



Cisco Live Amsterdam

A Tale of IPv6 Mostly and Other Stories

Joe Clarke

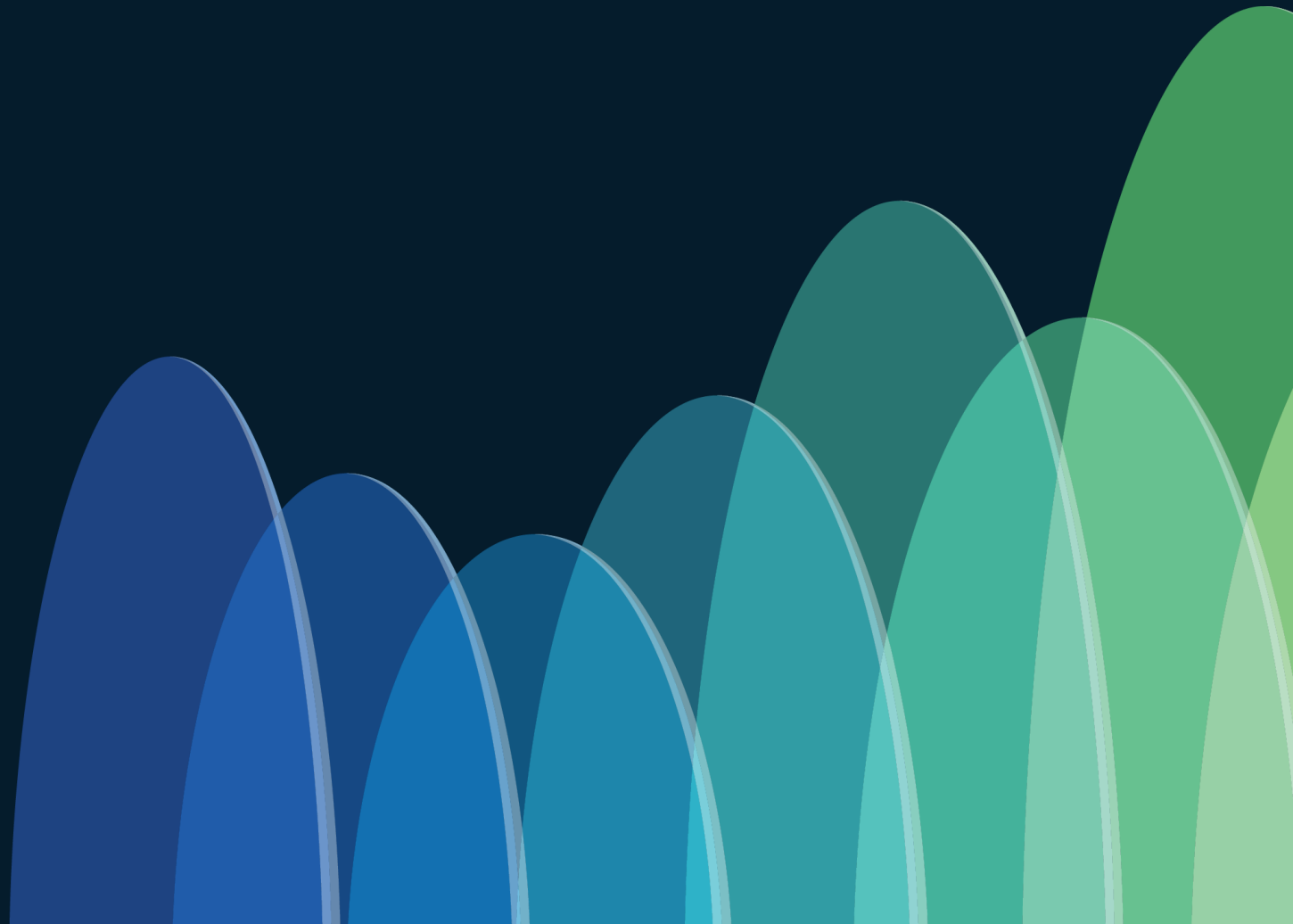
On Behalf of the CiscoLive NOC Team



Agenda

- Introduction
- Lessons Learned (aka: doctor, it hurts when I do this)
- IPv6 Mostly
- Stats

