

The background of the cover is composed of several overlapping geometric shapes. A large green triangle is on the left, a teal triangle is on the right, and a dark purple triangle is at the bottom. A diagonal white line separates the green and teal areas. In the top right corner, there is a black triangular area containing a grid of small, glowing dots in blue, purple, and red, creating a digital or network-like effect.

# London Internet Exchange

Annual Report 2021



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## What LINX Stands For

“As an Internet exchange operator, and as a voice on behalf of its members in public affairs, LINX has occupied a special place in the UK market and the global network operator community. Looking to the future, our task is to build on this and strive for more, taking pride in past achievements but also recognising that there are market challenges ahead. As a team we can face the challenges ahead confidently, with the energy and ideas to develop new products and processes, built on the strong foundations we already have in place.”

**Kurt-Erik Lindqvist**  
LINX Chief Executive Officer

# Group Strategic Report

## For the Period Ended 31st December 2021

The company is a membership organisation whose principal activity is to provide Internet Exchange Points for the mutual benefit of its members, to promote the interests of its members, and to represent its members in matters of public interest.

LINX's reach is wide and in its services sector it is a very significant player. LINX continues to attract new worldwide members who are based in Europe, the Middle East, Asia, Africa, the Americas, and Australasia.

The London Internet Exchange is a group of four companies. London Internet Exchange Ltd established in 1994 (LINX Ltd), and London Internet Exchange Trading Ltd established in 2013 (LINX Trading Ltd), are the two UK companies in the group in respect of which audited accounts are filed at Companies House.

The group also comprises two overseas companies: LINX USA Inc. and LINX America Inc. LINX USA was established in 2013 as the operational vehicle for LINX NoVA, our Internet exchange in Northern Virginia. LINX America was established in 2014 to support the promotion of LINX NoVA. The results of these companies are included in this consolidated report and accompanying financial statements.

This report therefore covers both LINX and the consolidation of the group as a whole. This Group Strategic Report was approved by the Board and signed on its behalf.



**Kurt-Erik Lindqvist**  
LINX Chief Executive Officer





# CEO's Report

## Business Review

The COVID-19 pandemic continued in 2021, but despite the effects of this the Directors consider the company has had a high level of performance and has executed on its strategy.

As COVID-19 related restrictions eased, staff were allowed to return to the offices and continued until further restrictions were imposed at the end of 2021. The company adapted to the situation early in the pandemic and provided tools for staff to continue to perform their work remotely. This has allowed productivity to remain high and at levels similar to pre-pandemic.

Demand for Internet communications, which drives the need for the company's wholesale products, remains high with the company seeing new traffic peaks several times across all its operating platforms. Peak traffic grew from 5.8Tbps to 6.6Tbps during 2021. The Directors consider this continued growth as the pandemic slowed, showing that demand will continue independent of the pandemic.

The outcome of 2021 demonstrates the Directors' view is justified as connected capacity also continued to increase. In 2021 it grew by 18% to 43.7Tbps (37Tbps in 2021). Performance metrics remained high with network availability over 99.999% across all services and member satisfaction and Net Promoter Scores were very positive.

Financial performance remains high with total sales coming in slightly higher than budget. The restrictions during the pandemic meant that some cost savings were realised leading to a net financial result considerably better than budget, with a surplus of £1.76M.

We remain optimistic about the future, and for 2022 we continued our long-standing trend of price reductions. At the start of the year a new pricing model was introduced which separates the pricing for the port on the platform from the service and capacity used. This allows for a more granular upgrade path for our members which provides more value. In addition, a price reduction of 5% to 10% was also introduced from 1st January 2022, depending on from which LAN services are provided.



## CEO's Report

### Business Review (cont.)

Despite the pandemic and associated restrictions LINX made progress on all areas of strategy. LINX completed the ISO27001 certification at the end of 2021, a key project to ensure LINX can meet future security and compliance needs. LINX also made significant progress on automation with all non Extreme Networks based platforms now under automation. This in combination with the launch of a new membership portal will allow for a high degree of self-service and increased scalability as LINX develops.

During 2021 we also deployed the first 400GE port, again highlighting the continuous need for increased capacity at LINX. We further signed another contract for managed IXP services with ManxIX in the Isle of Man.

We see that the demand for general interconnection services, besides our traditional peering platforms, continues to also grow in new enterprise segments. With the Cloud Connect, Private VLAN and repositioned co-location services, all launched in 2021, we are well positioned for capturing this market in the future.

The start of 2022 has been in line with expectations. Following reduced and restructured pricing, delayed CAPEX spend and sales activities in 2021, we have budgeted for a small deficit in 2022, returning to a net surplus in 2023.

Our available cash reserves remain strong and at a higher level than 2020 due to the lower than anticipated spend, including CAPEX, in 2021. This leaves us well placed for the investments planned for 2022 as well as any challenging trading conditions.

**"The interconnection market remains very competitive, yet in this challenging market our membership continued to grow with 95 new member applications received during 2021 [88 in 2020]. Our membership totalled 890 at the end of the year [881 in 2020], widespread across 81 countries."**

**Kurt-Erik Lindqvist**  
LINX Chief Executive Officer

### Risk Review

The business regularly reviews a wide range of risk factors across all areas of the business. A comprehensive risk register, that encompasses both operational and financial risks, is regularly updated and discussed at a senior management level, and twice a year at board level.

### Principal Risks and Uncertainties

Despite continued price pressure on peering port services, and taking into account our 10% price reduction at the start of 2021 and the sales campaign we ran during the second half of the year, port revenue came in just 4% below budget. Port revenue makes up 75% of total revenue. We saw continued strong sales for the 100Gbps ports with 194 new ports connected in 2021 (75 in 2020), and a further 23 awaiting provisioning at the end of the year.

Providing excellent levels of service is an important factor in retaining existing and gaining new revenue streams. Our network availability and resilience remained very high and our close relationship with our members enabled us to satisfy their demands, as evidenced by positive feedback in our membership surveys.

We do not believe that COVID-19 will have a lasting effect on us going forward. We have decided to adopt a hybrid working model permanently and any reimposed restrictions would not have any significant effect on our operations, as proven during 2021.

