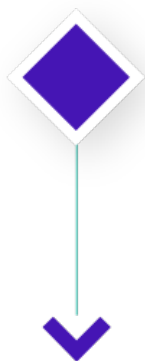# Technology Update

Richard Petrie &   **Anne Bates**
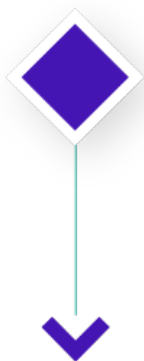CTO   Head of Exchange Platforms
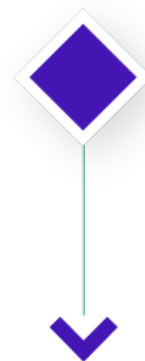
Thursday, 26th May 2022

LINX116

Operations Update

Review of service issues and maintenance work (Anne Bates)

Projects

Review of 2022 Projects

Route Servers

Update on our Route Server program

IX-API

Covering automation, v2 implementation, v3 development and supporting tools

Operations Update

Service Issues

Network Availability

- Since LINX115 we have seen high service availability and minimal service issues affecting members.

LAN	February 2022	March 2022	April 2022
LON1	99.9992%	99.9992%	99.9966%
LON2	99.9992%	99.9997%	99.9996%
LINXManchester	100%	100%	99.9996%
LINX Scotland	100%	100%	100%
LINXWales	100%	100%	100%
LINXNoVA	100%	100%	100%
JEDIX	100%	100%	100%

Service Issues

London - March

- Outage on LINX Collector (195.66.224.254 AS5459) 1st March 2022
    - Outage occurred whilst engineers were tracing cables.
    - This caused the interface of the collector to flap to its connected edge router which caused all BGP sessions to flap. Some sessions did no come back.
    - BIRD for IPv4 was restarted and all sessions re-established.

Service Issues

- LINX Collector for LON2 (collector1-tch-lon2 2001:7f8:4:1::1553:1 AS5459) 9th March 2022
  - A few IPv6 BGP sessions to members went down.
  - This outage was caused by a duplication of IPv6 on our monitoring network.
  - We removed the duplicate address to restore sessions.

- RS4-LON2 port flap 195.66.237.230/2001:7f8:4:1::220a:2 15th March 2022
  - While replacing the management switch in our management rack in TCH we disturbed the ILO port on RS4-TCH. This caused all LON2 sessions to RS4 to flap.
  - After replacing the cable, it became apparent that the issue was with the NIC, which was swapped out the next day under an emergency maintenance.
  - All sessions recovered after 10 minutes as the BIRD kernel needed to be restarted.

Service issues

London

- Dark Fibre between Telehouse North and Colt VPoP Down 13th April 2022
    - Note this is a single fibre, transmission PoP site
    - The connection to the probe in the Colt VPoP and the rest of that site was lost affecting two members.
    - Patching was swapped at the odf on our side and the fibre was restored, no root cause found.

JEDIX

- Jeddah Data Center Power Issue 23rd April 2022
    - All LINX infrastructure lost power at the data centre, thereby meaning all members peering at this exchange lost connectivity as a result.
    - We are awaiting the report from the DC, following their detailed investigation.
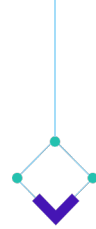
Operations Update

Maintenances

Maintenances

- Maintenance work to note for members which require action

    - LINX peering LAN IPv6 link-local address static configuration

    - LINX LON1 Netmask Change

LINX Peering LAN IPv6 link-local address static configuration

- LINX plan to enforce Appendix 1, Section 3.1 of the MoU; more specifically - IPv6 addresses (link & global scope) shall be explicitly configured and not auto-configured. This is to prevent ipv6 link-local addresses being duplicated across the exchange.

- In our peering LANs, we plan to start filtering all traffic sourced from non-assigned IPv6 link-local addresses starting from mid-June.

- Members should confirm the IPv6 link local address assigned on the portal https://portal.linx.net/my-services/port-based
This is the member mac address converted to an EUI-64 IPv6 link-local address.
In the vast majority of cases this will be the address already assigned by the network operating system so no change will be required.

- If this is not the case, the link local address should be explicitly configured asap.