Introduction



Wired Core Team



Lionel Hercot



James Botting



Andrew
Yourtchenko

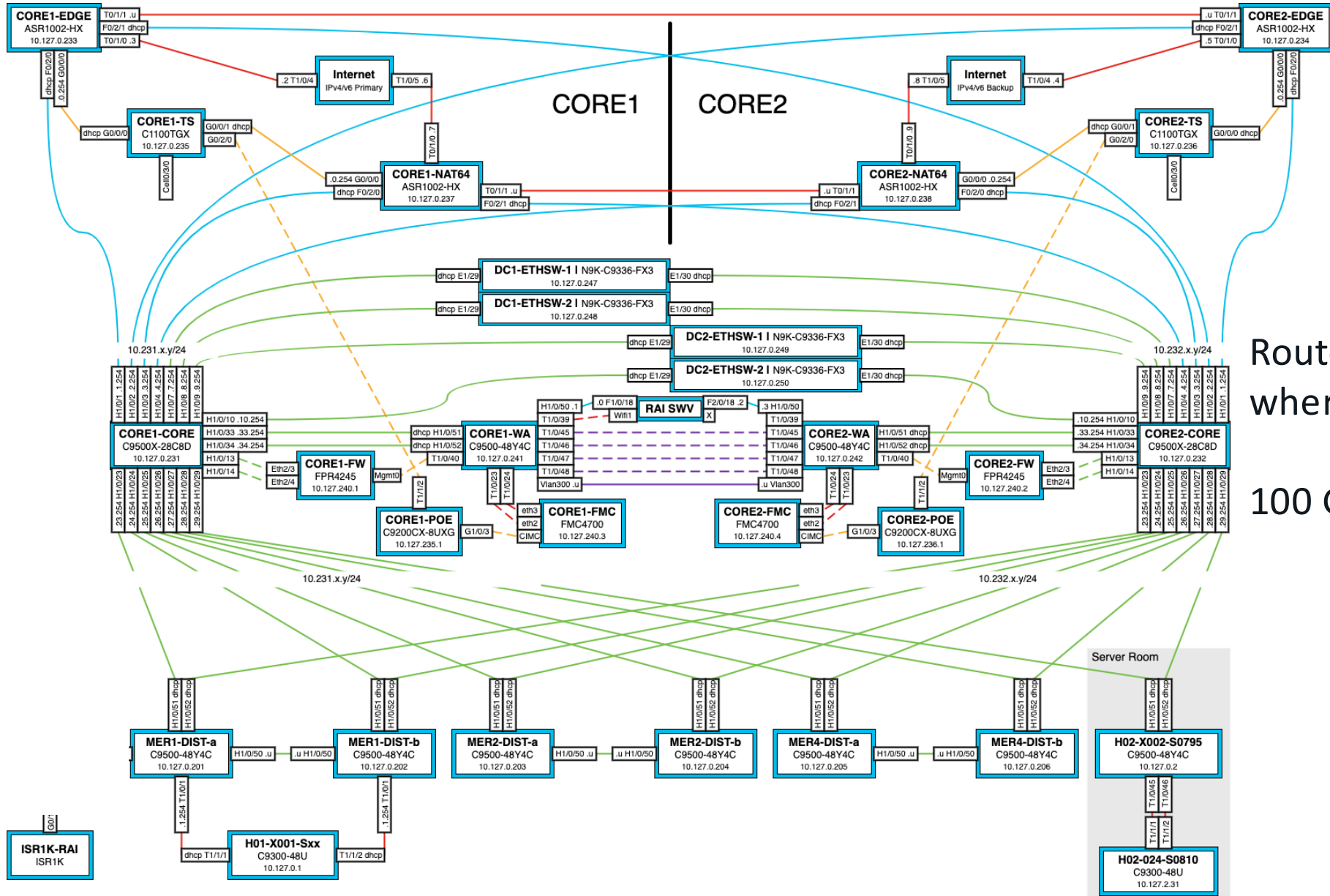


Martin Kriska



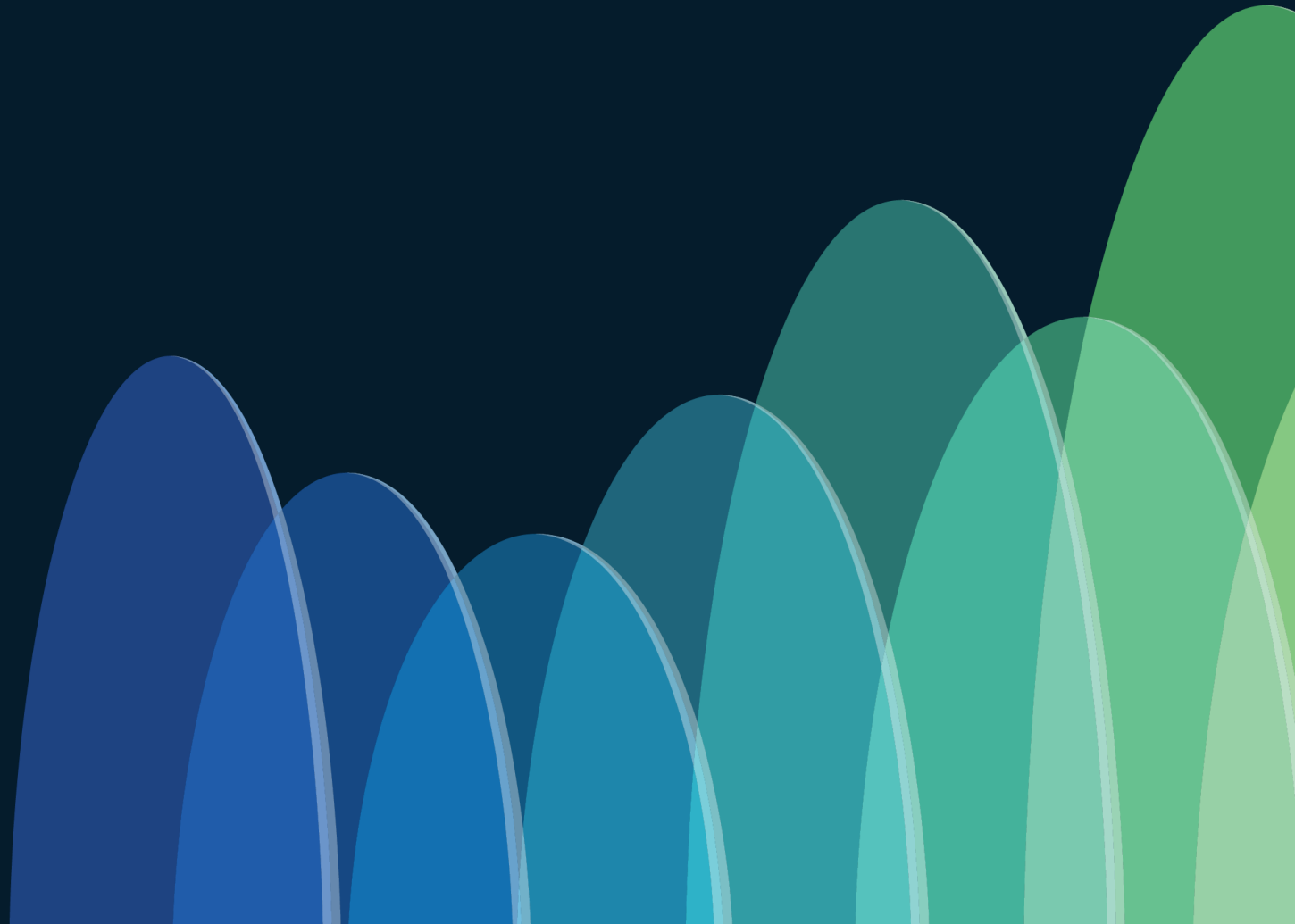
Ivan Ivanov





Route where you can, bridge where you must
100 Gbps backbone

Lessons Learned
(aka: doctor, it
hurts when I do
this)



Routing Table Increase

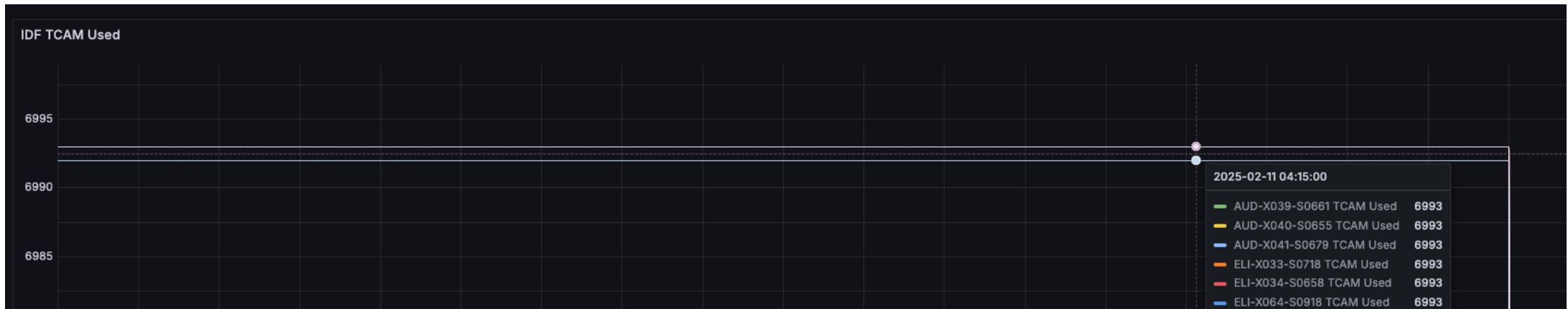
No SVI AutoState + 20% increase in L3 domains + 20% more VLANs =

```
%FMFP-3-OBJ_ACK_FROM_DP_STUCK: Switch 1 F0/0: fman_fp_image: AOM ack download to Data Plane is stuck for more than 1800 seconds for obj[14005] type[71] pending-ack Req-none Issued-create 'PREFIX 10.15.91.0/24 (Table id 0)'  
host = hal-x001-s0784 | source = sc4s | sourcetype = cisco:ios  
  
%FED_L3_ERRMSG-3-RSRC_ERR: Switch 1 F0/0: fed: Failed to allocate hardware resource for fib entry due to hardware resource exhaustion - rc:2054  
host = hal-x001-s0784 | source = sc4s | sourcetype = cisco:ios
```