During 2021 the shortage of semi-conductor components started to impact the wider telecom industry which has manifested in increasing lead times for new equipment. We are working with our existing vendors and evaluating new opportunities to make sure we can secure the supplies we need. This primarily affects the expansion to any new sites, and to a lesser extent our ability to provision new customers at existing sites. If this problem persists over a longer period, which seems likely, this may start to affect provisioning of new services. For this reason we continue to explore alternatives with our existing and new vendors which will mitigate longer lead times.

The OBR inflation forecast from February 2022 predicts that inflation will continue to rise to a peak in the second half of the year after which will recover relatively quickly to target. Inflation mainly affects certain parts of our SG&A costs such as staffing. At the same time a more permanent rise in inflation might put pressure on pricing, but this is uncertain. Given the current inflation forecast is a relatively temporary increase, this will have little effect on LINX. Activities to reach greater economies of scale combined with forecasted growth will still see us limit the financial impact.

This section was approved by the LINX Board on 27th April 2022.

## CEO's Report

### Financial Stability

Difficult business operational conditions are beginning to ease and this will improve our opportunities to capture new business. We expect additional demand to exceed the effects of the lower service prices and total revenues for 2022 should marginally exceed 2021 levels.

### Financial Key Performance Indicators

Our strategy of ongoing price reductions continues with the objective of maintaining competitiveness, retaining our current revenue streams, and sustaining demand. This approach has been vindicated with a 10% increase in turnover during 2021. At the beginning of 2022, in addition to offering further price reductions, we have also restructured our services to allow members to increase the level of the services they take without incurring similar sized price increases.

As with 2020, our ability to operate normally this year was not possible. Most marketing and member event activities remained suspended, or conducted remotely, with much lower attendance and were supported by staff working from home. The changed method of operation was a key element to the lower than expected overall expenditure and we will continue to focus on effectively managing our costs. However, we plan to reinstate the momentum of our member focused marketing and sales activities and this will result in our expenditure levels rising.

The 2021 net result of a surplus of £1.8M was a 50% increase in comparison with the previous year (£1.2M in 2020). The 2021 result was achieved despite turbulence in the economy following the COVID-19 outbreak, with expenditure managed accordingly and some activities curtailed. We expect the increased spend in 2022 will result in a deficit which can be readily covered within the level of our reserves.

The Directors consider that LINX should continue to maintain an appropriate balance in retaining a strong financial position alongside a policy of reducing prices. Despite the effects of the worldwide pandemic this approach is still vindicated by a continuing inflow of new members, the growth in provided services and the membership endorsed policy of driving down fees.



### Future Outlook

**LINX strategy has been formulated as:**

**For LINX to continue to create value for existing members, we need to offer services across the interconnect spectrum and industry segments at an attractive price point.**

**LINX also needs to be attractive for new members in an increasingly competitive environment in order to bring value for existing members.**

**To achieve this LINX needs to:**

- 1. Strive for greater economies of scale and lower working capital requirements which allows for LINX to follow market pricing.**
- 2. Broaden the interconnect offering to ensure market relevance.**
- 3. Ensure broad geographical and industry segment targeting including emerging market segments.**

Work will continue to fulfil each of these pillars. We expect to announce further partnerships for managed IXPs in 2022, as well as launch the LINX Marketplace product which allows member to member sale of services across the platforms. These will both widen LINX's interconnect offering and provide additional value for existing members and prospects.

During 2022 we will further develop automation and tooling, including member facing self-service features in the portal. This will speed up service delivery and provide greater economies of scale. LINX will also be refreshing many internal tools and systems during 2022 / 2023 such as finance and billing, and engineering tools etc, that will allow for more process automation.





# Chairman's Report

During 2021 the Board spent a lot of time around the pricing strategy and model which was voted through at the November 2021 EGM. This work is of strategic importance to ensure we can price and provide services in a range that will provide both an affordable growth path for existing members and attractive entry products for new members. Changing the pricing model was a key priority for the Board during 2021.

The Board proposed three MoU changes, two at the May AGM and one at the November EGM. At the AGM a change to the MoU allowing LINX to decline to interact with certain individuals following unacceptable behaviour was approved, and a second resolution that removed the need for LINX to operate a dedicated LAN for multicast traffic. At the November EGM a resolution was tabled to change the address of the LINX mailing lists as described in the MoU. All resolutions passed after prior consultation with the membership.

The May AGM also saw an election for two board seats which became vacant due to two Board members retiring by rotation. Steve Wright did not seek re-election having reached the maximum time limit allowed of nine years. Mike Blanche was re-elected, and Alex Bloor was elected as a new Board member.

The Board provides oversight of operations with reviews throughout the year of departmental roadmaps and company objectives that are reviewed throughout the year.

During 2021 the Board held ten board meetings.

A handwritten signature in blue ink that reads "Pieter".

**Pieter Knook**  
LINX Chairman



# LINX Board and Governance

## LINX Board and Governance

### Corporate Governance Report

The Board holds regular board meetings throughout the year, including an annual strategy review session. The Board also meets when necessary to discuss important emerging issues that require Board consideration in addition to scheduled Board meetings.

The Board operates three sub-committees whose voting members consist of non-executive directors. Executive directors and staff with specific relevant expertise are invited to attend the meetings where appropriate. Following each meeting, the Chairs of the sub-committees provide updates to the Board, summarising activities undertaken and key decisions taken and/or presenting proposals requiring final Board approval.

The following table shows the number of Board meetings and sub-committee meetings held in 2021.

	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
Board	•		•	•	•	•	•		•	•	•	•
FRS				•					•	•		
Govco			•				•					•
Remco							•				•	

Key:  
• Scheduled meeting  
• Additional meeting

### Board Meetings in 2021

The table below shows the Board members attendance record at Board meetings in 2021.

