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Facilities Council

# RAL Tier 1 & LHCONE update

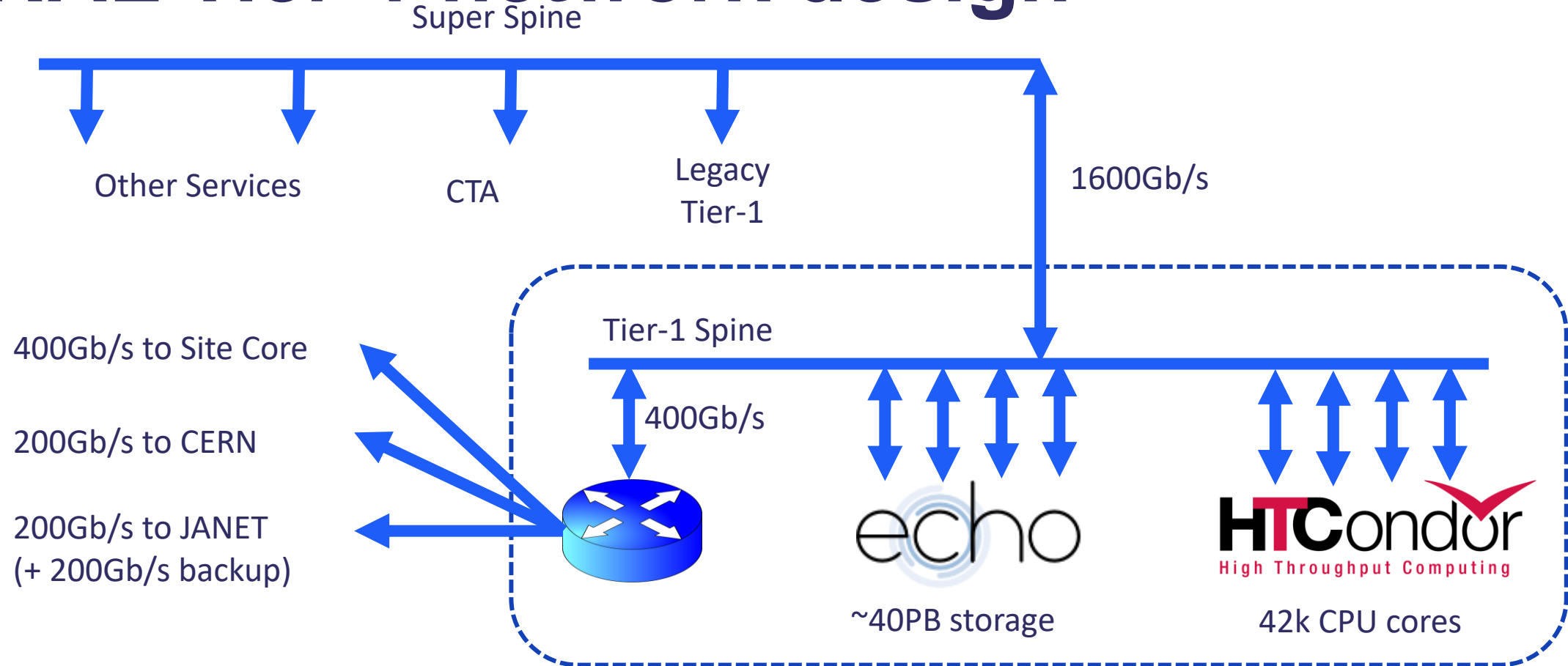
LHCOPN-LHCONE #50

FZU

18 April 2023

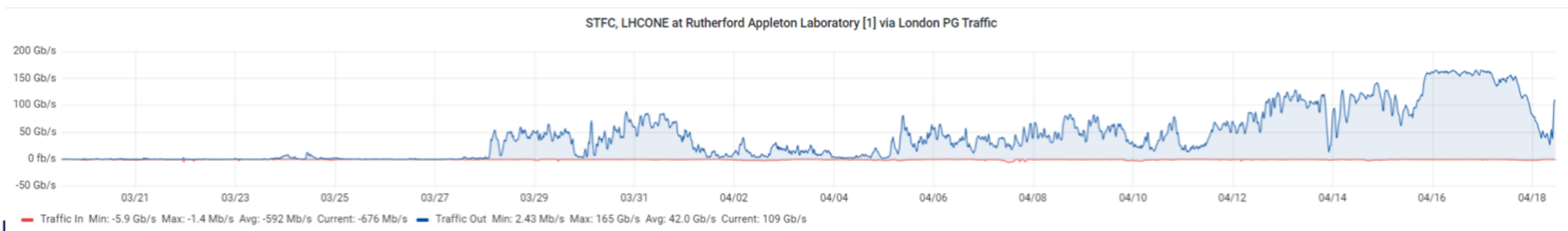
Ian Collier

# RAL Tier-1 network design



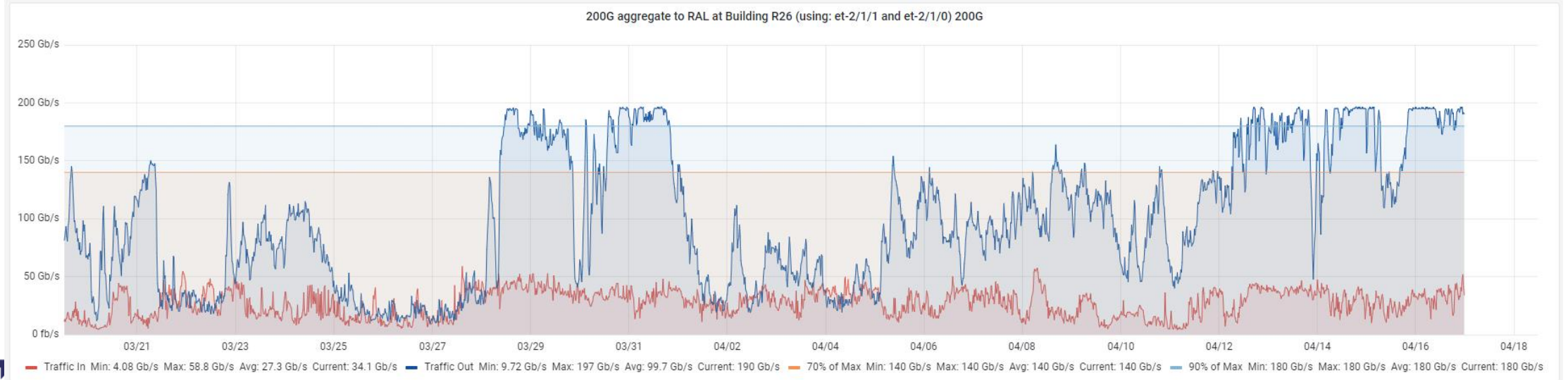
# Joining the LHCONE

- The legacy RAL tier-1 network had been designed back in 2009.
