LINX Technology Network Operations and Route-Server Update

Anne Bates and Tim Preston

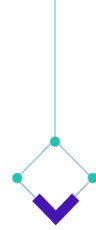Thursday 16 November 2023

Operations Update – Anne Bates

Service Issues

Service Issues – Route Server Looking Glass

June

Route Server Looking Glass

- AliceLG for route-servers crashed due to Extended communities being received
  - 3 June 2023
  - 8 June 2023

- Both times, a member originated prefixes with unusual Extended Communities added to some prefixes, which triggers a bug with AliceLG when parsing those.

- We are working with the developers on a fix, but are also talking to other IXPs in agreeing a common plan to filter out Extended Communities on Route servers.
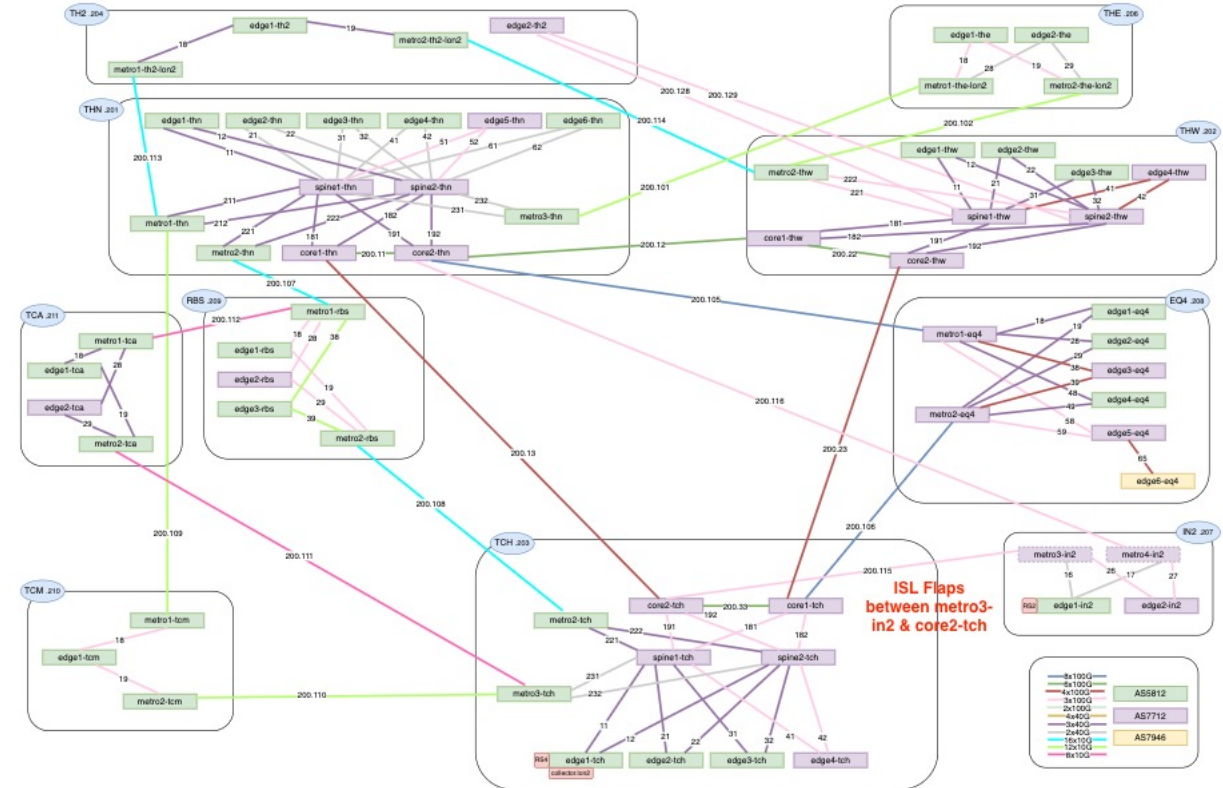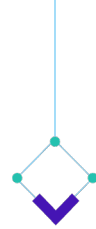
Service Issues - LON2 - Dark Fibre, Traffic loss & Reachability outages

LON2

- 20 June 2023 - LON2 incidents - Dark Fibre, Traffic loss & Reachability outages
  - 20 June – Dark fibre went down between metro2-in2-lon2 and metro1-tch-lon2
    - Wasn't member impacting, but reduced resiliency
    - Dark fibre was restored by dark fibre provider on the evening of 22 June

Service Issues - LON2 - Dark Fibre, Traffic loss & Reachability outages

21 June - Observation of Flowmon drops on LON2 followed by an ISL flaps succession between metro3-in2 and core2-tch.

- metro3-in2 was part of the work around to mitigate the fibre still being down.

