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How to Assure End-to-end Network Quality for Cloud Networks

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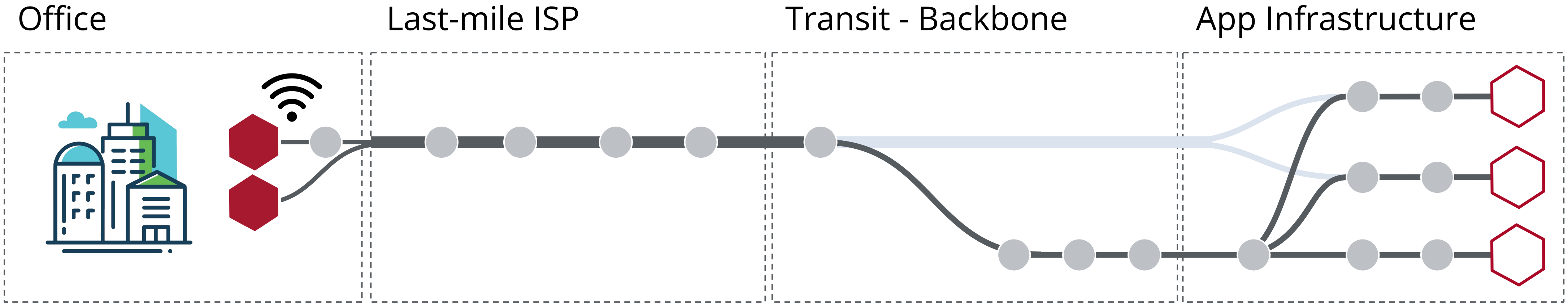
Network Quality

What makes a network **good**?

Reliability	Key metrics: uptime
Security	Zero-trust, accessibility
Flexibility	Complexity (eg, load balancing)
Performance	Metrics: latency, loss, jitter
Scalability	Responds to increases in traffic; tradeoff with cost
Management	Cost of maintenance, time to update

