



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

RIPE 87 Technical Report

Menno Schepers | RIPE 87 Rome | 1 December 2023

Meet the team



- Andrea di Menna
- Menno Schepers
- Marco van Tol
- Saloumeh Ghasemi
- Sjoerd Oostdijck
- Ihor Marhitych
- Ondřej Caletka
- Xavier Le Bris
- Rob de Meester



Preparations

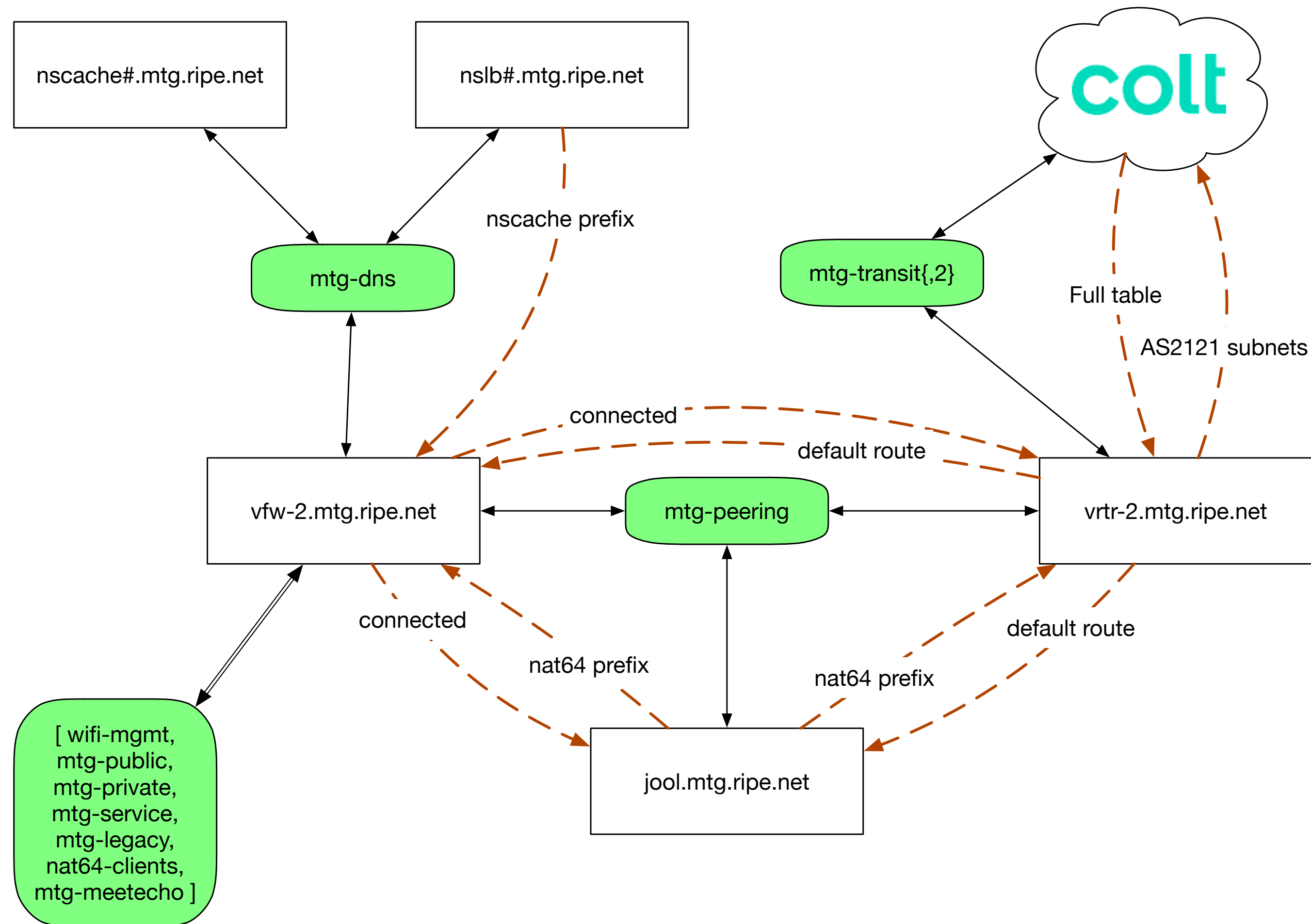


- 3 days to set up
- We bring:
 - 2 SuperMicro Servers (E300-9D-8CN8TP)
 - Wi-Fi Access Points
 - 300 ethernet cables (ranging from 1 to 30 meters)
 - Several 300 meter boxes of ethernet cable
 - 20 Raspberry Pi's
 - 3 presentation kits
 - power blocks (schuko 6-way power extension)
 - Lots of gaffer tape

