

# Cropped Top

Player: constantine

Kategori: Forensik

Challenge

19 Solves


## Cropped Top

### 310

Easy banget asli no fek fek

Tim Digital Forensics mendapatkan surat cinta dari Hengker jahat, tetapi setelah ditelusuri lebih lanjut, sepertinya file itu menyimpan sebuah rahasia, tolong bantu tim pembalik memecahkan teka-tekinya.

author: sn0wden

 chall.pdf

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## Phase 1: Initial Recon

```
constantine ~/0precForesty/Cropped Top (solved) v3.13.7 20:56 > ls
-rw-r--r-- 94k constantine 13 Nov 10:21 chall.pdf
-rw-r--r-- 2.1k constantine 13 Nov 10:53 poc.py
-rw-r--r-- 1.8k constantine 13 Nov 11:06 uncrop.py
```

File awal bernama *chall.pdf*. Saat dibuka, viewer melaporkan file corrupt. Langkah pertama adalah mengecek tipe file sebenarnya.

```
00000000  89 50 4E 47 0D 0A 1A 0A 00 00 00 0D .PNG.....
0000000C  49 48 44 52 00 00 03 40 00 00 02 40 IHDR...@...@
00000018  08 02 00 00 00 8D 01 9A 15 00 00 00 .....
00000024  09 70 48 59 73 00 00 0E C4 00 00 0E .pHYs.....
00000030  C4 01 95 2B 0E 1B 00 00 03 56 69 54 ...+....ViT
```

```
constantine ~/OprecForestry/Cropped Top (solved) v3.13.7 20:58 > exiftool chall.pdf
ExifTool Version Number      : 13.36
File Name                    : chall.pdf
Directory                    : .
File Size                    : 94 kB
File Modification Date/Time   : 2025:11:13 10:21:42+07:00
File Access Date/Time        : 2025:11:13 10:21:40+07:00
File Inode Change Date/Time   : 2025:11:13 10:34:38+07:00
File Permissions              : -rw-r--r--
File Type                    : PNG
File Type Extension          : png
MIME Type                    : image/png
Image Width                  : 832
Image Height                 : 576
```

Setelah dicek menggunakan exiftool dan hex view, terlihat bahwa:

- Ekstensi adalah **.pdf**
- **Magic bytes menunjukkan PNG** (89 50 4E 47 0D 0A 1A 0A)

Dengan kata lain, ini adalah **PNG yang disamarkan sebagai PDF**.

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## Phase 2: Structural Validation

```
constantine ~/OprecForestry/Cropped Top (solved) v3.13.7 20:58 > binwalk chall.pdf
/home/constantine
-----
DECIMAL      HEXADECIMAL    DESCRIPTION
-----
0            0x0           PNG image, total size: 94063 bytes
-----

Analyzed 1 file for 85 file signatures (187 magic patterns) in 2.0 milliseconds
```

Analisis menggunakan **binwalk** menunjukkan:

- Satu buah PNG image

- Tidak ada payload tambahan (ZIP, embedded file, dsb)

```
constantine ~/0precForesty/Cropped Top (solved) v3.13.7 20:58 > zsteg chall.pdf
extradata:imagedata ..
00000000: 00 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 |.....|
00000010: f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 f8 |.....|
*
```

'String#index': incompatible encoding regexp match (BINARY (ASCII-8BIT) regexp with UTF-8 string) (Encoding::CompatibilityError)

Menggunakan **zsteg** muncul indikasi error pada metadata Adobe XMP, namun tidak ditemukan stego Saat dicoba dibuka sebagai PNG (rename → **.png**), viewer tetap gagal load.