  - Storage bypassed the site firewall and could make use of the LHCOPN link.
  - Services and Worker Nodes were not.
- Moving the WN on to the LHCONE involved taking them outside the firewall which required careful consideration.
  - Various problems with IPTables and Docker needed to be resolved.
- On 27<sup>th</sup> March we added ~520k HS06 of CPU capacity to the LHCONE.



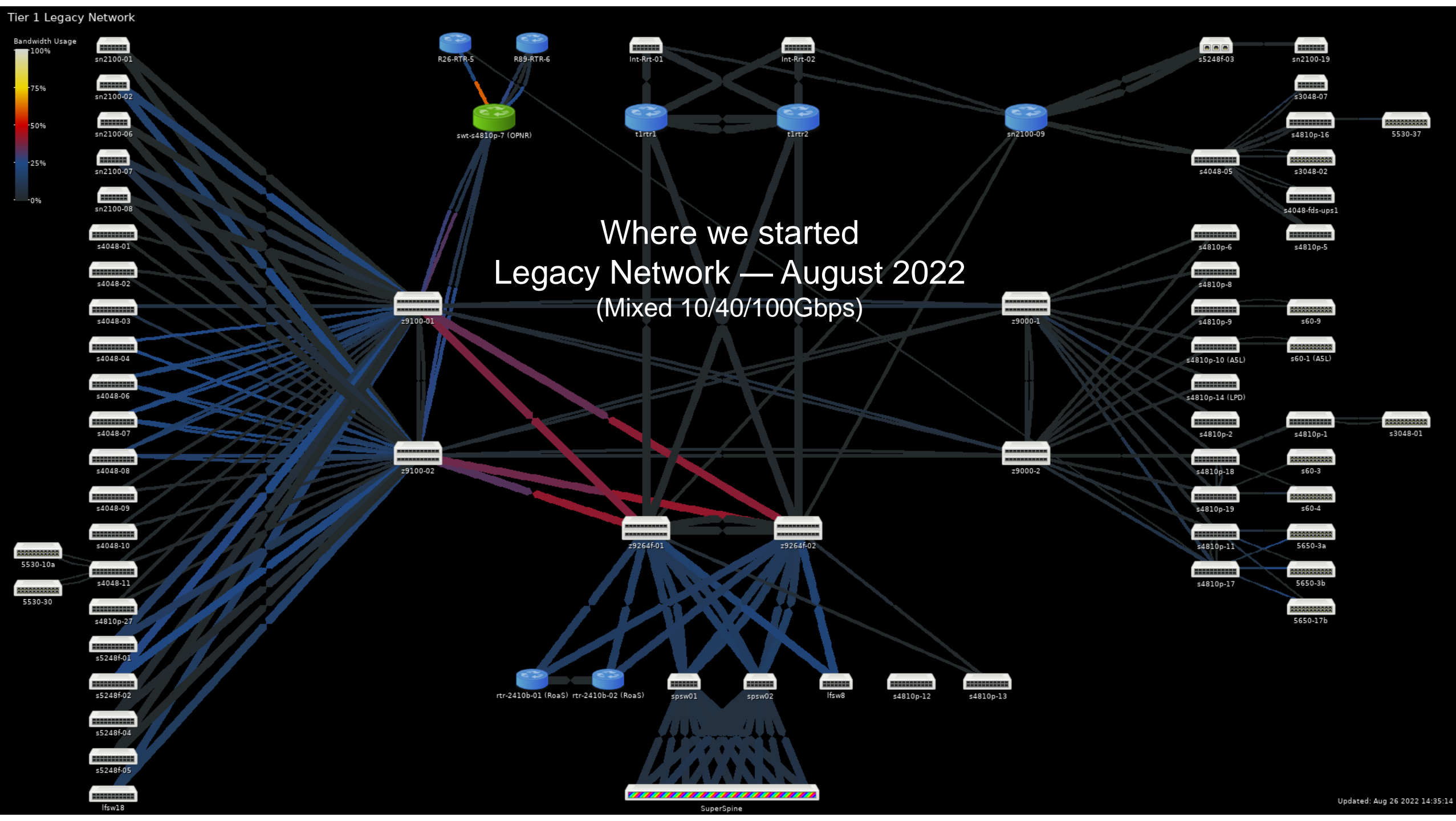
# Too successful?