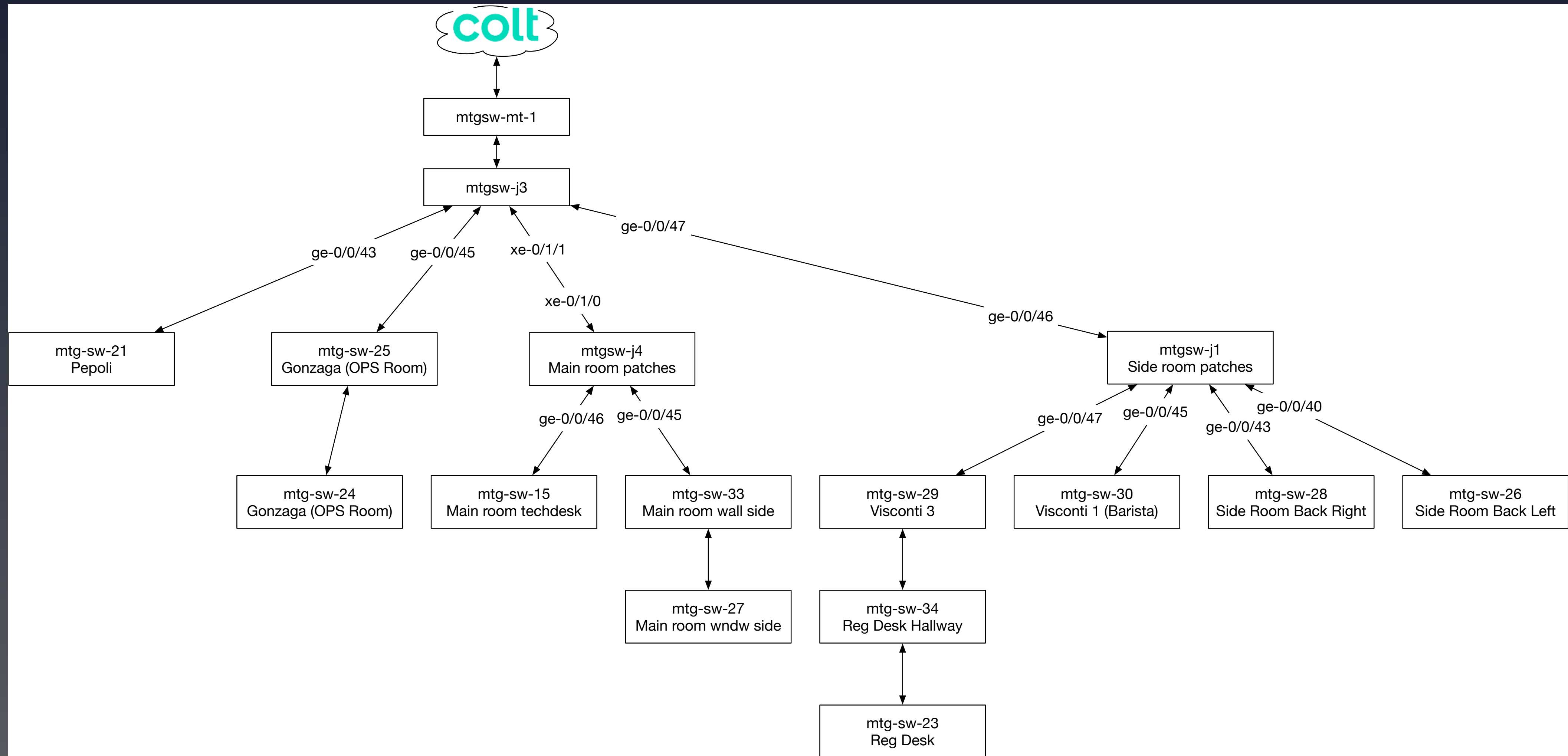


The network

Logical network topology



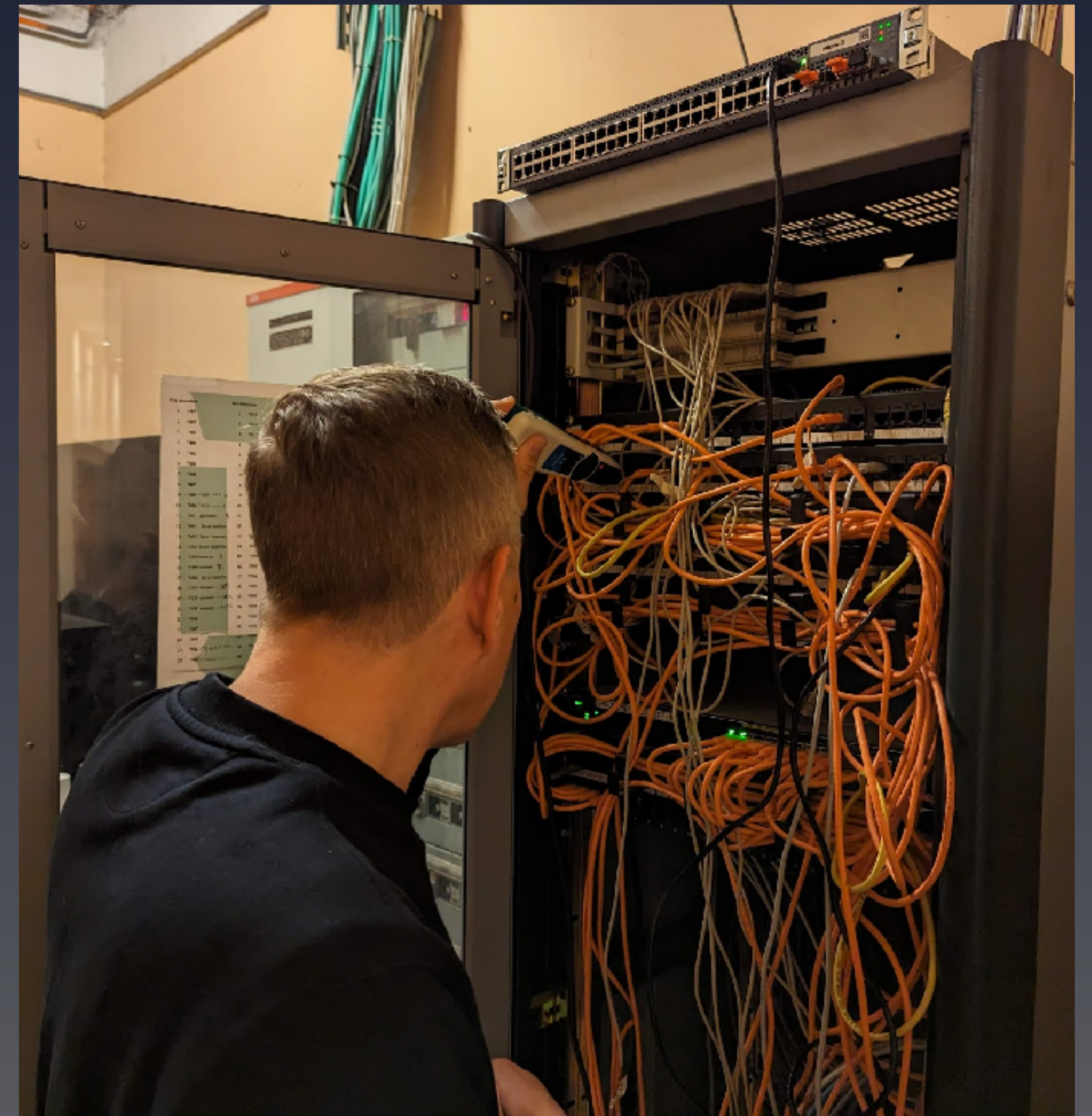
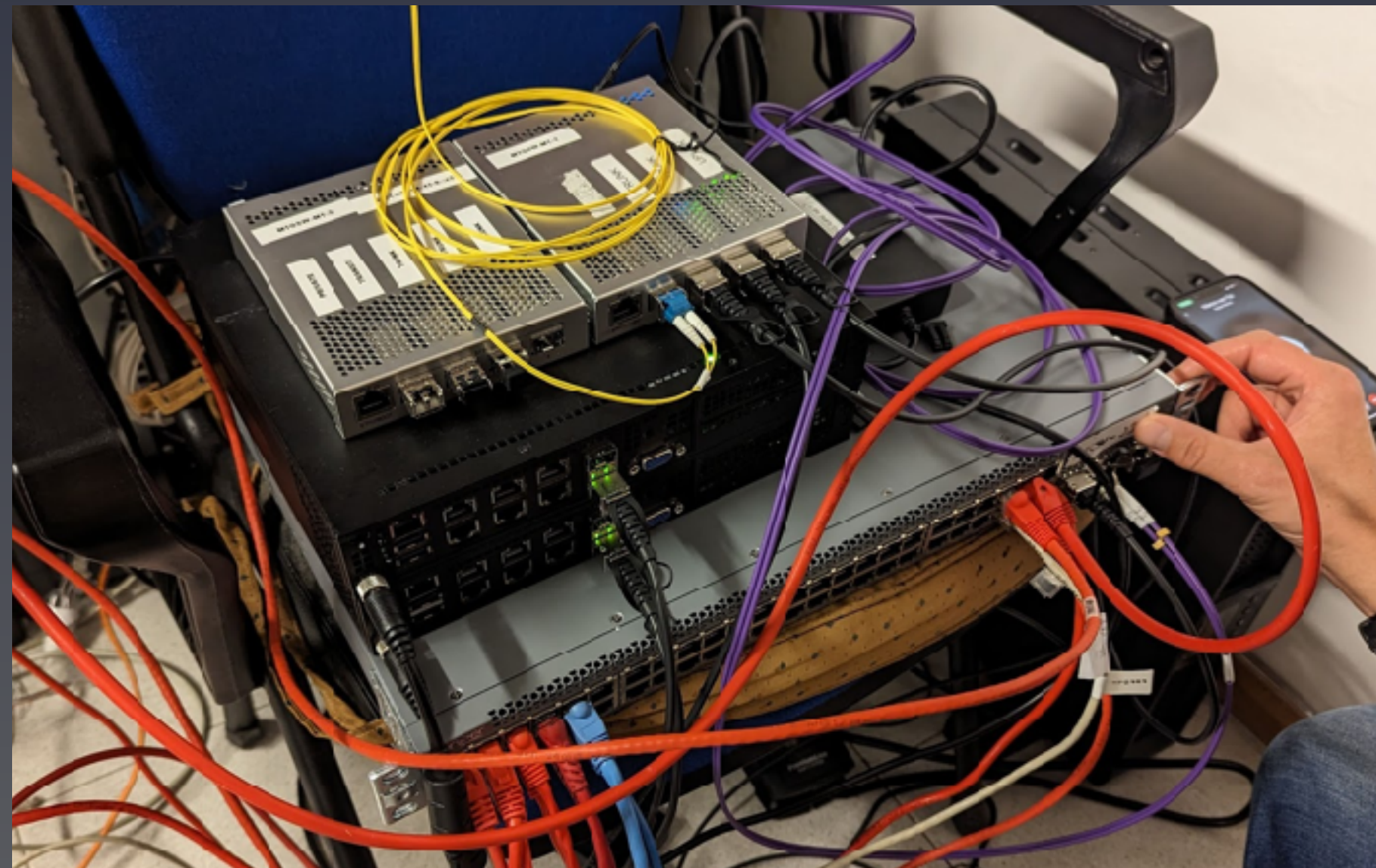
Physical network topology



