Cybersecurity Scenario

Objective: Is to protect the organizations data from internal and external threats

Context

Buffalo Network is a small medium IT company specializing in software development, Networking and other IT services. This team is tasked to provide and safeguard sensitive data, including client information, proprietary code, and financial records, against internal and external threats. This team already have some measures that are implemented to safeguard this information. The implemented measures include access control, intrusion detection, data encryption etc.

Relevance to learning objective

This scenario is relevant as it provides hands on experience with real world cybersecurity challenges, It aligns with the learning objective of understanding cybersecurity measures, incident response, data protection, and employee training. We will gain practical knowledge of implementing security protocols, conducting security audits, monitoring network traffic, and developing comprehensive response plan for data breaches.

Key Challenges

- The key challenged may be Identifying and Mitigating Vulnerabilities, conducting security audits to identify vulnerabilities requires a plenty of time while taking into consideration priorities.
- Monitoring network traffic, the challenge may be continuously monitoring network traffic for suspicious activity and potential breaches.
- Employee training and awareness, ensuring all employees are aware of cybersecurity best practices and their roles.

Task No 1

1. **Conducting a security audit and identifying vulnerabilities.**

Date of audit: 23/01/2024

Conducted by: Buffalo Networks

Overview of Recent security audit results

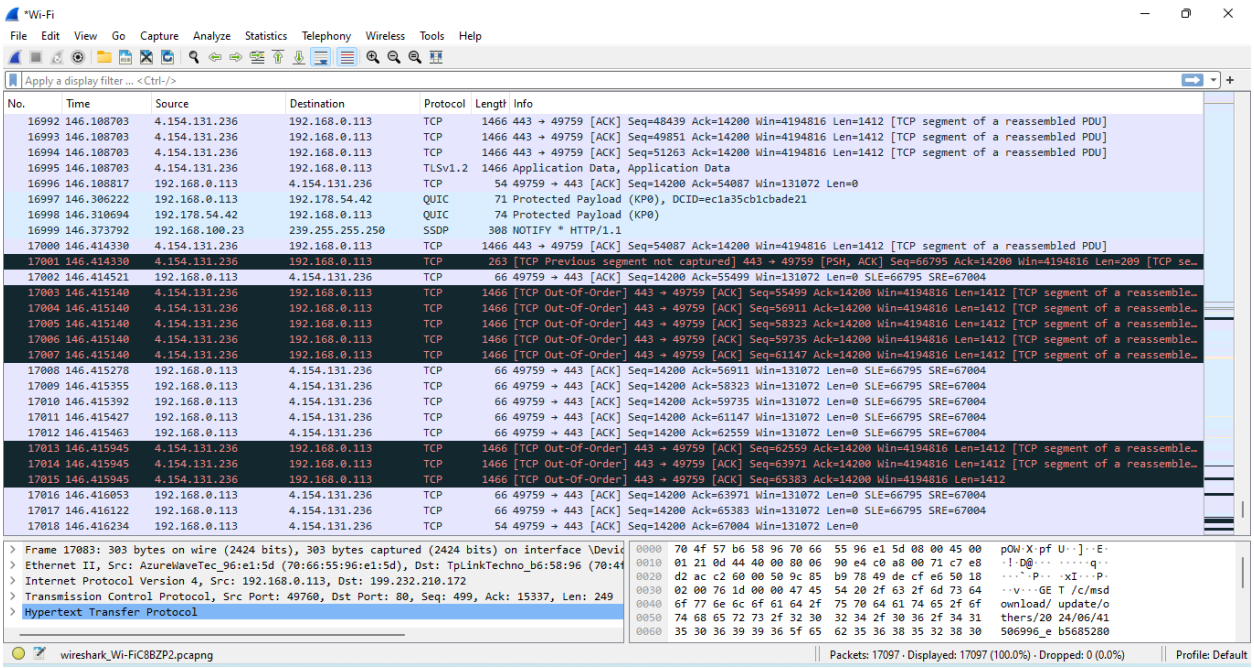
Scope of Audit

- Network Infrastructure
- Webserver
- Database server
- Desktop and multi user systems
- Web applications
- Data storage systems
- Access controls and authentication mechanisms

Audit Methodology

Vulnerability tools used to scan the network system.

