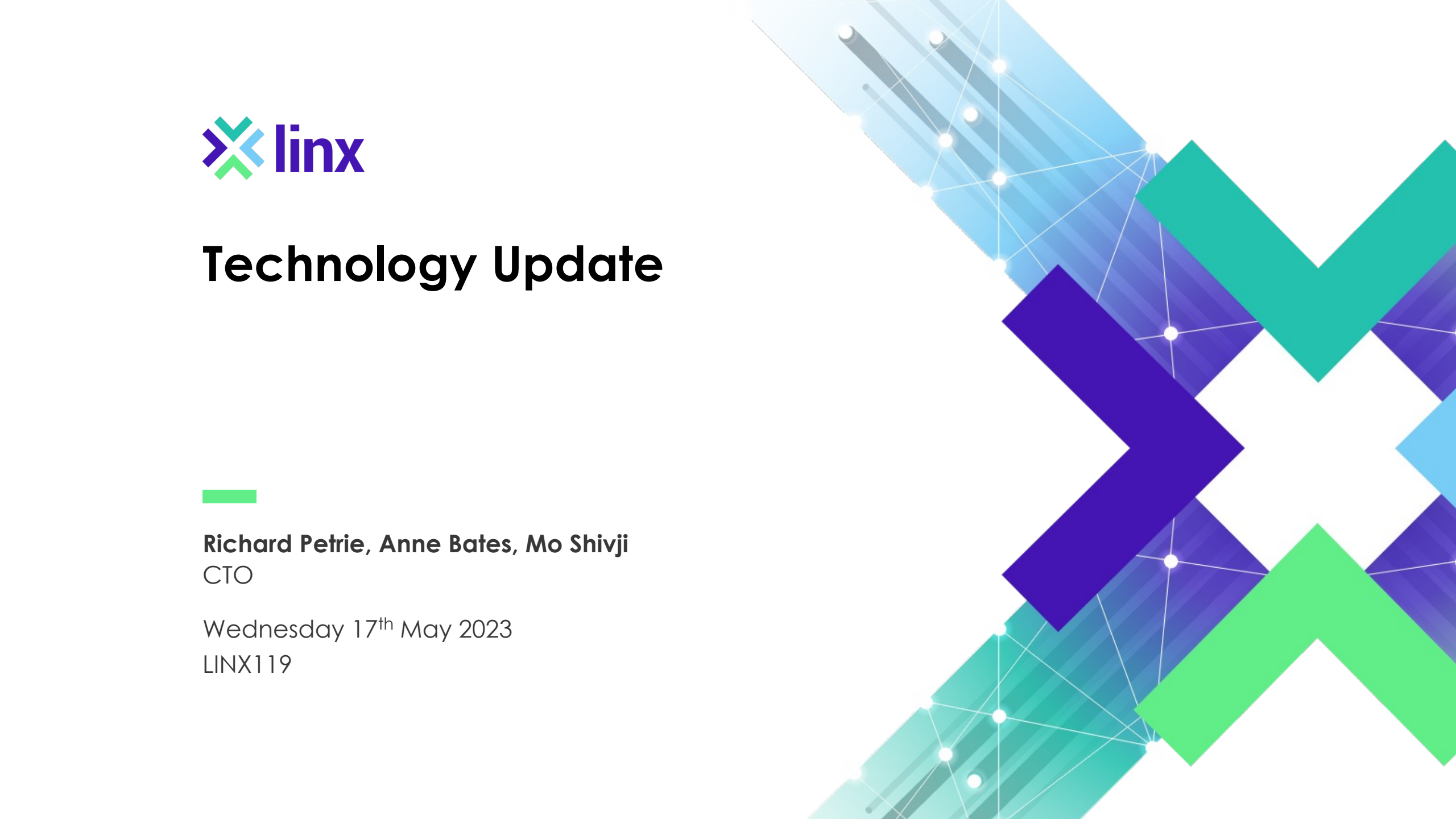


Technology Update

Richard Petrie, Anne Bates, Mo Shivji
CTO

Wednesday 17th May 2023
LINX119

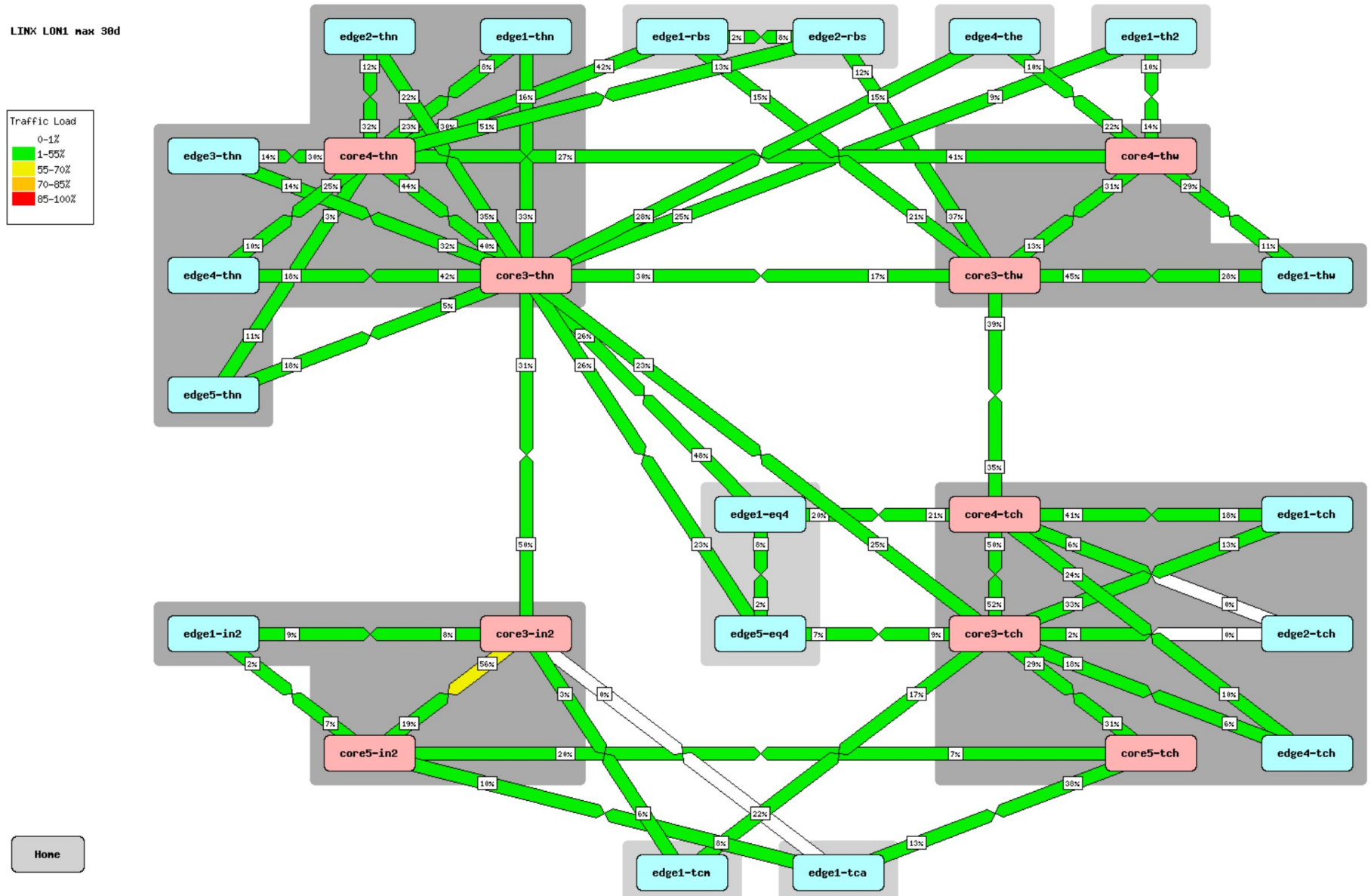
- 2023 Technology Investments
- Significant Active Projects
- Operations Update
- Route Server Update

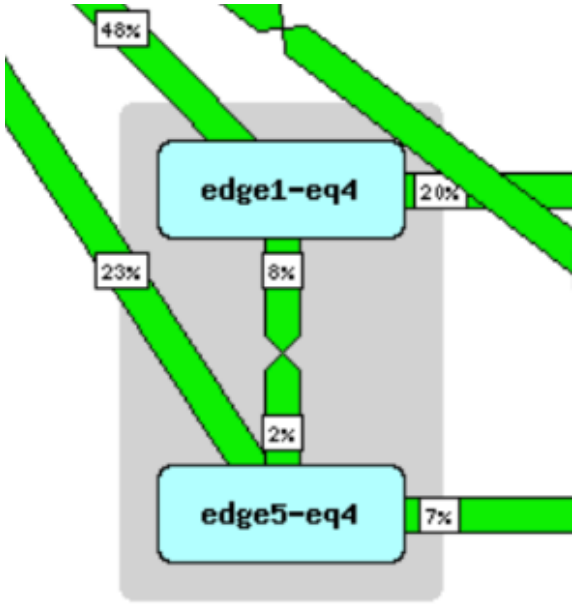
2023 Technology Investments

2023 Technology Investments

- LAN Interconnectivity Development – LON1

- Develop the 400GE offering
- Reduce the legacy footprint
- Reduce the power draw per Gb of member capacity
- Improve the port density
- Reduce support cost based on deployed network asset value and member capacity


Created: May 02 2023 05:15:05 - UTC
LINX LON1 max 30d
Traffic Load
0-1%
1-55%
55-70%
70-85%
85-100%
edge2-thn
edge1-thn
edge1-rbs
edge2-rbs
edge4-the
edge1-th2
edge3-thn
core4-thn
core4-thw
edge4-thn
core3-thn
core3-thw
edge1-thw
edge5-thn
edge1-eq4
core4-tch
edge1-tch
edge1-in2
core3-in2
edge5-eq4
core3-tch
edge2-tch
core5-in2
core5-tch
edge4-tch
edge1-tcm
edge1-tca
Home