Physical infrastructure challenges



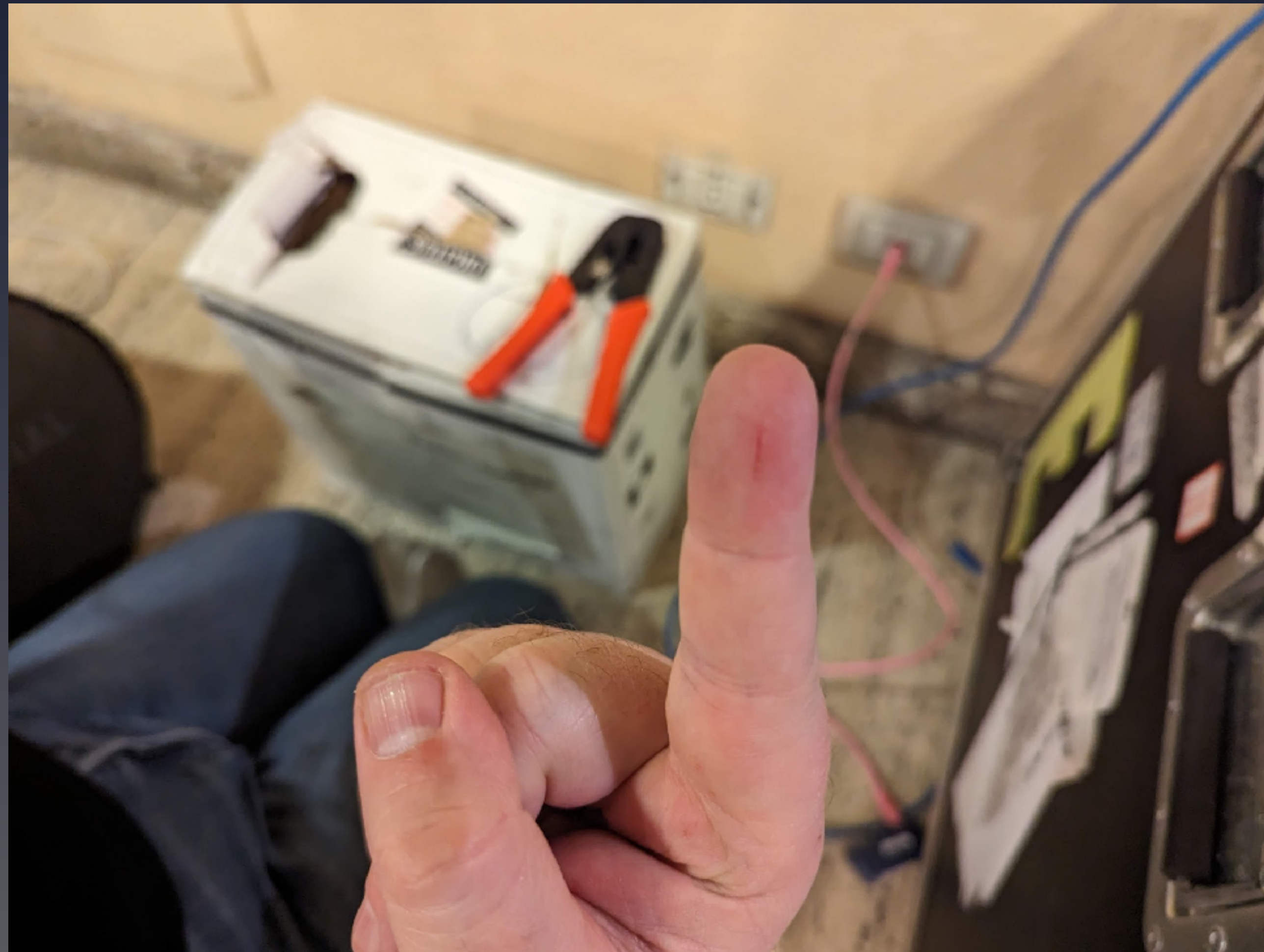
- Many broken ethernet cables/sockets
- Missing documentation
- **Tripping circuit breakers**



