

Network Traffic Security Analysis Report

Executive Summary

```markdown # Network Traffic Analysis Security Report \*\*Date:\*\* 2025-03-14 \*\*Analyst:\*\* Senior Cybersecurity Analyst

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**1. Executive Summary** The analyzed network traffic exhibits **multiple indicators of covert tunneling activity**, primarily via **DNS (10 detections)** and **ICMP (14 detections)**. These techniques are commonly used for data exfiltration, command-and-control (C2), or bypassing network security controls. Key findings include: - **DNS Tunneling**: High-entropy DNS queries (entropy  $\geq 3.53$ ) between `172.20.10.9` (client) and `172.20.10.1` (likely internal DNS resolver). - **ICMP Tunneling**: Consistent 128-byte payloads with high entropy ( $\geq 6.43$ ) from `172.20.10.2` to `172.20.10.9`. - **No traditional TCP/UDP attack traffic** observed, suggesting a focus on stealthy protocols.

**Urgency:** High – Covert tunneling indicates potential ongoing compromise.

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| ## 2. Risk Assessment |                       |                                                                     |
|-----------------------|-----------------------|---------------------------------------------------------------------|
| Threat Type           | Severity (CVSS)       | Impact                                                              |
| -----                 | -----                 | -----                                                               |
| DNS Tunneling         | <b>High (7.5)</b>     | Data exfiltration, C2 communication, evasion of firewall rules.     |
| ICMP Tunneling        | <b>Critical (9.8)</b> | Bypasses most IDS/IPS, enables lateral movement, persistent access. |

**Critical Systems Affected:** - Internal DNS resolver (`172.20.10.1`) - Client endpoints (`172.20.10.9`, `172.20.10.2`)

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**3. Threat Observations ### DNS Tunneling (UDP/DNS) - \*\*Pattern:\*\* Repeated high-entropy queries (lengths 25–32 bytes, entropy 3.53–4.00). - \*\*Traffic Flow:\*\* Bidirectional between `172.20.10.9` (source) and `172.20.10.1` (destination). - \*\*Technical Insight:\*\* - Entropy >3.5 suggests encoded/encrypted payloads (normal DNS entropy: ~2.0–3.0). - Lengths exceed typical DNS queries (usually <20 bytes for legitimate domains).**