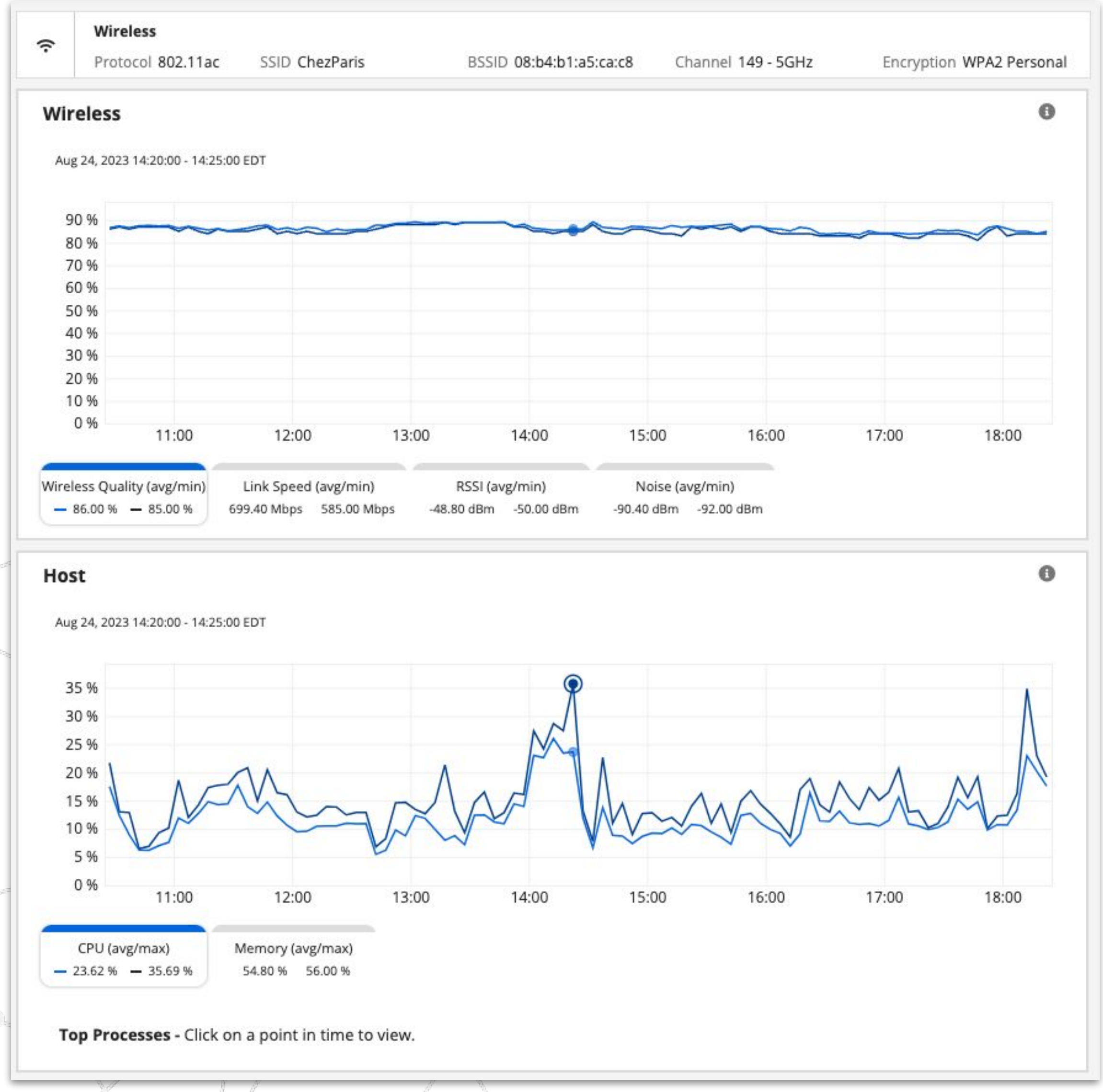
Error Domains



AppNeta provides visibility into:

1. Office environment (Wireless vs. wired? AP-specific issues)
2. User’s Last-mile ISP (or enterprise ISP in that case)
3. Whatever the mid-path is (ie. Comcast peers with Level 3 -- is it there?)
4. The cloud-based environment or the enterprise infrastructure

End-user Environment



Wireless

Protocol 802.11ac SSID ChezParis BSSID 08:b4:b1:a5:ca:c8 Channel 149 - 5GHz Encryption WPA2 Personal