Board members	Scheduled meetings attended/ Eligible meetings to attend
Pieter Knook (Chair)	10/10
Mike Blanche (Vice Chair)	9/10
Seb Lahtinen	10/10
Neil McRae	8/10
Pete Stevens	8/10
Lee Hetherington	10/10
Steve Wright *	4/4
Alex Bloor**	6/6
Kurt-Erik Lindqvist	10/10
Malcolm Huty	10/10
Malcolm Holt	10/10
Richard Petrie	10/10

\*Left the Board in May 2021

\*\*Joined the Board in May 2021



LINX Non-Executive Directors



**Pieter Knook**  
LINX Chairman



**Mike Blanche**  
Google



**Lee Hetherington**  
Facebook



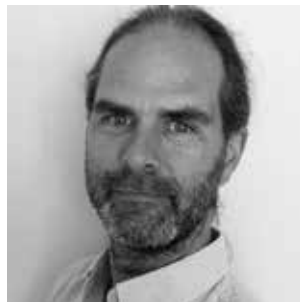
**Seb Lahtinen**  
NetConnex



**Neil McRae**  
BT



**Alex Bloor**  
Andrews & Arnold



**Pete Stevens**  
Mythic Beasts

LINX Executive Directors



**Kurt-Erik Lindqvist**  
LINX Chief Executive Officer



**Richard Petrie**  
LINX Chief Technology Officer



**Malcolm Hutt**  
LINX Director of Legal and Policy



**Malcolm Holt**  
LINX Chief Finance Officer

LINX Board Sub-committees

In addition to regular Board meetings, LINX has three sub-committees. These are:

- Finance, Risk and Security sub-committee (FRS)
- Governance sub-committee (Govco)
- Remuneration sub-committee (Remco)

LINX Board and Governance

Finance, Risk and Security Sub-committee (FRS)

The FRS delivers oversight of external audit as well as the prudence of financial reporting and controls operating within LINX. Additionally, the FRS reviews the effectiveness of LINX’s internal risk management processes and controls to ensure that these respond appropriately to developments, regulatory demands, and external risks.

This table shows the Board members attendance record at FRS meetings in 2021.

FRS members	Scheduled meetings attended/ Eligible meetings to attend
Pieter Knook (Chair)	3/3
Neil McRae	3/3
Pete Stevens	3/3
Steve Wright*	1/1
Alex Bloor**	2/2

\*Left the Board in May 2021  
\*\*Joined the Board in May 2021

In addition to the members, regular attendees of the FRS include the CEO, CFO, Director of Legal and Policy, Finance Manager and Company Secretary.

Governance Sub-committee (Govco)

The Govco oversees the company’s governance arrangements (processes and documents) on behalf of the Board to ensure they are in line with best practice. This includes preparing matters for consultation with the members, including proposed resolutions.

The Board members attendance record at Govco meetings in 2021 can be seen in this table.

Govco members	Scheduled meetings attended/ Eligible meetings to attend
Seb Lahtinen (Chair)	3/3
Lee Hetherington	2/3
Mike Blanche	3/3
Steve Wright*	1/1
Pete Stevens**	2/2

\*Left the Board in May 2021  
\*\*Joined Govco in June 2021

In addition to the members, regular attendees of the Govco include the CEO, Director of Legal and Policy and Company Secretary.



In its activities, the Remuneration Sub-committee (Remco) also considers external expert advice including benchmarking data.

# LINX Board and Governance

## Remuneration Sub-committee (Remco)

Remco recommend remuneration structures and policies to the Board, that enable LINX to meet its strategic and operational targets. In doing so it reviews and proposes performance measurement mechanisms, pension contributions, pay policy, bonus opportunity, employment terms, etc.

Each year Remco reviews and approves the specific remuneration, terms and performance of senior staff including the CEO, for its relevance and appropriateness. ‘Senior staff’ means any member of the Senior Management Team, a key employee, or any employee with a full-time equivalent base salary exceeding £90,000 gross annual salary, before any salary sacrifice.

Remco members	Scheduled meetings attended/ Eligible meetings to attend
Mike Blanche (Chair)	2/2
Lee Hetherington	2/2
Pieter Knook	1/2
Seb Lahtinen	2/2

In addition to the members, regular attendees of the Remco include the CEO, HR Manager and Company Secretary.



## LINX Member Meetings

The LINX member meetings are an integral part of the LINX calendar. Unfortunately, due to the restrictions imposed by the COVID-19 pandemic, we were only able to stage one in-person event during 2021. This took place at the Park Plaza, Victoria in London in November.

### LINX112

Thursday 18th February (Virtual Event)

This online event attracted 155 registrants from 90 different organisations. The meeting featured a consultation on proposed changes to the LINX MoU on corporate representatives, Africa’s Cloud and Content Evolution, and the NaMeX Market Place facility. There were operational updates from the Public Affairs and Technology teams, and the inaugural LINX ConneXions Reseller Awards.

### LINX113, AGM and Board Elections

Tuesday 25th May (Virtual Event)

LINX113 featured the second online LINX annual general meeting and Board election. Two seats on the Board were being contested and following voting Mike Blanche of Google was re-elected for another three years, and Alex Bloor of Andrews & Arnold joined the Board.

Amongst the presentations were talks on subsea cabling, Internet routing, plus guest Internet exchange, UIXP, from Uganda.

### LINX114 and EGM

Wednesday 10th and Thursday 11th November (In-Person Event)

The first in-person event in nearly two years saw 264 registrants from 112 different organisations sign up. The EGM session included a vote to approve the 2022 services and fees, a revision of LINX Memorandum and Articles of Association, plus approval of Board remuneration.

Agenda topics included the introduction of 400GE connectivity, peering automation, AltNet infrastructure, sport streaming post-COVID, and a panel on content access.



# LINX Network

## A Focus on Technology

Our technology focus tends to start with the foundation of our business and in that, building scalable, secure, and reliable networks.

## LINX Network

### LINX Technology Report

In 2021, we focused on managing traffic expansion across all locations, embracing new port speeds up to and including 400GE services, and expanded to new locations and points of presence (PoP).

As we all learnt to deal with living in a world with COVID as a backdrop, the changes seen in work practice in 2020 continued throughout the most of 2021. This meant the high growth rates of traffic seen in 2020 remained and even grew further in 2021, with cumulative peak traffic exceeding 6.8Tbps and our total port capacity exceeded 42Tbps.