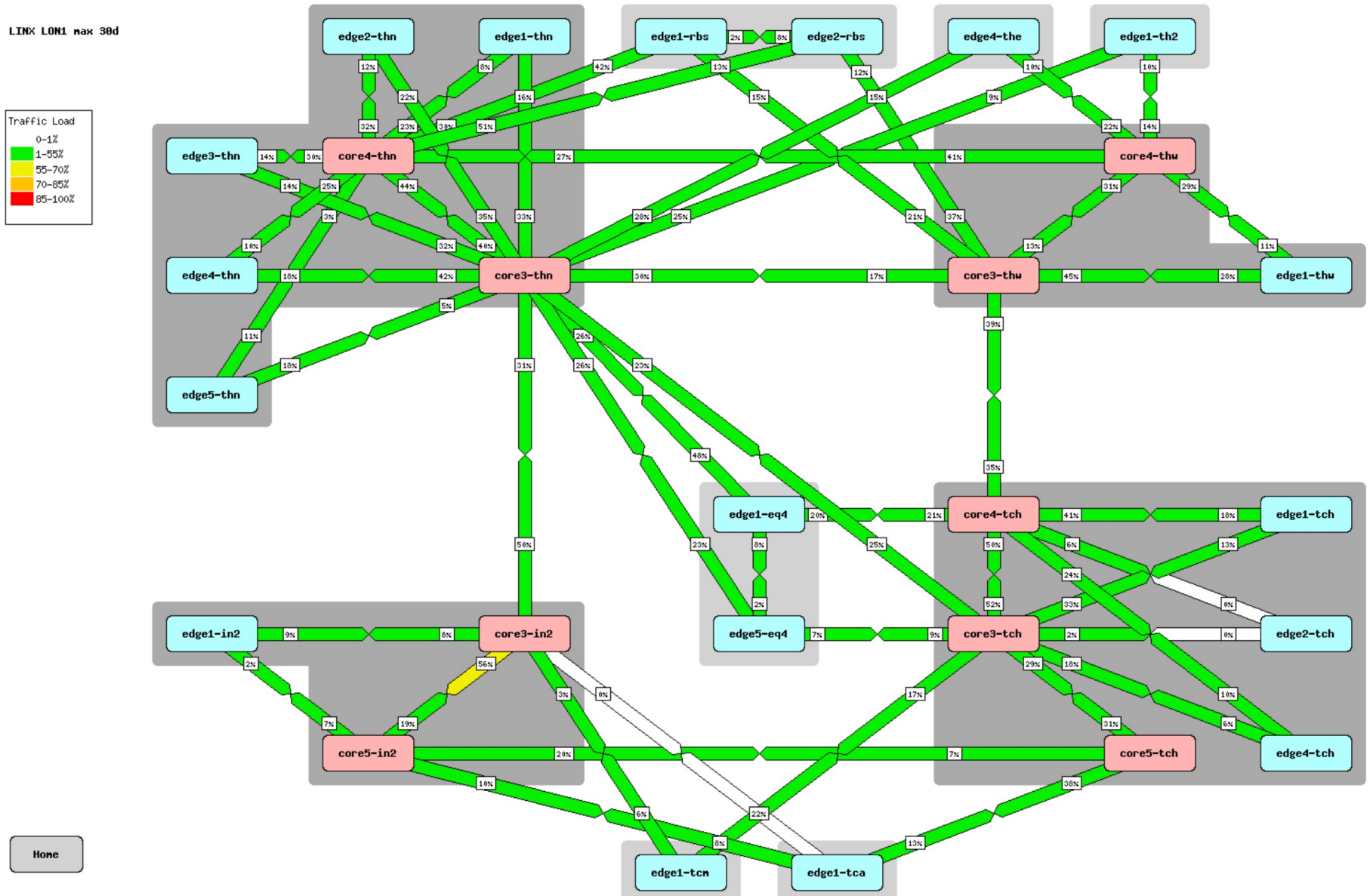


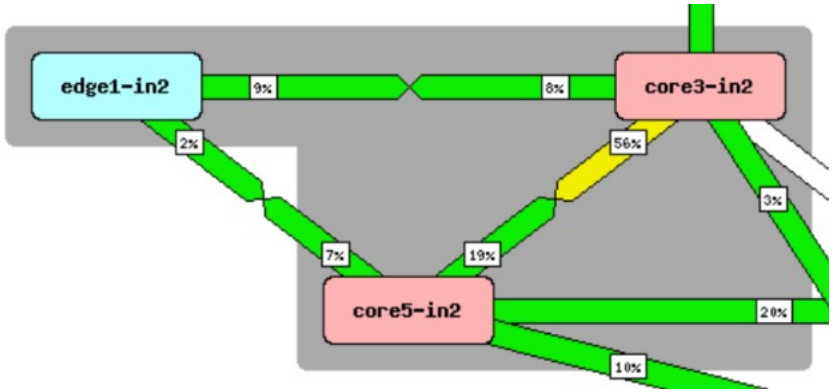
Complete the LD6 re-design project, Equinix Slough

1. Install Nokia 7750 SR-7s as edge5-eq4
2. Enable 400GE member services
3. Migrating 100GE members from edge3-eq4 and edge4-eq4
4. Decommissioning 2 x MX960s
5. Assigning addition ISL capacity to edge1-eq4