Wireless

Aug 24, 2023 14:20:00 - 14:25:00 EDT

Wireless Quality (avg/min)	Link Speed (avg/min)	RSSI (avg/min)	Noise (avg/min)
86.00 % 85.00 %	699.40 Mbps 585.00 Mbps	-48.80 dBm -50.00 dBm	-90.40 dBm -92.00 dBm

Host

Aug 24, 2023 14:20:00 - 14:25:00 EDT

CPU (avg/max)	Memory (avg/max)
23.62 % 35.69 %	54.80 % 56.00 %

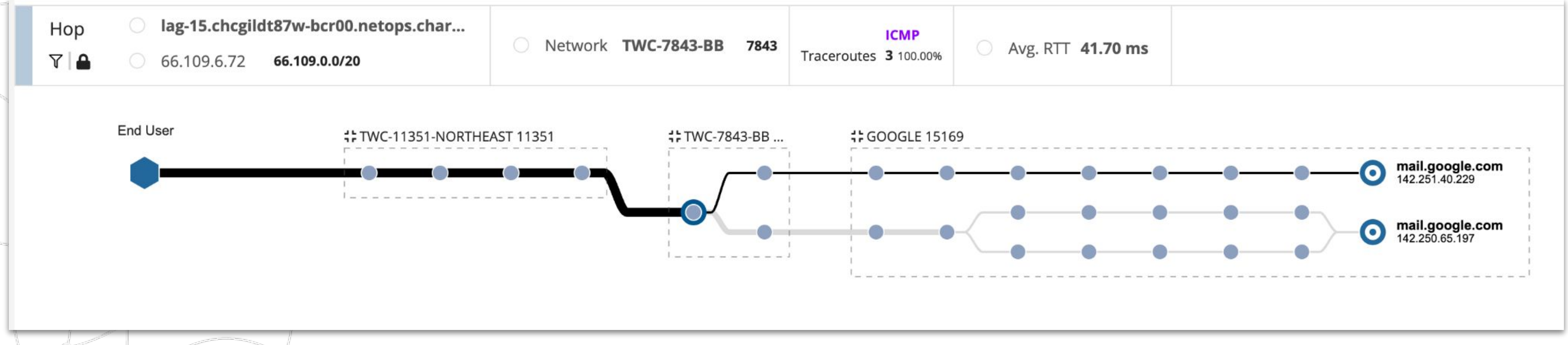
Top Processes - Click on a point in time to view.