### Service and Quality

Another important factor as we grow as a business in size and reach is security and high-quality operations. We decided to take on readiness in meeting the ISO27001 certification through building good working practices, securing systems, locations, and data; and in documenting our processes and policies. This allowed us to successfully complete certification of Stage 2 assessment in December. We look forward to formal certification to be issued in early 2022.

### Innovation

The evolution of LON1 and 400GE, saw us move away from the layer 2 network technology that is VPLS and to the more modern and appropriate EVPN technology. We also invested in evaluation and successful deployment of member facing 400GE services, with our first member going live in November 2021.





## LINX Network

### LINX Technology Report (cont.)

#### Geographical Expansion

Geographical expansion focused on locations and exchange platform automation. This saw our LINX Manchester exchange migrated to Edgecore and IP Infusion technology, with network automation enabled. This takes advantage of our digital transformation services and new LINX portal, and its self-service functionality. Network expansion also saw us launch a new Internet exchange in the Isle of Man (ManxIX) and PoP expansion took in new sites in LINX NoVA (Iron Mountain and QTS).

#### Digital Transformation

Our drive to service more interconnection products and deliver a digital transformation for member services, saw our new member portal launch in November, taking in a new user experience and design, providing added functionality which includes self-service. The Digital Transformation is a wide reaching program, covering previous work on network automation in 2019, the technical service inventory build project in 2020 and our new digital workflow development in 2021. This is coupled with the updated portal to give a member interface for digital fulfilment that will grow further to provide insight and order management in 2022.

#### Community Collaboration

We also continued our collaboration with fellow Internet exchanges AMS-IX, DE-CIX and Netnod on a number of technical projects. Across the IX-API development where we agreed a version 3 specification. Work continued the alternative to BIRD, Router Server deployment, under the Route Server Support Foundation, utilising the OpenBGPD implementation, coupled with a new development of Alice Looking Glass.

“As we look towards 2022, the year ahead will unquestionably continue to see investment in automation and digital services. Growth across interconnection products and reach and with our investment in 400GE we will enable more networks for members and adopt transport services running at 400GE and in time 800GE.”

**Richard Petrie**  
LINX Chief Technology Officer

## LINX Network

### Impressive Growth at LINX Manchester

The exceptional performance of the Manchester exchange comes not only with respect to the notable traffic growth experienced in the last 12 months, but also in an ability to continually attract new and exciting content members who have significant capacity needs.

**"The co-ordinated approach to the promotion of LINX's regional Internet exchanges has paid off during 2021. We will continue this effort via our joint marketing campaigns, which alongside our rejuvenated Steering Committees are proving to be working extremely effectively."**

**Jennifer Holmes**  
Chief Commercial Officer

### UK Local Internet Exchanges

#### LINX Manchester

LINX Manchester continues its impressive growth, maintaining its position as the pre-eminent regional exchange in the UK and cementing its importance within the wider LINX community.

Total traffic now averages around 125Gbps, which is 30% up on a year ago, with peak traffic approaching 240Gbps (over 50% greater than the year before). Following the seamless integration of the Teledata Data Centre, connected last year as part of the exchange, it has proven to be a popular addition to our offering.

Connecting into Manchester is now increasingly seen to be of prime interest to global players looking for complementary solutions to their international infrastructure. This reconfirms LINX Manchester as being a highly important component of the UK's critical national infrastructure, at the heart of the UK economy.

#### LINX Scotland

LINX Scotland has experienced a marked increase in new members and a resultant major uplift in traffic levels from this growth. Traffic almost doubled in the last 12 months and now averages around 2.3Gbps with peaks of just under 5Gbps.

This heightened interest in the exchange, with new content members and connectivity specialists coming onboard, has been partly due to a greater investment of activity across LINX - joined up approaches from marketing (Spotlight on Scotland in particular); to engineering improvements (100G enablement); plus in-person attendance at local events from the LINX sales team.

#### LINX Wales

LINX Wales continues to attract local interest, where traffic is currently peaking at 570Mbps. With the new team at the Vantage Datacentre in place and the Welsh Government grant continuing to take effect, we expect steady traffic growth going forward. Springing from our Spotlight on Wales event, we continue joint marketing campaign activity with our datacentre partners. We have also managed to reignite the Steering Committee to provide key local influence and help promote the exchange as a key part of Wales' economic infrastructure.



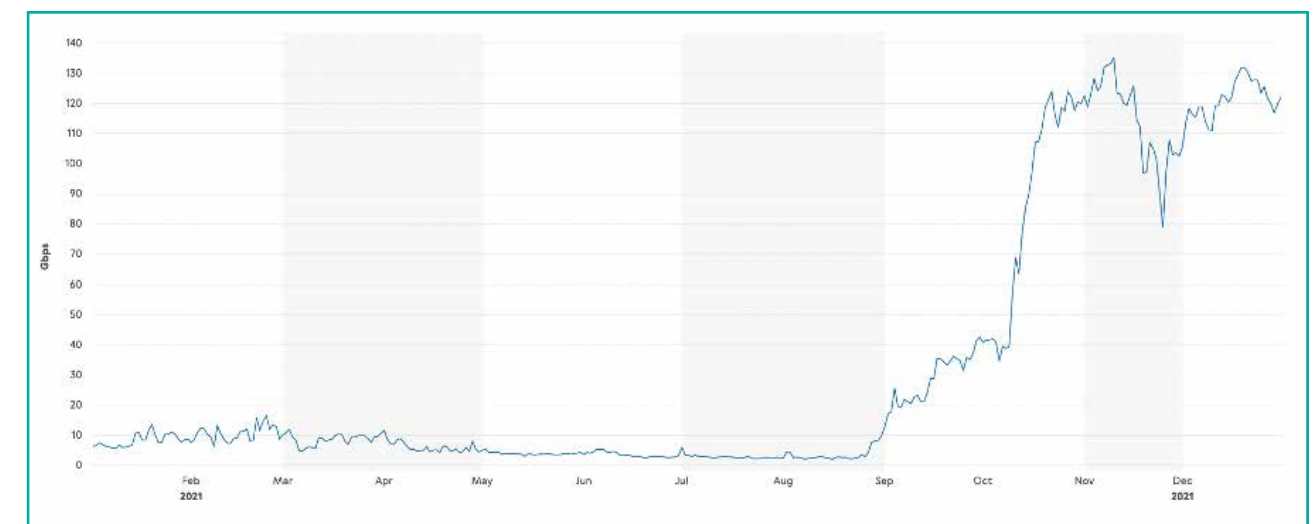
### International Local Internet Exchanges