Patch rooms



Making our own cables



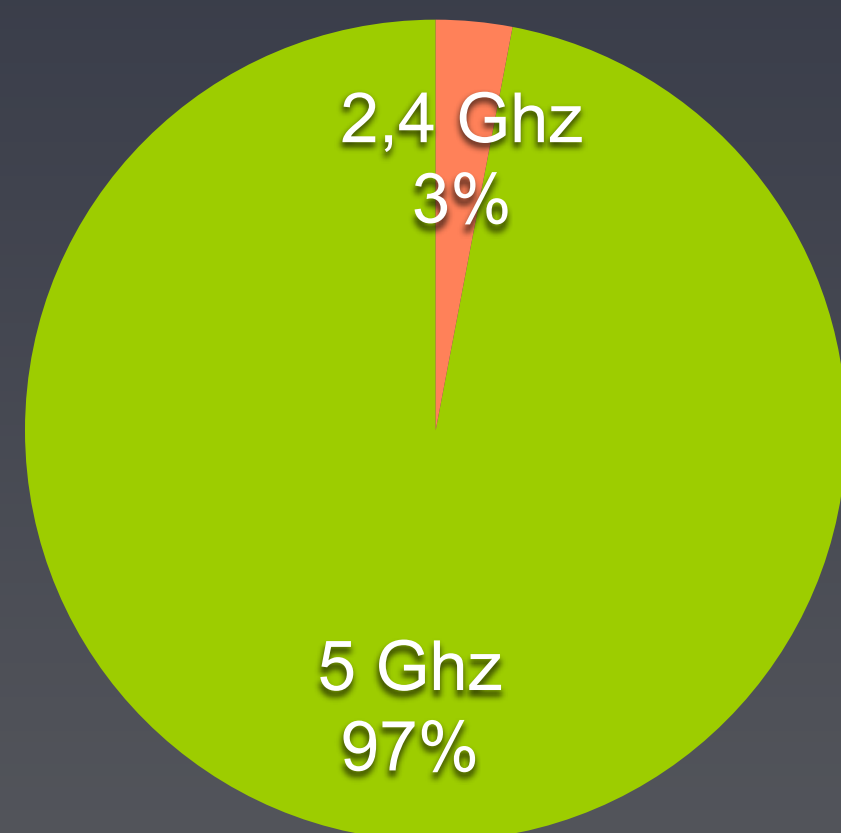
Electrical challenges



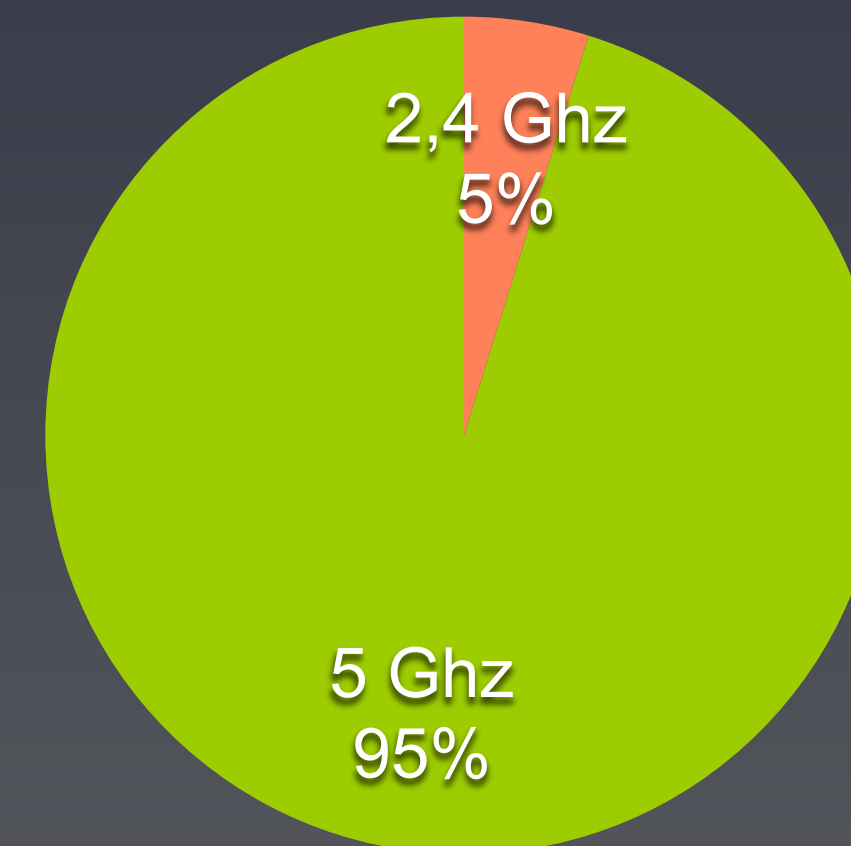
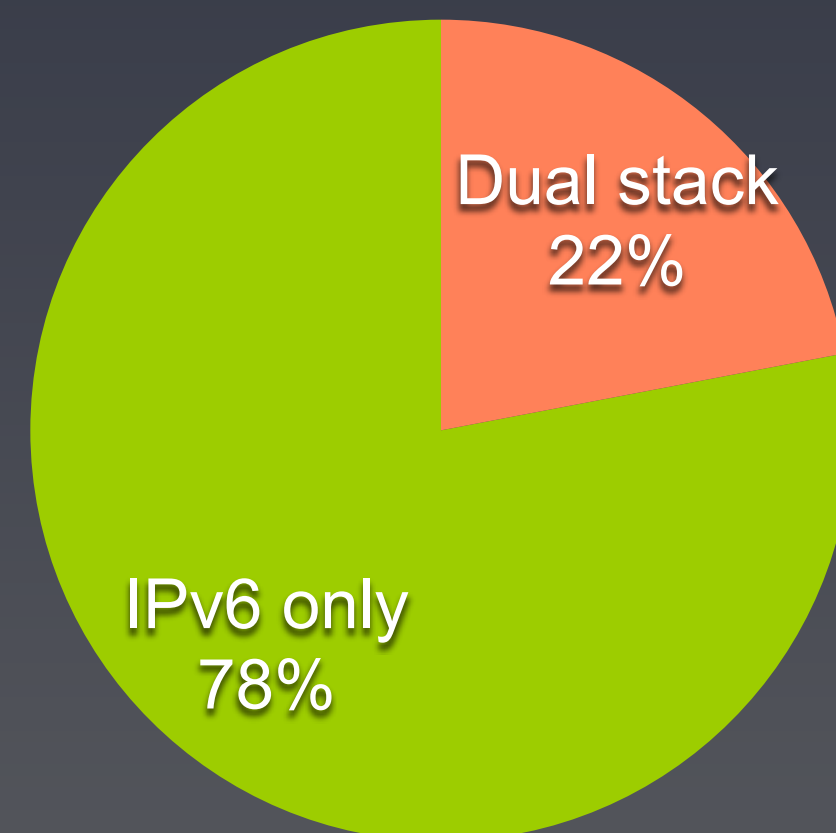
Wi-Fi network



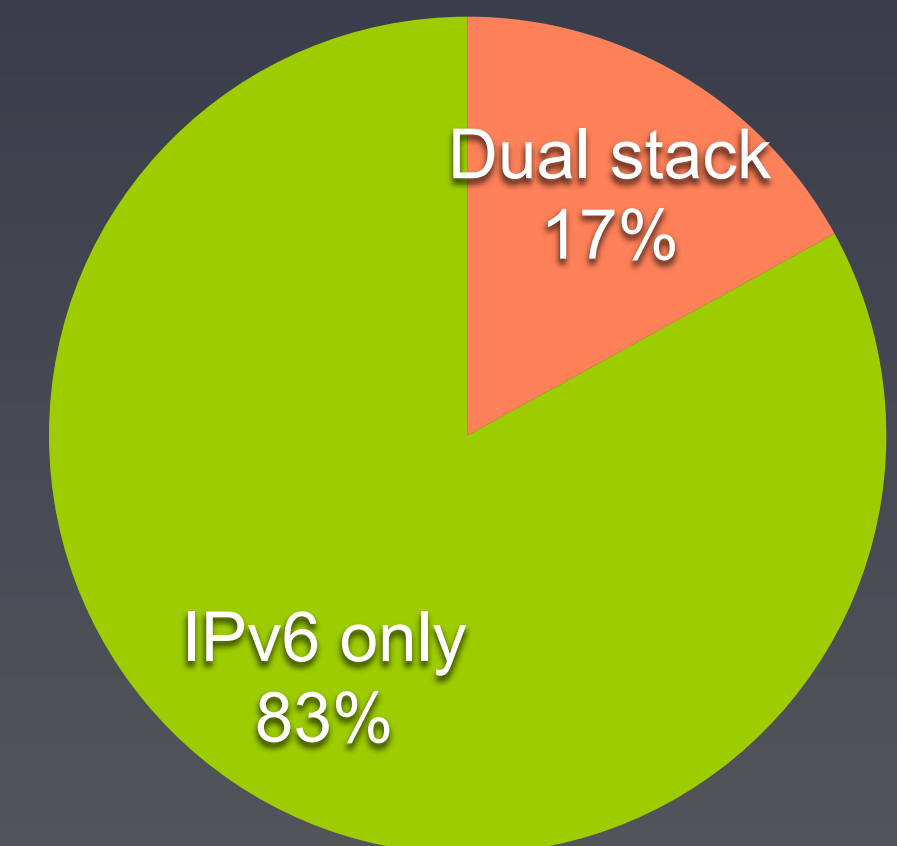
- Main network: 5 GHz-only, IPv6-mostly
 - Apple **fixed the issue** with custom IPv4 DNS servers on macOS 14 Sonoma
- Legacy network: 5 GHz and 2.4 GHz, dual-stack
- IPv6-only experiment: 5 GHz-only, no IPv4



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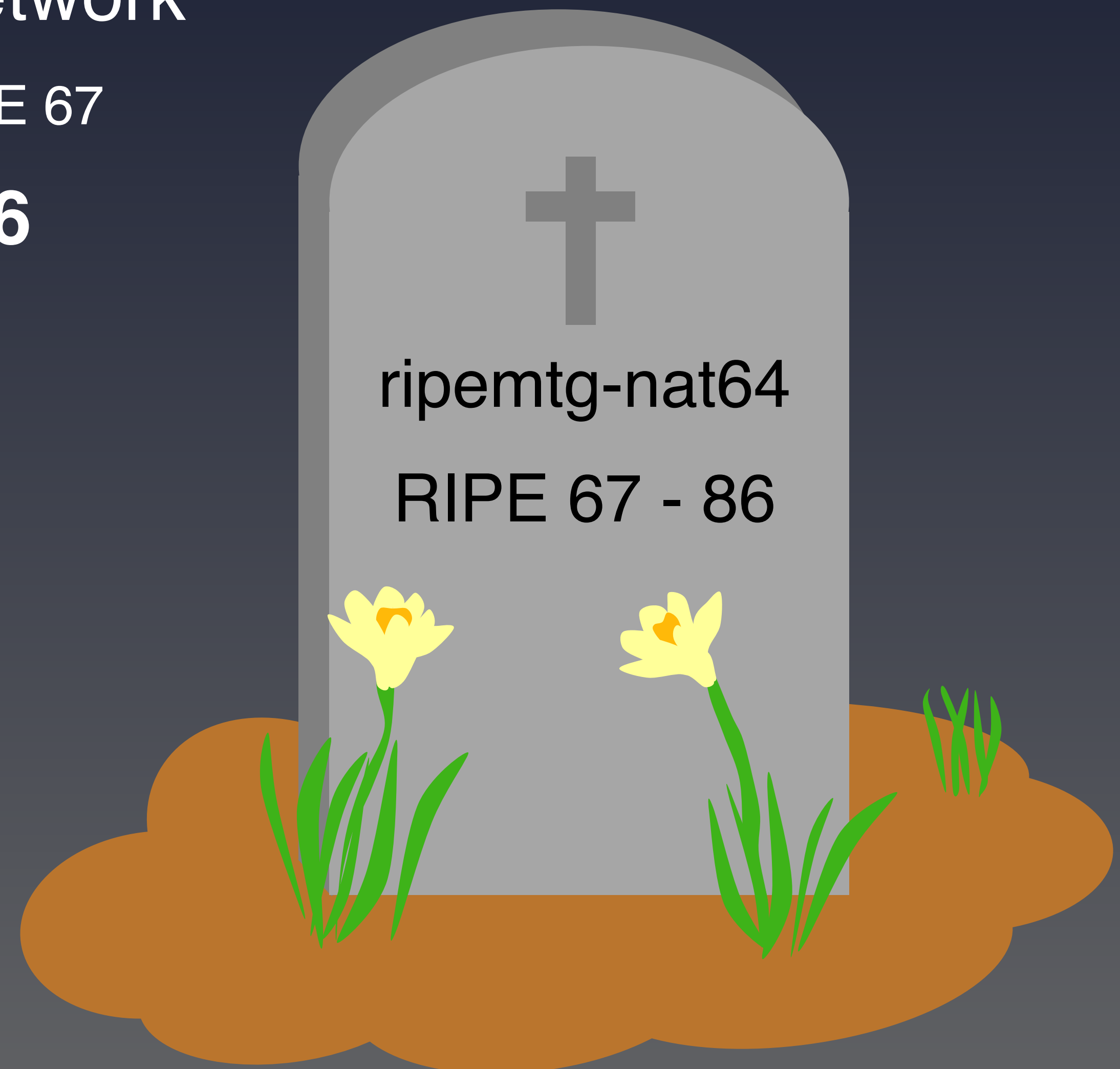
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Pure IPv6-only meeting network