Nmap report



Identified vulnerabilities

Identify weaknesses in the systems, processes, or practices that could be exploited by threats.

	Threats	Vulnerabilities	Priority
Webserver	SQL injection Cross-Site Scripting Denial of Service	Outdated software Misconfigured Services	2
Database Server	Unauthorized Access Data Breaches Malware infections	Weak password Unpatched security flaws	1
Employee workstations	Malware infections Phishing attacks	Lack of antivirus software Outdated operating systems	3
WIFI Networks	Eavesdropping Rogue access points	Weak encryption Default credentials	4

2. Implementing security measures for Desktop and Multi- User systems

Date of Review: 10/01/2024

Conducted by: Buffalo Networks

Scope of review:

Desktop workstations

Multi-user systems (shared systems, servers, etc)

Software and application used across these systems

Current Security Measures

User access controls- Role based access controls are implemented to ensure users have minimum necessary permissions. They are managed through Active Directory and group policies

Data Encryption- Sensitive data on desktops and multi user systems is encrypted. Bitlocker and file vault are used for both windows and macOS systems.

Endpoint Detection and Response(EDR)- EDR solutions are deployed to monitor and respond to security incidents on endpoints.

Proposed New Measures

(a) Antivirus and anti-malware software

- All desktops and multi user systems must have antivirus and anti-malware software installed.
- Example of anti-virus and anti-malware software: TotalAV, Bitdefender, Intego, McAfee.
- With these regular scans and real time proctection are always active.

(b) Operating System Updates and Patching

- All systems must be configured to receive automatic updates for operating systems
- They must be managed through a centralized IT management Tools.
- These are effective but some may encounter certain delays due to user interventions and configuration issues.

