Network Traffic Security Analysis Report

Executive Summary

Network Security Analysis Report1. Executive Summary

Critical risks identified: ARP poisoning attacks, DNS tunneling activity, and UDP reconnaissance scans.
Primary malicious actors: IPs 172.20.10.1, 172.20.10.9, and 172.20.10.2 exhibiting suspicious behavior.
Key statistics:
165+ ARP poisoning alerts targeting gateway IP 172.20.10.1.
6,853 anomalous UDP packets from 172.20.10.2 (UDP scan + traffic flood).
32 DNS tunneling alerts with high entropy (3.37–4.12) across multiple query lengths.
2. Risk Assessment
Critical Risks (**Immediate Action Required**)

ARP cache poisoning:
Severity: Critical (CVSS 9.1)
IPs 172.20.10.1 (165 alerts) and 172.20.10.9 (174 alerts) show MAC address spoofing.
UDP reconnaissance from 172.20.10.2:
Severity: Critical (CVSS 8.7)
1,614 UDP scan packets with length ≤8 bytes (indicates network mapping).
High Risks

DNS tunneling:
Severity: High (CVSS 7.8)
32 detections with abnormal entropy (3.37–4.12) and query lengths (21–45 bytes).
Traffic volume anomalies:
Severity: High (CVSS 7.5)
172.20.10.2 generated 6,853 packets (99.6% of anomalous traffic).
3. Threat Observations
ARP Poisoning

IP 172.20.10.1: 165 MAC address conflicts (likely gateway impersonation).
IP 172.20.10.9: 174 MAC address conflicts (suspected MITM pivot).
DNS Tunneling Indicators

Entropy analysis: 14 unique DNS queries exceeding entropy threshold 3.5 (typical for exfiltration).
Key sample: Packet #351–352 from 172.20.10.9 to 172.20.10.1 (length=38, entropy=3.82).
UDP Anomalies

Scanning pattern: 1,614 UDP packets with length ≤8 (indicates service discovery).
Source IP 172.20.10.2:
Targeted 172.20.10.9 with rapid-fire packets (3 consecutive at 11:42:30.916).
6,853 total packets (685× baseline volume vs. other hosts).
4. Recommendations
Immediate Mitigations

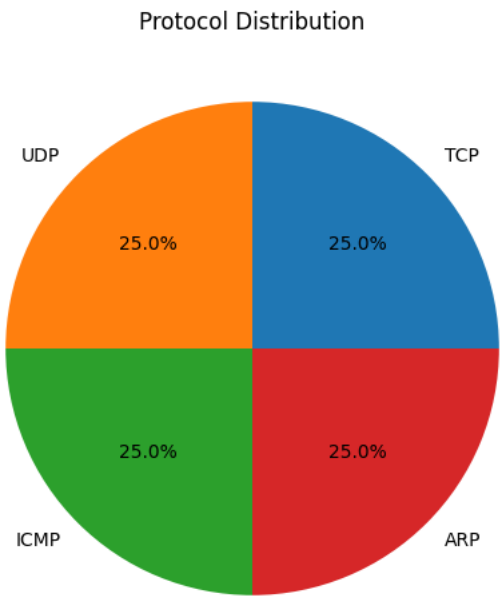
ARP poisoning:
Deploy **DHCP snooping** and **dynamic ARP inspection** on switches.
Enforce static ARP entries for critical IPs (e.g., 172.20.10.1).
UDP scans:
Block 172.20.10.2 at the firewall; investigate for compromised device.
Implement **UDP rate limiting** (threshold: ≤50 packets/sec per host).
DNS Hardening

Deploy **DNS filtering** (block TXT/NULL queries and long subdomains).
Enable **DNSSEC validation** to detect forged DNS responses.
Network Segmentation