LINX LON1 Netmask Change

- LON1 IPv4 network has changed from 195.66.224.0/22 to 195.66.224.0/21

- More than 50% of members have made this change

- LINX NOC will start tomorrow contacting over 300 members that haven't changed netmask If you haven't already then please make this change

- https://www.linx.net/linx-lon1-netmask-change/

LON1 Netmask Change - LINX
To enable the ongoing growth of the LINX LON1 peering LAN, the assigned IPv4 network will be changing from...

www.linx.net

Projects

Projects

- 400GE
- Equinix, Slough expansion
- Manchester, (+MA5 expansion)
- Research and Proof of Concept work
- Cloud compute investigation for LINX OSS layer
- Router Servers
- IX-API

Projects

- 400GE
  - Nokia SR7s deployed to Harbour Exchange and Telehouse
  - Expansion to other LON1 sites in planning
  - Slough re-design will enable 400GE
  - PoC to be run on the Juniper LC9600 card for the MX10Ks

Projects

- 400GE

- Equinix, Slough expansion
  - Re-design options based on both Nokia and Juniper solutions
  - Transmission (ISL) network needs upgrading
  - Work with Equinix on space and costs is in progress
  - Adding room for multi-year growth, 400GE capability

  - Design sign off Q2
  - Order Q2 and delivery Q3
  - Implementation, as soon as we have hardware
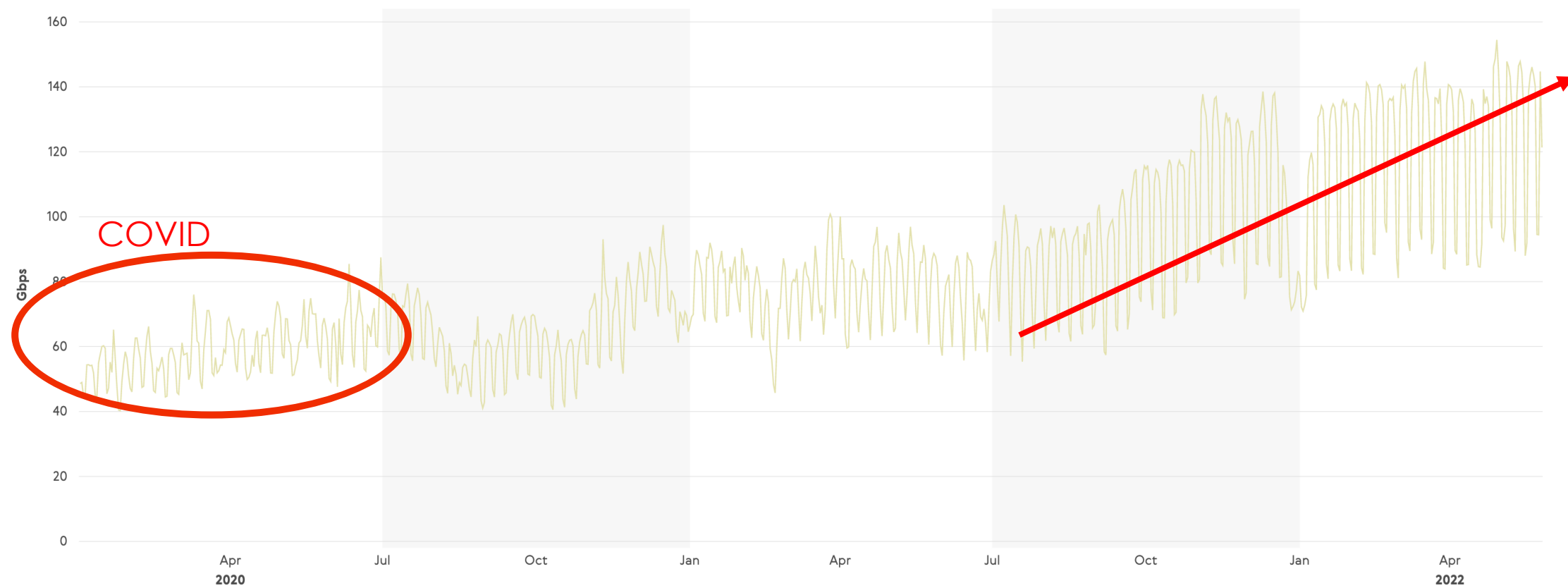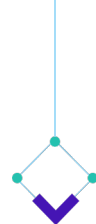 - Update at LINX117