- The ISL flaps caused traffic loss and reachability issues across the LAN.

- Disabling ISLs between edges in IN2 partially restored service.

- Full restoration was achieved as a work around by disabling the LAG between core2-tch-lon2 and core1-thn-lon2.

Service Issues - LON2 - Dark Fibre, Traffic loss & Reachability outages

- 22 June - Investigations continued and still seeing reachability issues to a small number of specific IPs in THN
  - Issue had re-emerged where MAC addresses for members would appear in the MAC table of an edge device but not in its MAC hardware table.
  - The resolution was to clear the L2VPN EVPN BGP session between affected VTEPS (Edges) for the MAC address to populate into the MAC hardware table.
  - After investigation, trigger identified as newly installed router (metro3-in2-lon2) that had been previously used in the lab.
    - This device was originally configured with a router id matching another device on the network (core2-thw-lon2) The old ospf and router ID config was removed prior to the device being placed into the network and the router id updated with a new value via a netconf deploy, however the old router id remained being used as the OSPF process required clearing to update the router id value.
    - The issue was later resolved completely by rebooting core2-tch and re-enabling the disabled link.

Service Issues - LON2 - Dark Fibre, Traffic loss & Reachability outages

LON2

- 29 June 2023 - Reachability issues across LON2 - Dark Fibre cancellation, Traffic loss & Reachability issues

  - Flows dropped between Equinix Powergate and DR Sovereign House affecting traffic between these sites. This issue coincided with a fibre issue between DR Sovereign House (RBS)to Telehouse North (THN) and DR Sovereign House (RBS) to Equinix Powergate (TCA)

Update – A software fix was applied to edge1-tca-lon2 and edge2-tca-lon2 on 26 October. Unfortunately, it did not resolve the issue and after an outage on 5 November, the software had to be reverted. Our vendor is investigating.
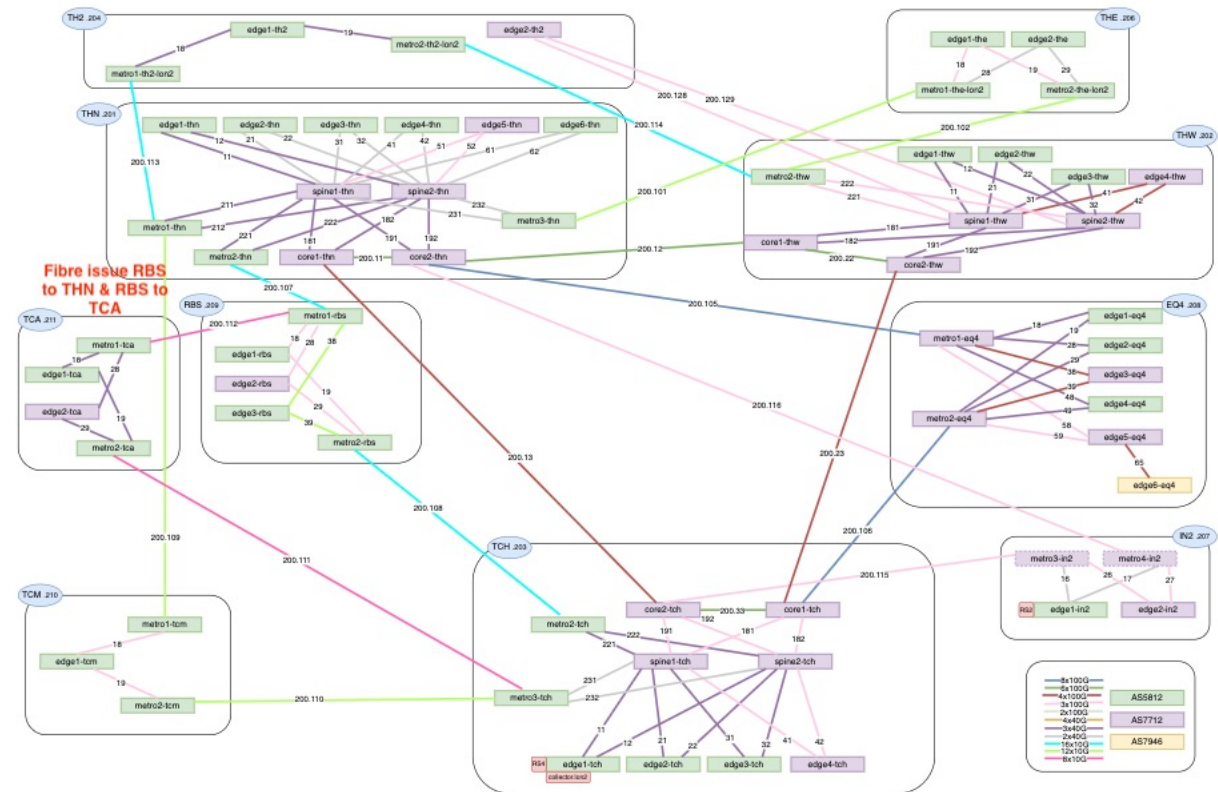
Service Issues – FPC6 core3-tch Failure

