Network Traffic Security Analysis Report

Overall Threat Assessment

Threat Level: 10/10

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Executive Summary

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Executive Summary

Network traffic analysis identified **16 tunneling attempts** (10 DNS, 6 ICMP) between 07:14 and 07:17 on 2025-03-14
Critical infrastructure risk: Tunneling activity detected in DNS and ICMP protocols, commonly abused for data exfiltration/C2 communications
Primary suspicious hosts: 172.20.10.9 (initiator), 172.20.10.1, and 172.20.10.2
Risk Assessment

Critical Risk: DNS tunneling attempts (10 events)

High entropy (3.53-4.00) and abnormal query lengths (25-32 characters)
Severity: ■ CVSS 9.1 (Potential data exfiltration/covert C2 channel)

Critical Risk: ICMP tunneling patterns (6 events)

Consistent 128-byte payloads with extreme entropy (6.43-6.58)
Severity: ■ CVSS 8.9 (Commonly used for bypassing firewall rules)

Environmental Risk: Internal IPs (172.20.10.0/24) communicating via suspicious channels

Indicates potential compromised endpoints or insider threat

Threat Observations
DNS Tunneling Patterns

Bidirectional traffic between 172.20.10.9 ↔ 172.20.10.1:

4 distinct DNS tunneling alerts (Packets #226-227, #236-237)
Alternating query lengths (26-28 chars) and decreasing entropy (3.84 → 3.53)
Null port activity suggests application-layer tunneling

ICMP Tunneling Patterns

Sustained traffic from 172.20.10.2 to 172.20.10.9:

6 identical payload-length alerts (128 bytes) with fluctuating entropy
Entropy values (6.43-6.58) exceed normal ICMP threshold (typically <5.0)
Pattern suggests encrypted payloads or compressed data

Temporal Analysis

Cluster 1: 07:14-07:15 (DNS tunneling)
Cluster 2: 07:17 (ICMP tunneling)
No TCP/UDP/ARP attack patterns detected
Recommendations
1. **Immediate Containment**

Quarantine 172.20.10.9 and 172.20.10.2 for forensic analysis
Block outbound DNS queries from non-authorized resolvers (current suspicious source: 172.20.10.9)

2. **DNS Hardening**

Implement DNS query length restrictions (max 15 characters for FQDNs)
Enforce entropy threshold alerts (≥3.5 shannon entropy)
Deploy DNS filtering solution (Cisco Umbrella or DNSFilter)

3. **ICMP Mitigation**

Block ICMP payloads >64 bytes at network perimeter
Implement anomaly detection for ICMP entropy >5.5
Restrict ICMP traffic to operational requirements (RFC 792-compliant only)

4. **Network Architecture**

Segment 172.20.10.0/24 subnet using micro-segmentation
Enable strict egress filtering for internal hosts
Deploy network-based TLS decryption for east-west traffic

5. **Threat Hunting**

Search for base64/gzip patterns in packet captures (PCAPs) of flagged traffic
Cross-reference with proxy logs for correlating C2 beaconing
Analyze historical DNS queries from 172.20.10.9 for domain generation algorithms (DGAs)

