



London Internet Exchange

Annual Report 2023



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Kurtis Lindqvist

LINX



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Group Strategic Report

Group Strategic Report

For the Year Ending 31st December 2023

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 our services sector we are a very significant player. We continue 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 five companies. London Internet Exchange Ltd (LINX), established in 1994, and London Internet Exchange Trading Ltd (LINX Trading), established in 2013, are the two UK companies in the group in respect of which audited accounts are filed at Companies House.

The group also comprises three overseas companies: LINX USA Inc and LINX America Inc, registered in the United States, and LINX (Internet Exchange) Kenya Ltd, registered in Kenya.

LINX USA was established in 2013 as the operational vehicle for LINX NoVA, our Internet exchange point in North Virginia, and 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.

LINX Kenya was established in 2022 as the operational vehicle for the LINX Nairobi Internet Exchange, as announced in 2022. LINX Kenya is 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 report was approved by the board on 16/04/2024 and signed on its behalf.

Kurt Erik Lindqvist
LINX Chief Executive Officer



CEO's Report

CEO's Report

Business Review

Following the years of the COVID pandemic, where we saw an increase in demand for Internet communications, which drives the need for the company's wholesale products, the demand remains high. The company saw new traffic peaks several times across all its operating platforms in 2023. Peak traffic grew from 7.424Tbps to 9.229Tbps during 2023.

Internet traffic and interconnection growth remains high, and while there was considerable uncertainty in how the higher inflation and interest rates would affect network investment and consumer demand, demand seems to have been stable.

The outcome of 2023 demonstrates the directors' view is justified as connected capacity also continued to grow. In 2023, it grew as in previous years by 21% to 62.96Tbps (51.71Tbps in 2022). Unfortunately, LON1 and LON2 platforms didn't quite meet the ambitious internal availability target of 99.998%; LON1 achieved 99.996% availability, and LON2 99.997%. The shortfall was due to several outages at our data centre partners that affected the platforms and had limited overall impact on our members. Other performance metrics remained high with member satisfaction and Net Promoter Scores being very positive. During the year, we also started publishing the member feedback in interaction with the various parts of LINX, both internally and at member meetings twice a year.

In response to the rising inflation at the end of 2022, the board decided to hold prices for 2023 static, as the inflation created pressure upon our costs. Keeping our prices static still represented a real-term price cut for our members. Perhaps because of this, total sales in 2023 were slightly higher than budget. In our core peering platform services, 100GE port revenue exceeded budget, although we also experienced lower than expected revenue from 10GE ports as members upgraded to the higher speed ports faster than anticipated.

Cost of Goods Sold (COGS) was slightly higher than budget. This category is mainly made up by data centre, fibre and support contract costs, and the increase reflects higher than anticipated energy costs at the start of 2023 as well as the negative impact from inflation on support contract costs.

Sales, General & Administration (SG&A) costs were also marginally higher than budget, and depreciation was slightly below budget. Overall, the net result was a small surplus against a budgeted small loss for the full year.



CEO's Report

Business Review (cont.)

Towards the end of 2023, and at the time of writing in early 2024, the economic outlook does look brighter, and inflation has come down significantly since the end of 2022. Energy prices also seem to have stabilised and lowered since the peaks after the expanded Russian war on Ukraine in early 2022. Despite this, there are still some significant uncertainties in the economy. Interest rates remain high, which contributes to general economic uncertainty and holds back industry investments. Currently, inflation is further running at higher than target in most of the economies of our members. As previously mentioned, in 2023 we responded to this by holding our prices stable; this was the first time in 15 years that we did not apply a broadly based price reduction. In budgeting for 2024, we decided again to hold prices steady as a reasonably conservative approach given the continued uncertainty in the economy. Our forward budget for 2025 assumes we will resume price cuts, but this might change, as might the price model.

The coming budget periods of 2024 and 2025 project a small profit in 2024 which then rises to a larger profit in 2025. Management conducts a number of forecasts throughout the year, including the budgeting process, which provides a granular view of how the market and economy is expected to affect performance. These reviews allow management to plan and execute corrective actions if needed as the economy develops.

LINX continues to maintain both its ISO 27001 and FSQS accreditations, which both support our ongoing security and compliance needs, and provides assurance to members. We have continued to deliver additional automation and self-service throughout 2023, with all port-based services now being available for ordering and management through our portal. This provides considerable value for members who can now themselves provision services at the time they want and need, bringing a considerably better customer experience and journey. The ongoing development of our automation also allows us to scale further with modest investments.

During 2023, 400GE continued to see demand, and for 2024 we expect to see this increase even further as the lower CAPEX costs for 400GE capacity will attract more networks to support their bandwidth growth in the transition to 400GE. We also expect to see the transition from 10GE to 100GE continue in 2024, with more members moving across the technologies. At the end of 2023, we saw LINX Nairobi become operational and receive the first orders.



CEO's Report

Business Review (cont.)

We started 2024 with revenue and costs on target. For 2023, CAPEX was marginally over budget, but with some shift towards the very end of 2023 from 2024.