## Phase 3: Repairing the Broken PNG

Saya menggunakan ChatGPT untuk membuat scriptnya, poc.py:

```
#!/usr/bin/env python3
import struct, zlib

FNAME = "chall.pdf"

data = open(FNAME, "rb").read()

assert data[:8] == b"\x89PNG\r\n\x1a\n", "Not a PNG file"

pos = 8
ihdr_data = None
other_chunks = []
idat_data = b""

while pos + 8 <= len(data):
    length = int.from_bytes(data[pos:pos+4], "big")
    ctype = data[pos+4:pos+8]
    pos += 8
    if pos + length + 4 > len(data):
        break

cdata = data[pos:pos+length]
```

```

crc = data[pos+length:pos+length+4]
pos += length + 4

if ctype == b"IHDR":
    ihdr_data = cdata
elif ctype == b"IDAT":
    idat_data += cdata
elif ctype == b"IEND":
    break
else:
    other_chunks.append((ctype, cdata))

assert ihdr_data is not None, "IHDR not found"
assert idat_data, "No IDAT data"

decomp = zlib.decompressobj()
raw = b""
chunk = idat_data

try:
    raw = decomp.decompress(chunk)
except Exception as e:
    raw += decomp.unconsumed_tail

if not raw:
    raise SystemExit("Failed to decompress IDAT")

def make_chunk(ctype, cdata):
    length = len(cdata).to_bytes(4, "big")
    crc = zlib.crc32(ctype + cdata) & 0xFFFFFFFF
    crc = crc.to_bytes(4, "big")
    return length + ctype + cdata + crc

new_idat = zlib.compress(raw, 9)

out = b"\x89PNG\r\n\x1a\n"
out += make_chunk(b"IHDR", ihdr_data)

for ctype, cdata in other_chunks:
    out += make_chunk(ctype, cdata)

out += make_chunk(b"IDAT", new_idat)

```

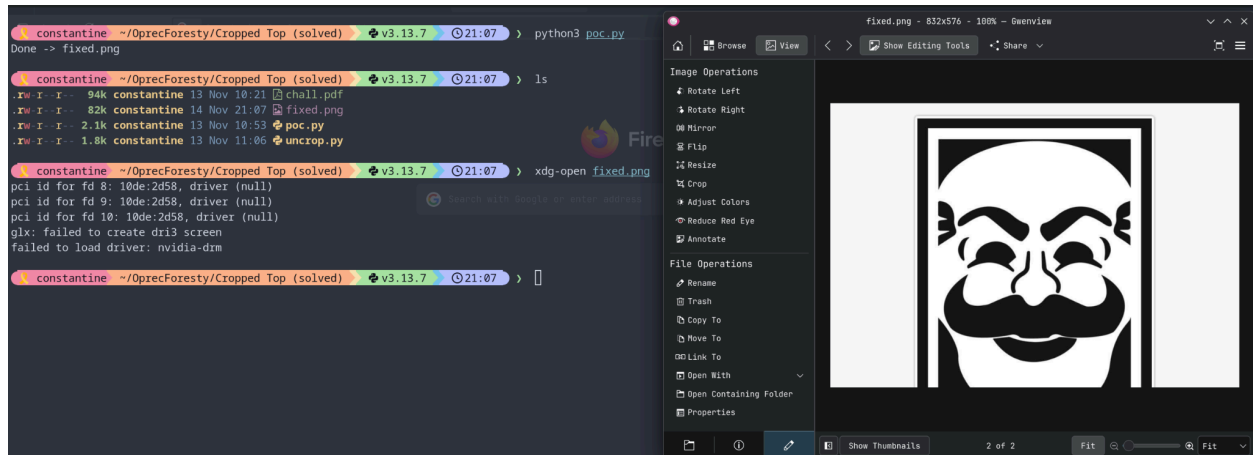
```

out += make_chunk(b"IEND", b"")

open("fixed.png", "wb").write(out)
print("Done -> fixed.png")

```

Tinggal jalankan [poc.py](#):



Muncullah gambar bertema fsociety dari Mr.Robot, namun **bagian bawah terpotong**. Berarti height pada IHDR tidak sesuai jumlah scanline sebenarnya.

## Phase 4: Image Reconstruction

Kita gunakan ChatGPT untuk membuat python script agar IHDRnya sesuai, [uncrop.py](#):

```

#!/usr/bin/env python3
import struct, zlib

FNAME = "chall.pdf"
data = open(FNAME, "rb").read()
assert data[:8] == b"\x89PNG\r\n\x1a\n", "Not a PNG"

pos = 8
ihdr = None
idat = b""

# --- parse IHDR & IDAT ---
while pos + 8 <= len(data):

