PEERING BANDWIDTH

Service Terms

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Service Terms

Words or phrases that start with a capital letter are defined in LINX's Membership Terms or in the glossary at the end of these Service Terms.

1. Summary of the Service

1.1 The Peering Bandwidth service provides connectivity across a LINX IXP on a shared Ethernet VLAN for the purpose of internet Peering with other LINX members.

1.2 The Peering Bandwidth service is a communications service that requires physical connectivity. This can be obtained by purchasing the LINX Port Access service, which is sold separately.

2. Ordering Peering Bandwidth

2.1 To use the Peering Bandwidth service, you must agree a written Service Order with LINX in accordance with your LINX Membership Agreement.

2.2 If you wish to purchase Peering Bandwidth via a LINX Channel Partner, you will need to order via your chosen Channel Partner who will order the service on your behalf. Additional terms may apply where you purchase services via a Channel Partner.

2.3 If, for any reason, the services you have requested are not available when you place your order, LINX will tell you and, where possible, indicate if and when the relevant services may become available. This could be, for example, because LINX, or your Access Port, do not currently support the combination you services you have requested. If so, you may choose to amend, delay or cancel your order.

2.4 When LINX first accepts a Service Order for Peering Bandwidth for a given Access Port, during the provisioning process, the Access Port will initially be placed in the Quarantine LAN before the service starts.

3. Start Dates and Renewals

3.1 Each Service Order will initially continue for the Initial Term specified in the order. If your Service Order does not specify an Initial Term, it will continue for one month from the Service Start Date.

3.2 After the Initial Term, each Service Order will automatically renew for successive periods of one month (each a "**Renewal Period**"), unless otherwise agreed in the Service Order. The Service Order will continue to renew until either you or LINX terminates it in accordance with clause 22 (*Ending Your Service*) of these Service Terms.

3.3 The Service Start Date for each Service Order will be determined as follows:

3.3.1 if you order Peering Bandwidth for an Access Port that does not currently have a Peering service attached, then the Service Start Date will be date on which your Peering service is transferred from the Quarantine LAN to the Peering LAN;

3.3.2 if you order Peering Bandwidth for an Access Port that already has a Peering service attached, then the Service Start Date will be the date on which the revised bandwidth capacity for that Access Port takes effect.

4. Bandwidth Capacity

4.1 Each user of Peering Bandwidth is allocated a maximum bandwidth capacity. Your maximum bandwidth capacity will be specified in your Service Order for the Peering Bandwidth service.

4.2 The total volume of Traffic you may pass over the IXP Peering LAN via a LINX Access Port must not exceed the maximum bandwidth capacity you have purchased and is assigned to your Access Port.

4.3 You are responsible for obtaining bandwidth capacity sufficient for your needs. If you attempt to send Traffic to your Peers, or your Peers attempt to send Traffic to your network, in excess of the maximum bandwidth capacity you have purchased, this will result in Port Congestion.

4.4 LINX may enforce your bandwidth capacity limits using technical means.

4.5 Your bandwidth capacity must be allocated to a specific, identified LINX Port or Link-Aggregated Port and must not be shared or transferred, except as provided for in these terms.

5. Peering Basics (1): Peering is not an Internet Access Service

5.1 Internet Peering is not an internet access service and a Peering connection will only give you access to a particular network. That will typically be the network run by the operator with whom you have established a Peering relationship (and potentially their customers). It does not provide access to the internet as a whole.

5.2 The role of the IXP in Peering is to route Traffic between Access Ports connected to the Peering LAN in a shared Ethernet broadcast domain. Once Traffic has been received at an Access Port, what happens to it (including delivery or non-delivery to its intended destination) is the responsibility of the network receiving the Traffic.

6. Peering Basics (2): You are Responsible for Obtaining Peering Connections

6.1 It is your responsibility to obtain Peering connections, by making separate bilateral agreements with other LINX members, or by joining the LINX Route Server, or both.