- **Connectivity Types**
  Rapidly isolate user connectivity between:
  - ○ Wired
  - ○ Wi-Fi
  - ○ VPN

- **Identify state changes**
  - ○ Switching connectivity types
  - ○ Weak signal
  - ○ Low link speed
  - ○ Channel and band flapping
  - ○ Congestion

Middle-mile: ISP and Transit

> “AppNeta enables us to look at the network path overall. When users encounter latency or connectivity issues, AppNeta enables us to quickly pinpoint which domain is responsible.”
>
> - Systems Engineer, FIS Global



Hop ○ lag-15.chcgildt87w-bcr00.netops.char... ○ 66.109.6.72 66.109.0.0/20

○ Network TWC-7843-BB 7843

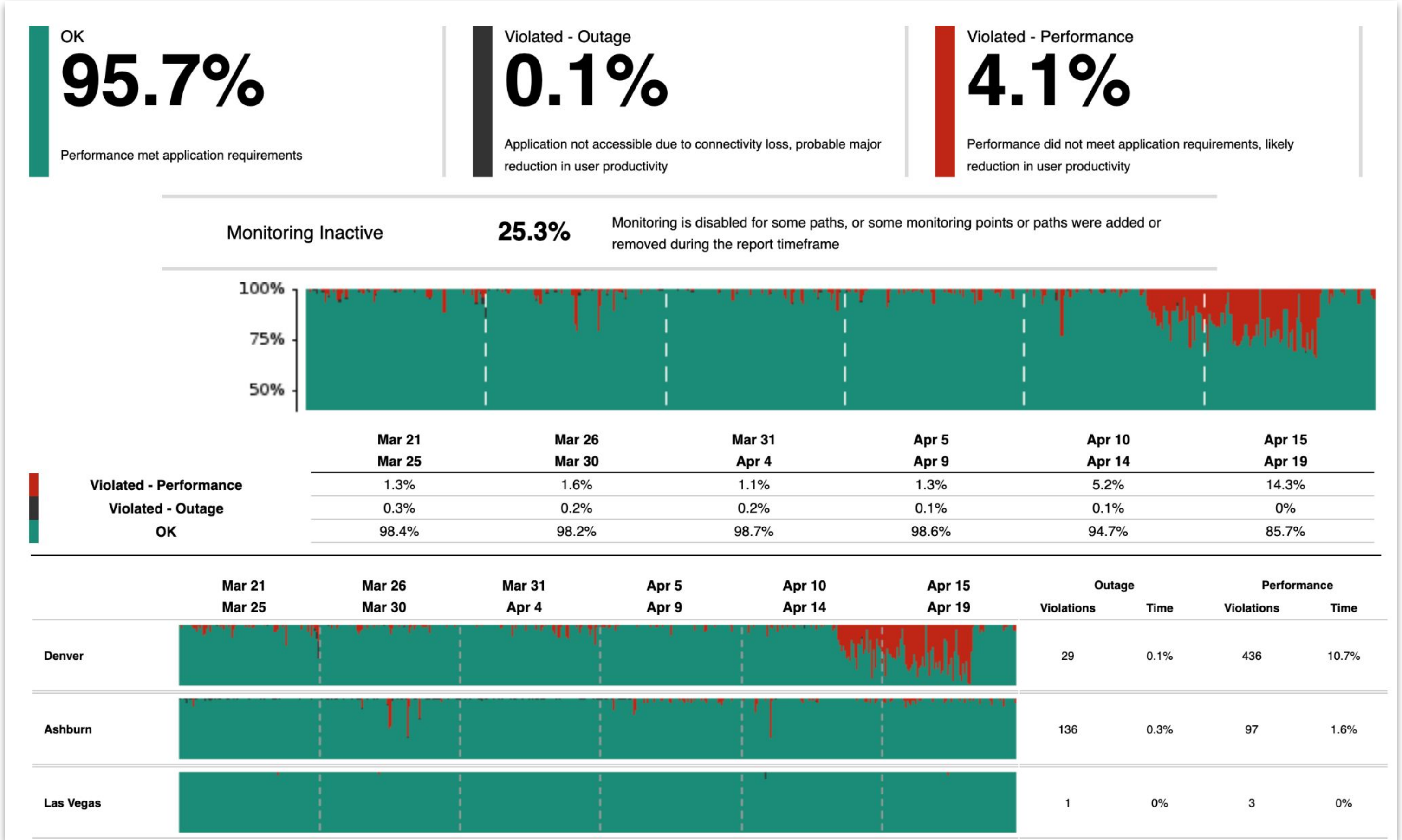
ICMP Traceroutes 3 100.00%

○ Avg. RTT 41.70 ms

App Service Provider & Cloud Environment

"With the move to the cloud, pinpointing network issues started to feel like trying to find a needle in the haystack,"

- Senior Infrastructure Architects, Kyndryl



OK

95.7%

Performance met application requirements

Violated - Outage

0.1%

Application not accessible due to connectivity loss, probable major reduction in user productivity

Violated - Performance

4.1%

Performance did not meet application requirements, likely reduction in user productivity

Monitoring Inactive 25.3% Monitoring is disabled for some paths, or some monitoring points or paths were added or removed during the report timeframe

	Mar 21 Mar 25	Mar 26 Mar 30	Mar 31 Apr 4	Apr 5 Apr 9	Apr 10 Apr 14	Apr 15 Apr 19
🟥 Violated - Performance	1.3%	1.6%	1.1%	1.3%	5.2%	14.3%
⬛ Violated - Outage	0.3%	0.2%	0.2%	0.1%	0.1%	0%
🟩 OK	98.4%	98.2%	98.7%	98.6%	94.7%	85.7%

	Mar 21	Mar 26	Mar 31	Apr 5	Apr 10	Apr 15	Outage		Performance	
	Mar 25	Mar 30	Apr 4	Apr 9	Apr 14	Apr 19	Violations	Time	Violations	Time
Denver							29	0.1%	436	10.7%
Ashburn							136	0.3%	97	1.6%
Las Vegas							1	0%	3	0%

