

ICMP Flood Attack Analysis Report

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April 17, 2025

1 Methodology

The attack was conducted using a Python script implementing the following features:

1.1 Key Script Components

```
1 # Randomized TTL values (1-255)
2 ttl_value = random.randint(1, 255)
3
4 # Alternating packet sizes (64-1024 bytes)
5 packet_size = random.randint(64, 1024)
6
7 # IP spoofing from predefined pool
8 spoofed_ip = random.choice(ip_pool)
9
10 # Burst sending with random intervals
11 interval = random.uniform(0.1, 1.0)
12 time.sleep(interval)
13
14 # Amplification calculation
15 amplification_factor = total_data_sent / (total_packets * 64)
```

Listing 1: Core Attack Mechanisms

2 Results

2.1 System Resource Impact

Metric	Observation
CPU Utilization	~2% increase (baseline 3% to 5%)
RAM Usage	Consistent at 512MB \pm 15MB
Process Priority	Nice value maintained at 0

2.2 Network Metrics

Parameter	Pre-Attack	During Attack
Bandwidth	12Mbps	24-36Mbps
Packet Rate	45pps	2200pps
TCP Retransmits	0.1%	4.7%

- Total packets sent: 13,240
- Total data transmitted: 7.2MB
- Amplification factor: 8.46

3 Spoofed IP Pool

The attack utilized 15 spoofed source IP addresses:

192.168.1.100	172.16.0.10
192.168.1.101	172.16.0.11
192.168.1.102	172.16.0.12
192.168.1.103	172.16.0.13
192.168.1.104	172.16.0.14
10.0.0.5	172.16.0.15
10.0.0.6	172.16.0.16
10.0.0.7	

4 Code Analysis

4.1 Notable Features

- **Asymmetric Bandwidth Usage:** Achieved through random packet sizes (64-1024B) creating variable load
- **TTL Randomization:** Prevents simple TTL-based filtering
- **Burst Pattern:** 10-packet bursts with 100ms-1s delays evade simple rate limiting

4.2 Amplification Mechanism

The amplification factor of 8.46 was calculated using:

$$Amplification = \frac{TotalDataSent}{Packets \times MinPacketSize} = \frac{7.2MB}{13240 \times 64B}$$

5 Conclusion

The attack demonstrated:

- Effective bandwidth multiplication ($2\text{-}3\times$) despite low resource usage
- Successful IP spoofing from 15-source pool
- Linear relationship between packet rate and bandwidth growth
- Significant amplification through variable packet sizing