Projects

- 400GE

- Equinix, Slough expansion

- Manchester, (+MA5 expansion)
  - Significant traffic growth over the last 2 years
  - Signing final contracts now on latest expansion, MA5 - May-22
  - Expectation is 4-6 weeks for DF and cabs build
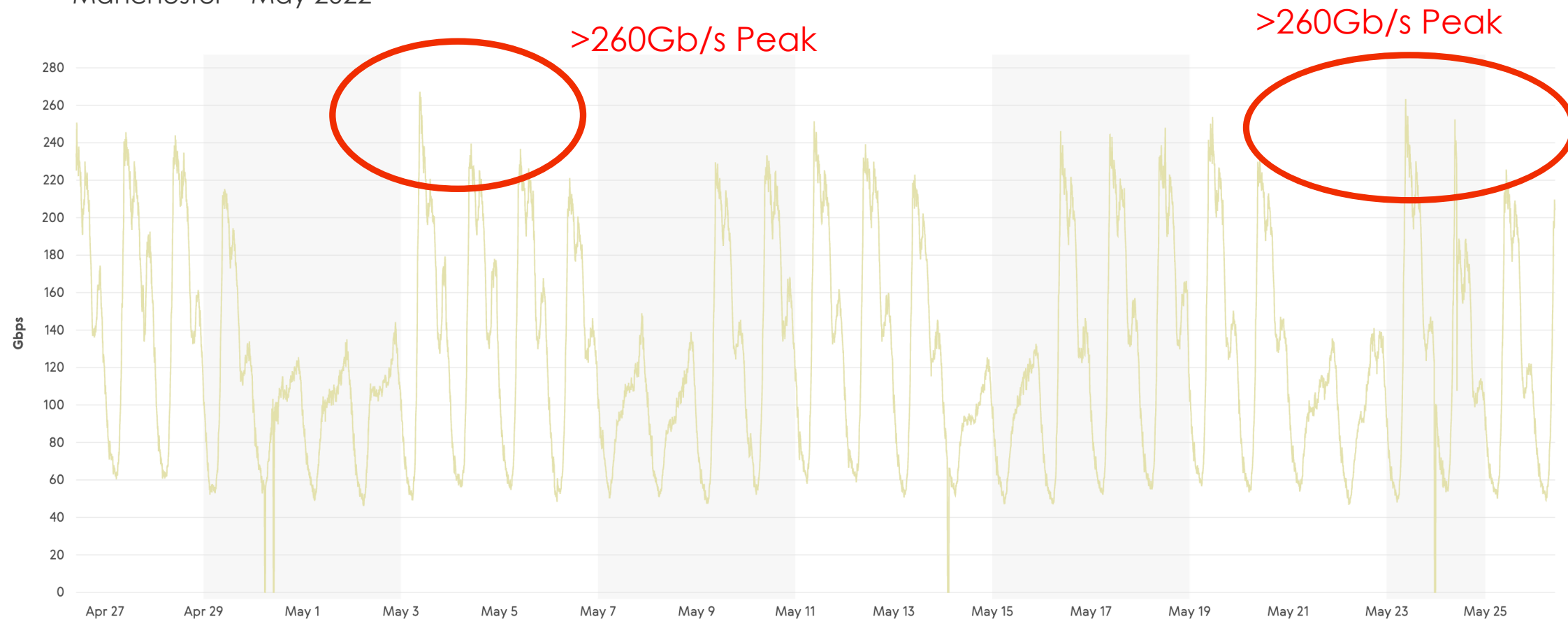 - Then LINX network build – Jul-22
  - Go-live ~Aug-22
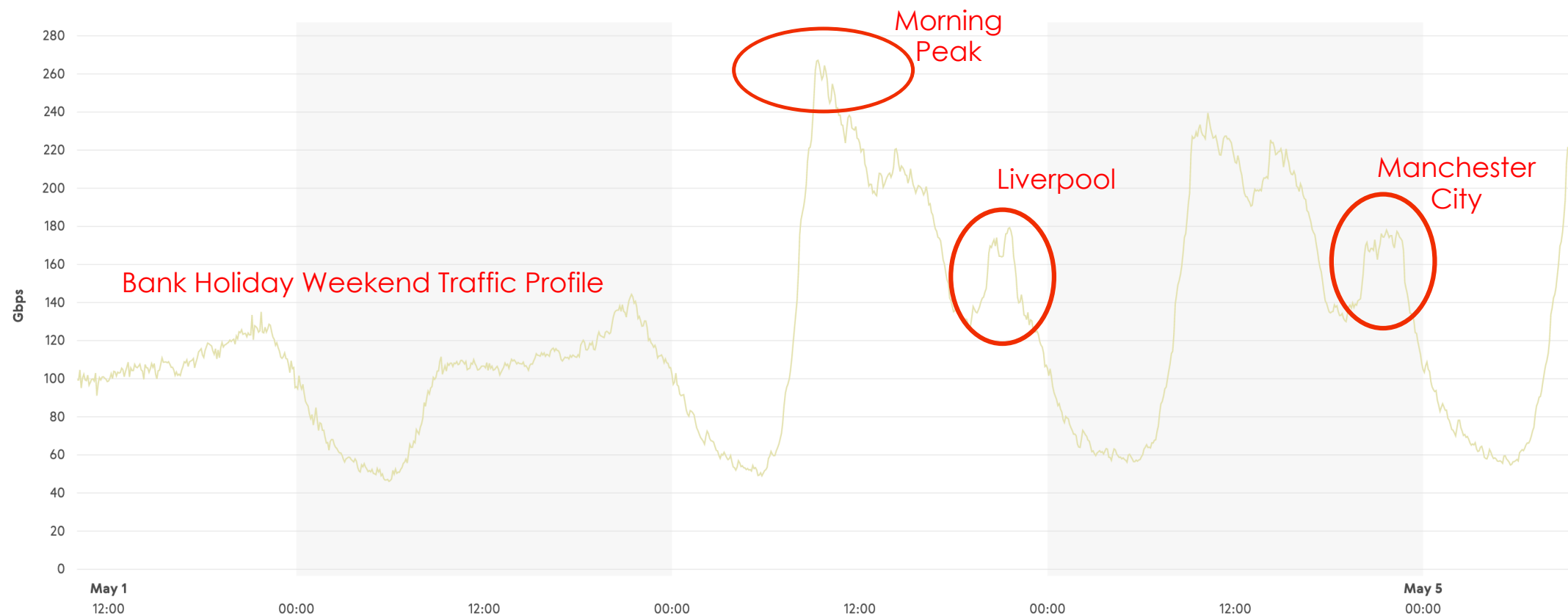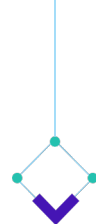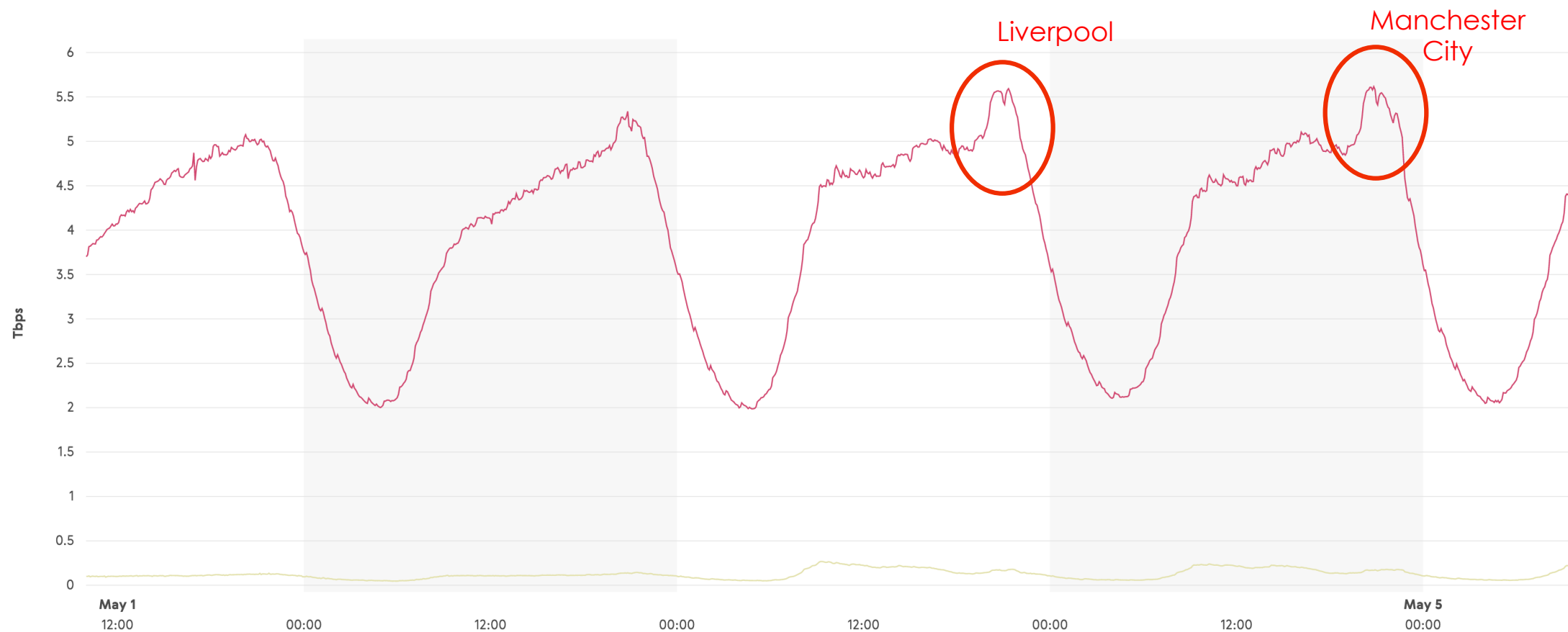
Manchester 1st January 2020 to date

