Cybersecurity Incident Report: Network Traffic Analysis

Part 1: Provide a summary of the problem found in the DNS and ICMP traffic log.
The UDP protocol was used to contact the DNS server to retrieve the IP address for the domain name of yummyrecipesforme.com. The ICMP protocol was used to respond with an error message, indicating issues contacting the DNS server. The UDP message going from your browser to the DNS server is shown in the first two lines of every log event. This is based on the results of the network analysis, which show that the ICMP echo reply returned the error message: udp port 53 is unreachable The port noted in the error message is used for: Port 53 is primarily used by DNS The most likely issue is: DNS server not responding

Part 2: Explain your analysis of the data and provide at least one cause of the incident.
Time incident occurred: Today at 13h24 Explain how the IT team became aware of the incident: By customers of clients not being able to access the company website Explain the actions taken by the IT department to investigate the incident: The team used tcpdump to attempt to load the webpage Note key findings of the IT department's investigation (i.e., details related to the port affected, DNS server, etc.): The team found out that when you send UDP packets to the DNS server, you receive ICMP packets containing the error message “udp port 53 unreachable.” Note a likely cause of the incident: DoS attack, firewall misconfiguration or UDP flood attack

Scenario

Scenario

Review the scenario below. Then complete the step-by-step instructions.

You are a cybersecurity analyst working at a company that specializes in providing IT services for clients. Several customers of clients reported that they were not able to access the client company website www.yummyrecipesforme.com, and saw the error "destination port unreachable" after waiting for the page to load.