Created: May 02 2023 05:15:05 - UTC

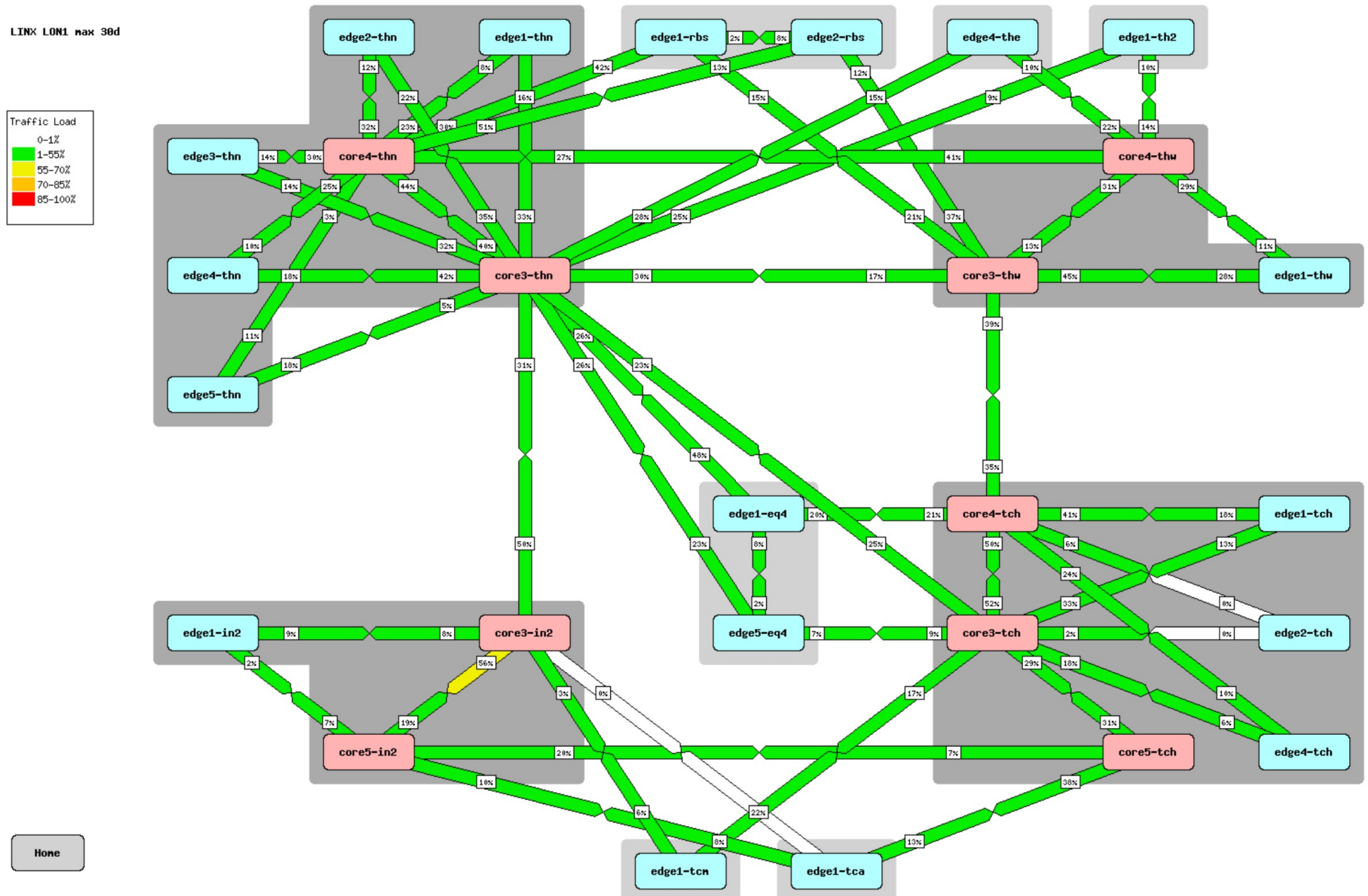
LINX LON1 max 30d





Develop the Digital Realty site (IN2/LON2)

1. Enable 400GE member services on the Juniper MX10K using the LC9600 card in core3-in2
2. Test the MX10K-LC480 card for 1/10GE services
3. Collapse the edge1-in2 into core3-in2
4. Decommissioning edge1-in2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edge1-th2
edge3-thn
core4-thn
core4-thw
edge4-thn
core3-thn
core3-thw
edge1-thw
edge5-thn
edge1-eq4
core4-tch
edge1-tch
edge1-in2
core3-in2
edge5-eq4
core3-tch
edge2-tch
core5-in2
core5-tch
edge4-tch
edge1-tcm
edge1-tca
Home

2023 Technology Investments

2nd half of 2023, there will be a wider review of all lower speed member ports,1 GE and 10 GE member services

Two PoCs underway

1. The **Nokia Ethernet satellite** SAS-Sx. This support feature allows a 7210 SAS-Sx or SAS-S chassis to act as a port extension for the 7750 SR host.
2. The **MX10K-LC480** which is a fixed-configuration line card with 48 SFP/SFP+ ports. Each port supports a speed of 10 Gbps or 1 Gbps, providing the line card a maximum bandwidth of 480 Gbps.