#### LINX NoVA

LINX NoVA, LINX's regional exchange in Northern Virginia, USA, had a very exciting start to the year as new points of presence were opened at the Iron Mountain and QTS facilities. The exchange continues to see steady growth and support from local networks who are keen to have a diverse option for peering in the area. Traffic peaked at 96Gbps at the end of September, which was likely driven by the return of school and colleges following the summer break. NoVA also had another boost in the middle of the year as a partnership was launched between LINX and NYIIX in New York, allowing customers and members of the two exchanges to reach the other exchange via our trusted partner Epsilon.

#### JEDIX

What a year for the STC owned peering LAN, JEDIX in Jeddah, Saudi Arabia. The LINX run exchange in the Middle East saw staggering growth towards the end of the year with a number of networks coming on board. This saw a huge increase in traffic, reaching an all time peak of 190Gbps. This is an impressive growth considering that the LINX team were not able to visit the region to promote the LAN until much later in the year due to continuing COVID-19 restrictions.



JEDIX Traffic growth in 2021



## LINX Network

### Member Applications

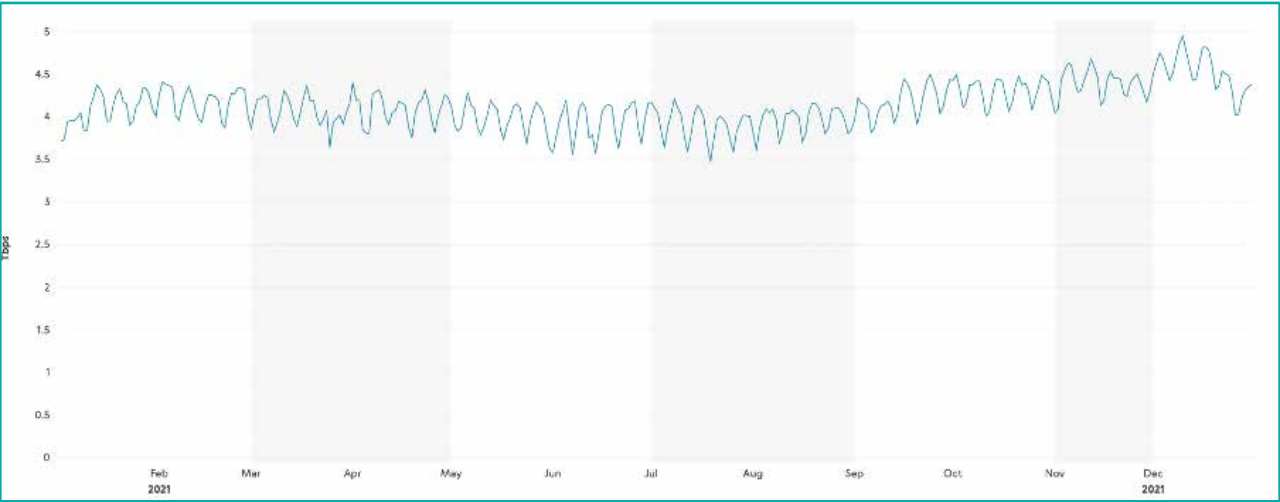
LINX had another strong year for new member applications receiving a total of 95 new applications for membership, 10 more than the previous year.

### Exchange Growth

The highs of network traffic seen during the pandemic were maintained and continued to grow throughout the course of 2021 as many businesses maintained a working from home status. Traffic continued to rise towards the end of the year with a peak of 4.9Tbps of aggregated traffic recorded in December 2021.

Despite the supply chain issues for member networks which started to creep in towards the end of the year, LINX received 80 orders for 100GE ports and over 190 orders for 10GE ports across all of its networks. Another significant milestone was the connection of the first member facing 400GE port, with more in the pipeline for 2022.

LINX member applications came in from near and far including networks from Singapore, Chile, Vietnam and Brazil to name a few. These applications contributed to the expansion of member networks from further afield, especially South America and Asia.



Aggregate traffic for 2021

# Membership Statistics

890	LINX Members
1000	Member ASNs
81	Member Countries
95	New applications in 2021
6.57	Terabits per second peak traffic on the public exchange
1784	Connected member ports
325	Member-facing 100GE ports
43.7	Terabits of connected capacity
241000	Number of prefixes on the Route Servers (LON1)





# LINX Network

## LINX Products and Services

We continue to expand our set of products and services that we provide to our members to cover a wide array of interconnectivity solutions. We started by introducing Private VLAN and Closed User Group services across our existing network fabrics. Both services allow members to use their existing or dedicated LINX ports to create private Layer 2 connections to other members or partners for many different use cases.

The availability of Private VLAN services on our infrastructure has also allowed us to start the introduction of Cloud Connect services. These services enable members to get direct Layer2 connections to several Cloud Providers. This currently includes Microsoft ExpressRoute, AWS Direct Connect and Google Cloud Interconnect. In addition, we have also introduced the Microsoft Azure Peering Service, which provides members who might not be accepted through the Microsoft Peering policy to still get direct public peering with Microsoft through their LINX port.

We expect to continue to evolve these products based on feedback and demand from our members while also continuing to improve portal and API functionality around all of our services. This will include self-service type functionality, either through the portal or IX-API, allowing for near real-time provisioning of logical services.

"While peering remains the core of our business, we continue to adjust our product offerings to the changing needs of our members."