- Since moving the WN, we have noticed several periods where the 200Gb/s site link to JANET is saturated!
- We believe this is CMS jobs performing remote reads.
  - We may need to limit the amount temporarily.



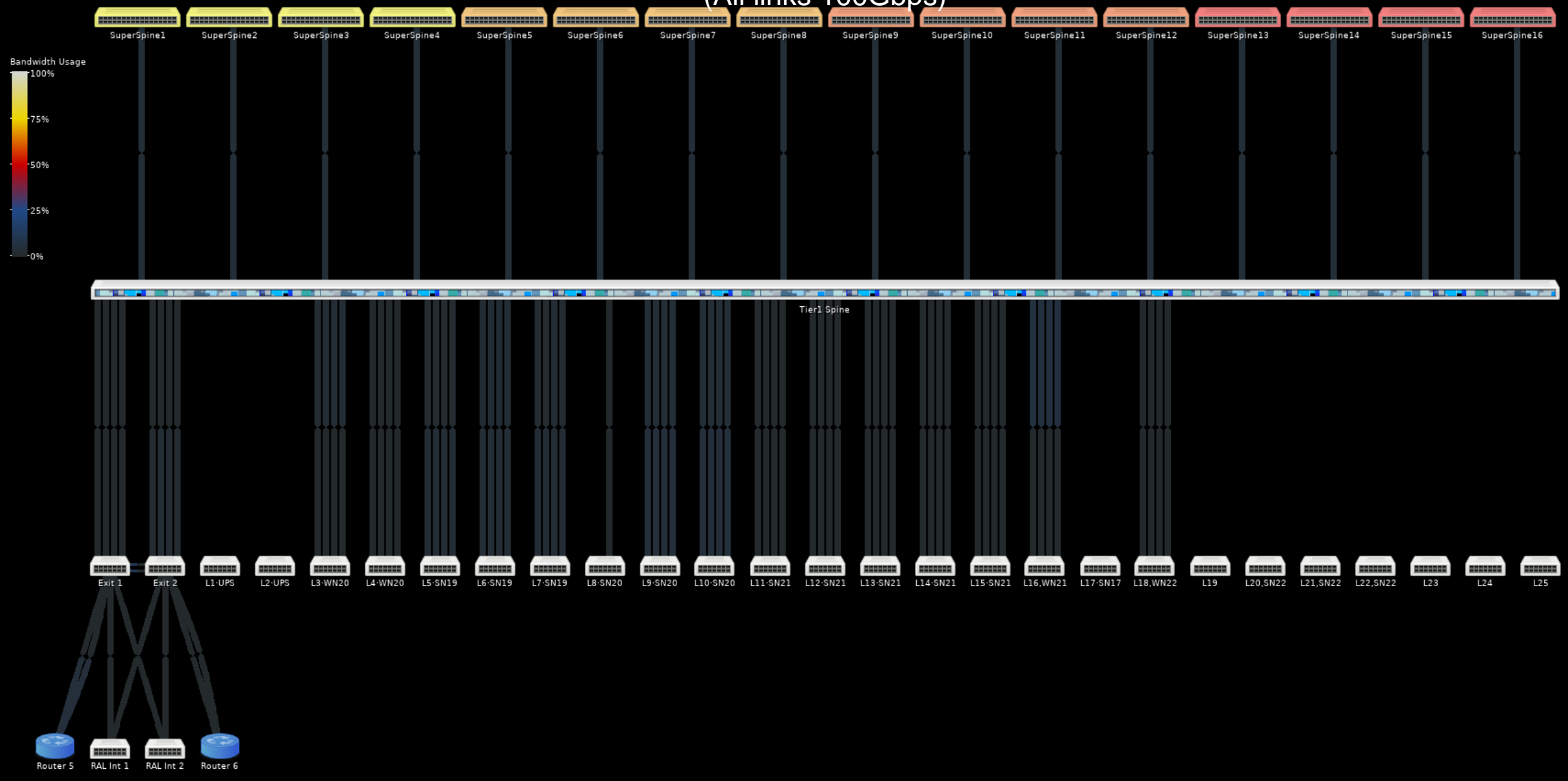
# LHCOPN to the rescue..