Significant Active Projects

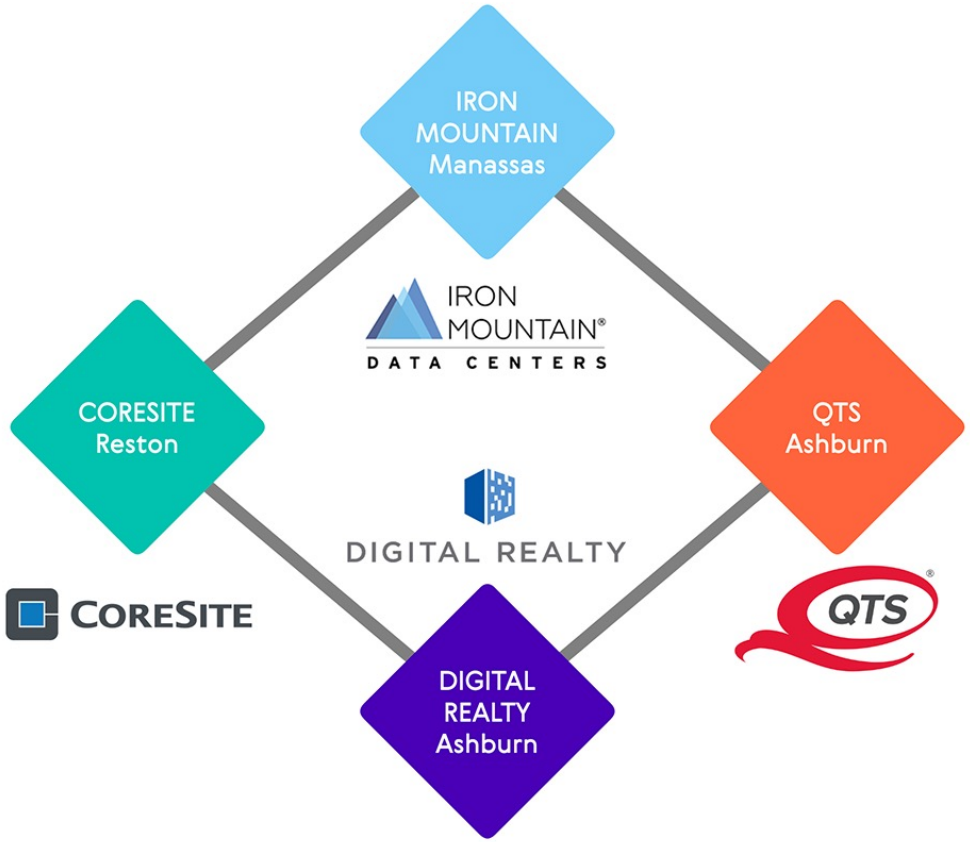
Significant Active Projects

- NoVA
- Nairobi
- Partnership with STC
- 400GE on LON2

Significant Active Projects

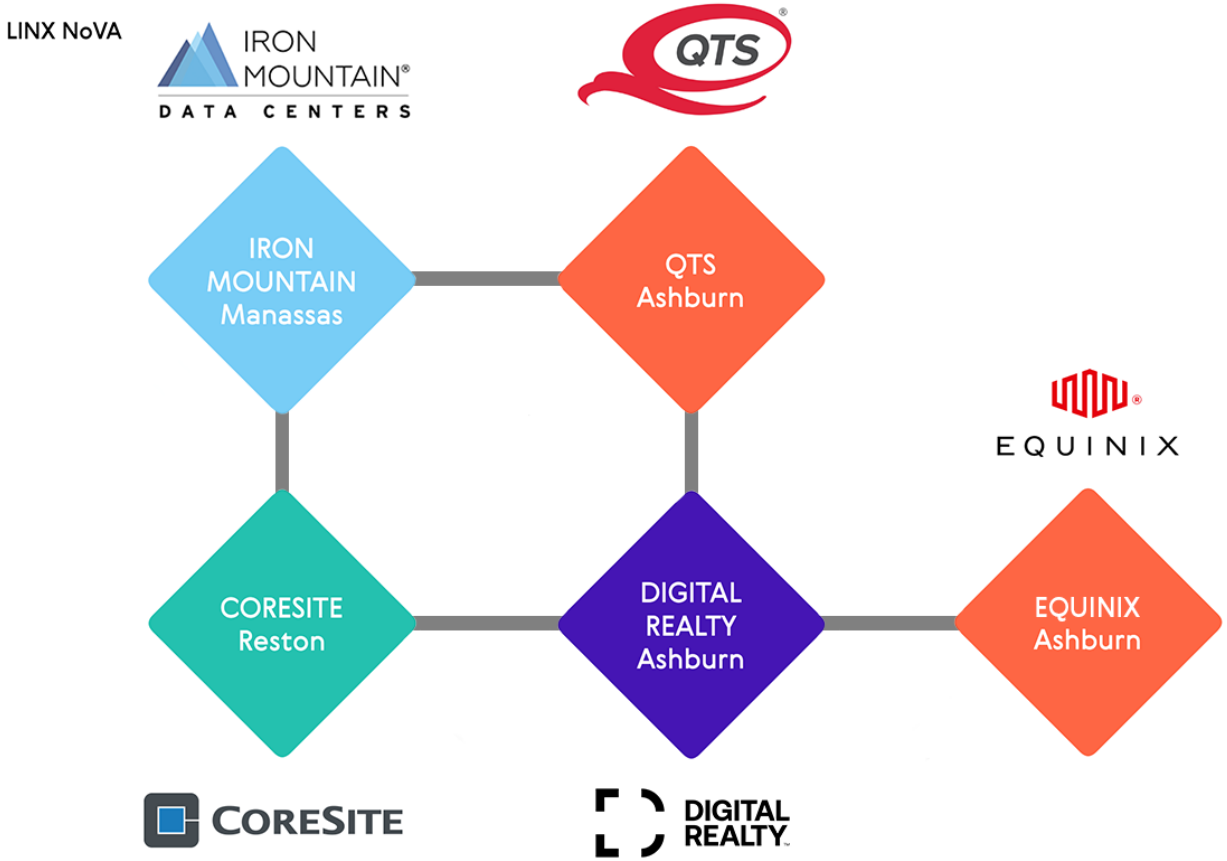
NoVA

LINX NoVA



Significant Active Projects

NoVA



Significant Active Projects

Nairobi

linxnairobi

Design & Readiness – Jan/Feb 2023

Build - March 2023

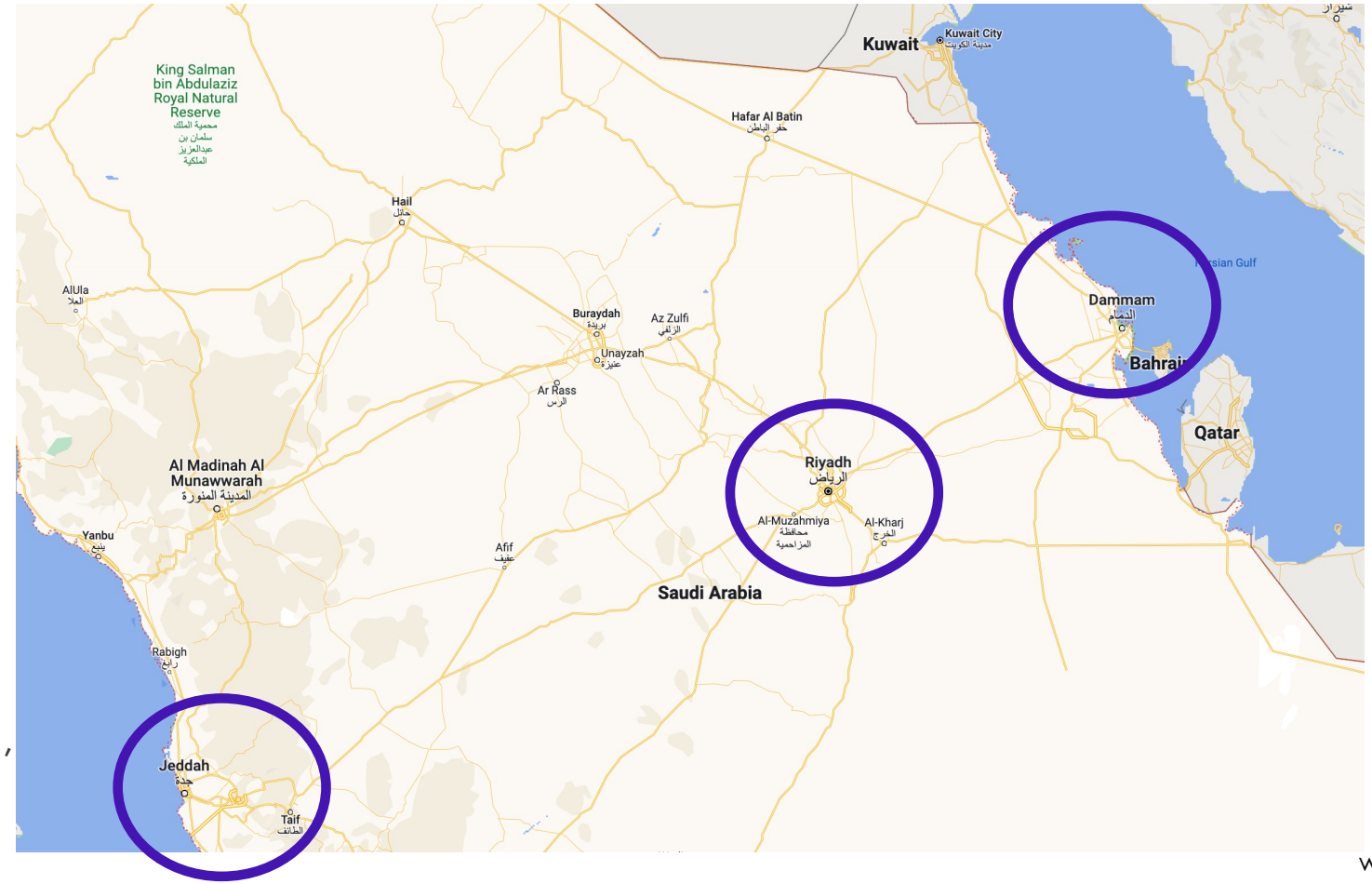
iXAfrica DataCentre

Build - May 2023

Launch - May 2023

Significant Active Projects

Partnership with STC



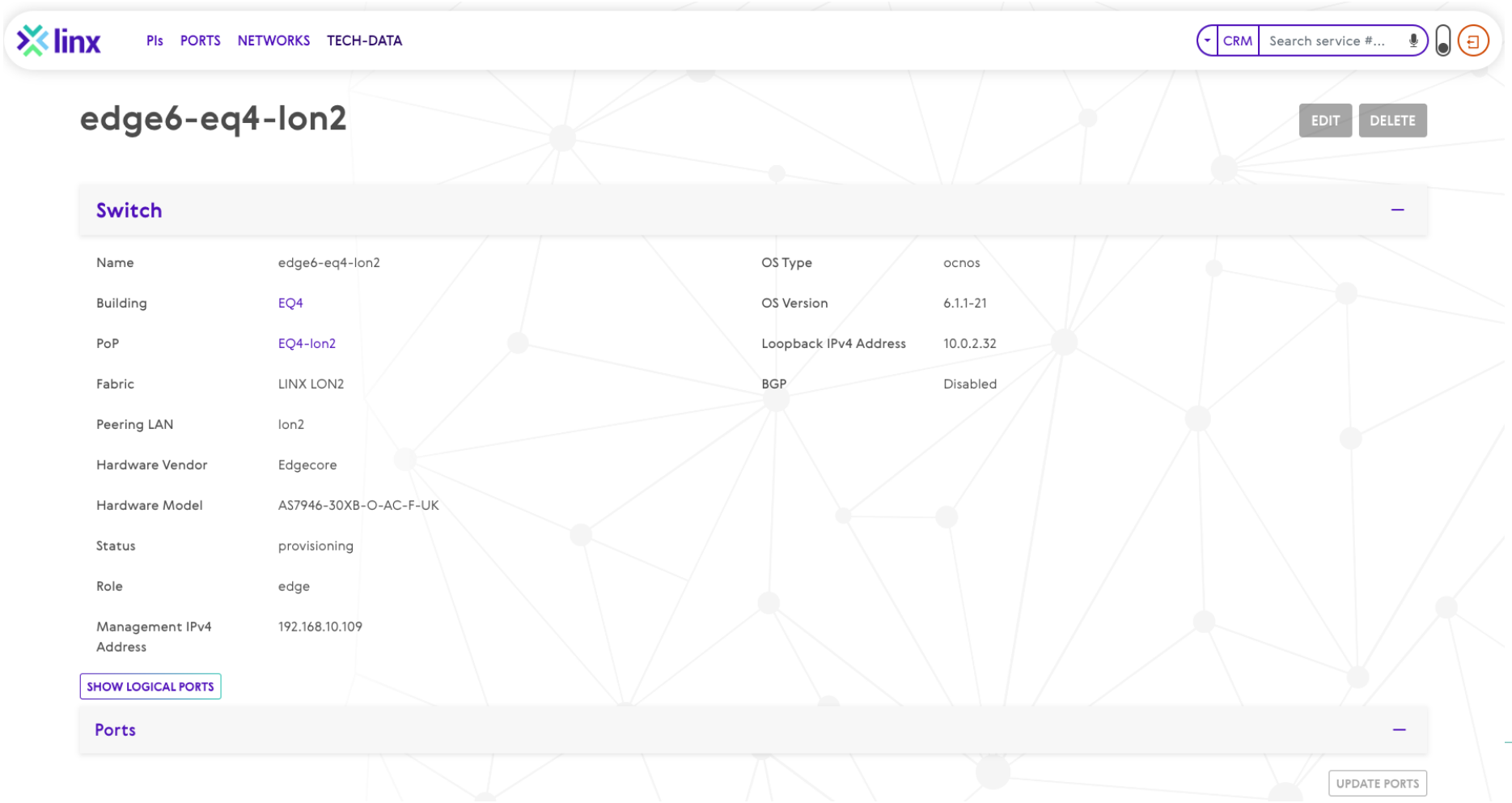
Dammam
Q3-23 Design

Riyadh
Q2-23 – Design
Q3-23 - Build

JEDIX in Jeddah,
Live in 2021

Significant Active Projects

400GE LON2



Operations Update – Anne Bates

- Service Issues
- Maintenances

Service Issues – Restart of Alice LON1

March

LON1

- 8 March 2023 - BGP collector sessions dropped
  - BGP drops identified via Alice which was returning an error for IPV4 on LON1, IPV6 was unaffected.
  - The BIRD daemon for IPv4 peering on the LINX LON1 Collector crashed and was restarted successfully.

Service Issues – Virtus vPoP

March

LON1 & LON2

- 14 March 2023 - Loss of connectivity to Virtus vPoP
  - This affected all five members connected.
  - Root cause identified as an issue with the data centre cross connect, outside our suite connecting the dark fibre.
  - A transmission PoP runs on a single fibre connect back to our THN site. Hence, any outage on this fibre results in a complete site outage as no redundancy currently built into transmission PoP solution.
  - The restoration came with Telehouse engineers working on the cross connect along with EuNetworks on their optical equipment.