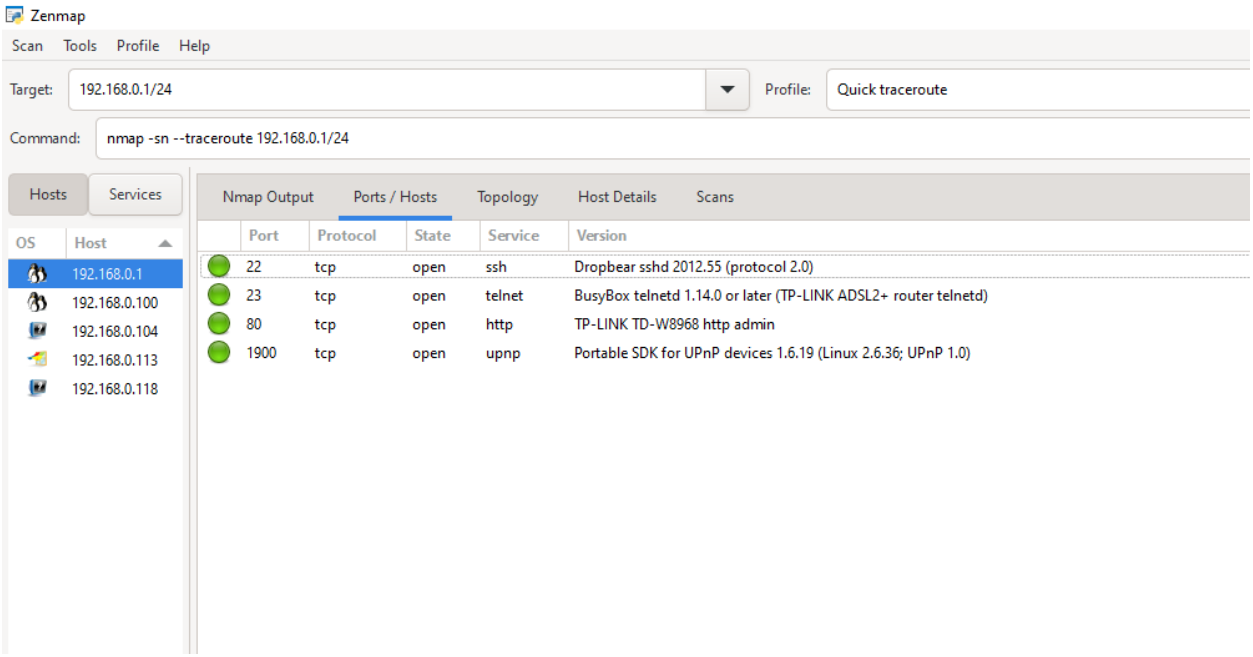
(c) Firewall protection

- Built in firewalls must be enabled on all systems to prevent unauthorized access
- They must be configured through group policies and local system settings
- Effective in blocking unauthorized access and correct configurations must be ensured

Deployment timelines and responsibilities to be assigned:

3. Monitor Network Traffic for Suspicious Activity

Current Network Monitoring practices and tools that were reviewed



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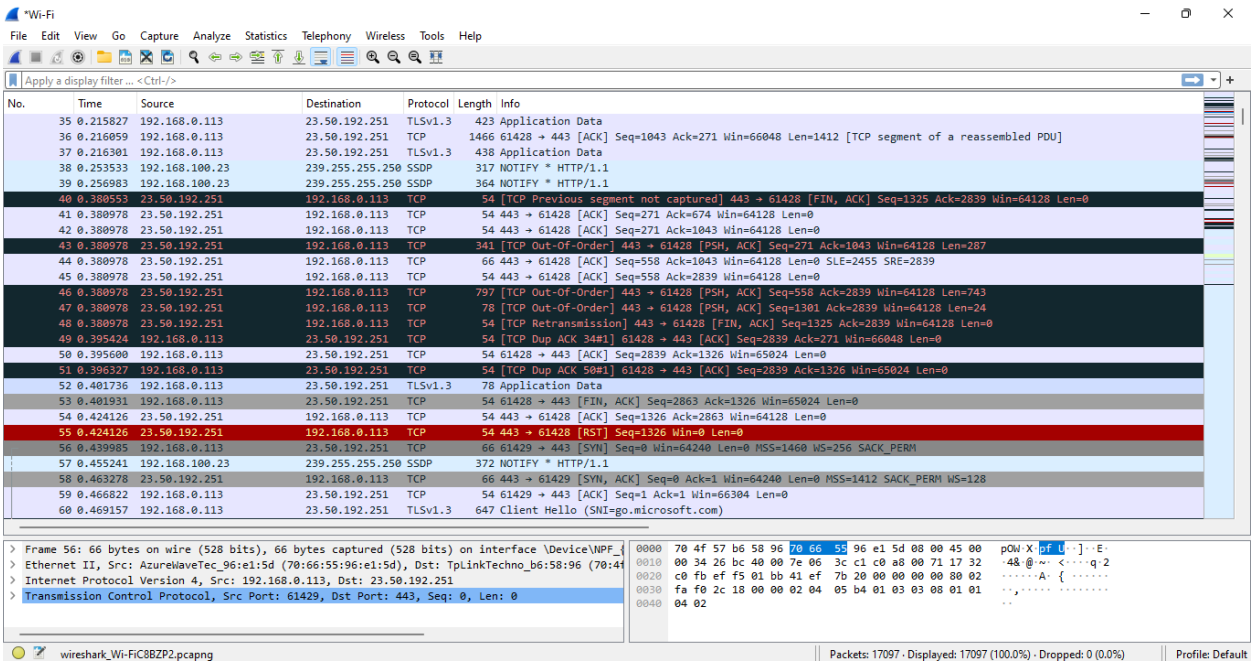

✓ Port 22 (SSH using Dropbear sshd 2012)

Risks

Brute Force Attacks- Attackers may try to guess login credentials through repeated attempts.