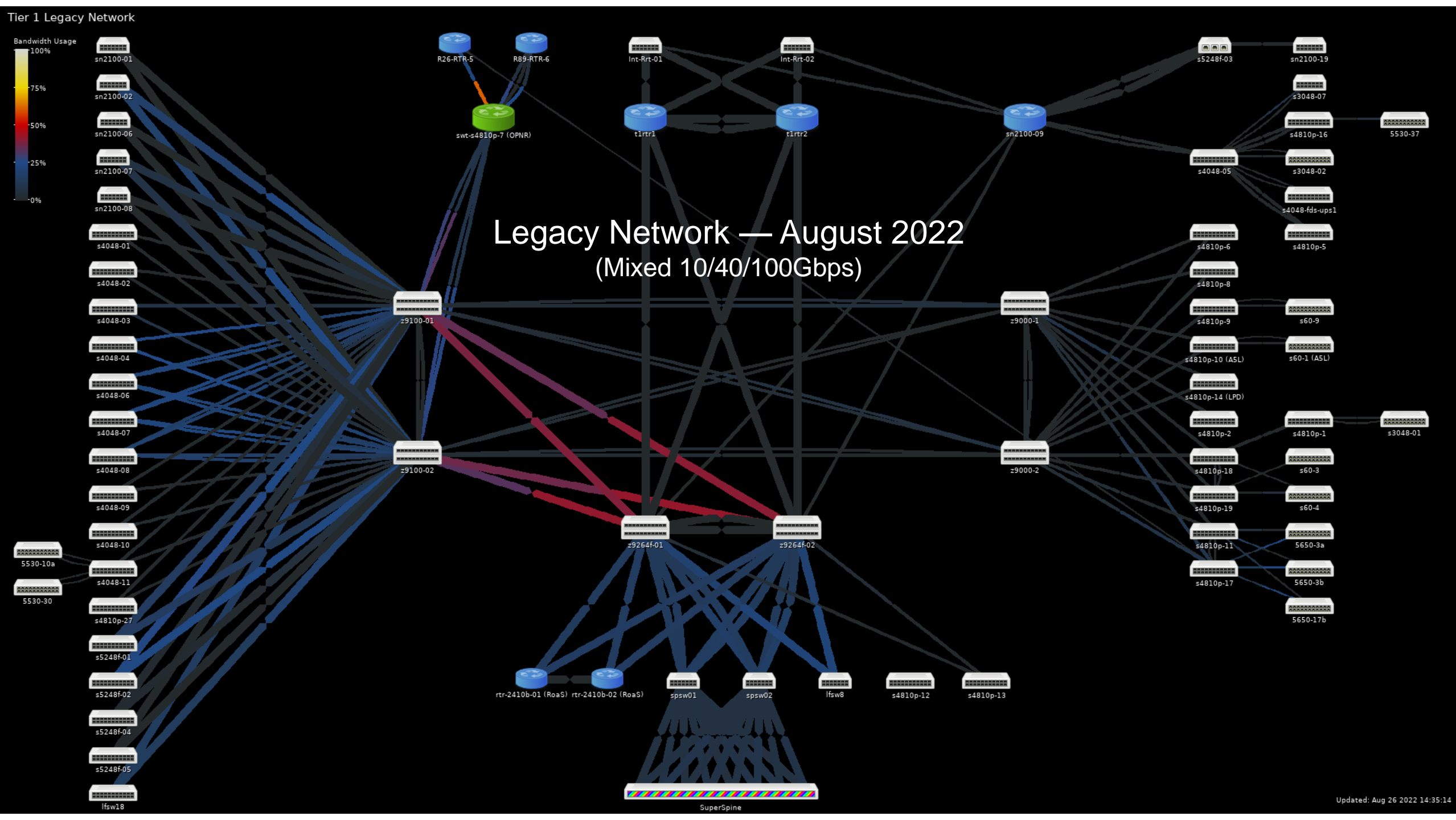
- We recently (March 2023) upgraded our OPN link from 100Gb/s to 200Gb/s although this second link is not yet connected.
  - The other 100Gb/s link is still attached to the old network.
- In the next few weeks we plan to connect the two 100Gb/s LHCOPN links to the new network providing us with 400Gb/s total capacity.
- We will also be adding Echo (Disk) gateways to the LHCONE.
- Antares (Tape) will follow although this will require a bit of work as it was originally intended to be internal only so we didn't setup things like IPv6.