July

LON1

- 12 July 2023 - Drops on LON1 – core3-tch FPC6 failure
  - We saw drops on the LON1 LAN caused by FPC6 on core3-tch going offline.
  - We tried bringing the card back online remotely without success and requested remote hands to reseat it.
  - During the re-seat of FPC6 on core3-tch we saw direct and transit traffic to and from core3-tch being dropped. We rebooted FPC7 to clear the alarms and the traffic normalised.
  - Related to an issue that occurred in March. We requested a JSU to fix issue where CRC errors observed on a fabric plane may cause traffic utilizing that plane to be discarded until the FPC or impacted fabric plane is restarted.

**Update** – JSU fix for this issue deployed over the past few weeks (last maintenance was on Tuesday morning)

Service Issues – LON2 Collector Sessions

July

LON2

- 11 July 2023 - LON2 collector sessions down
  - Collector sessions were down, engineer working onsite, a patch lead was disconnected during work.
  - This server was replaced as part of a scheduled hardware refresh and the patching re-run.
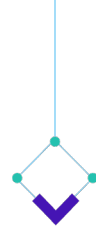
Service Issues - Drops on LON1 - edge1-thn

August

LON1

- 10 August 2023 - Drops on LON1 - edge1-thn
  - On edge1-thn all FPCs rebooted, on edge2-thn FPC2, 7 and 11 rebooted, and on edge3-thn FPC10 rebooted.
  - A software upgrade on our management router resulted in small scale unknown-unicast flooding on the local site management network. This flooded traffic triggered Juniper PR1712855 on our MX960s which both replicated this flooded traffic and passed it to the Junos kernel. This caused resource exhaustion; impacting various protocols and watchdog timers and resulting in FPC restarts on the affected routers.
  - JTAC provided a fix which we applied on 15 August disabling promiscuous mode on the management interface (fxp0) on all MX960s in the network.
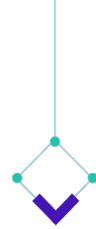
Service Issues

August

- 13 August 2023 - LON1 Collector outage
  - LON1 collector sessions down due to a memory issue on the server.
  - Bird was restarted to restore service.
  - Memory upgraded to rectify the issue.
- 18 August 2023 - AliceLG for the Route Servers is unavailable
  - The outage was caused by a member sending a custom extended community, which AliceLG was not able to process.

