Obfuscation - The Egg Shell File

Day 18

McSkidy keeps her focus on a particular alert that caught her interest: an email posing as northpole-hr.

- Obfuscation & Deobfuscation

Obfuscation & Deobfuscation

Overview

Room URL: https://tryhackme.com/room/obfuscation-aoc2025-e5r8t2y6u9

Difficulty: Medium

Category: Obfuscation

Date Completed: 12/18/2025

Objectives

- Learn about obfuscation, why and where it is used.
- Learn the difference between encoding, encryption, and obfuscation.
- Learn about obfuscation and the common techniques.
- Use CyberChef to recover plaintext safely.

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Introduction

This challenge puts defenders in the shoes of McSkidy, a security analyst investigating a suspicious phishing email. The narrative centers around a malicious PowerShell script (`SantaStealer.ps1`) extracted from a PDF attachment. The objective is twofold: first, deobfuscate hidden content within the script to understand its malicious intent, and second, demonstrate offensive obfuscation techniques by encoding sensitive data (an API key) to evade detection. This two-part challenge serves as an excellent introduction to common obfuscation methods used by threat actors,

including Base64 encoding and XOR encryption, while emphasizing the importance of CyberChef as a Swiss Army knife for cryptographic operations.

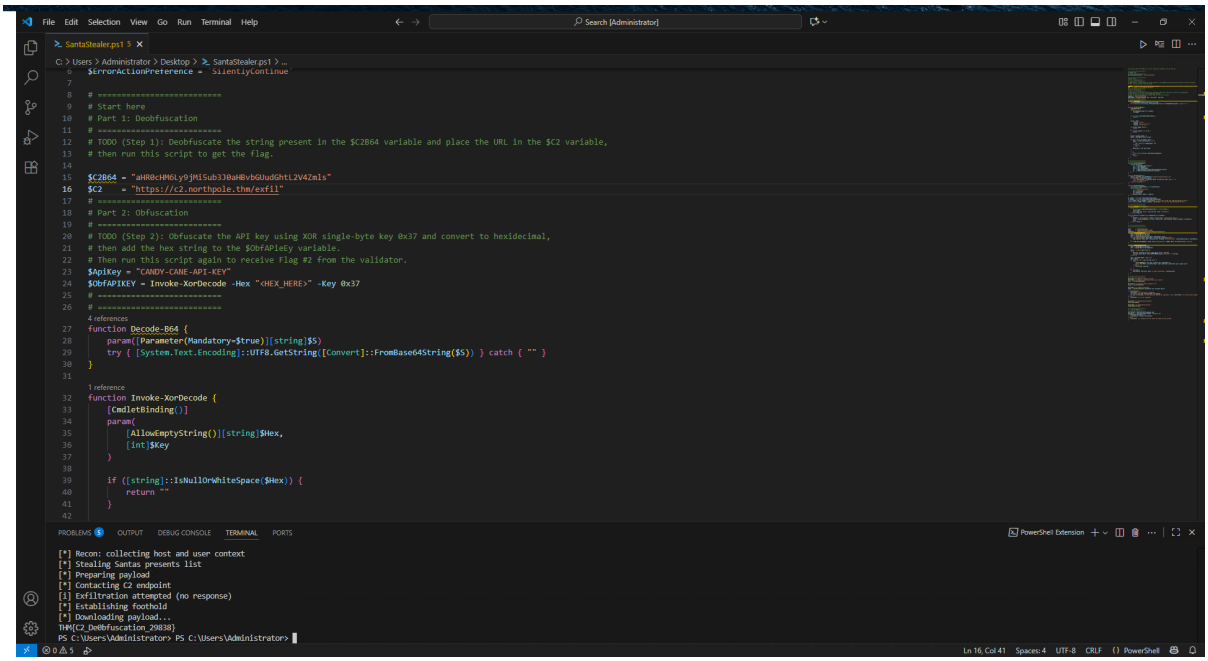
Tools & Techniques

- **CyberChef**: The primary tool for both deobfuscation (Part 1) and obfuscation (Part 2). Its intuitive drag-and-drop interface and real-time output made it ideal for rapid experimentation.
- **Visual Studio Code (VS Code)**: Used as the execution environment for the PowerShell script. A critical step was **trusting the workspace** in VS Code to allow script execution without security warnings.
- **PowerShell Terminal**: Executed the modified script to retrieve flags after completing each obfuscation/deobfuscation task.