Scenario | Financial Customer

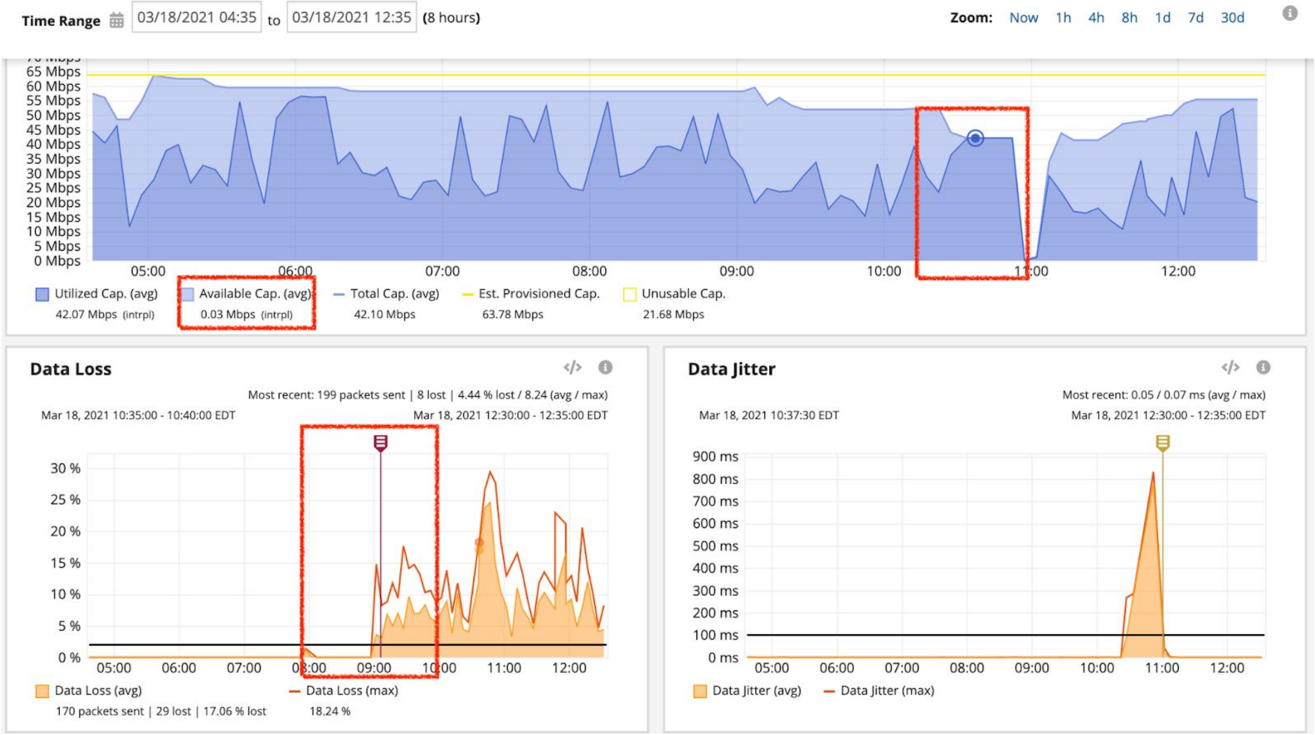
The primary DC for a financial customer went “down.” After being on an all-hands meeting for 3 hours the customer asked if AppNeta, currently in a Proof of Value phase, detected anything that could help the team identify the issue.

Triage

- The initial complaints were for poor internet performance.
- AppNeta report shows an uptrend in Loss starting around 08:45. Available Capacity was 0.00 at/around 10:30, lasting for over 30 minutes.

Solution

- Office 365 was the original suspect
- Time of the issue proved to be the key
- Team had pushed a change to Palo Alto FWs for inspecting ZIP files without knowing all Docker containers from Dev Teams were uploaded as ZIP causing GBs of traffic to be inspected


Time Range 03/18/2021 04:35 to 03/18/2021 12:35 (8 hours)

Zoom: Now 1h 4h 8h 1d 7d 30d
65 Mbps
60 Mbps
55 Mbps
50 Mbps
45 Mbps
40 Mbps
35 Mbps
30 Mbps
25 Mbps
20 Mbps
15 Mbps
10 Mbps
5 Mbps
0 Mbps
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
Utilized Cap. (avg) 42.07 Mbps (intrpl)
Available Cap. (avg) 0.03 Mbps (intrpl)
Total Cap. (avg) 42.10 Mbps
Est. Provisioned Cap. 63.78 Mbps
Unusable Cap. 21.68 Mbps

Data Loss

Most recent: 199 packets sent | 8 lost | 4.44 % lost / 8.24 (avg / max)

Mar 18, 2021 10:35:00 - 10:40:00 EDT

Mar 18, 2021 12:30:00 - 12:35:00 EDT

Data Jitter

Most recent: 0.05 / 0.07 ms (avg / max)

Mar 18, 2021 10:37:30 EDT

Mar 18, 2021 12:30:00 - 12:35:00 EDT

"You were able to come to this conclusion in how long? 15 minutes? We've been on this call for 3 hours."

Demo

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