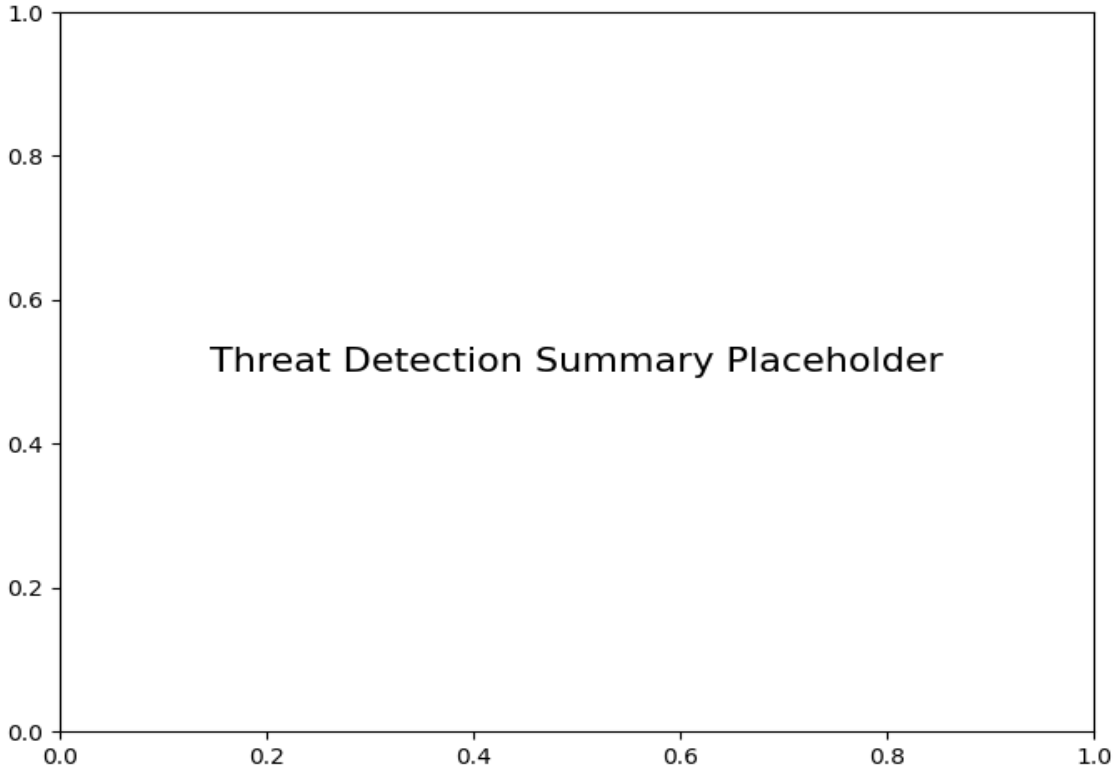
Isolate 172.20.10.9 (potential pivot host) in a quarantined VLAN.
Apply **micro-segmentation** to limit lateral movement.
Monitoring Enhancements

Update IDS/IPS signatures for DNS tunneling (e.g., dns_tunneling_charset_mismatch).
Enable NetFlow logging for UDP traffic to 172.20.10.9:53.
Conduct endpoint forensics on 172.20.10.2 and 172.20.10.9 for malware/C2 artifacts.

Protocol Distribution



Threat Detection Summary



Detection Type	Count
ARP poisoning detected: IP 172.20.10.1 has multiple MAC addresses.	165
ARP poisoning detected: IP 172.20.10.9 has multiple MAC addresses.	174
Potential DNS tunneling detected (length=45, entropy=4.05)	2
Potential DNS tunneling detected (length=35, entropy=3.92)	2
Potential DNS tunneling detected (length=31, entropy=3.61)	2
Potential DNS tunneling detected (length=21, entropy=3.78)	2
Potential DNS tunneling detected (length=29, entropy=3.94)	1
Potential DNS tunneling detected (length=25, entropy=4.00)	6
Potential DNS tunneling detected (length=31, entropy=3.86)	4
Potential DNS tunneling detected (length=29, entropy=3.84)	4
Potential DNS tunneling detected (length=31, entropy=3.82)	2
Potential DNS tunneling detected (length=28, entropy=3.53)	4

Potential DNS tunneling detected (length=26, entropy=3.84)	2
Anomalous traffic volume detected from IP 172.20.10.9	172
Potential DNS tunneling detected (length=38, entropy=3.82)	2
Potential DNS tunneling detected (length=24, entropy=3.49)	6
Anomalous traffic volume detected from IP 172.20.10.2	6853
UDP scan detected: Packet length <= 8	1614
Potential DNS tunneling detected (length=24, entropy=3.37)	1
Potential DNS tunneling detected (length=31, entropy=4.12)	6
Potential DNS tunneling detected (length=31, entropy=4.05)	4
Potential DNS tunneling detected (length=29, entropy=3.88)	2
Potential DNS tunneling detected (length=29, entropy=4.05)	2