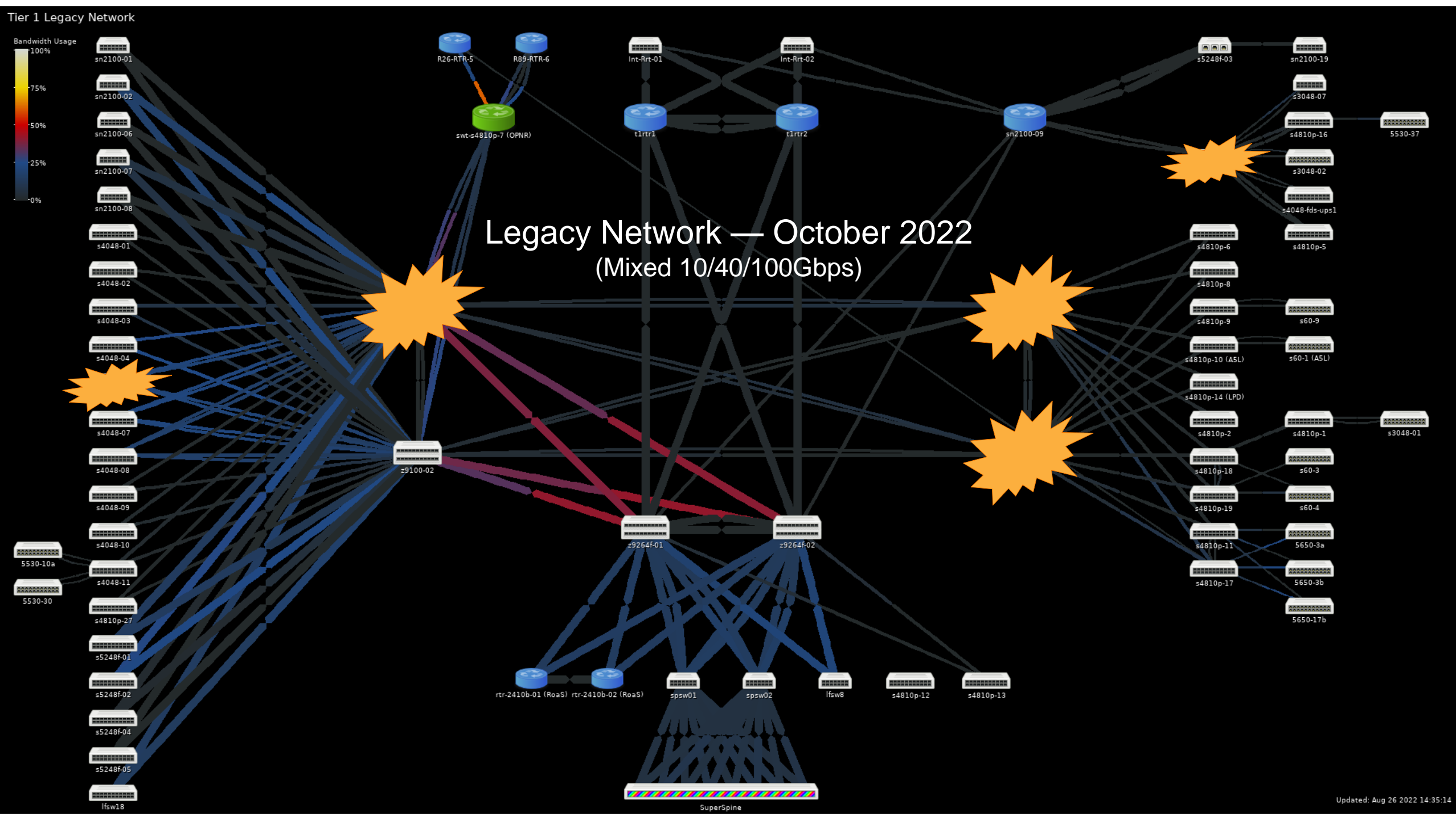
# Where we're heading...New Network — March 2023