Service Issues - Power Issue in Telehouse West

September

- 4 September 2023 Power Issue in Telehouse West
  - While working to clear power distribution issues on the PEMs on core3-thw, a PEM reseat ended up tripping the breaker to the PDU In rack 2 THW. This led to losing power within the rack and devices (core3-thw, edge1-thw, smux1-thw-rbs-1, smux1-thw-tch-1) losing power redundancy and some losing power altogether.
  - This was fixed by working with Telehouse Building Services to restore power to the PDUs affected.
  - The cause of the initial failure was a faulty power supply (PEM4) on core3-thw.
  - Continually maintaining and improving process around power, including audits and training.

Service Issues – edge1-th2 Outage

September

- 18 September 2023 edge1-th2 Outage
  - At 14:53 we observed i2c errors on all fabric planes on edge1-th2, which resulted in all FPCs rebooting, causing an outage to all members connected on this device.
  - All FPCs and member connections restored following the reboot.
  - We engaged JTAC and found it was PR1636118 being triggered.

- **Update** – The workaround is to replace the faulty PEM with i2c errors and the bug fix will be incorporated in our next round of software upgrades. The bug is fixed from 21.4R3. We are currently on 21.4R1-S3.
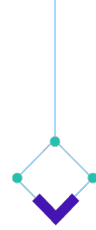
Service Issues - VM outage affecting RS2 in JEDix

October

- 24 October 2023 - VM outage affecting RS2 in JEDix
  - Outage on one of our VM servers in JEDix caused by a storage array failure. This affected the route server rs2.jed1 (AS209421,185.1.126.231, 2001:7f8:d1::3:320d:2). Members will see their connections with this route server down.
 - Replacement parts ordered.

# Service Issues – Reachability issues from edge1-tca-lon2

November

- 5 November 2023 - Reachability issues from edge1-tca-lon2
  - Sporadic flows being dropped between edge1-tca-lon2 towards other edges on LON2.
  - Issue was triggered by vendor dark fibre maintenance between Equinix Slough (EQ4) and Equinix Harbour Exchange (TCH) where MAC addresses of some LINX probes, route-servers and members were populating the hardware MAC table and then flushed out causing the sporadic dropped flows and reachability. This coincided with the hardware MAC table of the device being refreshed every 5 minutes.
  - Software had been upgraded as a fix for the hardware MAC table issue identified in June though had to be rolled back.
  - Our vendor are trying to re-create the behaviour locally and are in discussions with their DEV team to investigate the issue.
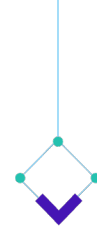
NoVA Migration

- NoVA to be migrated to Nokia 7250 IXR-D3 solution - parallel staging
  - Late November/Early December - new NoVA network will be pre-staged and run in parallel with the existing network.
  - Member migrations will start in the new year.

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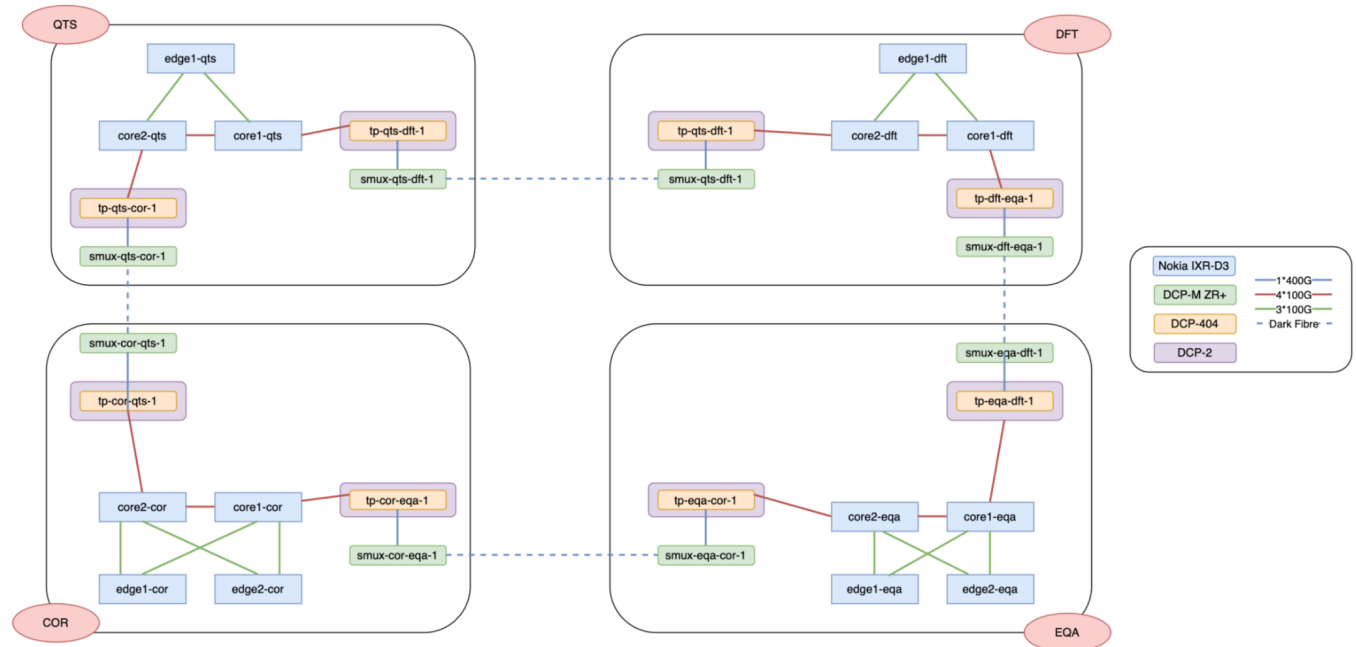
Wales Refresh