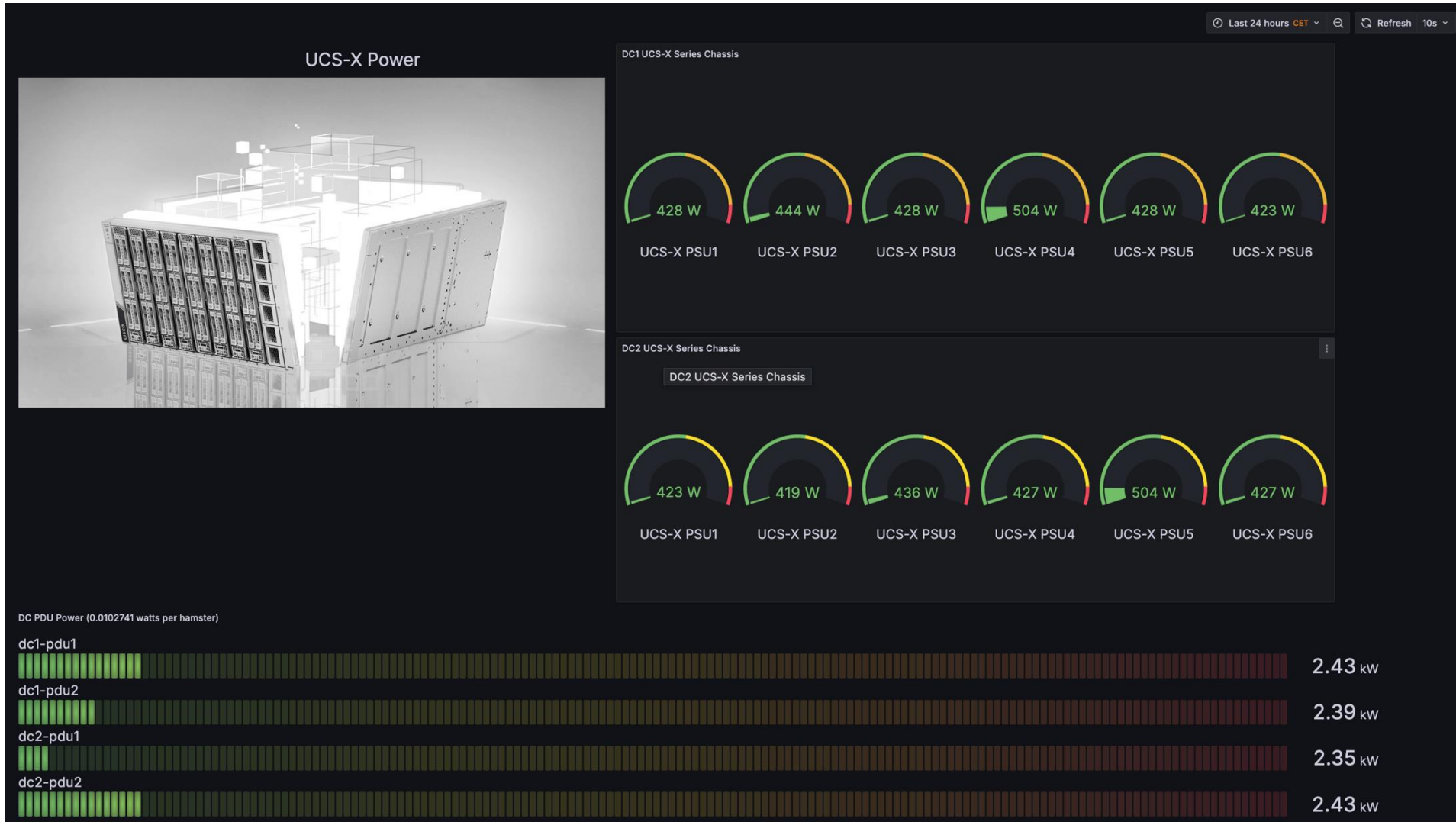
Shutdown reserved SVIs to recover

i	Time	Event
>	2/8/25 10:52:56.000 AM	%FMFP-3-OBJ_ACK_FROM_DP_RESUME: Switch 1 F0/0: fman_fp_image: AOM ack of objects to Data Plane is back to normal host = hal-x001-s0784 source = sc4s sourcetype = cisco:ios

