Latest Trends in DDoS Attacks

By: Aditya Sharma, Adham El Shafie, and Tiffany Alvear
What is a DDos Attack?

- Distributed Denial of Service

- Multiple compromised systems (usually infected with a Trojan) target a website/server etc.

- Make website/online service inoperable by flooding it with more traffic than it can handle
How does a DDoS Attack work?

Botnets: armies of hundreds or thousands of Internet-connected computers (zombies or bots) that are infected with malware.

https://www.f5.com/labs/articles/education/what-is-a-distributed-denial-of-service-attack-
Why is it concerning?

- Exploit diversion of target’s attention
- Computer may be a botnet without knowing it
- Symptoms hard to identify as being unusual
## Types of DDoS Attacks

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume-based attacks</td>
<td>The attack’s goal is to saturate the bandwidth of the victims site.</td>
<td>Bits per second (Bps).</td>
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<td>Protocol attacks</td>
<td>Attacks server resources and any intermediary devices (routers, gateways, firewalls, etc.).</td>
<td>Packets per second (Pps).</td>
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<tr>
<td>Application Layer attacks</td>
<td>Attacks done to crash the web server with legitimate GET/POST requests.</td>
<td>Requests per second (Rps).</td>
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</tbody>
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Volume Based Attacks (Bps)

**UDP Flood**
Flooding random ports on remote host to extract ICMP ‘Destination Unreachable’ replies. This takes up resources and makes the remote host almost inaccessible.

**ICMP (Ping) Flood**
Similar principle to the UDP flood but with ICMP (ping) requests that the remote host would reply to which takes up resources.
**Protocol Based Attacks (Pps)**

**SYN Flood**
Multiple spoofed IP addresses initiating a 3-way handshake with the remote host. When there is no acknowledgement for the requests, the resources have been allocated already resulting in a DoS.

**Ping of Death**
Sending fragmented pings that are under the MTU limit but when the victim defragments the packet is over the maximum packet limit – 65,535 bytes – and can result in OS crashing.

**Smurf Attack**
Attacker sends a ping request to a broadcast IP address from a spoofed IP address as the source – the victim. The each of the IP addresses of the broadcasted address responds to the spoofed source address resulting in flooding victim with ICMP (ping) replies.
US Banks

- 2012
- Peak floods 60 Gbps of Traffic
- DNS packets
- Online and mobile banking became slow
GitHub

- Started March 26, 2015
- Lastest About 5 days
- Attacked 2 Projects called greatfire and cn-nytimes
- Chinese government is the assumed culprit
- Javascript made anyone on Baidu to request those projects
- Github attacked with millions of requests
- Packets also had different TTL
10-minute DDoS attack
February 28th, 2018
Estimated to be 1.35 terabits per second of traffic
About 126.9 million packets per second
Thousands of different autonomous systems (ASNs)
The peak was caused by Memcached based attack
Imperva’s client

- Another possible candidate for largest DDoS attack
- Jan 10, 2019
- SYN flood
- 580 million packets per second (PPS)
Internet Infrastructure
October 21st, 2016
Botnets on printers, IP cameras, baby monitor etc
Mirai malware used on those IoT
DNS lookup from tens of millions of IP
Masked TCP/UDP traffic over port 53
1.2 Tbps at peak
The Great False Attack

- Not All DDoS are intentional
- June 24th, 2016
- Automatic route Optimizing software used by DQE commination caused it
- Software told Border Gateway Protocol (BGP) that the route for some of the traffic is towards them by accident
- Millions of traffic diverted towards them
- Some of these traffics were for facebook, google
Wikipedia Attack

September 6, 7 2019

Wikipedia was down in Germany and some other parts of Europe

- Most of the issues were in the connect phase of the HTTP server
- Computers would not be able to establish three-way TCP
AWS DDoS Attack

- October 23rd, 2019
- Lasted about 8 hours, 10:30 AM to 6:30 PM
- Parts of AWS taken offline for hours
Digital Map Attack

https://www.digitalattackmap.com/#anim=1&color=0&country=ALL&list=0&time=18185&view=map
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