Cash reserves at the end of 2023 were at similar levels to 2022 and within our reserves policy.

Principal Risks and Uncertainties

The business regularly reviews a wide range of risk factors across all areas of the business. We maintain a comprehensive risk register that encompasses operational, financial, governance and reputational risks, providing visibility of both our changing environment and the risk mitigations we rely upon. This is regularly updated and discussed at a senior management level, and twice a year at board level.

The interconnection market remains very competitive. Nonetheless, we continue to receive new membership applications, with 71 new member applications received during 2023 (67 in 2022). Our membership totalled 880 at the end of the year (891 in 2022), and they were widespread across 80 countries. The slowdown in growth of membership numbers seems to be mirrored across the industry, which we attribute to increased competition and consolidations following the economic environment.

The component shortage seen in 2022 eased off in 2023 and our supply chains returned to more normal delivery times. At the same time, we took steps with our suppliers to ensure we had adequate access to supplies for our planned growth and replacement projects.

Inflation in 2023 continued to above target, with Consumer Prices Index (CPIH) at 8.8% in January, falling to 4.2% in December. A high CPIH affects SG&A as well as COGS with higher support and power contracts, as these tend to be linked to inflation. The Office for Budget Responsibility (OBR) March 2024 forecast expects CPIH inflation to fall to an average of 2.2% in 2024 and 1.5% in 2025. This will take cost pressure of our operations combined with energy prices becoming more stable, and we hope to be able to return to price cuts in 2025. Activities to reach greater economies of scale combined with forecasted growth will help us generate a modest financial net surplus based on current forecasts.

CEO's Report

Financial Strength

Maintaining a strong financial position, while not increasing our prices in an inflationary economy, continues to be an area of key focus for management.

Financial Key Performance Indicators

Despite the UK economy facing a continuing challenge from inflationary pressures, we exceeded our budgeted income levels, with growth exceeding 10%, compared with the previous year. In particular, considering the backdrop, the income from our core services was a good result.

Our costs increased in line with expectations and the net result of a small surplus was better than the small deficit we envisaged as we entered 2023.

Maintaining a strong financial position, while not increasing our prices in an inflationary economy, continues to be an area of key focus for management; throughout the year the directors keep our financial results under close review. We have exercised tight financial controls and the results during the year have been in line with our planned targets.

Our approach towards balancing our prices against the increasing costs of our business operations is supported by the continuing increase in demand for our services and new membership applications. This approach, together with our healthy level of liquidity, provides the directors with confidence for our future.



CEO's Report

Future Outlook

In March 2023, the LINX board adopted the 2023–2025 strategy. This is built on three pillars:

2023–2025 STRATEGY: The Three Pillars

SUSTAIN

OPTIMISE

GROW

Pillar 1: Sustain

Sustain sees us work to sustain the leadership position in the markets we operate in, but also to sustain the value in our core products for all members by increasing reach and sustaining the revenue levels.

Pillar 2: Optimise

Optimise is focused on gaining further economy of scale, and improved working capital usage. We expect to continue to invest in automation and tooling, including member-facing self-service features in the portal. This will speed up service delivery and provide greater economies of scale.

Pillar 3: Grow

As the interconnection market evolves, members have increasing needs of services in emerging adjacent markets and segments to where LINX operates today. These adjacent services are often very similar to what LINX provides today or could be built on LINX existing platforms. To ensure future relevance and value for members, LINX will, under the **Grow** pillar, further research how to best provide value in these markets for its members.

We expect to announce further platforms in the future, as well as further build out in our marketplace which allows member-to-member sale of services across the platforms. We further expect to expand the reach of our product portfolio and make more products available at the non-LINX Internet Exchange Points (IXPs). This will both widen LINX's interconnect offering and provide additional value for existing members and prospects.



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Pieter Knook

LINX Chair



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Chairman's Report

Chairman's Report

In March 2023, the board approved a new three-year strategy, setting out the three strategic pillars of Sustain, Optimise and Grow as described in the Future Outlook. The board also reviewed a number of business initiatives such as the upgrade and expansion of the LINX NoVA platform.

The board continued to be closely involved in reviewing financial performance, in analysing the likely impact of the economic climate on business performance, and in reviewing our responses to external factors.

Following on from the continued uncertainty in the economic environment, the board decided to propose to members, who approved in November 2023, for the 2024 budget to hold prices stable as inflation still affects LINX's costs. With current inflation levels, this still means real-term price cuts on our services.

The board proposed, and in May 2023 the membership endorsed, a change to the Memorandum of Understanding (MoU), which broadened the scope of eligibility for LINX membership by allowing companies to join without consuming the public peering service. This opens LINX membership up to new members most interested in other LINX services, such as Cloud interconnection. Some further amendments were adopted in November 2023, to give effect to the intentions behind this change.

We welcome Simon Lockhart and Steve Glendinning, who were elected to the board at the AGM in May 2023.

The board provides oversight of operations through the review of departmental roadmaps and company objectives that are reviewed throughout the year.