Mike Hellers  
LINX Product Manager

## Products and Services by end of 2021

### LINX Products

- **Public Peering**  
Network traffic exchange over a shared network
- **Private Interconnect**  
Member point-to-point connections
- **ConneXions Partners**  
LINX connection via VLAN
- **ConneXions Access Points**
  - Datacentres with a LINX PoP
  - Datacentres with LINX transmission equipment
  - Datacentres with access to LINX via an approved Layer 2 carrier
- **Colocation**  
Rackspace at many of our locations, available directly through LINX
- **IXP Reseller**  
LINX connection from an existing Internet exchange
- **Private VLAN**  
Allows members to connect to other members from LINX over a single port
- **Closed User Group**  
A private Layer 2 domain for a group of members
- **Cloud Connect**  
Direct Layer 2 connections to a number of Cloud Service Providers
- **Microsoft Azure Peering Service**  
Managed direct public peering with Microsoft

### LINX Local Exchanges

- **LINX Manchester**  
Peering LAN in North West England
- **LINX NoVA**  
Peering LAN in Northern Virginia, USA
- **LINX Scotland**  
Peering LAN in Edinburgh and Glasgow in central Scotland
- **LINX Wales**  
Peering LAN in South Wales
- **JEDIX**  
Internet Exchange Point for the Middle East, supported by our strategic partner STC
- **ManxIX**  
Internet Exchange Point for the Isle of Man, supported by Bluewave Communications

### LINX Services

- **Public Affairs**  
Membership representation on matters of public policy
- **Route Servers**  
Free peering service of member advertised routes
- **Time Servers**  
LINX NTP (Stratum 1) time servers

# Finance Report and Statutory Accounts

## Finance Report and Statutory Accounts

### Chief Financial Officer Summary

During 2021, as for 2020, we adapted well to the changed operating conditions resulting from the COVID-19 pandemic and, despite these challenges, we continued with our policy of price reductions.

Demand for our services remained strong and, with the increase in our costs being held below the higher increased level of our revenues, we ended 2021 in a stronger position than we had at the beginning of the year. Consequently, we have used our increased reserves to support further price cuts at the beginning of 2022. However, with our activities planned to increase back towards pre-pandemic levels, we will see our costs increase and the results for 2022 are expected to show a deficit at a level easily managed within our existing resources.

Our projections from 2023 show our results returning to surpluses.

**Malcolm Holt**  
Chief Financial Officer

## Finance Report and Statutory Accounts

### Financial Summary

The 2021 net result of a surplus of £1.8M was a 50% increase in comparison with the previous year (£1.2M in 2020).

The 2021 result was achieved despite turbulence in the economy following the COVID-19 outbreak, with expenditure managed accordingly and activities curtailed.

We expect the increased spend in 2022 will result in a deficit which can be readily covered within the level of our reserves.

Statement of Income and Retained Earnings	2021 (£)	2020 (£)
<b>Turnover</b>	<b>16,635,214</b>	<b>14,898,784</b>
Cost of sales - direct and distribution costs	(4,005,713)	(3,433,706)
Staff costs	(6,210,356)	(5,671,586)
Operating lease rentals	(441,849)	(451,449)
Depreciation of fixed assets	(1,995,372)	(2,279,531)
Other administration costs	(2,120,382)	(1,834,690)
Other operating income	3,375	36,984
<b>Operating surplus</b>	<b>1,864,917</b>	<b>1,264,806</b>
Net interest receivable	9,468	23,107
<b>Surplus before taxation</b>	<b>1,874,385</b>	<b>1,287,913</b>
Tax on surplus from non-core activities	(86,406)	(15,456)
<b>Surplus after taxation</b>	<b>1,787,979</b>	<b>1,272,457</b>
Retained earnings at beginning of year	12,759,912	11,487,455
<b>Retained earnings at end of year</b>	<b>14,547,891</b>	<b>12,759,912</b>

### LINX Payment Cycles

The Board notes that LINX's payments cycle, with a significant portion of members paying in advance for services yet to be delivered, means the cash reserves must cover not only a prudent level of operating reserves, but also deferred revenue.

Balance Sheet	2021 (£)	2020 (£)
<b>Fixed Assets</b>		
At Cost - 1st January	25,717,633	23,590,233
Additions During Year	2,571,858	2,127,400
<b>At Cost - 31st December</b>	<b>28,289,491</b>	<b>25,717,633</b>
Accumulated Depreciation - 1st January	(22,283,257)	(20,003,726)
Depreciation - Charged During Year	(1,995,372)	(2,279,531)
<b>Accumulated Depreciation - 31st December</b>	<b>(24,278,629)</b>	<b>(22,283,257)</b>
Net Book Value - 31st December	4,010,862	3,434,376
Investments	103,723	-
<b>Total Fixed Assets</b>	<b>4,114,585</b>	<b>3,434,376</b>
<b>Current Assets</b>		
Trade and Other Debtors	537,792	810,625
Prepayments and Accrued Income	2,683,171	2,140,537
Cash At Bank	9,694,661	8,004,283
<b>Total Current Assets</b>	<b>12,915,624</b>	<b>10,955,445</b>
<b>Current Liabilities</b>		
Trade and Other Creditors	(588,068)	(559,113)
Taxation and Related Creditors	(10,553)	(244,867)
Accruals and Deferred Income	(1,866,685)	(813,971)
<b>Total Current Liabilities</b>	<b>(2,465,306)</b>	<b>(1,617,951)</b>
<b>Net Current Assets</b>	<b>10,450,318</b>	<b>9,337,494</b>
<b>Net Assets and Members' Funds</b>	<b>14,564,903</b>	<b>12,771,870</b>



## Finance Report and Statutory Accounts

### Reserves Policy

The Board seeks to maintain a prudent level of cash and operating reserves with a Reserves Policy.

The goals of the Reserves Policy are:

- To provide a level of working capital that protects the continuity of business and ensures we have cash available to meet requirements as they arise;
- To provide a level of funding for unexpected opportunities; and
- To provide cover for risks such as unforeseen expenditure and unanticipated loss of income, or delays or failure by our debtors to make payments when due.

### Reserves Policy

During the year we have clarified our approach towards holding reserves. When determining a prudent level of operating reserves to target, the Board believes that it is appropriate that LINX maintain a more cautious approach to risks than typical for an ordinary commercial venture of LINX's size, requiring a higher level of cover to protect against those risks.