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Manchester – May 2022

>260Gb/s Peak

>260Gb/s Peak

Manchester – Champions League Semi-Finals

LON1 – Champions League Semi-Finals
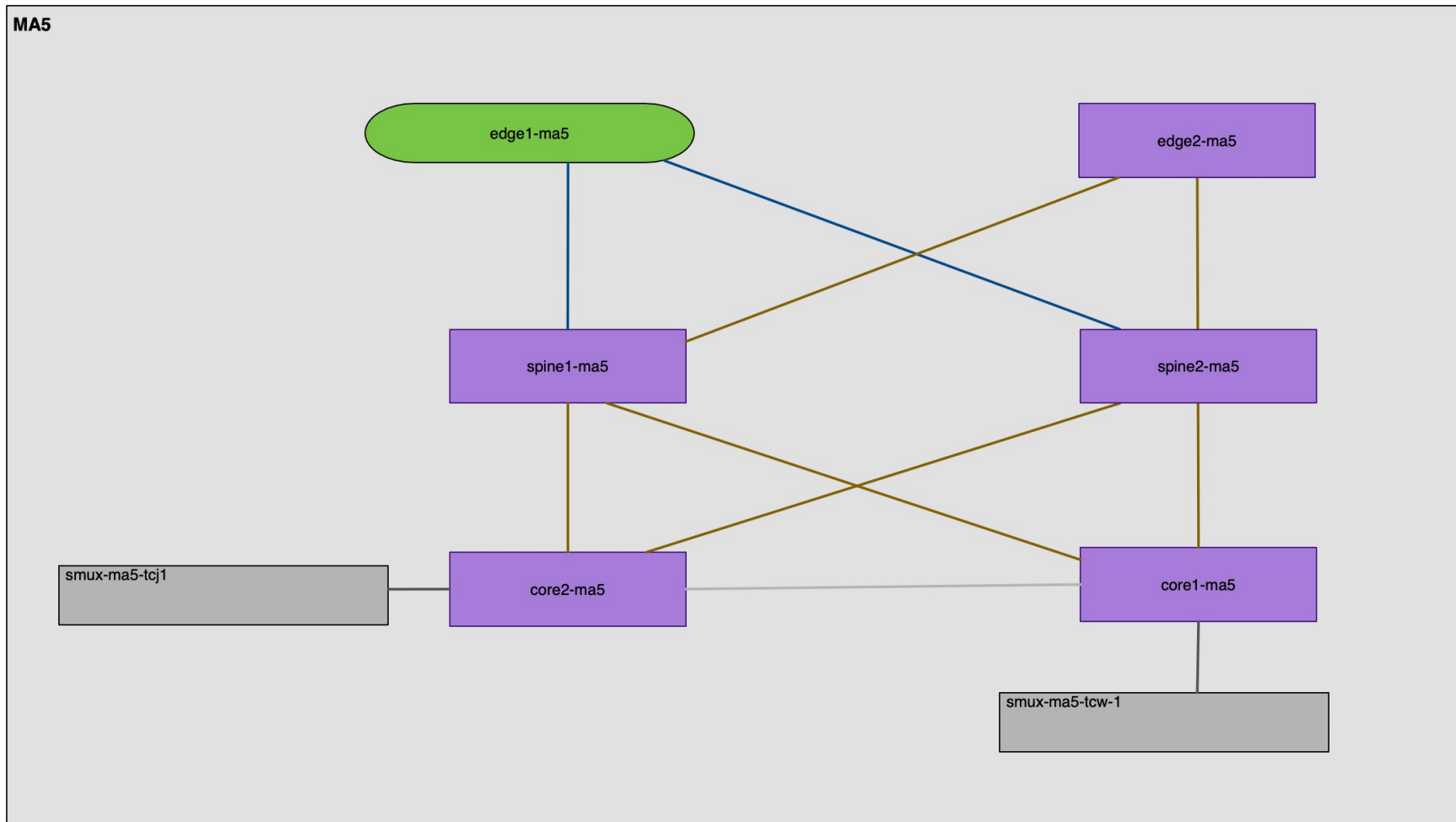
www.linx.net
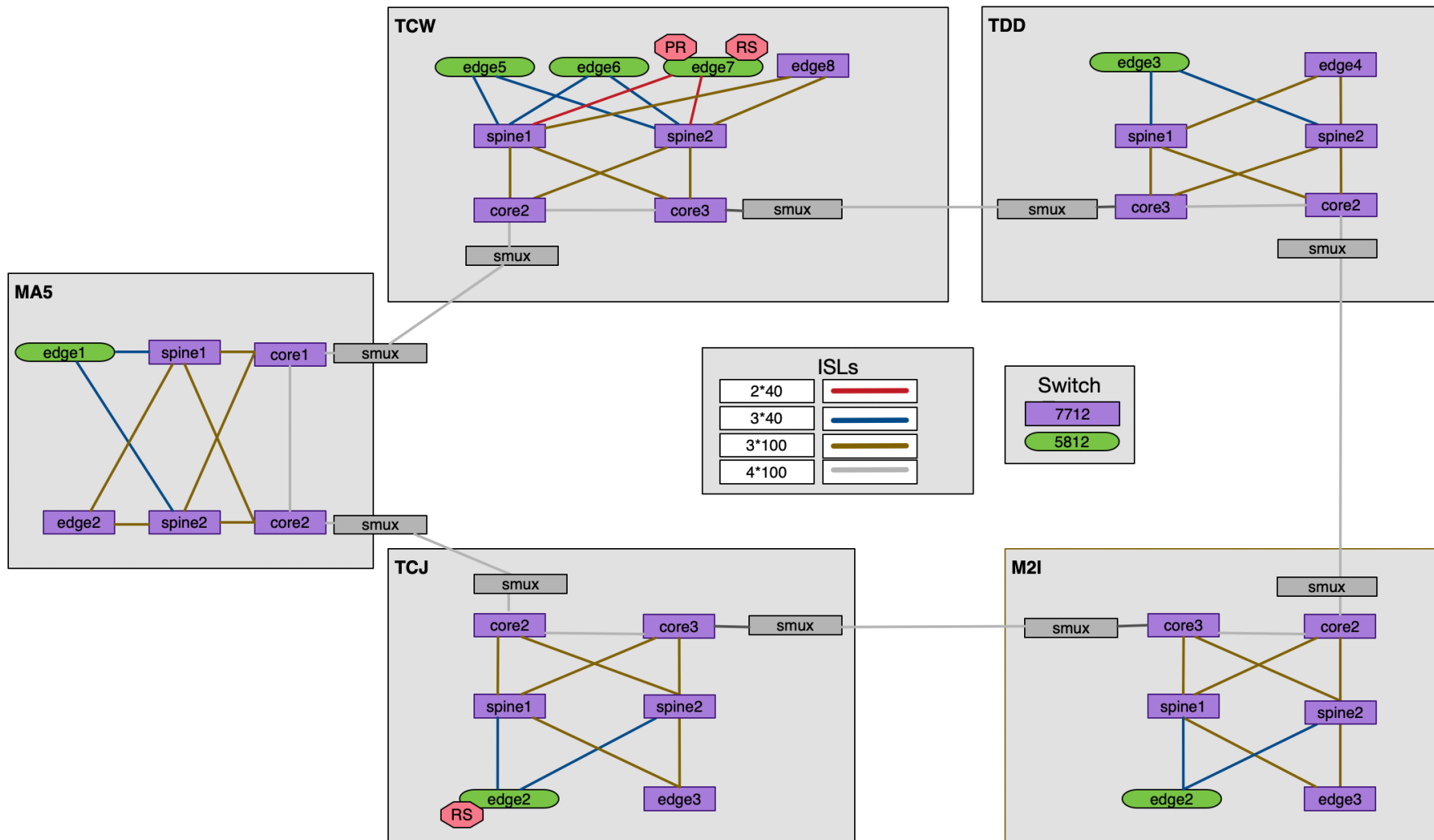
Projects