During 2023, the board held ten board meetings.



Pieter Knook
Chairman



LINX Board and Governance

LINX Board and Governance

Corporate Governance Report

As part of our commitment to deliver our strategy, maintain positive stakeholder engagement and create long-term sustainable value for our members, the board maintains the highest standards of corporate governance across the group.

How the Board Operates

The board is comprised of an independent Chairman, six Non-executive Directors, the Chief Executive and three Executive Directors.

The board is collectively responsible for ensuring leadership through effective oversight and review, and is accountable for the long-term success of the company. The board sets the strategic direction and monitors management's performance against those objectives in a way that enables sustainable long-term growth, while maintaining a balanced approach to risk within a framework of prudent and effective controls. Our robust governance framework is also instrumental in ensuring our strategy is delivered successfully.

Board and Sub-committee Meetings

The board meets formally on a regular basis, including a two-day annual strategy review session in the Spring. Additional ad hoc meetings are also scheduled for the board to consider and decide important emerging issues outside of the scheduled meetings. Additionally, and in line with the UK Corporate Governance Code, the Chairman holds meetings with the Non-executive Directors before each board meeting, without the Executive Directors present. Board meetings are structured to allow open discussions, where the board considers business performance, strategic proposals, members' interests, and other matters relating to risk, corporate governance, culture and staff wellbeing.

LINX Board and Governance

LINX Non-executive Directors



Pieter Knook
LINX Chairman



Mike Blanche
Google



Steve Glendinning
BRSK Limited



Simon Lockhart
Bogons Ltd



Neil McRae
Juniper Networks



Alex Bloor
Andrews and Arnold



Pete Stevens
Mythic Beasts

LINX Executive Directors



Kurt Erik Lindqvist
LINX Chief Executive
Officer



Richard Petrie
LINX Chief Technical
Officer



Jennifer Holmes
LINX Chief
Commercial Officer



Malcolm Holt
LINX Chief Financial
Officer

LINX Board and Governance

Board Sub-committees

The board operates three sub-committees whose voting members consist of Non-executive Directors. Executive Directors and individuals from the relevant business areas are invited to attend the meetings where appropriate. At each board meeting, the Chairs of the sub-committees provide updates to the board, summarising key discussions and decisions taken, and/or presenting proposals requiring final board approval.

Finance, Risk and Security Sub-committee (FRS)

The role of the FRS continues to be to deliver oversight of external audit as well as the prudence of financial reporting and controls operating within. 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.

The Company Secretary acts as Secretary of the committee. Other key invitees include the CEO, CFO, Director of Legal and Policy, Finance Manager, and Treasury and Finance Systems Development Manager.

Governance Sub-committee (Govco)

The Govco continues to ensure that the board is effective in discharging its responsibilities and in having oversight of all matters relating to corporate governance. It 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 reviewing matters for consultation with the members, including proposed resolutions.

The Company Secretary acts as Secretary of the committee. Other key invitees include the CEO and Director of Legal and Policy.

Remuneration Sub-committee (Remco)

The Remco recommends 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 £95,000 gross annual salary, before any salary sacrifice. This threshold is increased every year based on CPIH.

The Company Secretary acts as Secretary of the committee. Other key invitees include the CEO and HR Manager.

LINX Board and Governance

Board and Sub-committee Meetings Attendance During 2023

The following table shows the number of board and sub-committee meetings held in 2023, including ad hoc meetings held.

	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023
Board	•		•	•	•		•		•	•	•	•
FRS				•					•	•		
Govco			•				•					•
Remco							•				•	

Director	Position	Board Meetings	FRS Sub-committee Meetings	Remuneration Sub-committee Meetings	Governance Sub-committee Meetings
Pieter Knook	Chair of the Board	9/9	3/3	4/5	-
Kurt Erik Lindqvist	Chief Executive Officer	9/9	-	-	-
Malcolm Holt	Chief Financial Officer	8/9	-	-	-
Jennifer Holmes ¹	Chief Commercial Officer	7/8	-	-	-
Richard Petrie	Chief Technology Officer	9/9	-	-	-
Mike Blanche	Non-executive Director	9/9		5/5	4/5
Alex Bloor	Non-executive Director	9/9	3/3	5/5	-
Steve Glendinning ²	Non-executive Director	6/6	2/2	-	-
Simon Lockhart ³	Non-executive Director	6/6	2/2	5/5	2/3
Neil McRae	Non-executive Director	6/9	-	-	3/5
Pete Stevens	Non-executive Director	9/9	3/3	-	5/5
Malcolm Huty ⁴	Director, Legal and Policy	1/1	-	-	-
Lee Hetherington ⁵	Non-executive Director	1/3	-	-	0/2
Seb Lahtinen ⁶	Non-executive Director	3/3	-	-	2/2

Notes:

¹ Jennifer Holmes was appointed to the board on 27th January 2023.

² Steve Glendinning was appointed to the board on 17th May 2023.

³ Simon Lockhart was appointed to the board on 17th May 2023.

⁴ Malcolm Huty stepped down as a board Director on 27th January 2023.