6.2 In order to establish bilateral Peering relationships, you must make separate agreements with other LINX members to exchange internet Traffic between your networks and to enable you to establish a BGBv4 peering session between your router and their router over the IXP to which you are both connected.

6.3 You may set any conditions you wish for agreeing to establish a bilateral Peering relationship with other LINX members. LINX does not set requirements for your bilateral Peering relationships (although this statement does not waive LINX's rights to enforce these Service Terms or any other agreement you have with LINX). Whilst LINX encourages Peering, it does not interfere in its members' freedom to choose with whom they peer.

7. Peering Basics (3): You are Responsible for Traffic Management

7.1 You must use BGPv4 to make announcements of those networks from which you intend to accept internet Traffic at your Access Port, as identified by its IP address. If you have multiple Access Ports, you may use BGPv4 announcements from each Access Port, as identified by their respective IP addresses to load balance between them.

7.2 You (and your Peers) are responsible for complying with BGP standards and related customary industry practice. LINX is not responsible to you for your Peers' compliance with the

same. If one of your Peers does not comply, you may stop Peering with that network and it is your responsibility to do so if you wish.

7.3 Internet Traffic addressed to an IP address used by a LINX Link-Aggregated Access Port will be distributed broadly evenly between the component Access Ports of the Link-Aggregated Access Port, according to the distribution algorithm of the LINX switch within which the Link-Aggregated Access Port is situated.

8. Permitted Use: Peering Bandwidth is for Internet Peering Only

8.1 You must only use LINX's Peering Bandwidth service for the purpose of Peering with other LINX members who are also using the Peering Bandwidth service on the same IXP.

9. Prohibited Uses: Traffic Hijacking, Spoofing and other Harm

9.1 You must not make BGP announcements to accept Traffic for Netblock without the consent of the owner of that netblock. Breach of this condition may cause severe disruption to the IXP and, therefore, will constitute a material breach of your Membership Agreement and your Service Orders for Peering Bandwidth. If LINX reasonably suspects that you have breached this condition, it may suspend your Access Port without prior notice until you provide reasonable evidence to demonstrate that you are not in breach of this condition.

9.2 You must not attempt to spoof either: (a) the source MAC address; or (b) the source IP address of any Traffic you send over the IXP.

9.3 Your use of the Peering LAN, the LINX Route Server or the LINX Route Collector must not cause Harm to: (a) the IXP to which it is connected (or any part of it); (b) LINX; or (c) any other LINX members.

10. LINX Route Server

10.1 To facilitate Peering connections, LINX operates LINX Route Servers on each IXP it operates. If you choose to establish a BGPv4 Peering Session with a LINX Route Server, you will announce that you are willing to accept Traffic from any other LINX member that also has a Peering Session to a LINX Route Server to the address blocks they advertise to the LINX Route Server (subject to limitations). If this is your policy, you may also join a LINX Route Server, which will then provide you with immediate access to a large number of internet routes.

10.2 By establishing a Peering Session with a LINX Route Server on the IXP using the IP address allocated to your Access Port, you are granting permission to any other LINX member connected to a LINX Route Server on your IXP to send Traffic to that Access Port according to the route announcements you have made to a LINX Route Server from that Access Port.

10.3 The presence of any particular LINX member on a LINX Route Server does not guarantee the continued availability of routes to their network, which may be withdrawn at any time without notice. You also have the right to withdraw from LINX Route Servers at any time without notice.

11. Port Allocation and IP Address Allocation

11.1 You must identify the Access Port on which the Peering Bandwidth service is to be provided in your Service Order.

11.2 LINX will provide you with one IPv4 address for each Access Port to which your Peering Bandwidth service is allocated, unless you have specified that the Access Port is to be a component of a Link-Aggregated Port, in which case LINX will provide you with one IPv4 address for each Link-Aggregated Port.

12. Port Congestion

12.1 You are solely responsible for avoiding port congestion through your network capacity planning, network architecture, network routing choices and choice of Peering Sessions. If you believe you may experience port congestion, you may increase your bandwidth capacity and/or obtain additional Access Ports. You may also limit port congestion caused by excess inbound Traffic by dropping Peering Sessions from your congested Access Port and opening a corresponding Peering Session with another Access Port that is not experiencing congestion.