- LINX Wales will be migrated to Edgecore/IPI solution – parallel staging
  - November/December - new network will be pre-staged and run in parallel with the existing network.
  - This also means the last manually maintained extreme LAN will be removed and every LAN will be fully automated with self service.
  - Member moves will follow shortly after and announced through the usual means.

Change Freeze

NoVA Thanksgiving Change Freeze

- From 17:00 EST on Wednesday, 22 November to 09:00 EST on Monday 27 November 2023

Christmas and New Year Change Freeze

- From 12:00 UTC on Friday, 15 December through to 09:00 UTC Tuesday, 2 January 2023

LINX Route-Server Update – Tim Preston

- OpenBGpd
- Bird1.6 and Bird2
- Alice Looking-Glass & Extended-Communities
- Stats

LINX Route-Server Update

- OpenBGPd
  - Deployed on all LAN's except LON1.
  - Received OpenBGPd 8.3 for testing.
    - Fixes for changing next-hop.
      - Required for Basic RTBH.
    - Fixes for filtering Extended-Communities.
  - Upgrade all RS2's with also a target to deploy on LON1.
  - OpenBGPd migrated to MAPS in LINX Manchester and LINX NoVA.
  - Still working with RSSF with other IX's.

LINX Route-Server Update

Bird1.6 and Bird2

- BIRD1.6 is EOL on 31 December 2023.
- BIRD2 will replace BIRD1.6 on al RS1's.
    - Will begin deployment in LINX Wales and LINX Scotland.
    - Once all RS1's are BIRD2 will deploy to all Collectors.
    - Deployment delayed:
        - Stable Debian/Ubuntu package not available for latest release.
        - Issue resolved by Developers providing a repository for this.
- Collapsed BIRD MAPS into AS8714 route-servers running as a 3rd instance.
    - Saves space, power and cost.
        - LINX Manchester
        - LINX NoVA
        - LINX LON1

LINX Route-Server Update

Alice Looking Glass & Extended-Communities
- Recent issues on AliceLG have been caused by Extended Communities not parsing through AliceLG causing it to crash.
  - Bug report opened with developer.
  - Plans to upgrade AliceLG to version 6.
  - Along with Birdwatcher.
- Working with other IXP's on an RFC/BCP on withdrawing use of Extended Communities on IXP route-servers. Currently in draft.
  - Recommendation to scrub .
  - OpenBGPd 7.7 has a bug for filtering out certain types of Extended-Communities.
- This will happen as each route-server is deployed with BIRD2 and OpenBGPd8.3.

LINX Route-Server Update

Stats

- Stats data collected by NET-SNMP scripts.
  - Perl for BIRD
  - Python for OpenBGPd
- Still uses RRDTool to create the stats graphs.
- Will look at using Prometheus exporter in 2024.

Thank you!