- A replacement to former NAT64 network
 - It served us nicely for **ten years**, starting RIPE 67
- **No IPv4, no NAT64, just pure IPv6**
- **Surprisingly quite usable**
 - But still not GitHub or Twitter



There's still the legacy network



- The only 2.4 GHz and WPA2 Wi-Fi
- For some reason also used by devices that are supposed to work just fine on the main network



DDR



Deutsche Demokratische Republik

Dance Dance Revolution

Double Data Rate

Discovery of Designated Resolvers (RFC 9462)



Discovery of Designated Resolvers



- A mechanism for DNS clients to use DNS records to discover a resolver's **encrypted DNS configuration**
- Supported by Windows, macOS and iOS
- Resolver queries special name `_dns.resolver.arpa` IN SVCB
- Gets list of encrypted DNS options
- Validates that **TLS certificate contains the IP address of the resolver advertised by RA or DHCP**

Getting TLS certificate for IP address



- **Not supported (yet) by Let's Encrypt**
 - RFC 8738 extends ACME protocol to support IP address validation
 - CA/B Forum Baseline Requirements **allow such validation**
- **Let's resort to *traditional* CAs for now**

Digicert: \$ 1057 per year



- Probably would work
- The price is just insane

Order summary	
Basic OV 1-year plan	
Price details	
Base price	\$289.00 USD
Primary URL x 1 year	
Additional standard URLs	\$768.00 USD
4 standard URLs x 1 year	
Subtotal	\$1,057.00 USD
Tax	\$0.00 USD
Total	\$1,057.00 USD

Sectigo: \$ 149 per year



- Error -1 when trying to add IPv6 SAN
- Tech support:
”I understand that you want to add this to the SAN but unfortunately, if you add this the **order will not be processed further**. I would hence request you to kindly proceed further with the order **without adding IPV6** to the SAN.“

Additional Domains :	0	Quantity :	1
Total Domains:	5		
Warranty:	\$250,000		
Re-issue:	Unlimited		
Your Savings:	\$300.00		
Total:	\$149.00		

SSL.com: \$ 177 per year



- IPv6 is supported
- IPv4 is causing troubles

Enter or paste your domains
(Separated by space, new line or comma)

193.0.31.237

Legend: Valid Wildcard Invalid

Invalid domains/IPv6 addresses need to be edited and corrected.

nscache.mtg.ripe.net x 2001:67c:64:53::53:1 x 2001:67c:64:53::53:2 x

Total: \$177.00

SSL.com: success at last

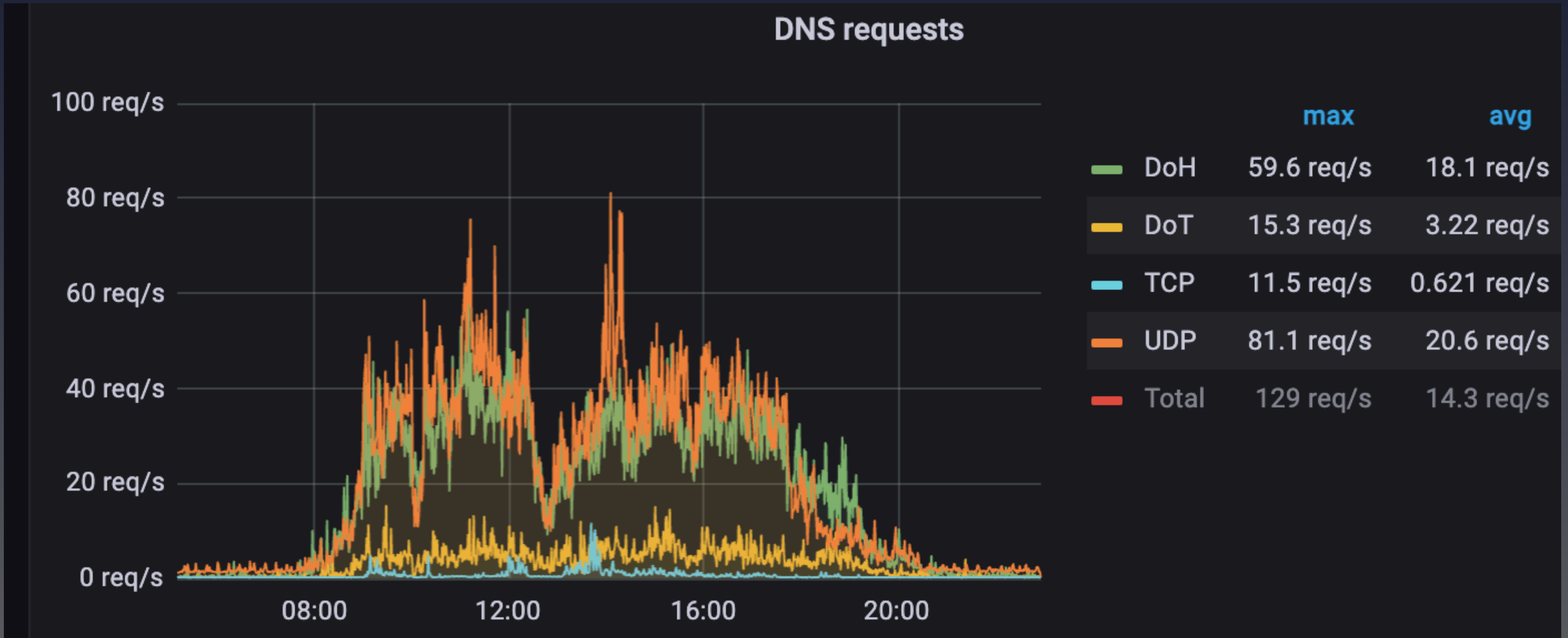


- We reduced number of IPv4 and IPv6 addresses to one each for cost reasons
- They are both high available anyway

```
X509v3 Subject Alternative Name:  
DNS:nscache.mtg.ripe.net  
IP Address:193.0.31.237  
IP Address:2001:67C:64:53:0:0:53:1
```