LINX operates Internet Exchange Points that are considered part of the UK's critical national telecommunications infrastructure and we are regulated as an Operator of an Essential Service under the Networks and Information Systems Regulations (2018), as amended and strengthened in 2020. While our regulator, Ofcom, has not yet expressed a view on the level of financial reserves we should maintain, we are aware that it is considering risk management at every level of the business.

The Board also note the limitations in the tools available to it to keep the reserves close to the targeted level. Without the ability to pay a dividend, LINX's primary mechanism for preventing the accumulation of excessive reserves is to cut prices on services to members. Due to our governance and member and market expectations, it is not easy to raise prices once they have been cut. At the time of instituting a price cut, it is not known whether or to what extent a price cut will stimulate further demand.

As a result, making steep price cuts intended to reduce excess reserves would run the risk of introducing a structural deficit that may be difficult to recover. The Board intends to approach such choices cautiously, so as to avoid imperilling the long-term financial viability of the business. This introduces a structural bias in targeting error toward the upside of target, which will sometimes result in a larger level of reserves than intended, as at the reporting date. The Board considers this a prudent and appropriate choice in our circumstances, considering the risks of the alternative.

The Board is keeping the level of reserves targeting under review.



# Public Policy and Internet Regulation

## Public Affairs in Focus

This section includes analysis by LINX's Director of Legal and Policy, Malcolm Huty.

Two of major items of legislation are covered: the Digital Services Act, and The Telecommunications (Security) Act.

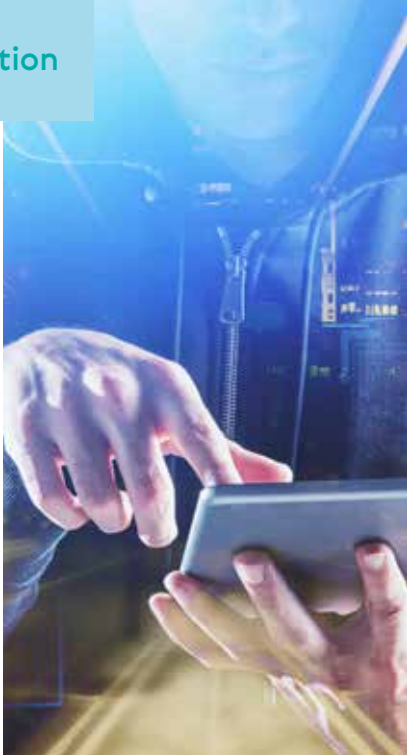
## Public Policy and Internet Regulation

### Digital Services Act

2021 saw the culmination of a major, multi-year Public Affairs initiative, with the creation of the Digital Services Act ("DSA"), a European Union Regulation. At the time of writing, the DSA has completed its passage through the main legislative stages, and is in the final reconciliation (or "triadogue") stage, where the Parliament, Council and Commission negotiate compromises between the different versions of the instrument they have passed. While some important changes could yet occur, the main elements of the Regulation are now clear.

The DSA reaffirms the legal protections from liability for Internet intermediaries first implemented by the E-Commerce Directive in 2000. It reinforces the "notice and action" regime that evolved for hosting providers once they acquire "actual knowledge" of unlawful content, by setting out specific criteria for which a notice must meet. It further extends the protection from liability for hosting providers in circumstances where they seek to protect their service from illegal content proactively, by limiting the possibility they might be deemed to incur "actual knowledge" by so doing. It retains protection for providers from being required to conduct "general monitoring" of their services and, depending on the outcome of final triadogue negotiations, may introduce new legal protection for end-to-end encryption.

Official orders to remove illegal content are more closely regulated. Providers will be required to establish single points of contact for removal notices and decisions, and to provide fair, transparent and non-discriminatory terms and conditions. End users will be given a right to be given reasons by their provider why their content has been removed or their service restricted, although the extent of this is subject to continuing negotiations. Providers will also be obliged to introduce an internal complaints-handling procedure open to end-users whose content has been removed or service restricted. More controversially, national regulators will appoint "trusted flaggers" to notify platforms of allegedly illegal material, whose notices must be expedited, although the final decision remains with the platform.



# Public Policy and Internet Regulation

## Digital Services Act (cont.)

More extensive duties to conduct “risk assessments”, and to work with national regulators to reduce risks, have been laid on “very large online platforms” (VLOPs), as well as specific duties for online marketplaces. However, unlike the UK’s forthcoming Online Safety Bill, those provisions that blur the distinction between suppressing unlawful material and material which is lawful but disfavoured as “harmful” are limited to actions initiated by the VLOPs. Smaller hosting providers and web site operators are spared the more extensive duties for ill-defined categories of content that the UK regime proposes.

Since around 2007 the Internet industry has faced the threat of the withdrawal of the E-Commerce Directive’s protections from liability, and so fought a “review” of that Directive that it believed would only place unbearably onerous burdens and unlimited legal liability. Even as recently as 2017, it was generally thought implausible that the industry’s protection from liability would survive unscathed, given a political climate that seemed to blame Internet operators for all manner of social ills.

Working with and through our partners EuroISPA, LINX developed a vision and a five-year strategy to persuade the European institutions to adopt a more balanced approach to reform that would address legitimate concerns about Internet content while preserving the bedrock legal foundations on which a viable Internet and telecommunication industry rely. The DSA that resulted from this process is far closer to that vision than we had previously believed possible. While there will inevitably be many aspects where the outcome is imperfect, the core structure of the DSA seems likely to stand as an exemplar for a well-balanced Internet regulatory framework around the world.

## Working on Behalf of Members on Matters of Public Policy

In 2021 LINX underwent an extensive internal programme to prepare itself to not only meet, but also be able to demonstrate that we meet, the more stringent security practices the industry will be expected to follow. This involved a broad team effort, including senior management and Board level input, Legal and Public Affairs, and a substantial portion of our technical staff members.

## Telecommunications (Security) Act

The major item of legislation passed in the UK in 2021 was the Telecommunications (Security) Act, the legislative vehicle for the Telecoms Security Requirements (TSRs). The Bill was introduced to Parliament at the end of November 2020 and received Royal Assent in November 2021.