Monitor the usage



Events Are Hungry



NOC AI - Powered By UCS X Direct and Nvidia L40S GPUs

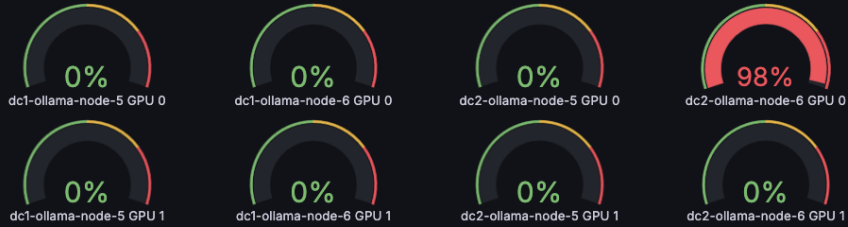
Total GPU Utilization



Total GPU Power Usage

870 W

GPU Utilization



GPU Utilization Over Time



GPU Power Usage



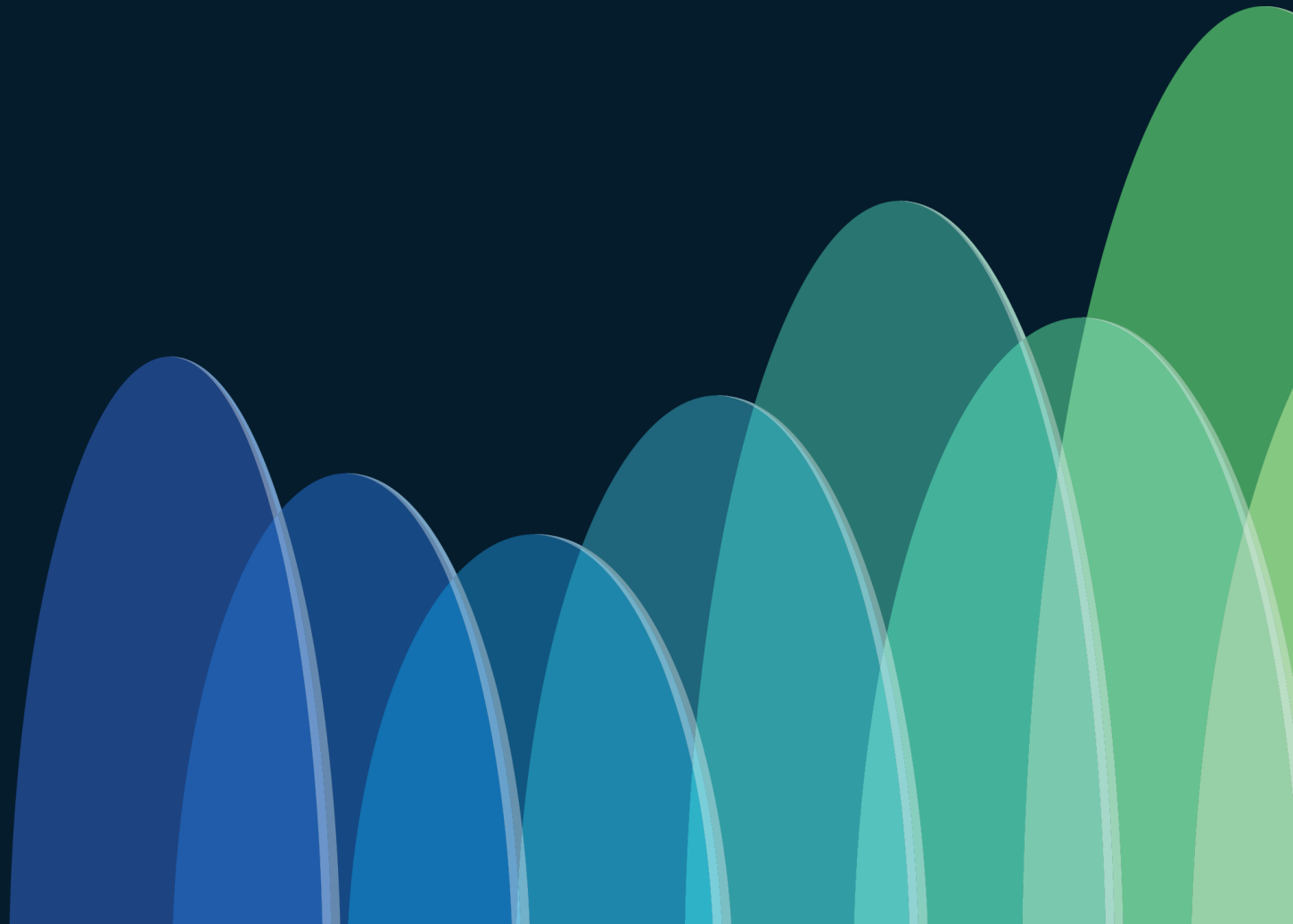
Jara Osterfeld 10:23
Live tell me about [10.100.240.47](#) in a form of a poem please

Live NOC Bot 10:23
Hey, Jara! Let **ChatNOC** work on that for you...

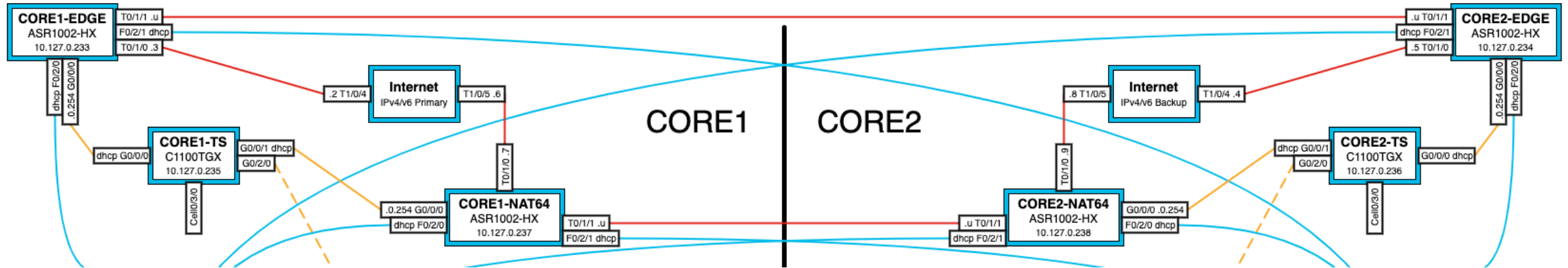
Hello josterfe 🙌,
I've gathered some information about the IP address [10.100.240.47](#) in a poetic form for you:

- The IP address 10.100.240.47 so fine,
- Is leased to a MacBookPro, a device divine.
- Its MAC address is 5e:04:b8:4b:bc:1b,
- Connected to the IDF-240-NOC-MANAGEMENT scope with glee.
-
- It's associated with the SSID CL-OPS,
- On the access point CONLO-IM-PI1416, no need to mope.
- The client details show a user jclarke,
- With an IP address and MAC address that perfectly embark.
-
- The device is running macOS 15.3,
- A wireless connection with a health score of 10, you see.
- It's located in CLEUR 2025/Congress/Congress-L0,
- A place where connections are made, don't you know!
-
- So there you have it, josterfe,
- Information about the IP address, all in a poetic retrieve 📄
- From ****CPNR**** and ****Netbox****,
- And ****ISE**** and ****Cat Center****, all data to perceive.