Exploits in Dropbear SSHD 2012- Older versions of Dropbear may have known vulnerabilities that could be exploited.

Weak Authentication Methods- Using password-based authentication instead of key-based authentication increases risk.

Strategies for improving monitoring

Use Strong Authentication- Implement key-based authentication instead of password-based.

Update and Patch Software- Ensure Dropbear SSHD is updated to the latest version.

Limit Access- Use firewalls to restrict access to port 22 to known IP addresses.

Enable Intrusion Detection- Monitor for unusual login attempts and implement rate limiting or fail2ban.

✓ Port 23 (Telnet on TP-Link ADSL2)

Risks

Unencrypted Communication- Telnet transmits data, including credentials, in plaintext, making it susceptible to eavesdropping.

Legacy Protocol- Telnet is considered outdated and insecure compared to modern alternatives like SSH.

Potential Router Exploits- Routers may have vulnerabilities that can be exploited via Telnet.

Strategies for improving monitoring

Disable Telnet- If possible, disable Telnet and use SSH instead for secure remote management.

Use Strong Authentication- Ensure strong, unique passwords are used.

Update Router Firmware- Keep the router firmware up-to-date to mitigate known vulnerabilities.

Restrict Access- Use a firewall to restrict access to port 23 to known, trusted IP addresses.

- ✓ **Port 80 (HTTP for Admin Access)**

Risks

Unencrypted Communication- HTTP traffic is unencrypted, making it susceptible to interception and man-in-the-middle attacks.

Web Application Vulnerabilities- The admin interface may have vulnerabilities such as cross-site scripting (XSS), SQL injection, etc.

Default Credentials- Admin interfaces often have default credentials that may not have been changed.

Strategies for improving monitoring

Use HTTPS- Implement HTTPS to encrypt communication.

Secure Admin Interface- Ensure the admin interface is not exposed to the internet or is accessible only from a secure network.

Change Default Credentials- Use strong, unique credentials for the admin interface.

Regular Updates and Patching- Keep the web server and any associated software updated.

Implement Web Application Firewall (WAF)- Use a WAF to protect against common web vulnerabilities.

- ✓ **Port 1900 (UPnP Services on Portable SDK)**

Risks

UPnP Exploits- UPnP has known vulnerabilities that can be exploited to gain unauthorized access or cause denial of service.

Exposure to Internal Network- UPnP can expose internal devices and services to potential attackers if not properly secured.

Strategies for improving monitoring

Disable UPnP- If UPnP is not required, disable it on the device.

Restrict Access- Use firewall rules to limit access to port 1900 from trusted internal networks only.

Update Firmware- Ensure that the device firmware is up-to-date to mitigate known UPnP vulnerabilities.

Monitor Traffic- Regularly monitor network traffic for unusual activities related to UPnP services.

4. Develop a Response Plan for the Potential Data Breaches

Date of Review: 15/ 01/ 2024

Existing Data Breach Response Plan

Purpose: The data breach response plan aims to provide a structured and effective approach to handling data breaches, minimizing damage, and ensuring a swift recovery. It outlines the steps to identify, respond to, mitigate, and report data breaches.

Key Components of the Existing Plan

1. **Preparation:**

   - **Incident Response Team (IRT):** A dedicated team responsible for handling data breaches, comprising members from IT, legal, public relations, and management.
   - **Training and Drills:** Regular training sessions and simulated breach scenarios to prepare the IRT and relevant staff for real incidents.
   - **Contact List:** A comprehensive list of internal and external contacts, including IRT members, legal advisors, law enforcement, and third-party security experts.

2. **Identification:**

   - **Monitoring and Detection:** Continuous monitoring of systems and networks using security information and event management (SIEM) tools and intrusion detection systems (IDS).
   - **Reporting Mechanism:** Clear procedures for employees to report suspected data breaches promptly.