The Act itself is structured as a set of powers for Ministers to enact Regulations, which contain the actual legal duties for network operators. These are backed by a Code of Practice, which is a rewrite of the much more detailed TSRs that the government was discussing with industry over the previous year.

The Government’s plan is to split network operators into three tiers. The largest operators will get the most intensive scrutiny from Ofcom, which will be the regulator enforcing the new requirements, and the most ambitious timetable for implementing the requirements. The middle tier will get less intensive scrutiny, and a more relaxed timetable. The lowest tier will be expected to follow the general principles contained in the Regulations, but not necessarily the detailed technical rules in the Code of Practice. Ofcom will only investigate network operators in the lowest tier if there is a problem, or in specific cases where an operator appears unusually high risk for its size.

However, under some circumstances small network operators that supply other network operators will be “inherit” a higher tier from their customer.



# Public Policy and Internet Regulation

## Partners, Associates, and Supporting Organisations

LINX has enjoyed a supportive and collaborative relationship with its community partners over many years.

It is through these relationships within the Internet community that LINX is able to provide members representation at a global level, the opportunity to benchmark performance, and offer a role in helping make the Internet a safer and more trusted space. There is also the opportunity for members to influence policies and procedures in the UK and overseas.

## LINX in the Wider World

### Euro-IX

Euro-IX, the European Internet Exchange Association, currently has 80 member IXPs from around the world. LINX is a founding member of Euro-IX. LINX CEO Kurt-Erik Lindqvist served as the Chairman of the Board until October 2019. LINX regularly meets with the IXP community at Euro-IX conferences to discuss and share ideas and experiences for the mutual advantage of the membership. This is done via technical meetings, mailing lists and online resources. Euro-IX also gathers information on regulatory issues affecting member exchanges that could potentially impact the membership from within the European region, and other jurisdictions, in the future.



### EuroISPA

A key partner for LINX is EuroISPA, the pan-European association for organisations representing the ISP industry. Working with EuroISPA allows us to influence policy and legislation at the EU level, which it has done efficiently and effectively for many years. Malcolm Hutty, LINX's Director of Legal and Policy, served as President of the association for five years. He is currently chair of the Intermediary Liability Committee.



### Internet Exchange Federation

IX-F, the Internet Exchange Federation, is a global platform for associated Internet Exchange Point Associations, including Euro-IX. Its goal is for exchanges to collaborate “to build a global IXP community and help the development of IXPs throughout the world”.



### Internet Watch Foundation

LINX played a pivotal role in the creation and start-up of the Internet Watch Foundation (IWF). One of the roles of the organisation is to assist hosting providers identify and remove child abuse images hosted on their servers. When the IWF was founded in 1996, the UK hosted 18% of the world's known online child sexual abuse material. Today, it hosts just 0.2%.



### Internet Society

The policy and international engagement activities of the Internet Society (ISOC) are rooted in the organisation's fundamental belief that the Internet is for everyone and should be available to people everywhere. ISOC works with governments, national and international bodies, civil society organisations, the private sector, and other stakeholders to reach decisions about the Internet that conform to its core values.



ISOC's mission to preserve and protect the open, collaborative, distributed, multi stakeholder model is strongly supported by LINX and its stance has defined the successful development of the Internet for many years. As an “Organisational Member” of the Internet Society, membership enables LINX to influence Internet policy on a global stage, through international forums such as the IGF, the ITU and ICANN.

# Working Life at LINX

## Working Life at LINX

### LINX is a Great Place to Work!

#### Working Life at LINX

We pride ourselves on our progressive and supporting approach to staff, and want to be as good an employer as we can be, consistent with our mission and values.

#### Why is that?

- We understand that it is a **two way thing** – we want our staff to give of their best in what they do at work, and at the same time we want them to enjoy it, and feel that it is a place where they can develop their capabilities and talents.
- We offer many great benefits. As well as the more obvious elements, one key aspect of working at LINX is flexible working.
- In return, we expect staff to take responsibility for what they do in the work context. We expect staff to be flexible too – the last thing we want is for employees to think that their performance is judged by the time they spend and the hours they keep.

An intangible part of this is that employees will be working with great people – not just internally (although we are really proud of the individuals we have attracted to LINX), but also with others who work for our members, key suppliers, and partners. Some of these people set the standards for the Internet, while others are great innovators that are constantly developing the Internet and making it what it is today.

An underlying reason why LINX is a great place to work is that we have the right model (we think it is the best model) for an Internet exchange. The crucial aspect of this is that LINX is a membership organisation meaning that essentially there is just one stakeholder: the members (who both own LINX and are also the customers for our services). This mutual model keeps the focus where it should be: towards our members. It means we are a stable organisation, even though we push both to innovate and to be using the best of what is on offer in terms of relevant technology.

LINX has a proud history of doing things at the vanguard of Internet exchange development, and you can read more about this on the LINX website.

All of this is done in accordance with our mission and values (see next page).



## LINX's Core Values



## The LINX Vision

LINX is an open community of network operators, interconnecting and passing traffic to maintain and grow an 'Internet for everyone', all without interference.

## Our Mission

- To provide world-leading internet exchange points for the mutual benefit of members, that provide increasing performance and value for members;
- To represent the interests of its members in matters of public interest; and
- To promote the interests of its members;  
...all as a membership organisation

## Specifically, the LINX Core Values are:

- **Excellence** – we believe in providing world-class engineering and products, top-tier reliability and resilience, brilliant communications and services. "Good enough" is not good enough.
- **Openness** – we welcome anyone who would benefit from LINX membership.
- **Transparency** – we aim to be as transparent as possible with our members.
- **Mutuality** – we are owned and governed by our members.
- **Neutrality** – we treat all members fairly, and avoid privileging particular members, groups or business models.



## LINX's Staff Charter reflects our cultural values

This is our LINX Staff Charter which reflects our staff cultural values which we commit to and likewise we expect staff to commit to them.

We expect staff to uphold them in others and to challenge those around them, to do so too.



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