⁵ Lee Hetherington stepped down as a Non-executive Director on 17th May 2023.

⁶ Seb Lahtinen stepped down as a Non-executive Director on 17th May 2023.

LINX Board and Governance

LINX Membership Meetings

LINX membership meetings provide members with the chance to meet and build business relationships, develop interconnection opportunities, and gain insight into LINX's development plans.

Meeting presentations also provide opportunities for continuing professional development for networking professionals, encompassing new technical developments and trends, case studies, and personal reflections from experienced members of the interconnection community.

LINX118

Monday 27th and Tuesday 28th February 2023

LINX118 took place in London and attracted more than 90 different member organisations, with an attendance of over 115 participants. Agenda highlights included a detailed look at how LINX's 2023 strategy is driving product updates, an analysis of regulatory proposals including the revival of a push for regulatory changes to the economic charging model for interconnection known as "Fair Share", and tips on using open-source software and the PeeringDB database to choose peering partners.

LINX119 and AGM

Tuesday 16th and Wednesday 17th May 2023

LINX119 took place in Manchester, drawing over 68 distinct member organisations, with approximately 65 individuals in attendance. The agenda was diverse, covering internal topics such as the annual accounts, alongside external topics such as "Can AI replace programmers?"

An Annual General Meeting (AGM) was conducted during LINX119, where two board seats were up for contestation. Following the voting process, Steve Glendinning (BRSK Limited) and Simon Lockhart (Bogons Ltd) were elected for three-year terms.

LINX120 and EGM

Thursday 16th and Friday 17th November 2023

The last LINX meeting of the year attracted more than 104 different member organisations, with over 120 individuals in attendance. The agenda covered a wide range of topics, including internal matters like LINX's member engagement activities, as well as external subjects such as volcanic hazards and subsea cables, where insights from the 2022 eruption of the Hunga volcano were discussed.

An Extraordinary General Meeting (EGM) was also held to vote on the approval of the 2024 LINX services and fees, 2024 board remuneration, and changes to the MoU.





LINX Network

LINX Network

LINX Technology Report

Goals for 2023

For 2023, the LINX technology teams set out to enhance our digitalisation of services, extending the member self-service function further. We did this in conjunction with an eye on member feedback, to make sure what we were to offer was appreciated by our members and adds value to the user experience.

Looking back at 2023, we have seen significant investment in our established exchange points as well as new ones in emerging markets. The move to 400GE peering services did take longer to ramp up, but as we end the year, we sit at eight member ports and have over 3Tbps of capacity for this product alone. This helps to take our overall access capacity beyond 60Tbps. With the move to 400GE services and investment in the Nokia high-density 100GE line cards, we have been able to deliver more member port capacity, reducing the capital spend per port delivered, as well as reducing the running costs and the power consumption for each packet we deliver across our platforms.

The new exchange point that we brought live in 2023 was in Kenya, deployed across the metro of the capital, Nairobi. Taking in three data centres linked via redundant dark fibre services to provide a multi-site, data centre neutral exchange platform, which we believe will bring interest, investment and new capabilities to the businesses within Kenya and beyond.

We continued to maintain extremely good service quality throughout the year for our members in both the platform-wide service availability and the member fulfilment needs, with our network operations centre scoring highly on member satisfaction, fix first time rates and qualitative feedback direct from members. The fulfilment capability and high service-level performance has been supported and, in many ways, enhanced by our aggressive rollout of self-service capability. Extending the 2022 developed software defined, overlay service build capability into a full, end-to-end automation offering. This allows us to offer portal-driven self-service and digital workflows to even hybrid automation services, fully supported by the LINX order management system, to piece together software defined services with physical needs as well as third party add-ons. This makes all but the physical install part an end-to-end automated experience.



LINX Network

LINX Technology Report (cont.)

Our research and development efforts focused on the development of the second route server daemon, OpenBGPd. Our objective here is to run dual route server daemons throughout our exchange points, and we see BIRD and OpenBGPd as the best performing services in the market. For many years, LINX has relied solely on BIRD as the main and back-up option, but as we move into 2024, every exchange point except LON1 has been migrated to a BIRD and OpenBGPd design, and we expect LON1 to migrate in the first half of 2024, completing this ambition. This innovation on route servers comes after extensive lab work, testing and collaboration with the software developers at the Route Server Support Foundation. Our LINX engineers play an active role in IXP collaboration and here we engaged in a collection of projects in 2023 to help better the peering and interconnection ecosystem. This has seen us enhance the capability of the IX standard interface IX-API, with version 2.5 released; the development of OpenBGPd; as well as driving a consistent experience for the Alice Looking Glass application on both BIRD and OpenBGPd route servers.

Chief Technical Officer Summary

Looking ahead to 2024, we will see the rollout of the LINX Community platform. This will give members a new feedback channel and an interface for us to improve our communication quality. The port access, 400GE services will become standard across all our London points of presence as well as many other IXPs we run in other geographies. The investment in automation and digital workflow done in 2022 and 2023 gives us the ability to expand our IXPs, grow capacity and add services while controlling overheads as well as maintaining quality.