IPv6 Mostly



Edge Design

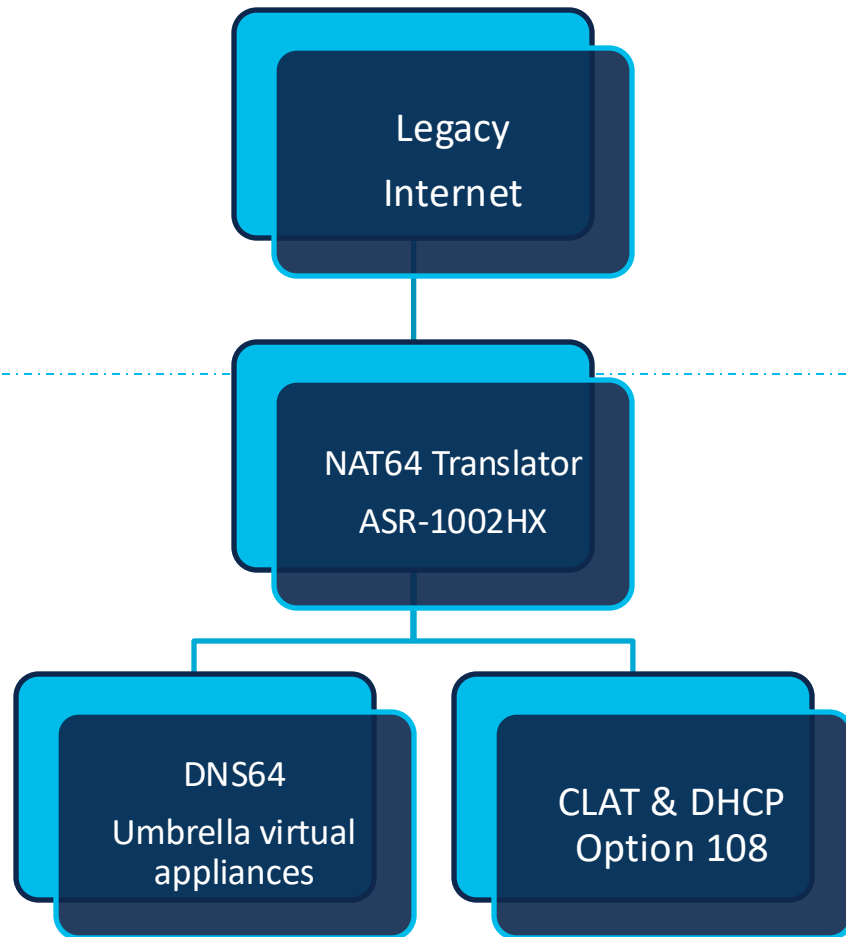


2x ASR 1002-HX for NAT44 and Native IPv6
 2x ASR 1002-HX for NAT64 only
 /26 of V4 public per NAT pool

Each unit BGP peered to Venue
 1x 10Gb/s connectivity to Venue
 2x 40Gb/s to core

NAT64 Design

Aspiring for 100% IPv6 inside the network



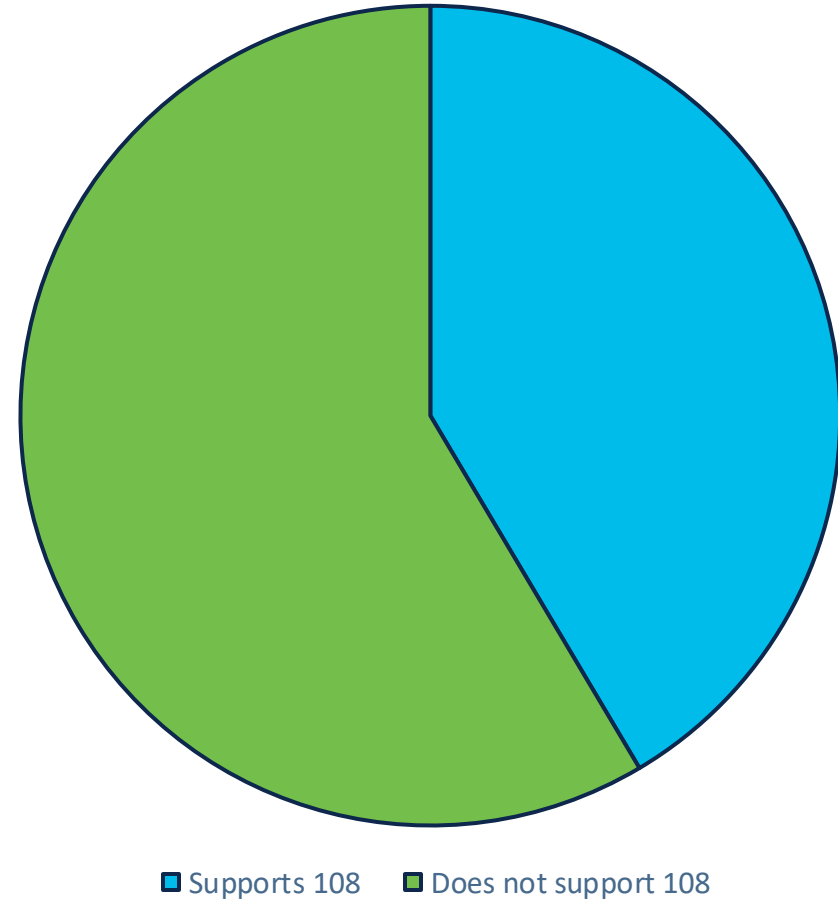
IPv4 Traffic
83.97.13.0/24

IPv6 Traffic
64:FF9B::/96

Option 108 – IPv6 Mostly

I don't often do IPv6 Mostly, but when I do, I do it by default

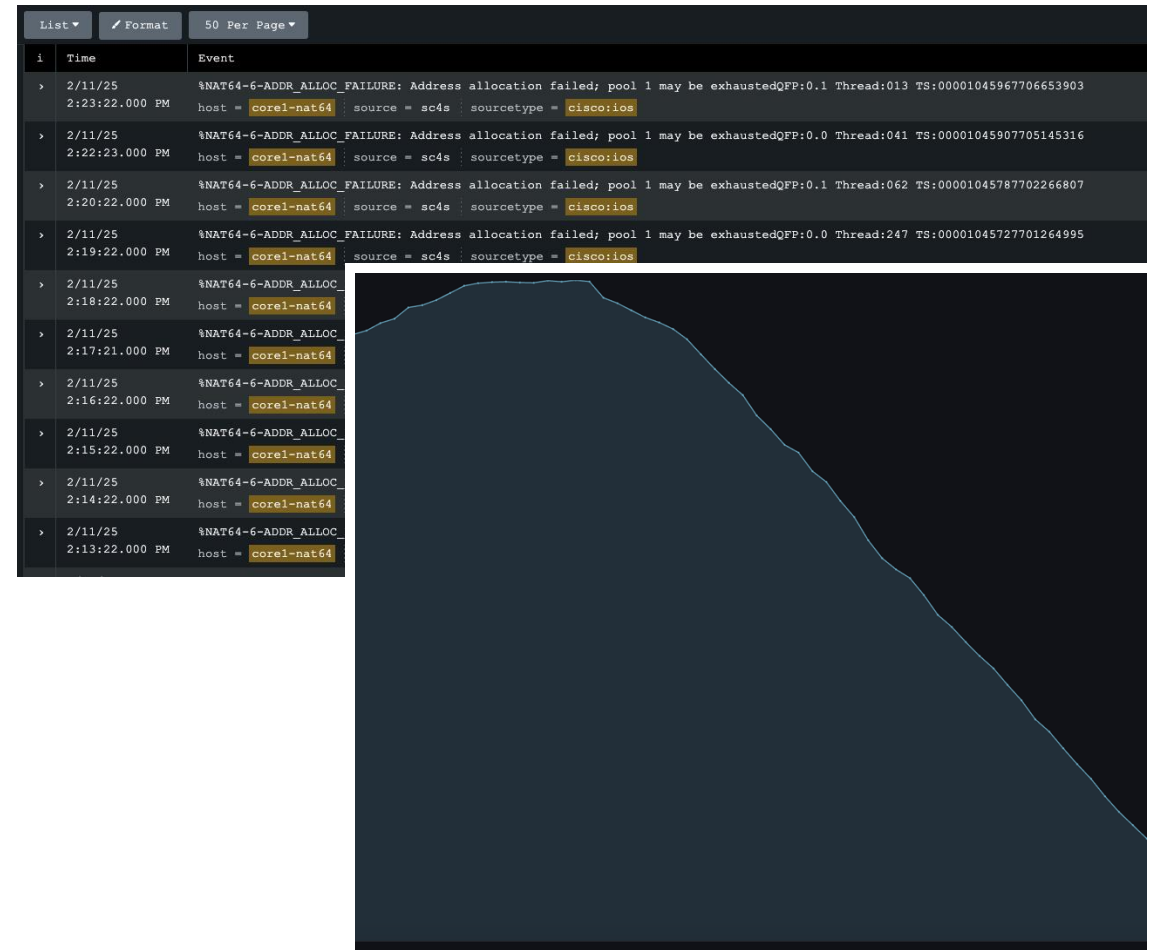
- Clients supporting CLAT support Option 108. These devices get a pure IPv6 only operation in the network.
 - We used 900 (seconds) as the value for 108
- Clients that don't understand 108 don't request it, get dual stack.
- We still catch some traffic with synthetic IPv6 AAAA records via NAT64 for those older clients