You are tasked with analyzing the situation and determining which network protocol was affected during this incident. To start, you attempt to visit the website and you also receive the error "destination port unreachable." To troubleshoot the issue, you load your network analyzer tool, tcpdump, and attempt to load the webpage again. To load the webpage, your browser sends a query to a DNS server via the UDP protocol to retrieve the IP address for the website's domain name; this is part of the DNS protocol. Your browser then uses this IP address as the destination IP for sending an HTTPS request to the web server to display the webpage The analyzer shows that when you send UDP packets to the DNS server, you receive ICMP packets containing the error message: "udp port 53 unreachable."

```
13:24:32.192571 IP 192.51.100.15.52444 > 203.0.113.2.domain: 35084+ A?
yummyrecipesforme.com. (24)
13:24:36.098564 IP 203.0.113.2 > 192.51.100.15: ICMP 203.0.113.2
udp port 53 unreachable length 254

13:26:32.192571 IP 192.51.100.15.52444 > 203.0.113.2.domain: 35084+ A?
yummyrecipesforme.com. (24)
13:27:15.934126 IP 203.0.113.2 > 192.51.100.15: ICMP 203.0.113.2
udp port 53 unreachable length 320

13:28:32.192571 IP 192.51.100.15.52444 > 203.0.113.2.domain: 35084+ A?
yummyrecipesforme.com. (24)
13:28:50.022967 IP 203.0.113.2 > 192.51.100.15: ICMP 203.0.113.2
udp port 53 unreachable length 150
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Cybersecurity Incident Report

Section 1: Identify the type of attack that may have caused this network interruption
One potential explanation for the website's connection timeout error message is: A DoS attack The logs show that: Abnormal number of SYN requests This event could be: SYN flood attack

Section 2: Explain how the attack is causing the website to malfunction
When website visitors try to establish a connection with the web server, a three-way handshake occurs using the TCP protocol. Explain the three steps of the handshake: 1. SYN is the initial request from a client trying to connect to a web page hosted on a web server. 2. SYN, ACK is the server response agreeing to the connection. 3. ACK is the final step which is the client acknowledging permission to the connection. Explain what happens when a malicious actor sends a large number of SYN packets all at once: Simulates tcp connections and floods the server with SYN packets Explain what the logs indicate and how that affects the server: The logs indicate that the server became unable to process new connections with the web site visitors.

Scenario

Scenario

Review the following scenario. Then complete the step-by-step instructions.

You work as a security analyst for a travel agency that advertises sales and promotions on the company's website. The employees of the company regularly access the company's sales webpage to search for vacation packages their customers might like.

One afternoon, you receive an automated alert from your monitoring system indicating a problem with the web server. You attempt to visit the company's website, but you receive a connection timeout error message in your browser.

You use a packet sniffer to capture data packets in transit to and from the web server. You notice a large number of TCP SYN requests coming from an unfamiliar IP address. The web server appears to be overwhelmed by the volume of incoming traffic and is losing its ability to respond to the abnormally large number of SYN requests. You suspect the server is under attack by a malicious actor.

You take the server offline temporarily so that the machine can recover and return to a normal operating status. You also configure the company's firewall to block the IP address that was sending the abnormal number of SYN requests. You know that your IP blocking solution won't last long, as an attacker can spoof other IP addresses to get around this block. You need to alert your manager about this problem quickly and discuss the next steps to stop this attacker and prevent this problem from happening again. You will need to be prepared to tell your boss about the type of attack you discovered and how it was affecting the web server and employees.

Logs

Color as text	No.	Time	Source (x = redacted)	Destination (x = redacted)	Protocol	Info
red	52	3.390692	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	53	3.441926	192.0.2.1	203.0.113.0	TCP	443->54770 [SYN, ACK] Seq=0 Win-5792 Len=120...
red	54	3.493160	203.0.113.0	192.0.2.1	TCP	54770->443 [ACK Seq=1 Win=5792 Len=0...
green	55	3.544394	198.51.100.14	192.0.2.1	TCP	14785->443 [SYN] Seq=0 Win-5792 Len=120...
green	56	3.599628	192.0.2.1	198.51.100.14	TCP	443->14785 [SYN, ACK] Seq=0 Win-5792 Len=120...
red	57	3.664863	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	58	3.730097	198.51.100.14	192.0.2.1	TCP	14785->443 [ACK] Seq=1

						Win-5792 Len=120...
red	59	3.795332	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win-5792 Len=120...
green	60	3.860567	198.51.100.14	192.0.2.1	HTTP	GET /sales.html HTTP/1.1
red	61	3.939499	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win-5792 Len=120...
green	62	4.018431	192.0.2.1	198.51.100.14	HTTP	HTTP/1.1 200 OK (text/html)

Color as text	No.	Time	Source	Destination	Protocol	Info
green	63	4.097363	198.51.100.5	192.0.2.1	TCP	33638->443 [SYN] Seq=0 Win-5792 Len=120...
red	64	4.176295	192.0.2.1	203.0.113.0	TCP	443->54770 [SYN, ACK] Seq=0 Win-5792 Len=120...
green	65	4.255227	192.0.2.1	198.51.100.5	TCP	443->33638 [SYN, ACK] Seq=0 Win-5792 Len=120...
red	66	4.256159	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	67	5.235091	198.51.100.5	192.0.2.1	TCP	33638->443 [ACK] Seq=1 Win-5792 Len=120...
red	68	5.236023	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	69	5.236955	198.51.100.16	192.0.2.1	TCP	32641->443 [SYN] Seq=0 Win-5792 Len=120...
red	70	5.237887	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	71	6.228728	198.51.100.5	192.0.2.1	HTTP	GET /sales.html HTTP/1.1
red	72	6.229638	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
yellow	73	6.230548	192.0.2.1	198.51.100.16	TCP	443->32641 [RST, ACK] Seq=0 Win-5792 Len=120...
red	74	6.330539	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	75	6.330885	198.51.100.7	192.0.2.1	TCP	42584->443 [SYN] Seq=0 Win=5792 Len=0...

red	76	6.331231	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
yellow	77	7.330577	192.0.2.1	198.51.100.5	TCP	HTTP/1.1 504 Gateway Time-out (text/html)
red	78	7.331323	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
green	79	7.340768	198.51.100.22	192.0.2.1	TCP	6345->443 [SYN] Seq=0 Win=5792 Len=0...
yellow	80	7.340773	192.0.2.1	198.51.100.7	TCP	443->42584 [RST, ACK] Seq=1 Win-5792 Len=120...
red	81	7.340778	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	82	7.340783	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	83	7.439658	192.0.2.1	203.0.113.0	TCP	443->54770 [RST, ACK] Seq=1 Win=5792 Len=0...

Color as text	No.	Time	Source (x = redacted)	Destination (x = redacted)	Protocol	Info
red	119	19.198705	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	120	19.521718	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
yellow	121	19.844731	192.0.2.1	198.51.100.9	TCP	443->4631 [RST, ACK] Seq=1 Win=5792 Len=0...
red	122	20.167744	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	123	20.490757	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	124	20.81377	192.0.2.1	203.0.113.0	TCP	443->54770 [RST, ACK] Seq=1 Win=5792 Len=0...
red	125	21.136783	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	126	21.459796	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	127	21.782809	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...

red	128	22.105822	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	129	22.428835	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	130	22.751848	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	131	23.074861	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	132	23.397874	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	133	23.720887	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	134	24.0439	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	135	24.366913	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	136	24.689926	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	137	25.012939	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	138	25.335952	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	139	25.658965	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	140	25.981978	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	141	26.304991	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	142	26.628004	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	143	26.951017	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	144	27.27403	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	145	27.597043	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	146	27.920056	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...

red	147	28.243069	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	148	28.566082	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	149	28.889095	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	150	29.212108	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	151	29.535121	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...
red	152	29.858134	203.0.113.0	192.0.2.1	TCP	54770->443 [SYN] Seq=0 Win=5792 Len=0...