<https://crt.sh/?id=10495720523>

Increased DoH usage



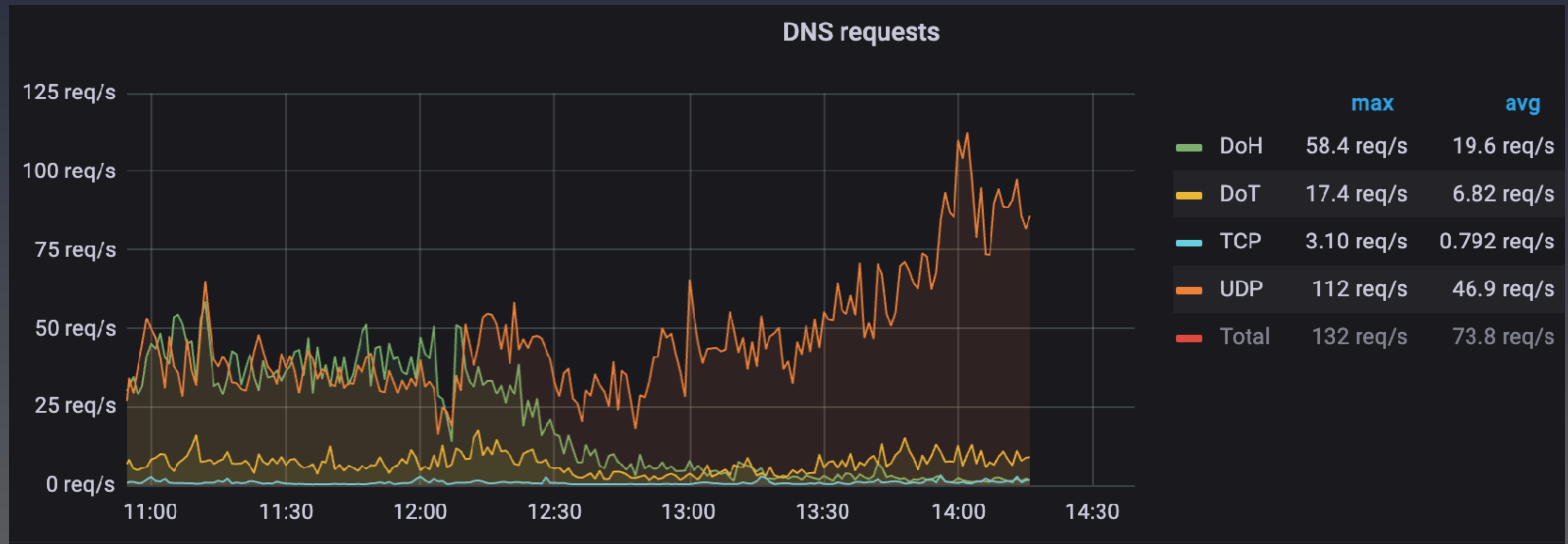
Is this related?



Very likely yes



- The problem disappeared after turning off DDR signalling
- But we have no clue what's wrong



