site is secured with basic authentication but is susceptible to a dictionary attack. **BBS** was able to use a username gathered from OSINT in combination with a wordlist in order to guess the user's password and access the configuration file.

Affected Hosts: vpn.megacorpone.com

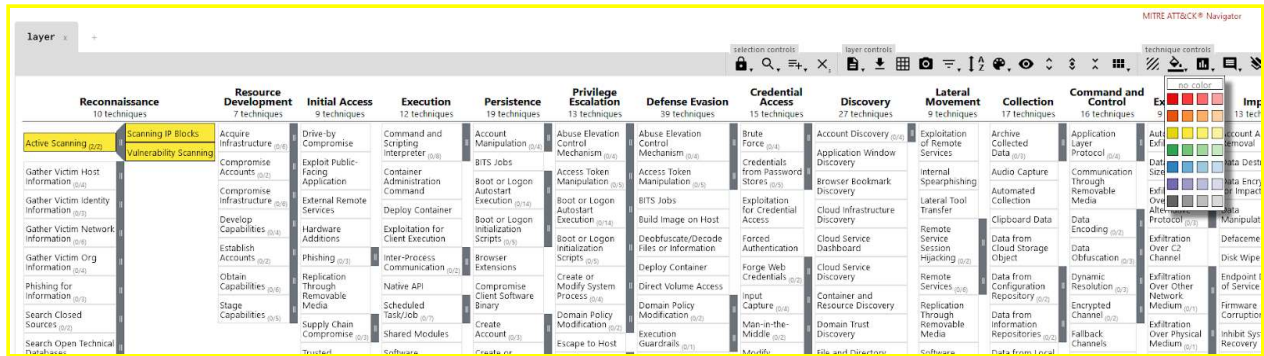
Remediation:

- Set up two-factor authentication instead of basic authentication to prevent dictionary attacks from being successful.
- Require a strong password complexity that requires passwords to be over 12 characters long, upper+lower case, & include a special character.
- Reset the user **thudson**'s password.

Username should be changed to something that is different from employee emails. Regular port scanning on the network to ensure there are not any open that should be.

MITRE ATT&CK Navigator Map

[Using the [MITRE ATT&CK Navigator](#), build out a map showing what techniques you've used so far. To do so, on the MITRE ATT&CK Navigator page, click "Create New Layer," then "Enterprise," and select each technique that you've used. Change the color of each selected technique to highlight it in yellow if it was successful, or in red if it was unsuccessful, as the following image shows:



When you're done, be sure to download the chart as JSON by clicking the download icon, as the following image shows:



Remember, this report is not yet complete—we will finish it in the next module.

The following completed MITRE ATT&CK navigator map shows all of the techniques and tactics that **BBS** used throughout the assessment.

Legend:

Performed successfully

Failure to perform

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