```

```

length = int.from_bytes(data[pos:pos+4], "big")
ctype = data[pos+4:pos+8]
pos += 8
cdata = data[pos:pos+length]
pos += length
crc = data[pos:pos+4]
pos += 4

if ctype == b"IHDR":
    ihdr = cdata
elif ctype == b"IDAT":
    idat += cdata
elif ctype == b"IEND":
    break

assert ihdr is not None, "IHDR not found"
assert idat, "No IDAT data"

# --- info asli dari IHDR ---
width, height, bit_depth, color_type, comp, filt, inter = \
    struct.unpack(">IIBBBBB", ihdr)

bpp_map = {0:1, 2:3, 3:1, 4:2, 6:4}
bpp = bpp_map[color_type]
rowlen = 1 + width * bpp

print("old height =", height)
print("rowlen =", rowlen)

# --- decompress semua IDAT ---
raw = zlib.decompress(idat)
print("len(raw) =", len(raw))

total_rows = len(raw) // rowlen
print("total_rows =", total_rows)

new_height = total_rows

# --- build IHDR baru ---
new_ihdr = struct.pack(">IIBBBBB",
                        width, new_height,
                        bit_depth, color_type,
                        comp, filt, inter)

```

```

new_idat = zlib.compress(raw, 9)

def chunk(ctype, cdata=b''):
    length = len(cdata).to_bytes(4, "big")
    crc = zlib.crc32(ctype + cdata) & 0xFFFFFFFF
    return length + ctype + cdata + crc.to_bytes(4, "big")

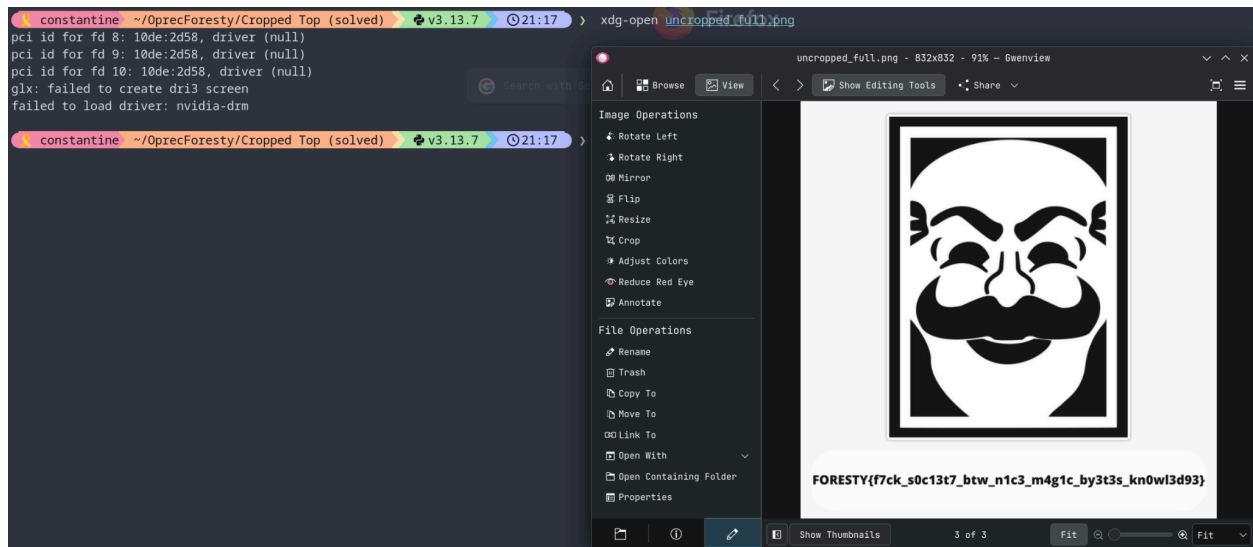
png = b"\x89PNG\r\n\r\n\x1a\n"
png += chunk(b"IHDR", new_ihdr)
png += chunk(b>IDAT", new_idat)
png += chunk(b"IEND")

open("uncropped_full.png", "wb").write(png)
print("Wrote uncropped_full.png")

```

Height pada IHDR diubah menjadi **832**, kemudian:

1. Raw image data disusun ulang menggunakan seluruh scanline
2. IDAT dikompres ulang
3. PNG baru dibangun dari awal (IHDR + IDAT + IEND)



Hasilnya gambar berhasil terbuka penuh dan bagian yang hilang muncul.

Di bagian paling bawah terdapat flag yang jelas.

---

## Final Flag

**FORESTY{f7ck\_s0c13t7\_btw\_n1c3\_m4g1c\_by3t3s\_kn0wl3d93}**