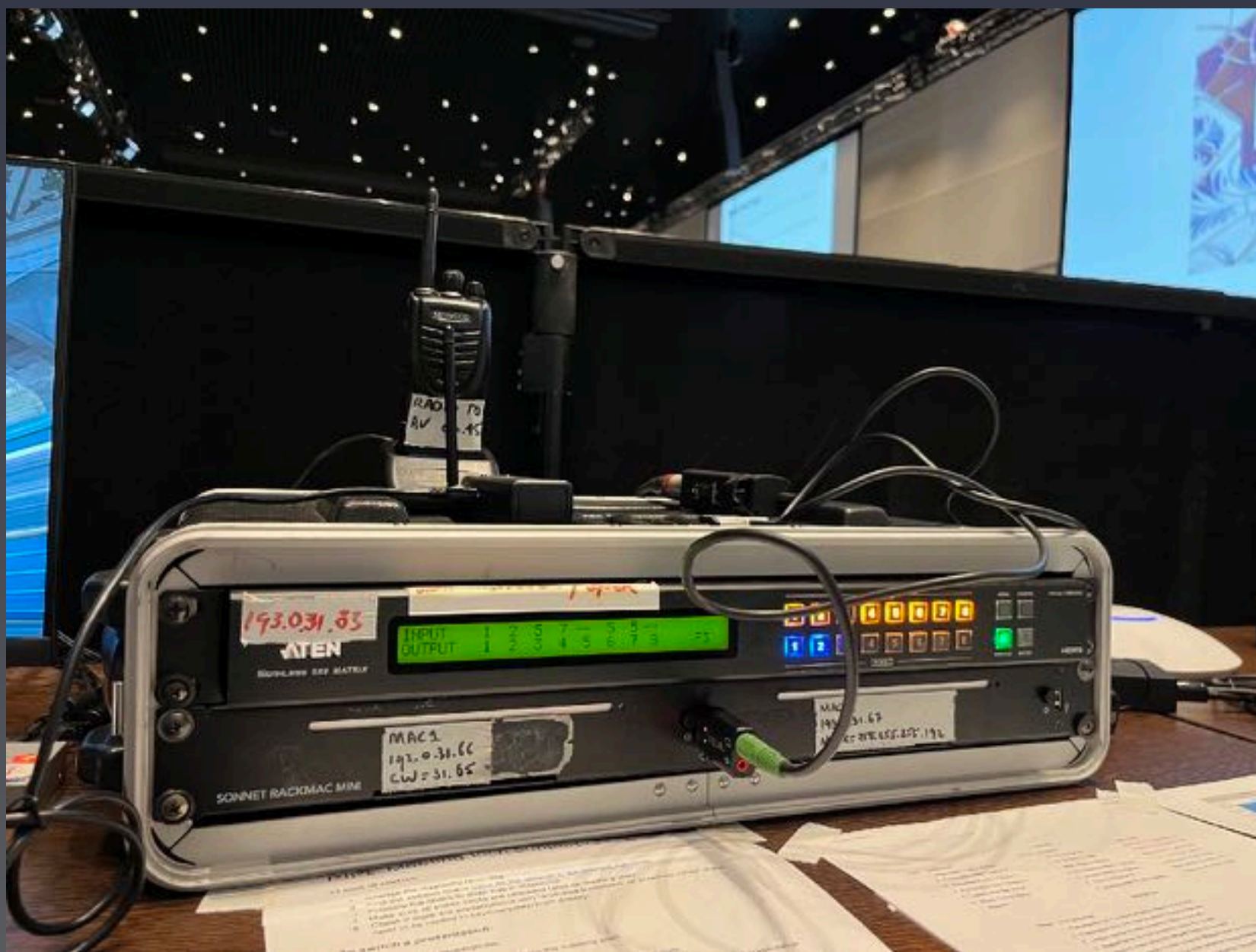


Presentation system

Presentation system



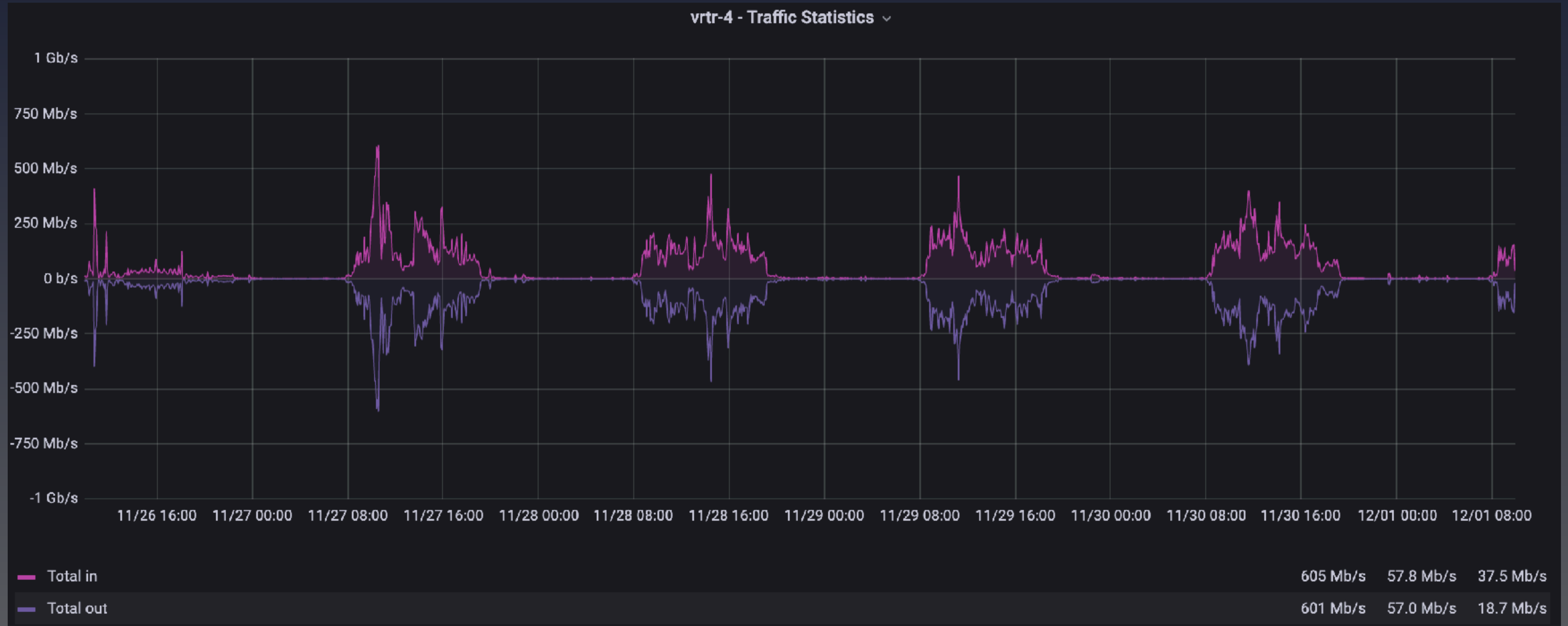
- Two MacMini's, ATEN HDMI Matrix switcher
- DSAN clicker, Limitimer console and clock
- HDMI grabber for Meetecho