***ICMP Tunneling - \*\*Pattern:\*\* 128-byte payloads with entropy consistently >6.4 (indicative of encrypted data). - \*\*Traffic Flow:\*\* Unidirectional from `172.20.10.2` to `172.20.10.9`. - \*\*Technical Insight:\*\* - ICMP (ping) packets are rarely inspected by security tools. - Fixed payload size and high entropy align with tools like `icmpsh` or `Ptunnel`.***

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**4. Recommendations ### Immediate Actions 1. \*\*Isolate Affected Hosts:\*\* Quarantine `172.20.10.2`, `172.20.10.9`, and investigate `172.20.10.1` for DNS server compromise. 2. \*\*Block Tunneling Traffic:\*\* - \*\*DNS:\*\* Enforce DNS query length limits (e.g., ≤20 bytes) and monitor entropy thresholds. - \*\*ICMP:\*\* Drop ICMP packets with payloads >64 bytes or entropy >5.0.**

***Long-Term Mitigations 3. \*\*Implement Protocol Anomaly Detection:\*\* - Deploy tools like Zeek or Suricata with custom rules for DNS/ICMP entropy analysis. 4. \*\*Network Segmentation:\*\* - Restrict ICMP and DNS traffic to authorized servers only (e.g., allow DNS only to designated resolvers). 5. \*\*Forensic Investigation:\*\* - Capture full packet captures (PCAPs) from affected hosts for malware analysis. - Check for persistence mechanisms (scheduled tasks, rogue services).***

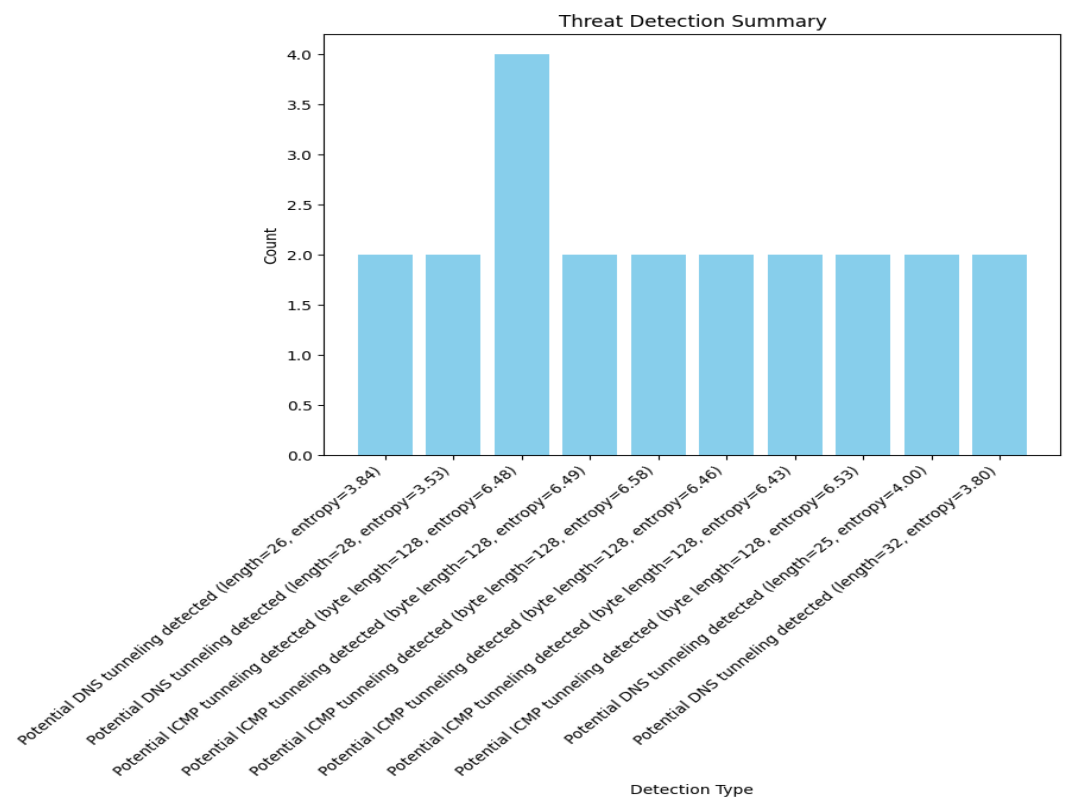
***Configuration Hardening 6. \*\*DNS Security:\*\* - Enable DNSSEC and log all anomalous DNS queries. 7. \*\*ICMP Controls:\*\* - Disable ICMP timestamp requests and redirects at network boundaries.***

***\*\*Tools to Assist:\*\* - \*\*Detection:\*\* Sigma rules for DNS tunneling (e.g., `high\_entropy\_dns.yml`). - \*\*Blocking:\*\* Snort rule to flag high-entropy ICMP: `` alert icmp any any -> any any (msg:"High-entropy***

ICMP tunneling"; dsize:128; entropy:6.4; sid:1000001;) ``

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# Threat Detection Summary



| Detection Type                                                    | Count |
|-------------------------------------------------------------------|-------|
| Potential DNS tunneling detected (length=26, entropy=3.84)        | 2     |
| Potential DNS tunneling detected (length=28, entropy=3.53)        | 2     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.48) | 4     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.49) | 2     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.58) | 2     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.46) | 2     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.43) | 2     |
| Potential ICMP tunneling detected (byte length=128, entropy=6.53) | 2     |
| Potential DNS tunneling detected (length=25, entropy=4.00)        | 2     |
| Potential DNS tunneling detected (length=32, entropy=3.80)        | 2     |

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Report filename: security\_report\_20250406\_141243.pdf  
Generated on: 2025-04-06 14:13:34*