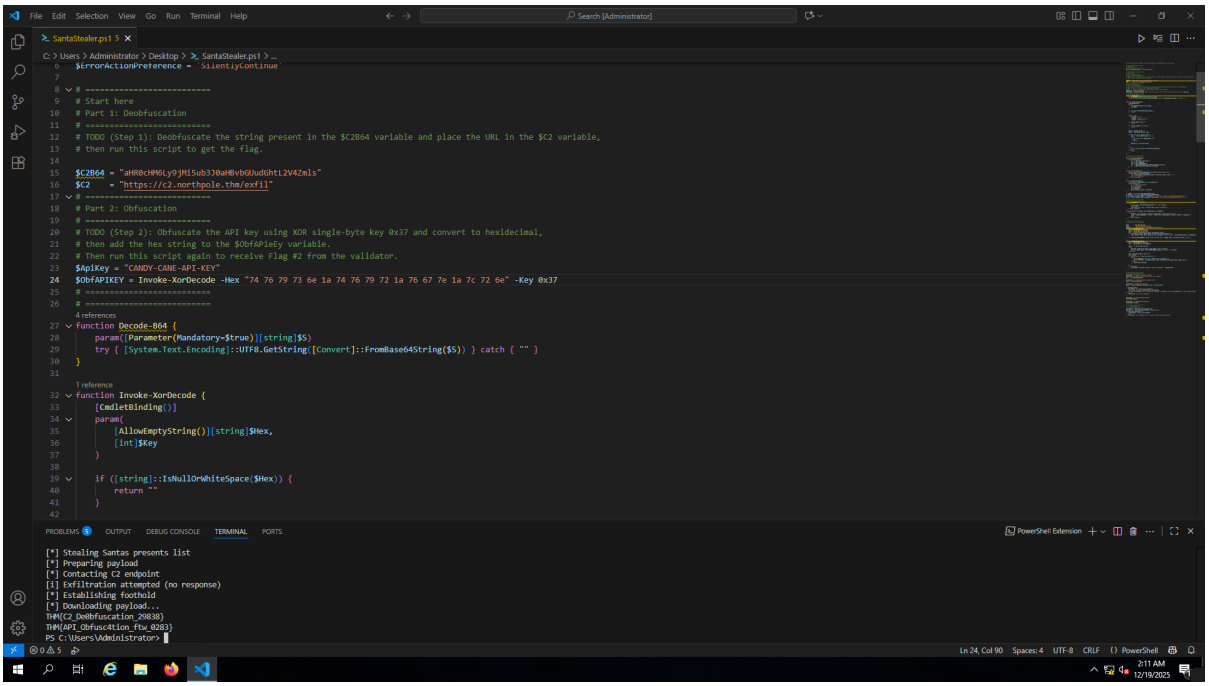
Walk Through

Part 1: Deobfuscation (Obtaining Flag 1)

1. **Script Analysis**: Opened `SantaStealer.ps1` in Visual Studio Code and navigated to the "Start here" section as instructed by the in-code comments.
2. **Pattern Recognition**: Identified a Base64-encoded string within the script—characterized by a long sequence of alphanumeric characters with `=` padding.
3. **Deobfuscation with CyberChef**:
   - Opened CyberChef
   - Pasted the Base64 string into the **Input** pane
   - Dragged the **From Base64** operation into the **Recipe** section
   - Clicked **BAKE!** to decode the string into plaintext
4. **Script Modification**: Replaced the obfuscated string in the PowerShell script with the decoded plaintext as per the challenge instructions.
5. **Execution**: Saved the modified script, opened PowerShell, navigated to the Desktop directory (`cd .\Desktop\`), and executed the script (`.\SantaStealer.ps1`) without debugging. **Flag 1 retrieved successfully.**



6. **Objective Understanding**: The second challenge required *encoding* the malicious actor's API key using **XOR encryption** with a specific key (`0x37` in hexadecimal) to simulate how attackers hide sensitive credentials.
7. **Obfuscation with CyberChef**:
   - Entered the plaintext API key (found in the script) into CyberChef's **Input** pane
   - Dragged the **XOR** operation into the **Recipe** section
   - Configured the XOR key as `37` and set the dropdown to **Hex** (ensuring the key was interpreted as hexadecimal `0x37`, not ASCII)
   - The **Output** pane displayed the XOR-encrypted result in hexadecimal format
8. **Script Update**: Replaced the plaintext API key in the PowerShell script with the newly obfuscated hexadecimal string as instructed by the "Part 2" comments.
9. **Final Execution**: Saved and re-ran the script in PowerShell. **Flag 2 retrieved successfully.**



Lessons Learned

- **Security Through Obscurity Fails**: This challenge demonstrates that obfuscation (Base64, XOR) merely delays investigation rather than prevents it. Freely available tools like CyberChef make these techniques trivially reversible.
- **Implement Behavioral Analysis**: Deploy EDR solutions that monitor script execution behavior rather than relying on static signatures. PowerShell scripts executing suspicious commands should trigger alerts regardless of obfuscation.
- **Enable PowerShell Logging**: Activate PowerShell Script Block Logging and Transcription to capture deobfuscated command execution in real-time, making forensics significantly easier.
- **Use Application Whitelisting**: Implement AppLocker or WDAC to restrict PowerShell execution to trusted, digitally-signed scripts only.
- **Deploy Advanced Email Security**: Use sandboxing solutions that detonate PDF attachments in isolated environments to expose embedded scripts before reaching end users.

Resources

TryHackMe

CyberChef