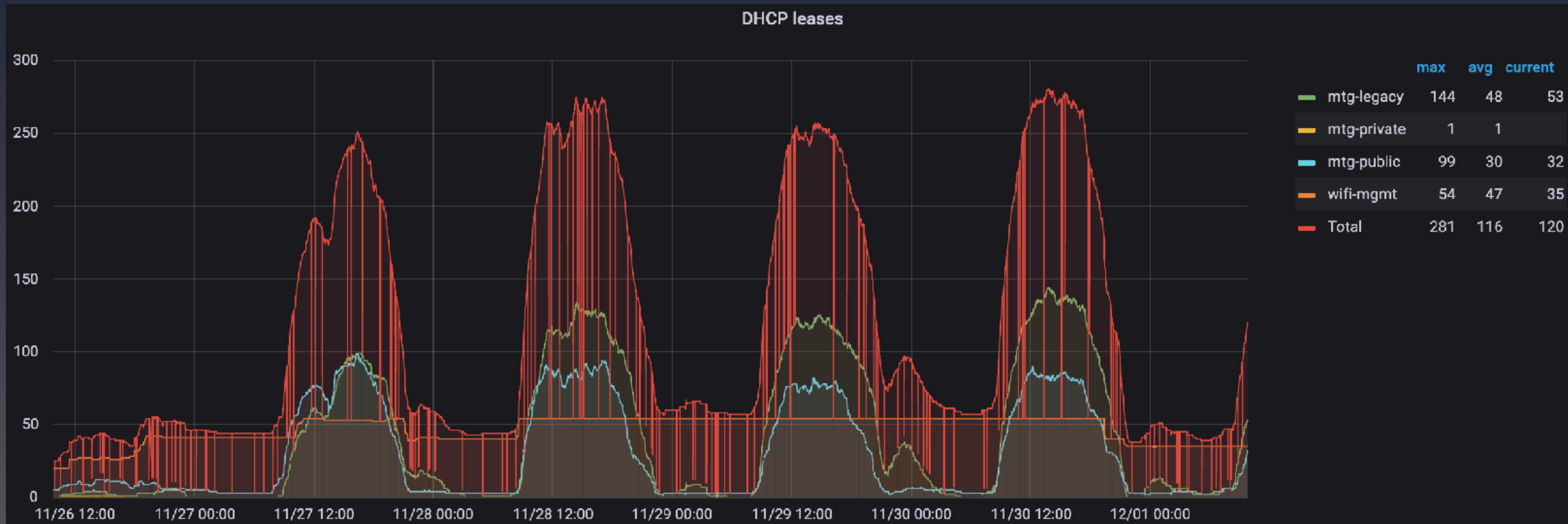


Statistics

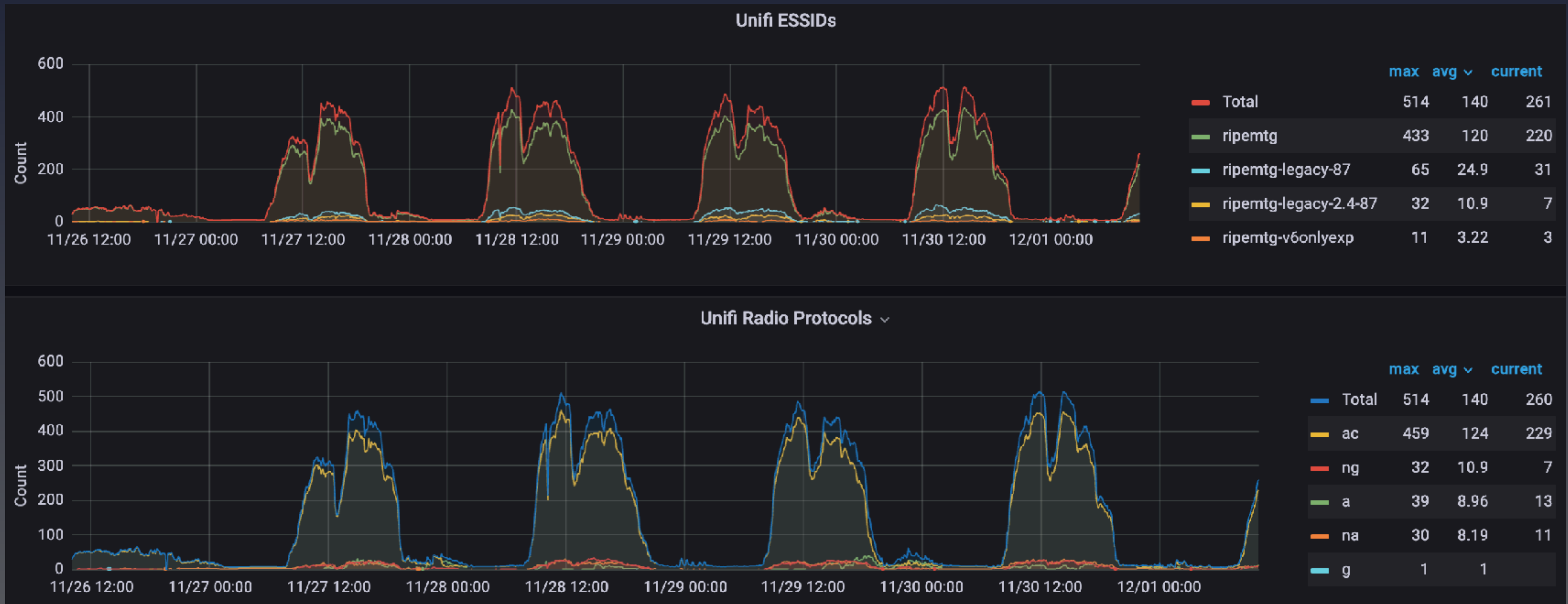
Network graph



DHCP leases



Wi-Fi clients

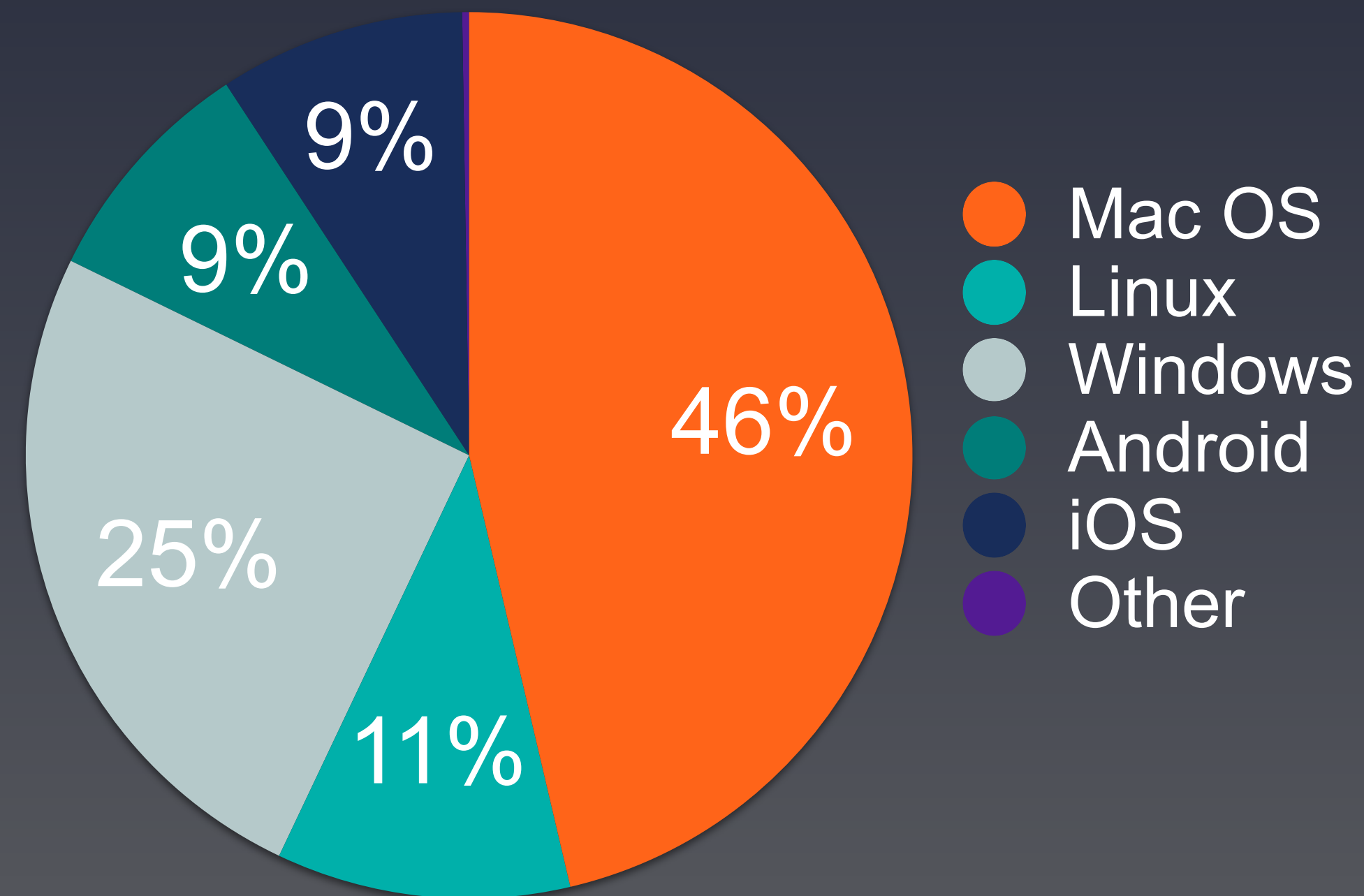


Meetecho statistics

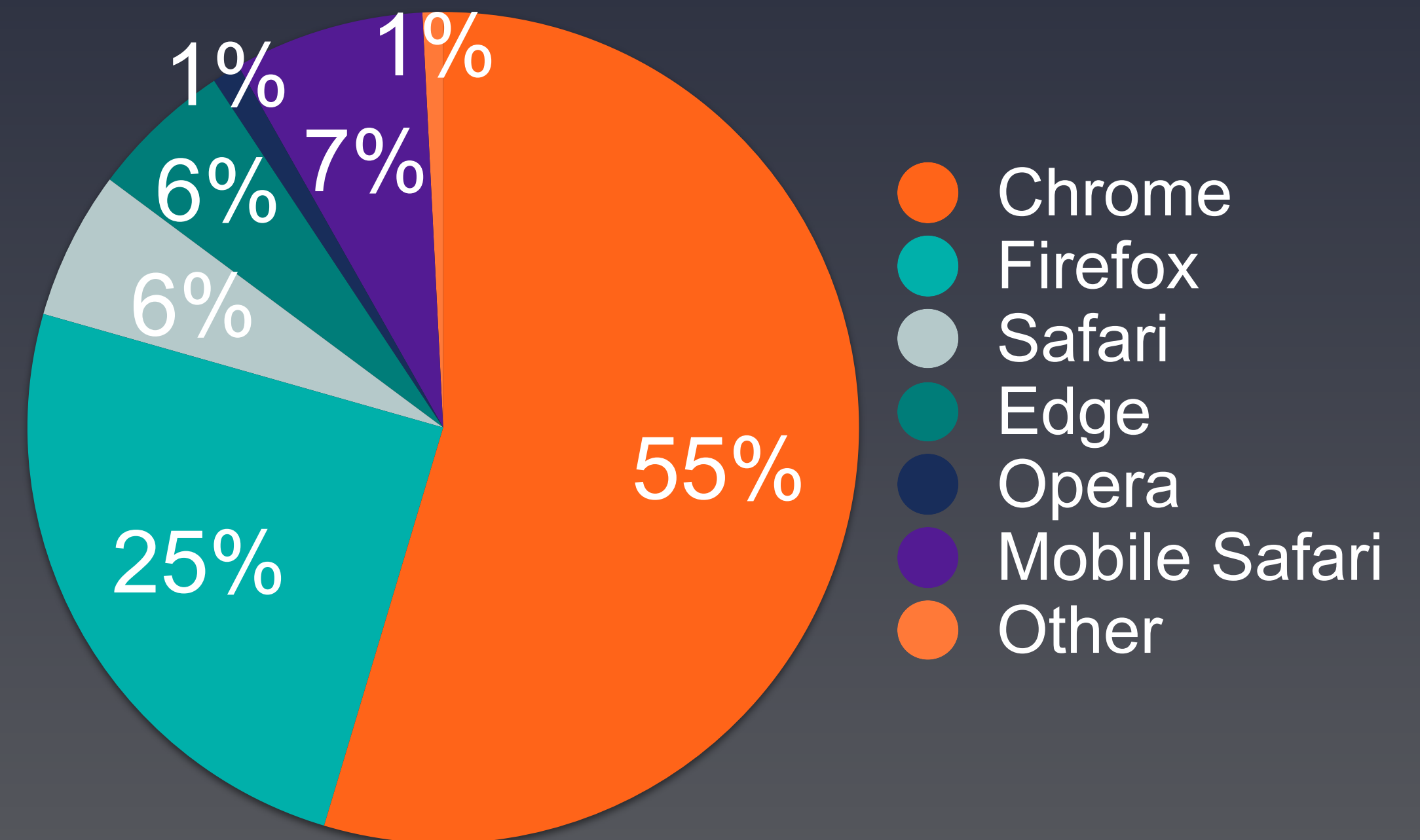


- Percentage joined over IPv6: 63,25%

OS Usage



Browser Usage





Web Team

- Ihor Marhitych
- Marita Phelan
- Frantisek Holop
- Philip Oldham
- Jura Zakarija

Steno Team

- Aoife Downes
- Mary McKeon
- Tina Kaely
- Anna Murphy

Coordinators

- Sandra Gijzen
- Wan-Min Huang
- Kajal Ince

Meetecho Team

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- Alessandro Toppi



Questions



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