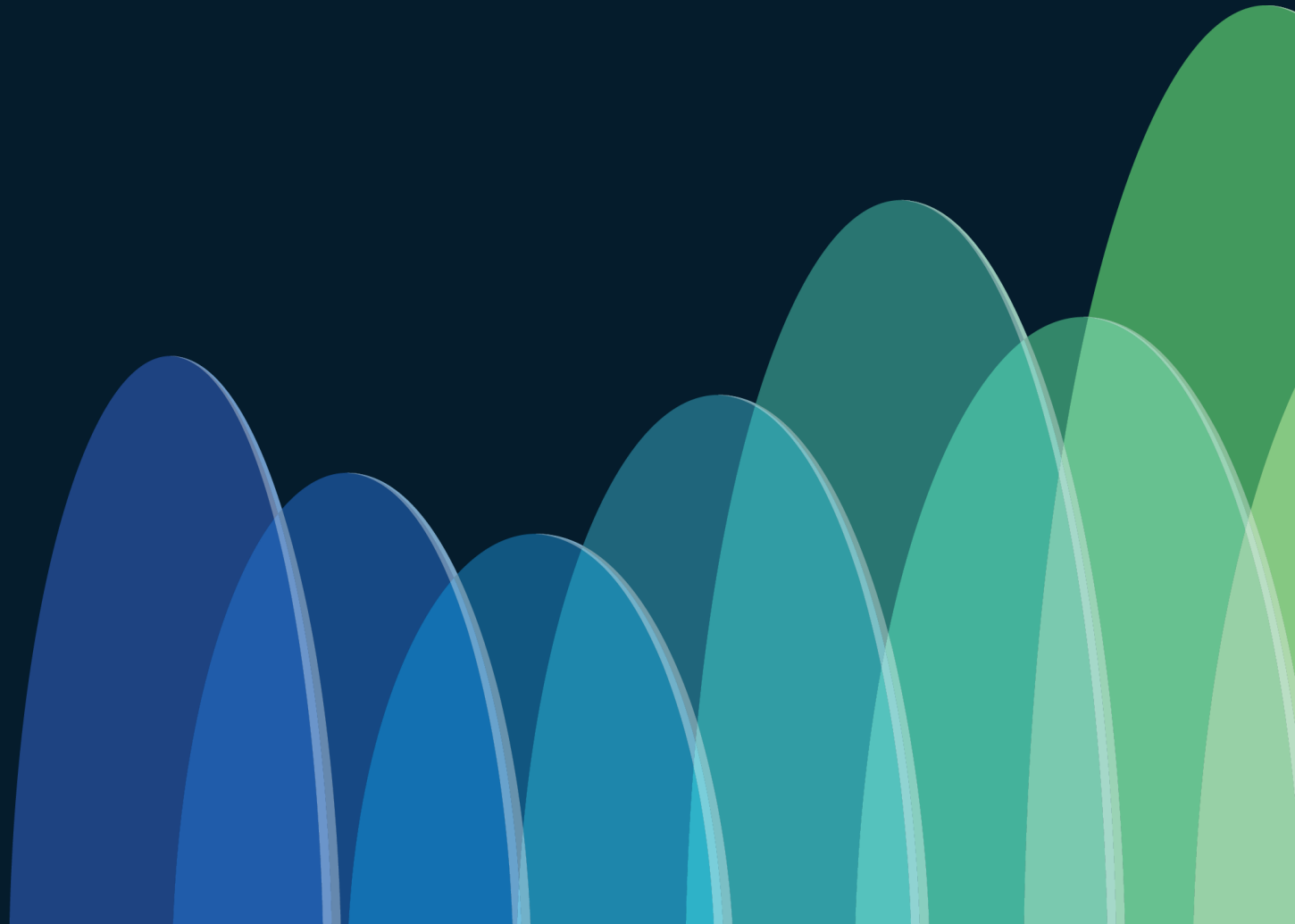
NAT64 More Popular than Expected

Segmenting your IPv4 space between NAT44 and NAT64 is tricky

- Didn't really know how popular NAT64 would be over NAT44 edge.
- Ultimately, not enough addresses in NAT64 pool and too many in NAT44
- Changed translation expiry timers to resolve, added more IP's out of hours.
- Additionally, Cisco Secure Client split tunnel VPNs didn't like CLAT



Stats



Our Monitoring Stack

- LibreNMS
- Splunk
- Prometheus
- Grafana
- Telegraf
- InfluxDB
- Custom Rust and Python
- Syslog-NG
- Net-SNMP
- Big Buck Bunny
- Cisco Catalyst Center
- Stealthwatch
- Samplicator (for NetFlow replication)
- Deadman

NOC Room

Actual DAYLIGHT!