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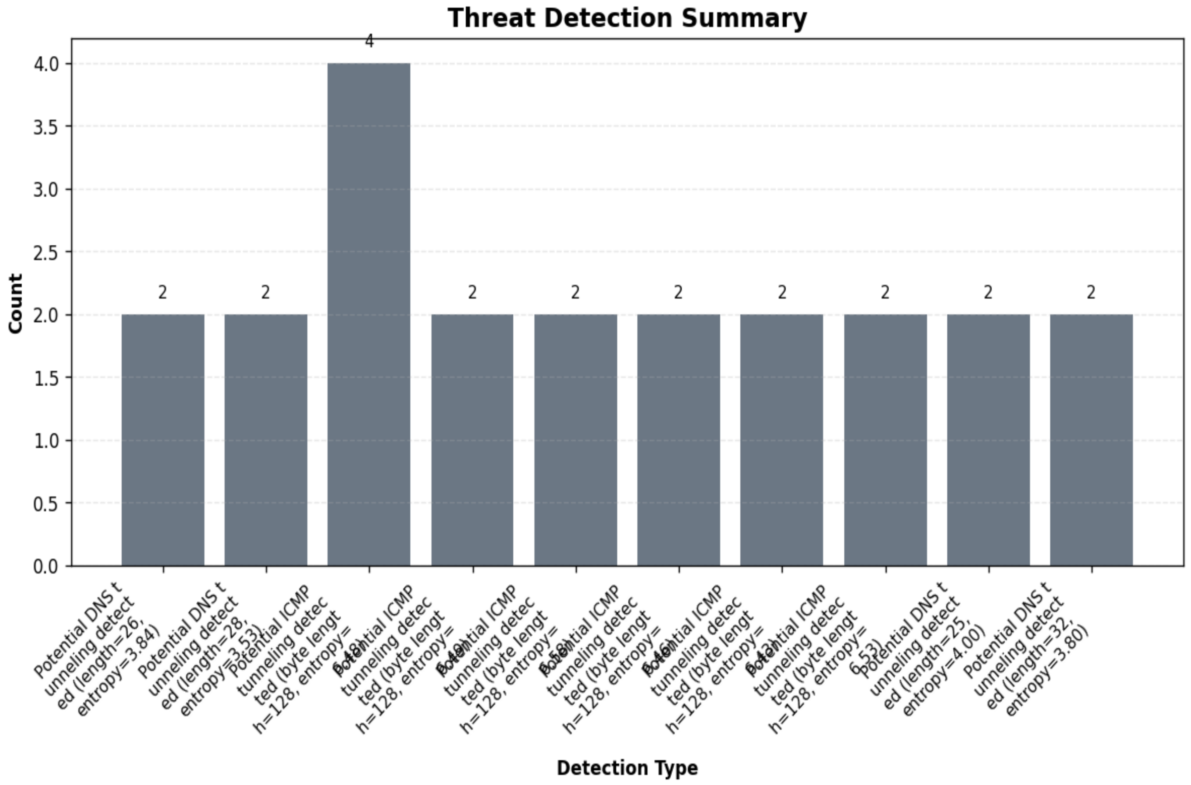
Threat Detection Summary



Detection Details

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

Source/Destination Analysis

IP Address	As Source	As Destination	Total
172.20.10.9	2	3	5
172.20.10.1	2	2	4
172.20.10.2	1	0	1

Event Timeline

Time	Packet #	Protocol	Detection
07:14:56.113	226	UDP, DNS	Potential DNS tunneling detect<br/>ed (length=26, entropy=3.84)
07:14:56.137	227	UDP, DNS	Potential DNS tunneling detect<br/>ed (length=26, entropy=3.84)
07:15:57.855	236	UDP, DNS	Potential DNS tunneling detect<br/>ed (length=28, entropy=3.53)
07:15:57.957	237	UDP, DNS	Potential DNS tunneling detect<br/>ed (length=28, entropy=3.53)
07:17:07.470	254	ICMP	Potential ICMP tunneling detec<br/>ted (byte length=128, entropy=<br/>6.48)

Appendix: Raw Traffic Analysis Data

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{
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    "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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    "tcp_packets": 0,
    "udp_packets": 0,
    "icmp_packets": 0,
    "arp_packets": 0
  },
  "top_threats": [
    {
      "packet_number": 226,
      "timestamp": "2025-03-14T07:14:56.113791",
      "minute": "2025-03-14 07:14",
      "protocols": [
        "UDP",
        "DNS"
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      "src_ip": "172.20.10.9",
      "dst_ip": "172.20.10.1",
      "src_port": null,
      "dst_port": null,
      "detection_details": [
        "Potential DNS tunneling detected (length=26, entropy=3.84)"
      ]
    },
    {
      "packet_number": 227,
      "timestamp": "2025-03-14T07:14:56.137435",
      "minute": "2025-03-14 07:14",
      "protocols": [
        "UDP",
        "DNS"
      ],
      "src_ip": "172.20.10.1",
      "dst_ip": "172.20.10.9",
      "src_port": null,
      "dst_port": null,
      "detection_details": [
        "Potential DNS tunneling detected (length=26, entropy=3.84)"
      ]
    },
    {
      "packet_number": 236,
      "timestamp": "2025-03-14T07:15:57.855561",
      "minute": "2025-03-14 07:15",
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        "UDP",
        "DNS"
      ],
      "src_ip": "172.20.10.9",
      "dst_ip": "172.20.10.1",
      "src_port": null,
      "dst_port": null,
      "detection_details": [
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      ]
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    {
      "packet_number": 237,
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      "minute": "2025-03-14 07:15",
      "protocols": [
        "UDP",
        "DNS"
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      "src_ip": "172.20.10.1",
      "dst_ip": "172.20.10.9",
      "src_port": null,
      "dst_port": null,
      "detection_details": [
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      ]
    },
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      "packet_number": 254,
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      "minute": "2025-03-14 07:17",
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        "ICMP"
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      "src_ip": "172.20.10.2",
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