(All links 100Gbps)











# New network

Four leaves of workers (almost) **+1**

104% of 2023 CPU pledge (146% soon)

Eleven leaves of storage in production **+6**

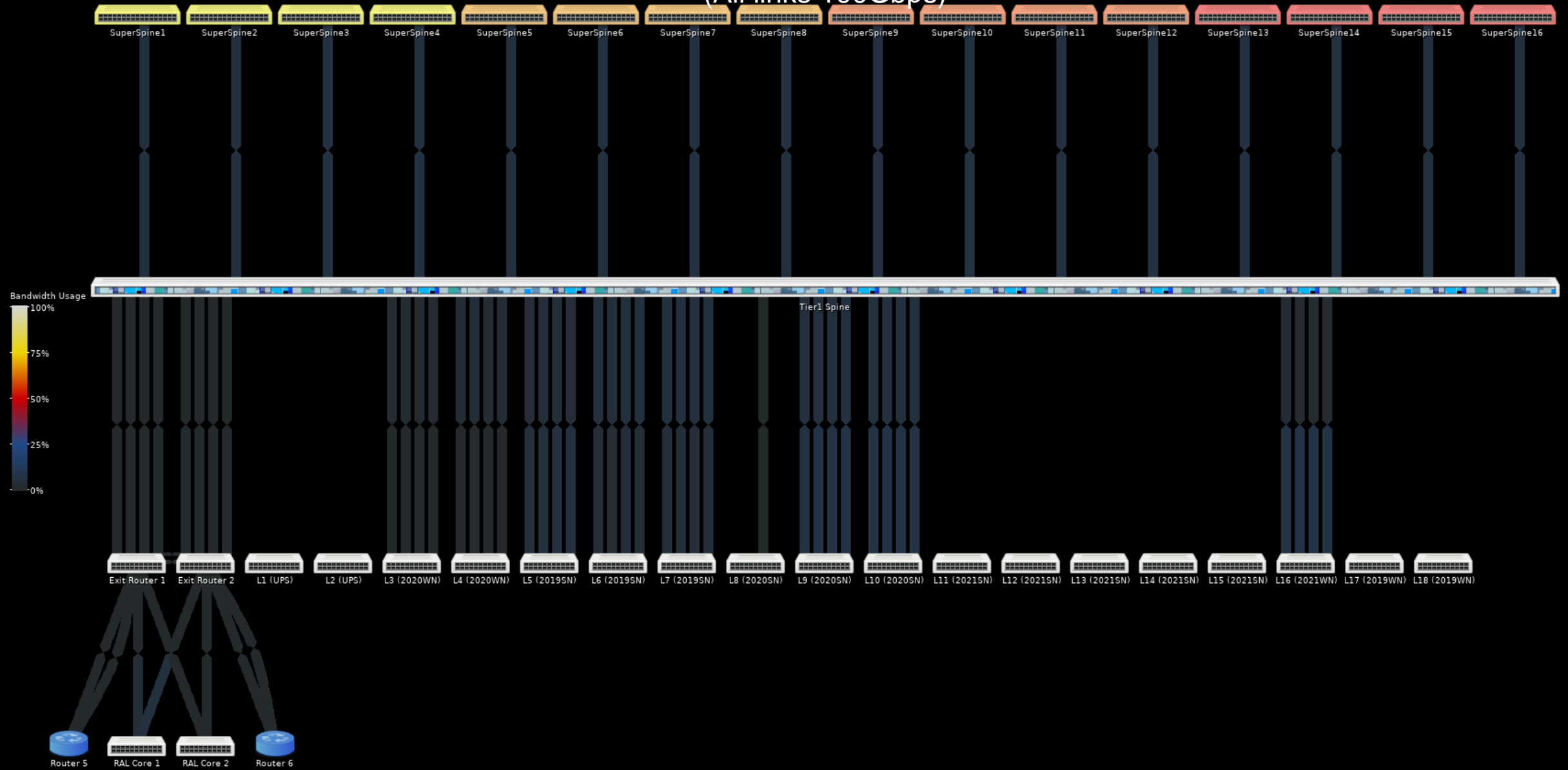