CiscoLive! **8651**

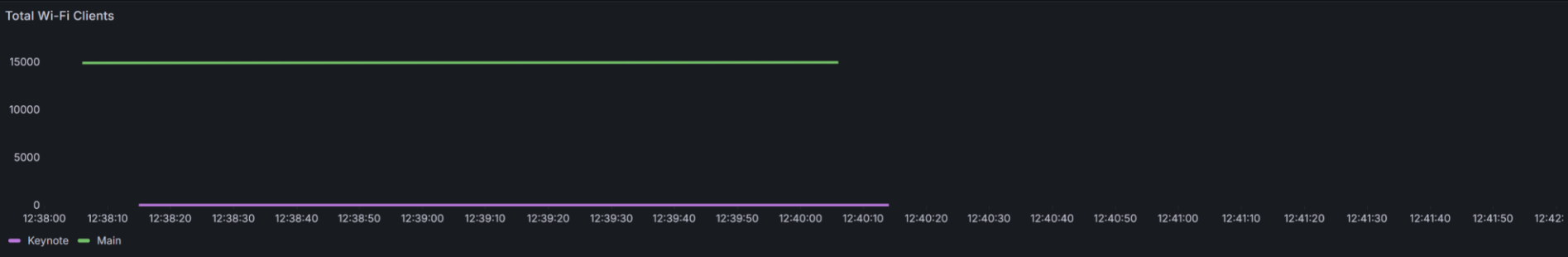
OpenRoaming **4770**

CiscoLive-Legacy **1040**

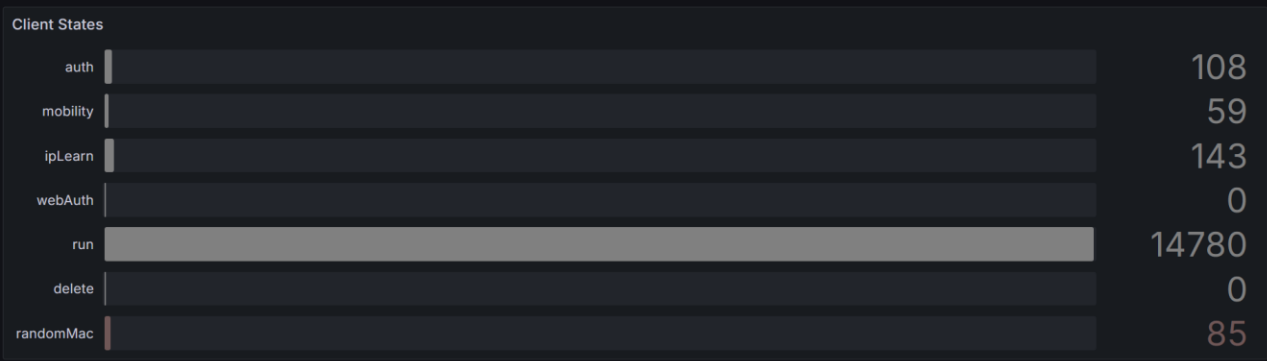
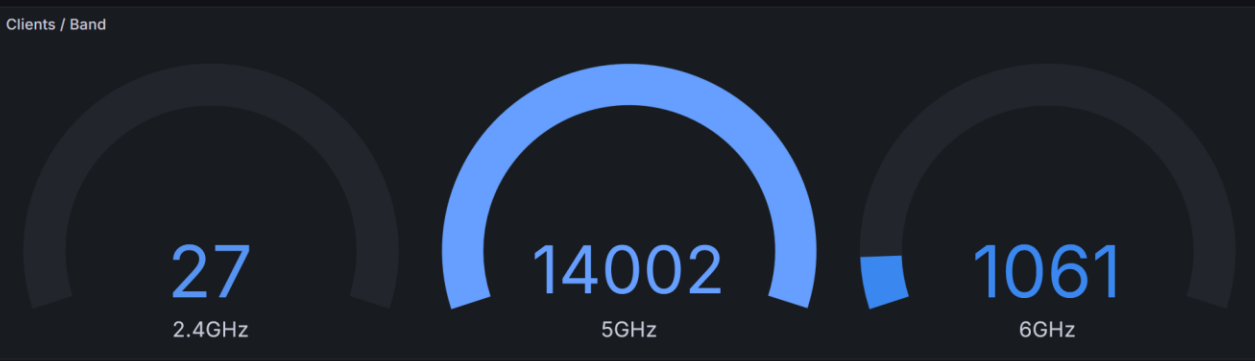
eduroam **535**

CL-OPS **63**

At peak, only 7% joined legacy



Total Wi-Fi Clients **15121**



DNS Volume

Deployment Health



Network Breakdown

See All Security Events

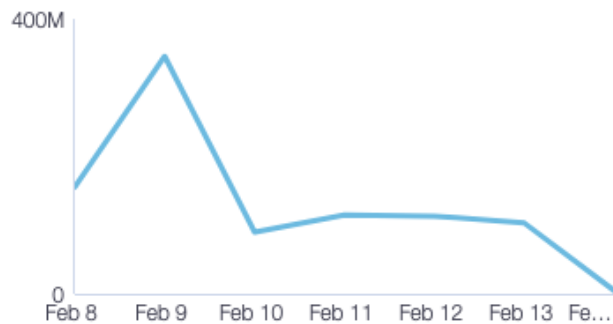
ALL

DNS

WEB

Total Requests

926.2M Total ▲ 1775% vs. last 7 days



Total Blocks

102.6K Total ▲ 11.7K% vs. last 7 days

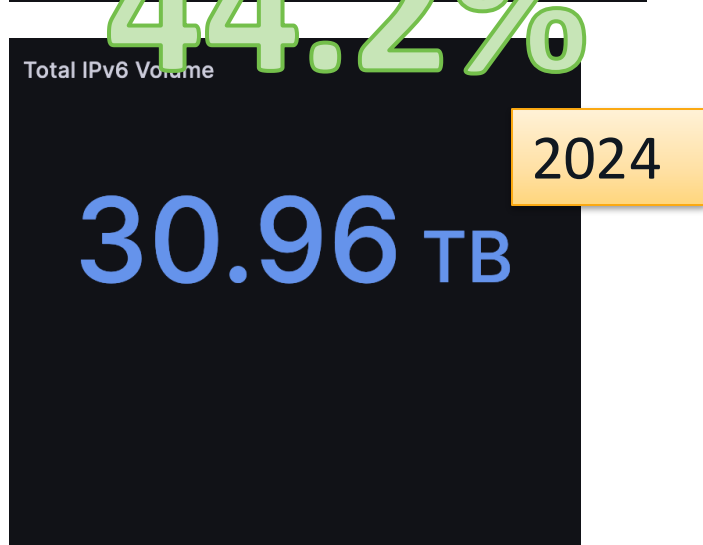
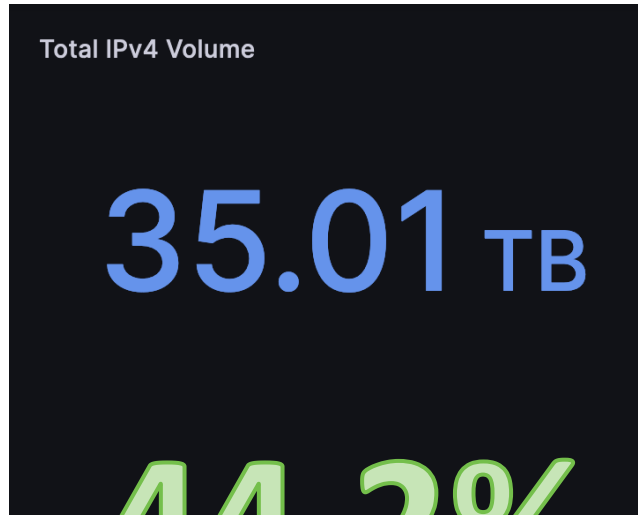