Richard Petrie
LINX Chief Technical Officer



LINX Network

UK Local Internet Exchanges

LINX Manchester

LINX Manchester continued its impressive connection growth in 2023, with some significant new member additions and an upward trend in the port access size required.

Traffic levels have also continued to grow, with an all-time max now reaching 500Gbps. The continued growth has been fuelled by data centre growth and expansion in the area, and LINX has recognised this with its new partnership with AtlasEdge in Manchester to complement the existing PoPs, and aims to continue with this strategy in 2024. There is increasing evidence that Manchester is being evaluated as an alternative in terms of diversity to the traditional Slough/Docklands infrastructure.

LINX Scotland

Since the beginning of 2024, our efforts have turned to engaging locally with Scottish Government. In addition to the local steering committee, we have turned to the more defined opportunity offered by becoming engaged in activity, such as a seat on the management team for developing Internet of Things in Scotland; engagement and collaboration with the wider public sector has occurred through this. We are expecting to hear soon of a new event to replace the “Host in Scotland” series, with a wider view of the ecosystem required to develop business in Scotland. We believe the Scottish government’s long-term strategic approach and commitment has kept LINX Scotland topical for the region, positioning it to support future development.

LINX Wales

Since mid 2023, a programme of engaging locally has begun to take effect. Meetings and discussions have been initiated with interested parties such as Ogi, Vantage DC and other local partners, which has resulted in some progress in enhancing the reputation of, and interest in, our presence in Cardiff. Quarterly review meetings with Welsh Government and local stakeholders have resulted in some active opportunities, which should close in 2024. To support these efforts, discussions between LINX and the Welsh government have been held to explore ways in which we can both support any potential new members promoted by LINX in connecting to the exchange. Other initiatives are being discussed to assist supporting new members for cross connects by local partners.



International Local Internet Exchanges

LINX Nairobi

LINX Nairobi is a LINX owned and operated exchange with the ambition to support the recent significant growth in the region's Internet infrastructure. The LINX brand of neutrality and mutuality has been extended to the LINX Nairobi project. Staff are very passionate about the exchange and community there, and LINX is confident that the new IX will have a transformative impact on both connectivity and Internet community development in the region.

The launch of LINX Nairobi across our three data centre partners iColo, ADC and IX-Africa has created great interest with the first members fully connected late in 2023, seeing the first traffic across the exchange.

LINX staff spent several days with each data centre partner and their customers in turn, knowledge sharing about how and what can be achieved by establishing an ecosystem of this type in Nairobi. LINX has also collaborated with the most significant global content providers to confirm their plans for connecting to the exchange, from this we will see the connection of the first content players in Q2 2024.

center3 – Saudi Arabia

Much time during 2023 was spent working with Saudi Telecom (STC) to convert the ownership of JEDix from STC to centre3. This involved discussions on branding and contracts which will be concluded in 2024. In parallel to these discussions, the Jeddah location experienced another extremely strong year for sales, doubling the amount of traffic across the platform and becoming the most significant exchange in the region! The Riyadh location will be live early in 2024, with several networks already waiting to connect. Later in 2024, Dammam will come online. Each exchange will be standalone managed IXP service operated and managed by LINX.

center3 - Saudi Arabia Traffic Growth in 2023



LINX Network

LINX NoVA

LINX NoVA is a critical Internet exchange point located in Northern Virginia, USA. Over the past 12 months, LINX NoVA has played a pivotal role in facilitating Internet traffic exchange among various networks, contributing significantly to the efficiency and resilience of the global Internet infrastructure.

Developments have contributed to maintaining its position, including new ISP/access networks, additional interconnection services such as MAPS, and infrastructure changes to further improve redundancy and latency.

LINX continues to engage and collaborate with partners such as data centres and other IXPs such as NYIIX. This collaboration, through projects, new service offerings (IXP reseller), joint marketing and events, helps to maintain the healthy ecosystem required for the benefit of our connected members.

Member Applications

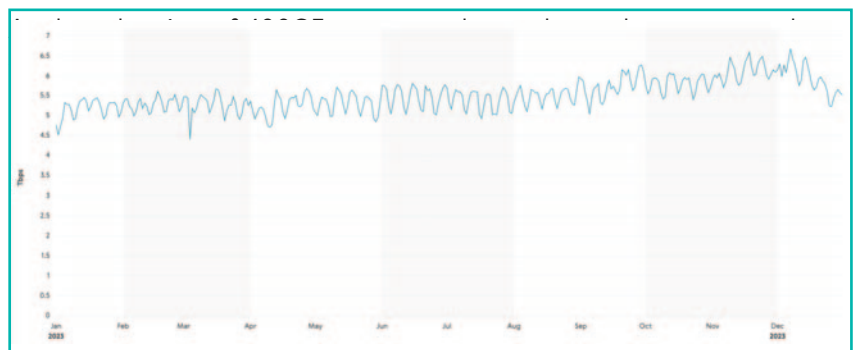
LINX had another strong year for new member applications, receiving a total of 71 new applications for membership.