3. **Containment:**

   - **Immediate Actions:** Steps to contain the breach, such as isolating affected systems, revoking access, and stopping data exfiltration.
   - **Short-Term Containment:** Temporary fixes to prevent further damage while a thorough investigation is conducted.
   - **Long-Term Containment:** Implementation of permanent solutions to address vulnerabilities and prevent recurrence.

4. **Eradication:**

   - **Root Cause Analysis:** Identifying the cause of the breach and removing all traces of the threat from the systems.
   - **System Cleaning:** Ensuring affected systems are clean and secure before resuming normal operations.

5. **Recovery:**

   - **Restoration:** Restoring systems and data from backups, ensuring they are free from vulnerabilities.
   - **Monitoring:** Increased monitoring of affected systems to detect any signs of residual or new threats.

6. **Communication:**

   - **Internal Communication:** Informing relevant internal stakeholders, including management and employees, about the breach and response actions.
   - **External Communication:** Notifying affected parties, regulators, and the public as required by law and company policy.
   - **Media Management:** Coordinating with public relations to manage media inquiries and protect the company's reputation.

7. **Post-Incident Review:**

   - **Debriefing:** Conducting a thorough review of the incident, response actions, and outcomes.
   - **Lessons Learned:** Identifying strengths and weaknesses in the response plan and making necessary adjustments.
   - **Documentation:** Documenting the breach, response actions, and lessons learned for future reference and compliance purposes.

2. Updates and improvements to the response plan.

(a) **Enhanced Monitoring and Detection:**

- Implement advanced SIEM and IDS tools to improve breach detection capabilities.
- Regularly update and fine-tune monitoring tools to adapt to evolving threats.

(b) **Regular Training and Simulations:**

- Increase the frequency of training sessions and simulated breach scenarios for the IRT and relevant staff.
- Include cross-departmental drills to ensure comprehensive preparedness.

© **Clear Reporting Mechanism:**

- Simplify and streamline the reporting process for suspected breaches.
- Ensure all employees are aware of the reporting procedures.

(c) **Improved Communication Protocols:**

- Develop clear guidelines for internal and external communication during a breach.
- Regularly update the contact list and communication templates.

(d) **Post-Incident Review Enhancements:**

- Establish a more structured debriefing process to ensure thorough analysis and documentation of each incident.
- Implement a continuous improvement process based on lessons learned.

Assigning roles and responsibilities

Person	Responsibility	Task

5. Educating Staff on best Practices for Data security

Date of the awareness: 24/01/2024

Reviewed the Effectiveness of Current Training Programs

Summary: The effectiveness of current training programs was evaluated based on feedback from employees, the number of security incidents reported, and the overall improvement in data security practices.

Findings

Positive Outcomes: Increased awareness of phishing threats and improved password hygiene among staff.

Areas for Improvement: Continued occurrences of minor security breaches due to human error, indicating a need for more comprehensive training.

New Training Initiatives Introduced

Initiative 1: Interactive Workshops

- **Description:** Monthly interactive workshops where employees engage in hands-on activities related to data security, such as recognizing phishing emails, secure password creation, and understanding the importance of encryption.
- **Benefits:** Enhances practical understanding and application of security practices.

Initiative 2: E-Learning Modules

- **Description:** Introduction of e-learning modules covering various aspects of data security, including safe internet browsing, handling sensitive information, and identifying social engineering attacks. These modules will be mandatory for all employees and include quizzes to reinforce learning.
- **Benefits:** Allows employees to learn at their own pace and ensures consiste nt training across the organization.

Scheduled Regular Training and Awareness Sessions

Frequency: Quarterly training and awareness sessions to keep all staff updated on the latest data security practices and emerging threats.

Next Training Session:

- **Date:** 23/07/2024
- **Agenda:**

    - Overview of recent security incidents and lessons learned.
    - Introduction to new data security tools and practices.
    - Interactive workshop on recognizing and responding to phishing attempts.
    - Q&A session to address any concerns or questions from staff.