

These writeups, authored by Peyton Braun, are designed to guide you through the process of solving all the challenges from the Inaugural University of Wisconsin – Stout Cybersecurity Capture the Flag (CTF) event.

This event was hosted by UW-Stout CyROC x CCDL

I hope these writeups help you gain a deeper understanding of each challenge and how to overcome them.

CTF Challenge Writeups

Each writeup will cover the following aspects of the challenge:

1. **Challenge Overview:** A brief description of the challenge.
2. **Steps to Solve:** Detailed steps, tools used, and reasoning behind each step.
3. **Tools and Methods:** Explanation of why specific tools and methods were chosen.
4. **How It Works:** Insight into the underlying concepts and the thinking process.

Challenge: "Based Ports"

Challenge Overview:

The challenge involves decoding a text file of gibberish using a combination of base encoding techniques. The name hints at "Based" (base encoding) and "Ports" (65536, the maximum number of TCP/UDP ports).

Challenge Description:

- That's a lot of Based Ports!

Steps to Solve:

1. **Base 65536 Decode:**
 1. Use the <https://www.better-converter.com/Encoders-Decoders/Base65536-Decode> to decode the gibberish into Base64 format.
2. **Decode Base64:**
 1. Use CyberChef's "From Base64" operation to convert the Base64 string into binary data.
3. **Decompress Gzip:**
 1. Apply CyberChef's "GUNZIP" operation to extract an image.
4. **Render Image:**
 1. Open the image in CyberChef's rendering tool or a compatible viewer to observe hex color values.

5. Extract Hex Values:

1. Use <https://imagecolorpicker.com/> to extract the following hex values from the image:

1. #53544F
2. #555443
3. #54467B
4. #327147
5. #6E4A50
6. #61336F
7. #6A4966
8. #4C5275
9. #776D75
10. #6E6967
11. #52686F
12. #313976
13. #336A63
14. #61397D

6. Convert Hex to ASCII:

1. Remove # and set it up like hex: 53 54 4F 55 54 43 54 46 7B 32 71 47 6E 4A 50 61 33 6F 6A 49 66 4C 52 75 77 6D 75 6E 69 67 52 68 6F 31 39 76 33 6A 63 61 39 7D
2. Use a hex-to-ASCII converter, like <https://rapidtables.com/convert/number/hex-to-ascii.html>, to decode the hex values into plaintext.

7. Reconstruct the Flag:

Combine the ASCII characters in order to form the flag.

8. Decoded Flag:

1. STOUTCTF{2qGnJPa3ojfLRuwmunigRho19v3jca9}

Tools and Methods:

• Tools Used:

- Base65536 Decoder
- CyberChef
- Image Color Picker
- RapidTables Hex to ASCII Converter

- **Methodology:** A systematic decoding process using multi-layered encoding and a careful interpretation of image-based data.

How It Works:

The challenge demonstrates a creative use of encoding schemes, progressing from Base65536 to Base64, gzip, and image data. Extracting hex values and converting them into ASCII showcases a unique, multi-step decoding process.