Exchange Growth

The year 2023 was an incredible period of growth for the LINX exchanges. Many of the main LANs continued to see growth in the number of connected networks. LINX Nairobi welcomed its initial members as the East African exchange went live towards the end of the year. Notably, we received membership applications from 71 new entities, spanning regions such as China, Germany, Turkey and the USA among others.

There were numerous traffic peaks throughout the year, with the Manchester LAN experiencing particularly rapid growth and heightened activity, reflecting the rapidly developing networking landscape of Manchester as a digital hub.

Over the year, we processed a large number of orders for new peering services and upgrades to existing peering services. Collaborating with several members, we facilitated the transition of their networks onto 400GE ports, connecting a total of eight throughout the year.



Average aggregate traffic for 2023

Membership Statistics

875 LINX
members

884 Member
ASNs

81 Member
countries

71 New applications
in 2023

9 LINX
LANs

9.229 Terabits per second peak
traffic on the public exchange

1763 Connected
member ports

477 Member-facing
100GE ports

8 Member-facing
400GE ports

62.25 Terabits of
connected capacity



LINX Network

LINX Products and Services

During 2023, much of our focus remained dedicated to the continuous improvement of our member portal. The order processes for port-based services, including peering, Private VLAN, Closed User Group, Cloud Connect, and Microsoft Azure Peering Service (MAPS), are now fully integrated into our order management system. This integration ensures efficient self-service and immediate provisioning of these services in many scenarios. Where manual intervention is required by our 24/7 Network Operations Center team, you will be able to see the status at any point directly in the portal, providing you with a clear and transparent view of the process. The same is valid for changes (upgrades, downgrades, cancellations) to existing services.

Based on member feedback, we are now also allowing members to establish Private VLAN connections between their own ports on our network fabrics. The flexibility of the order processes enables members to activate and change these services instantly, providing a lot of flexibility for many use cases.

We have also brought live MAPS, which provides an easy and secure method to establish direct peering with the Microsoft public network, to LINX Manchester and LINX NoVA, in addition to LON1, where we launched it initially.

We continue to see steady demand for the colocation services we provide, in close collaboration with our data centre partners in many locations. This service allows our members to have a single point of contact and 24/7 support for all their services in one or more locations.

Our 2024 roadmap promises to deliver exciting new products and services to our members, influenced by their feedback and requirements, amid the continuously evolving interconnection market.

“In 2023, we continued to improve and expand the functionality of our member portal. Provisioning for many of our services now occurs immediately and is fully automated using our network config automation platform. This allows our members to instantly add, remove or change services, offering a very agile use of our fabrics based on their needs, whether it is a point-to-point link to another member, connectivity to a cloud provider, or consuming the services offered by members or partners.”

Mike Hellers
LINX Product Manager

Products and Services by End of 2023

LINX Products

- **Public Peering**
Network traffic exchange over a shared network
- **Private Interconnect**
Member point-to-point connections over dedicated fibre
- **ConneXions Partners**
LINX partner programme, allowing remote connection to our peering LANs
- **Managed IXP Services**
Fully managed IXP service
- **Colocation**
Rackspace at many of our locations, available directly through LINX
- **IXP Reseller**
LINX connection from an existing Internet exchange
- **Private VLAN**
Layer2 point-to-point link across our network fabrics
- **Closed User Group**
A private Layer2 domain for a group of members
- **Cloud Connect**
Direct Layer2 connections to a number of cloud service providers
- **Microsoft Azure Peering Service (MAPS)**
Managed direct public peering with Microsoft AS8075

LINX Services

- **Public Affairs**
Membership representation on matters of public policy
- **Time Servers**
LINX operated NTP (Stratum 1) time servers
- **LINX Marketplace**
Platform allowing LINX members and partners to present and offer their services to our membership

LINX Exchanges

- **LINX LON1 and LON2**
Peering LANs in London
- **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
- **LINX Nairobi**
Peering LAN in Nairobi, Kenya

Powered by LINX

- **JEDix**
Internet exchange point for the Middle East, supported by our strategic partner, center3
- **ManxIX**
Internet exchange point for the Isle of Man, supported by BlueWave Communications

IXP Partnerships

- **Names**
Partnership allowing Names members to connect directly to LINX LON1
- **JPIX**
Partnership allowing JPIX customers to connect directly to LINX LON1
- **NYIIX**
Partnership allowing LINX NoVA members to connect directly to NYIIX, and NYIIX customers to connect to LINX NoVA



Finance Report and Summary Accounts

Finance Report and Summary Accounts

Chief Financial Officer Summary

I am pleased to report we ended 2023 in a better position than we had expected, and this was against considerable volatility in financial and world political conditions.

The small surplus of £135k compared favourably with the small deficit we had expected when we set the budget for this challenging year. We also maintained a strong balance sheet with a level of liquidity that supports the business and its future planned growth.