33% of Echo capacity

FY2022 nodes currently being deployed

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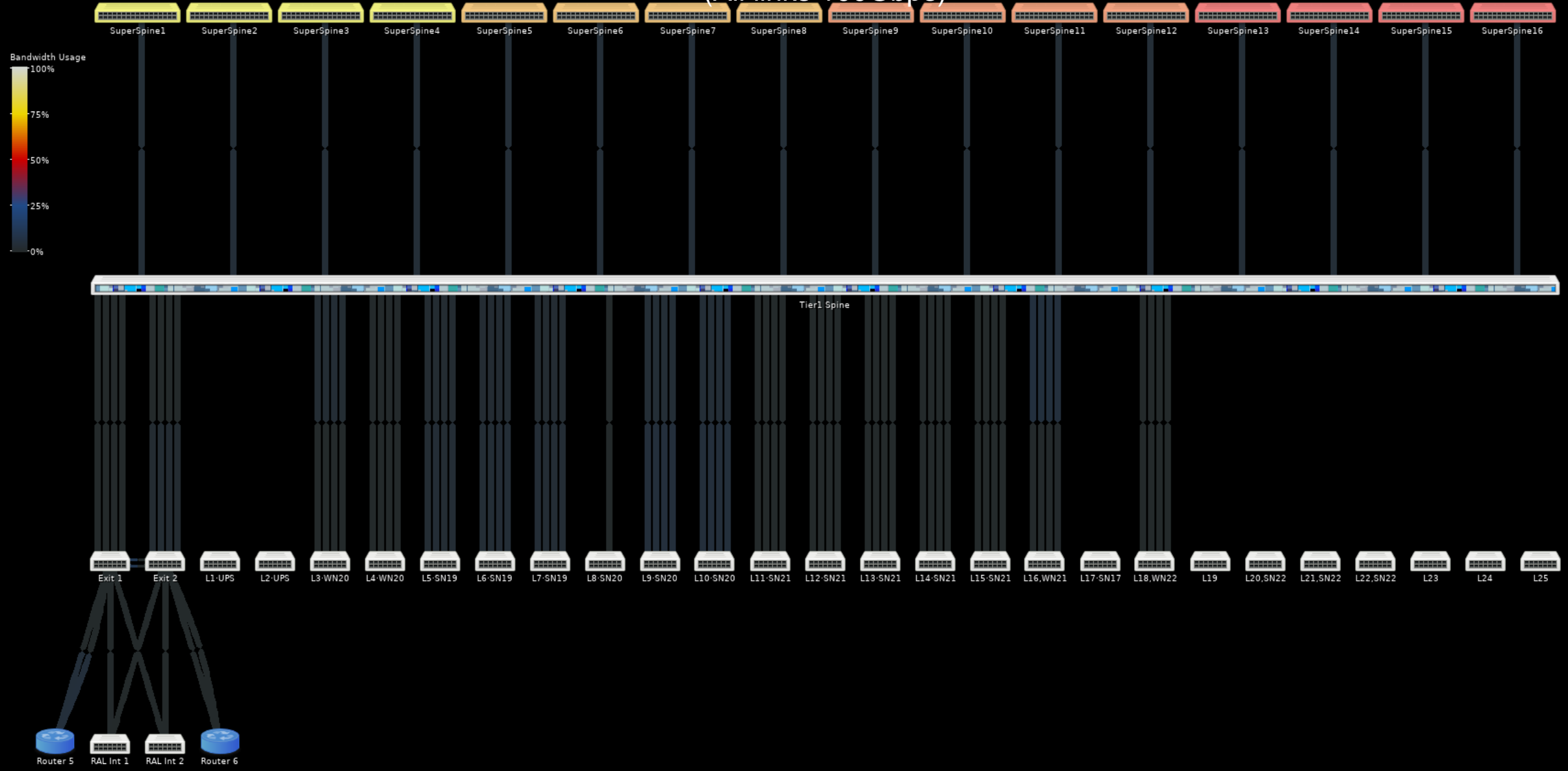
# New Network — August 2022

(All links 100Gbps)