- 400GE
- Equinix, Slough expansion
- Equinix, Manchester, MA5 build
- Research and Proof of Concept work
  - Nokia 7220 D2 and D3 evaluation
    - Alternative to Edgecore for some geographies
    - We will be testing next-gen Edgecore 10, 100 and 400G devices as well
  - Smart Optics 400GE
    - Kit is on long lead times
    - Would allow us to consolidate n*100GE ISLs and provide capacity growth
  - Juniper LC9600, 400GE line card

Projects

- 400GE
- Equinix, Slough expansion
- Equinix, Manchester, MA5 build
- Nokia 7720 evaluation
- Smart Optics 400GE
- Cloud compute investigation for LINX OSS layer
  - Still in evaluation phase
  - We are improving our OSS design as part of a wider improvement
    - firewall architecture
    - monitoring and observability architecture
    - the cloud interconnection design
    - as well as deciding what could go to public cloud

Projects

- 400GE
- Equinix, Slough expansion
- Equinix, Manchester, MA5 build
- Nokia 7720 evaluation
- Smart Optics 400GE
- Cloud compute investigation for LINX OSS layer
  - Still in evaluation phase
  - We are improving our OSS design as part of a wider improvement
  - We wait on TSR consultation feedback for clarity on the impact to LINX considering:
    - our tier status
    - the third-party supplier rules
    - security critical functions
    - network oversight functions

Route Servers

Route Server Program

- Operational release for the Openbgpd Route Server:
  - Following on from the RSSF presentation given earlier, LINX will deploy the Openbgpd Route Server into operations at our Scotland and Wales Exchange Points
    - Scotland – 20th June 2022
    - Wales – 23rd June 2022
  - The UAT has been passed for the LINX router server automation (RSA) tool chain (Feb-22)
  - The UAT has been passed for the newly developed Alice LookingGlass application (April-22)
  - The Openbgpd Route Server will provide the same capabilities and functionality as the BIRD Route Server

Route Server Program

- For 2022, we are progressing on our diversification strategy. The high-level roadmap update is here:
  - Sign-off and acceptance into operations for the Openbgpd Route Server
  - Review and assessment of the BIRDv2 release
  - Upgrade of production BIRD RSs to v2, with improved configuration design
  - Further testing of Openbgpd software releases for large IX scaling
    - There after upgrades to Manchester and NoVA if possible

www.linx.net

IX-API

IX-API

- For general ix-api documentation, contacts and sandbox details please visit the ix-api website - https://ix-api.net/.

- For LINX ix-api version 2 documentation please visit https://ix-api.linx.net/api/v2.

- Version 2 has now been released by our technology teams and it is currently being beta tested with selected partners:
  - This covers all backend systems work, integration and automation workflows.

- Versions 2 release provides the ability to:
  - Query for our available services and locations.
  - Manage own account and contacts or sub-customer's ones.
  - Order peering services on existing ports (incl. route server and collector functions).
  - Order vlans: point-to-point (PVLAN) and multipoint-to-multipoint (Closed User Group).
  - (Coming soon) Order cloud connect services.

IX-API

- Version 3, is under development and will cover statistics and network event data sets
  - Member engagement event in late 2021
  - Planning – June (planned)
  - Sandbox and reference implementation build – July and August (expected)
  - Internal implementation – Q4 (pending other priorities)
- Since the early development by LINX, AMS-IX and DE-CIX we have seen steady progress with ~10 partners consuming the API and ~5 other IXs working on implementations
- We continue to look at ways to help and document back-end systems work to leverage the full benefits of the IX-API model
- We welcome and support the work on Peering Manager which is under development against ix-api as well. https://peering-manager.net/

Thank you