We are currently planning to contain the effects of inflation within the existing prices for our services, and should the financial results during the year become better than expected, we will re-visit the possibility of reducing our prices. At present, the existing pricing structure is anticipated to result in a close to break-even result for 2024.

This will be my last year as author of this chief financial officer report, as I will soon be heading into retirement. It has been a pleasure working for LINX over the last seven years and I wish all LINX staff, its members, suppliers and partners success for the future. In particular, I hope that the incoming chief financial officer, Andy Fabian, receives the same high level of support.

Malcolm Holt
LINX Chief Financial Officer

Finance Report and Summary Accounts

Financial Summary

The net surplus for 2023 was £0.1m, which compared with a £0.3m surplus in the previous year. Our revenues rose by a healthy percentage, but so did our costs as the pressure from inflation continued. The result, however, was better than the small deficit that we had expected and forecasted.

Cost inflation levels remained at a higher level, and for longer, than anticipated and this was still a challenging factor as we entered into 2024.

The economic outlook for 2024 indicates only minimal growth in GDP. Consequently, we have revised our expectations for 2024 to be again close to an overall break-even position. In this situation, we have decided not to reduce our prices at the beginning of 2024. However, we will, as usual, continue to monitor the position as 2024 progresses to establish whether a price reduction opportunity appears later in the year.

We continued investing in new technology to expand our networks to accommodate the increase in demand for our services. In 2023, this totalled £3.0m, and in 2022, the equivalent investment was a similar amount at £2.9m.

Also consistent with recent years is holding a healthy level of funds to provide a solid base to cope with ongoing uncertainties in the economic environment and to support our future business development.

Statement of Income and Retained Earnings	2023 (£)	2022 (£)
Turnover	19,042,581	16,815,998
Cost of sales – direct and distribution costs	(5,406,774)	(4,654,241)
Staff costs	(7,218,456)	(6,468,219)
Operating lease rentals	(467,827)	(458,503)
Depreciation of fixed assets	(2,230,646)	(2,363,715)
Other administration costs	(3,693,062)	(2,629,872)
Other operating income	-	-
Operating surplus	25,816	241,448
Net interest receivable	263,285	92,265
Surplus before taxation	289,101	333,713
Tax on surplus from non-core activities	(153,758)	(50,873)
Surplus after taxation	135,343	282,840
Retained earnings at beginning of year	14,830,731	14,547,891
Retained earnings at end of year	14,966,074	14,830,731



Balance Sheet	2023 (£)	2022 (£)
Fixed assets		
At cost – 1st January	31,171,958	28,289,491
Additions during year	3,045,343	2,882,467
At cost – 31st December	34,217,301	31,171,958
Accumulated depreciation – 1st January	(26,642,345)	(24,278,629)
Depreciation – charged during year	(2,230,646)	(2,363,715)
Accumulated depreciation – 31st December	(28,872,991)	(26,642,344)
Net book value – 31st December	5,344,310	4,529,613
Investments	102,711	103,200
Total fixed assets	5,447,021	4,632,813
Current assets		
Trade and other debtors	1,453,879	478,845
Prepayments and accrued income	2,803,675	2,840,841
Cash at bank	9,823,044	9,360,919
Total current assets	14,080,598	12,680,605
Current liabilities		
Trade and other creditors	(2,606,348)	(637,713)
Taxation and related creditors	(96,544)	(22,715)
Accruals and deferred income	(1,852,064)	(1,860,478)
Total current liabilities	(4,554,956)	(2,520,906)
Net current assets	9,525,642	10,159,699
Foreign exchange reserve	(6,589)	38,219
Net assets and members' funds	14,966,074	14,830,731



Public Policy and Internet Regulation

Working on Behalf of Members on Matters of Public Policy

LINX regularly monitors its work in the public affairs arena to ensure it not only meets, but also that it is able to demonstrate that we have met the more stringent security practices the industry expects us to follow. This involves a broad team effort, including senior management and board level input, Legal and Public Affairs, and a substantial portion of our technical staff members.

Public Policy and Internet Regulation

LINX is regulated by Ofcom as an “operator of essential services” (OES) under the Network and Information Systems (NIS) Regulations 2018.

The NIS Regulations established a new regulatory regime within the UK that requires designated OESs and relevant digital service providers to comply with various duties. In particular, the NIS Regulations impose on OESs three key requirements in relation to the security of the network and information systems on which their essential services rely.

First, they require that an “OES must take appropriate and proportionate technical and organisational measures to manage risks posed to the security of the network and information systems on which their essential service relies”. Second, they require that an “OES must take appropriate and proportionate measures to prevent and minimise the impact of incidents affecting the security of the network and information systems used for the provision of an essential service, with a view to ensuring the continuity of those services”.

Finally, they require that an “OES must notify the designated competent authority”, in our case Ofcom, “about any incident which has a significant impact on the continuity of the essential service which that OES provides”.