Security Blocks

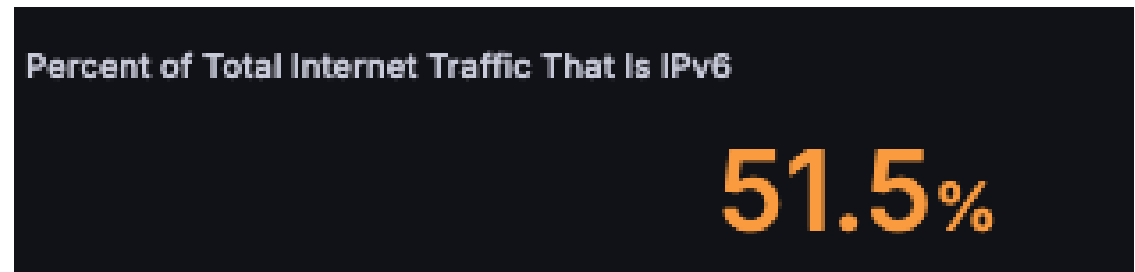
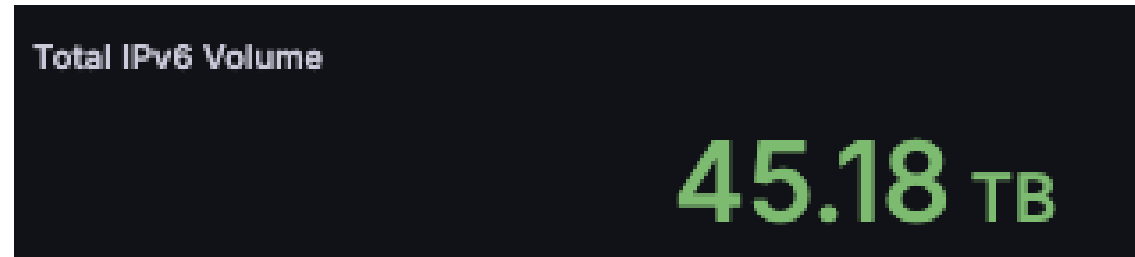
41.5K Total ▲ 36K% vs. last 7 days



The *New Year* of IPv6



44.2%



The *New Year* of IPv6

Total IPv4 Volume

26.20 TB

44.2%

2024

IPv6 traffic volume if all v4-only services supported v6

61.62 TB

Percentage of traffic that would have been v6 if services supported it

70.2%!

Clients That Give Back

Clients that support IPv6 Mostly will request DHCPv4 option 108. If available, those clients will prefer v6 and do CLAT in order to reach v4-only sites. They will also not lease an IPv4 address.

Number of Clients That Support IPv6 Mostly 🟡

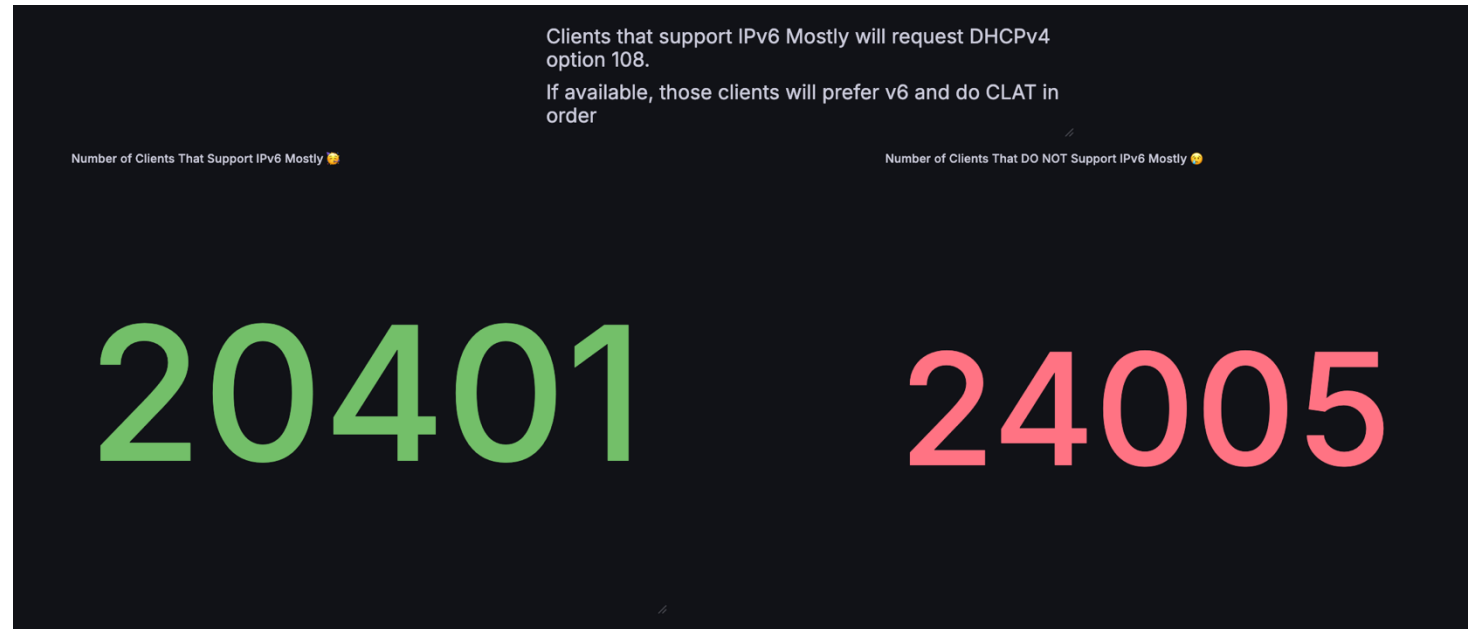
21763

Number of Clients That DO NOT Support IPv6 Mostly 🟡

30468

dhcp_client.count

Main SSID v6 Mostly Support



Total Traffic To The Internet...



20,000 attendees over five days