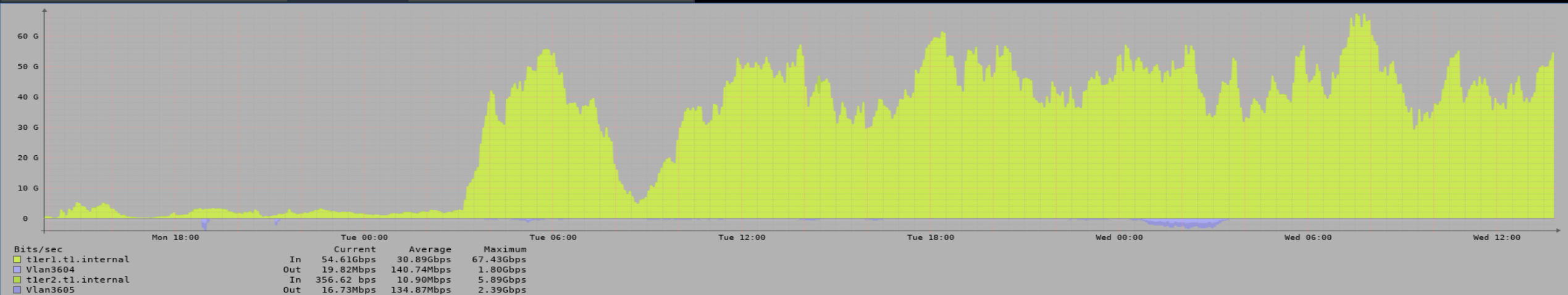
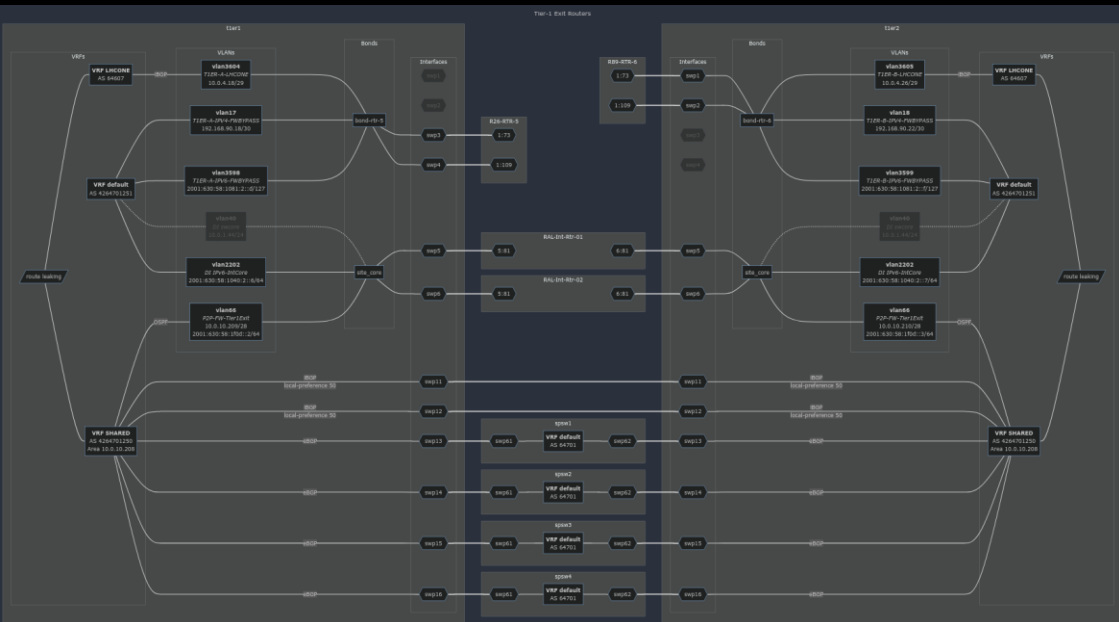
# New Network — March 2023

(All links 100Gbps)



# LHCONE

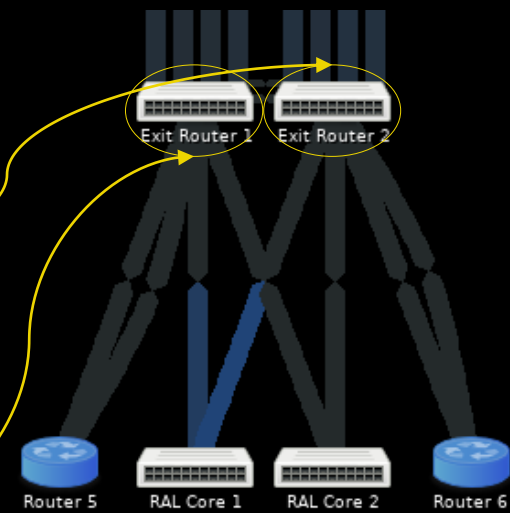
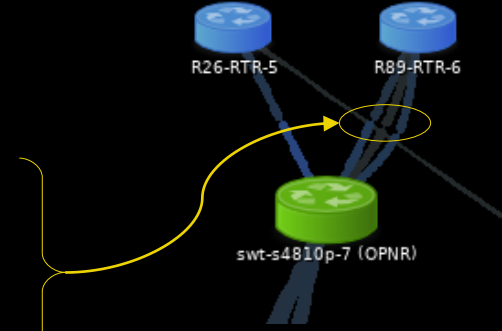
- Peering with both Exit Routers
- Everything on new network now advertised
  - 2020+ Worker nodes
  - 2019+ Storage
    - No echo gateways (yet)



# LHCOPN



- Still peering with legacy OPNR via RAL Border Router 6.
- Second 100Gbps link now provisioned!
  - Will connect directly to Exit Router 2.
- Then move existing link to Exit Router 1.





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# Thank you

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