In their role as the designated regulatory authority for the digital infrastructure subsector in the UK under the NIS Regulations, Ofcom issued all OESs in the subsector, including LINX, with a Security Assessment Scheme self-assessment questionnaire, with the intention of using the responses to gain an understanding of operators’ approach and status regarding security and operational resilience. This questionnaire was a set of risk analysis questions, based on the National Cyber Security Centre’s Cyber Assessment Framework, which Ofcom had adapted for NIS.



Public Policy and Internet Regulation

The questionnaire consisted of 31 questions, grouped into six objective areas, which were: Establishing Scope, Organisational Capability, Security Architecture, Threat Management, Protective Measures, and Security and Resilience. Each question required a detailed written response and had to be supported by providing Ofcom with evidence, such as internal policy documents and network diagrams.

Ofcom's approach reflects a wider shift in the UK government's strategy to manage cyber risk. In its 2016 Regulations and Incentives Review, the government had concluded that cyber risk management was more effective when pursued from a positive business engagement stance, rather than instituting a culture of compliance which may not lead to transformative behaviour change – a position that endorsed the approach taken through the previous decade.

However, in its 2022 Regulations and Incentives Review, the government concluded that this approach was not delivering the necessary improvements in cyber resilience. Instead, it concluded that it needed to take a more proactive and interventionist approach to keep the UK safe from cyber attacks. This new approach has resulted in the government strengthening the regulatory framework, most notably by developing a new security framework for public telecoms providers in the UK, which it established through the Telecommunications (Security) Act 2021. This framework includes setting out the specific security measures that providers must take, as well as detailed technical guidance on the government's preferred approach to demonstrating compliance with the duties of the Act.

The new attitude to regulatory oversight has had a noticeable impact on LINX, as we now need to be able to demonstrate the measures we take to ensure security and continuity of service, not only to our own satisfaction and those of our members but in a manner suitable for systematic assessment by an external authority. LINX's strategy has centred on adopting the ISO 27001 Information Security Management Systems standard, to which we first became accredited in 2021; the scope we apply is then extended by the additional expectations of the new regulatory landscape. LINX then seeks to use that framework as our main support for answering and satisfying Ofcom's oversight enquiries.



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.

Public Policy and Internet Regulation

LINX in the Wider World

Euro-IX

Euro-IX, the European Internet Exchange Association, currently has over 80 member IXPs from around the world. LINX is a founding member of Euro-IX and LINX's Nurani Nimpuno serves as Chair on the board. 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.



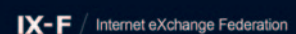
EuroISPA

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 Huddy, LINX's Director, Legal and Policy, served as President of the association for five years. He is currently Chair of the International Affairs 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".





LINX in the Wider World (cont.)

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 to 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

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.

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 benefits that not many other organisations do. 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 also 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.

Company Culture

The LINX culture forms an integral part of working at LINX and this is an important factor in the employee life cycle. This starts with how we engage with candidates and new starters when recruiting and onboarding, with both hiring managers and HR setting the scene of what the cultural values are, what the candidates can expect and what is expected in return.

We also engage with particular education providers to encourage new talent through areas such as work experience, internships and apprenticeships. This not only introduces students to work skills and experience but also offers the potential of future employees to LINX, while also offering LINX staff the opportunity to mentor students and develop their own management and knowledge-sharing skills.

By carrying out two annual staff surveys, we measure both staff satisfaction and organisational culture trends. Both surveys include specific questions regarding the company culture. Along with giving excellent insights, the response rates were good, at 85% and 91% respectively. The results and actions are discussed and worked on with staff.

Our appraisal process, which includes a training and personal development plan for each member of staff, also has a 360-degree element, where questions include staff being asked to give feedback on how their colleagues embody the cultural values. This gives useful feedback to staff, and also gives line managers a way of helping staff to reach their goals and identify any areas for development.

Another important part of the LINX culture is the recognition of staff both formally and informally, and this is done in various ways. We give regular reminders to staff on how to recommend their colleagues for recognition.

And finally, when it comes to a member of staff leaving the company, during their exit interview, in order to gain more insight, we ask them to give feedback on working at LINX, what worked well, and also how we can improve.

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.

LINX’s Core Values

Excellence

In line with our mission to provide “world-leading IXPs”

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.

Open membership and ethical selling

Openness – we welcome anyone who would benefit from LINX membership.

Transparency to members

Transparency – we aim to be as transparent as possible with our members.

Mutuality and mutual ownership / governance model

Mutuality – we are owned and governed by our members.

Neutrality between members

Neutrality – we treat all members fairly, and avoid privileging particular members, groups or business models.

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;
- To promote the interests of its members,
...all as a membership organisation



Integrity

Have integrity and demand it of others

Empowerment

Encourage and support others

Teamwork

Be inclusive, work together, be supportive

Excellence

Be the very best you can be

Staff Cultural Values

Respect

Be respectful to your colleagues, our company and yourself

Passion

Believe in what we are doing

Rationality & Transparency

Decisions are to be rational and justified

Flexibility

Go the extra mile to achieve our collective goals

The Staff Charter

LINX's Staff Charter reflects our cultural values which reflects our staff cultural values, which we commit to and likewise we expect staff to.

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

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