Service Issues - core3-tch FPC6/FPC7

March

LON1

- 19 March 2023 - [Emergency At Risk] core3-tch FPC6 card replacement (maintenance that became an outage FPC7)
  - The FPC6 card on core3-tch in Equinix LD8 went offline, and we were advised by the vendor to replace the card as errors were incrementing indicating a potential hardware failure.
  - Another ISL card(FPC7) on the same switch started logging errors and silently dropping traffic.
    - It is believed that FPC7 and the corresponding fabric may have been disturbed whilst FPC6 was replaced causing the errors, and subsequent drops.
  - This affected a significant number of member sessions peering with RS1, RS3, route-collector and direct peering with their traffic transiting FPC7 or having their ports directly connected on core3-tch switch.

Service Issues - core3-tch FPC6/FPC7 cont.

- After identifying the issue was related to FPC7 reporting fabric chip errors on multiple planes the card was rebooted resolving the issue.
- Caused by a bug, described as; when CRC errors are observed on the fabric plane traffic utilizing that plane may continue to discard traffic until the FPC or impacted fabric plane is restarted.
- Juniper were unable to recreate the issue in the lab by pulling adjacent card, only by manually injecting the CRC errors, so chances of a reoccurrence has been confirmed as very low.
- The bug is due to be fixed from 21.4R3-S4 onwards (currently on 21.4R1-S3) and will available when we upgrade later in the year.
- Work around if issues re-occurs - off-lining/on lining the impacted fabric plane to restore traffic, rather than requiring a complete FPC reboot.

Service Issues - core3-tch FPC6/FPC7 cont.

Learnings

- Issue took longer to resolve than on average, plus the member communication wasn't to our normal level
- FPC7 silently discarding traffic when FPC6 was replaced during a routine maintenance window
  - Time was spent troubleshooting FPC6 as the maintenance was on that card
  - As it was a Sunday and NOC cover being low due to holiday taken, the on-call Network Engineer found it difficult to complete physical work along with troubleshooting the issue, sending out communications and keeping an eye on monitoring

Actions

- Reinforced with Network Engineers and NOC Engineers to escalate when assistance is needed
- Continuing to upskill our NOC Engineers

Service Issues – edge1-in2 FPC3

May

- 1/May/2023 - edge1-in2/edge1-in2-Slot3 Reboot
  - FPC 3 on edge1-in2 rebooted and members on this card would have seen their sessions drop briefly whilst the reboot was taking place.
  - The card came back online after a few minutes and member connections were restored.
  - Raised the issue with our vendor TAC to investigate who advised to replace the FPC and the card was replaced in an emergency maintenance window.

Service Issues – edge1-in2 FPC3, cont.

- After the maintenance was completed, members reported that their traffic hadn't returned.
- Encountered an issue with BCP214, where the Network Engineer who completed the maintenance was unable to remove it properly.
- The issue was escalated to a Senior Network Engineer who had to implement a work around of rolling back to the configuration before BCP214 was enabled to restore service to the members who had it enabled.
- The issue was escalated with our software team to fix the bug that caused the issue (CRM call broke the data in the database and this was fixed by changing vanilla api endpoint to write BCP214 directly.)

Upcoming Maintenances

- Route-Server Replacement – RS1.CAR1
  - Hardware replacement of the LINX Wales route-server located at Vantage Data Centres, Newport

- SCO1 Network Refresh - Member moves
  - Completing the network refresh of LINX Scotland

LINX Route-Server Update – Mo Shivji

- OpenBGpd
- Bird1.6 and Bird2
- Extended-Communities
- Stats

LINX Route-Server Update

- OpenBGPd
  - OpenBGPd running successfully in LINX Wales and Scotland since 2022.
  - Decision to deploy in Manchester and NoVA to replace RS2's in other exchanges and RS4 on LON2.
  - Deployments were successful.
    - Issue with Extended-communities crashing the looking-glass.
    - Worked with those members to remove those Extended-communities.
  - Still working with RSSF (Route-Server Software Foundation) on improvements.
  - Aim is to have a OpenBGPd route-server running on LON1

LINX Route-Server Update

- Bird1.6
  - Currently running both 1.6.3 and 1.6.8 around LINX Exchanges
  - Has been successful since deployment in 2010.
  - Announcement for EOL on BIRD1.6.
    - EOL date set to 31 December 2023.

LINX Route-Server Update

- BIRD2
  - Started on work to add this to our automation system.
    - Will begin deployment before the end of the year.
    - BIRD 1.6 EOL
    - LINX Collectors will also be upgraded to BIRD2.
    - BIRD3 Alpha release
      - Not yet tested.
      - Should work with BIRD2 configuration

LINX Route-Server Update

- Extended-Communities
  - Attended Euro-IX Route-Server workshop at TOP-IX.
    - Removal of Extended-Communities from IXP route-servers discussed.
    - Majority of Euro-IX IXP's have removed support for Extended-Communities.
    - Upcoming RFC to be released explaining why IXP route-servers should not use Extended-Communities.
    - LINX will remove support for Extended-Communities in 2023.
    - Recommendation to use Large-Communities
    - We have and will continue to contact members who use them. So far, we haven't received any replies.

Stats

- Route-Server Stats
  - No current stats for OpenBGPd route-servers
  - Legacy scripts in Perl
  - Have been re-written Python
  - Ready for production by end of May 2023
  - Future plans are to use some Prometheus endpoints for OpenBgpd/Bird2

linx

Thank you!