13. Technical Requirements for Peering

13.1 You must comply with the Technical Requirements for Peering at LINX that are attached to these Service Terms.

13.2 You must maintain a Peering Session with the LINX Route Collector at all times.

13.3 You must maintain a Peering Session with either: (a) the LINX Route Server; or (b) another LINX member at all times.

13.4 For clarity, even though you are required to maintain Peering Sessions at all times, there is no minimum Traffic volume requirement for these sessions.

14. Unrequested Internet Traffic

14.1 You must only send internet Traffic to other LINX members over the IXP in accordance with the route advertisements they have made to you in a Peering Session.

14.2 LINX is not responsible for Traffic sent to your Access Ports. LINX will not be liable to you if another LINX member sends unrequested or unwanted Traffic to your Access Ports.

15. Service Availability

15.1 LINX will use commercially reasonable efforts to ensure that the Peering Bandwidth service is available 24 hours a day, 365 days a year in accordance with Good Industry Practice. You acknowledge that the service may be unavailable from time-to-time for reasons that could include, but are not limited to, equipment failure, planned maintenance, emergency maintenance and causes beyond LINX's reasonable control.

15.2 The Peering Bandwidth service is not provided with a service level agreement or service credits as standard. Any service level commitments or related service credits must be agreed separately with LINX and may be subject to additional fees.

15.3 LINX will notify you at least seven days before any planned maintenance windows. This may be done by making a member announcement (as described in the LINX Membership Terms).

16. Technical Support

16.1 If you experience a problem with your Peering Bandwidth service, you should contact support@linx.net.

17. Port Access Required

17.1 If your Peering Bandwidth service is assigned to an Access Port you have purchased from LINX (which will be the case unless you are a customer of an authorised LINX Channel Partner), then you should not cancel the Access Port while the Peering Bandwidth service is live. If you do, you will be unable to use the Peering Bandwidth service, but will still be charged for it.

17.2 If your Access Port becomes unavailable for any reason, then your Peering Bandwidth service assigned to that Access Port will also not be available.

18. Fees and Payment

18.1 You must pay the fees for the Peering Bandwidth service set out in your Service Order. You must pay those fees in accordance with your LINX Membership Agreement and any other payments terms agreed in your Service Order.

18.2 If you purchase Peering Bandwidth via a LINX Channel Partner, then all fees must be agreed with, and paid via, your chosen Channel Partner.

19. Service Warranty

19.1 LINX warrants that the Peering Bandwidth service will perform substantially in accordance with its Service Description for the duration of your Service Order.

19.2 All other warranties or conditions that might be implied or incorporated into these Service Terms by law are excluded (unless the law does not allow them to be excluded), including any terms related to the quality, performance or suitability of the Peering Bandwidth service.

20. Suspension of Your Service

20.1 LINX may suspend your Peering Bandwidth service if:

20.1.1 your LINX membership has been suspended or LINX has the right to suspend your membership;

20.1.2 LINX has the right to suspend the service in accordance with your LINX Membership Agreement;

20.1.3 you are in breach of the Technical Requirements for Peering;

20.1.4 LINX reasonably suspects that you may be in breach of clause 8 (*Permitted Use*) or clause 9 (*Prohibited Uses*) of these Service Terms; or

20.1.5 LINX reasonably considers suspension is necessary in order to trace, diagnose or rectify a fault.

20.2 If LINX suspends your service, it will restore the service once the reasons for the suspension no longer apply.

20.3 If LINX suspends your service it may also suspend the Access Port on which the Peering Bandwidth service is provided.

21. Liability

21.1 LINX's entire liability to you under each Service Order will, in each Contract Year, be limited to the value of the fees paid by you under the relevant Service Order in that Contract Year. This is an aggregate cap that applies to all liabilities that arise during each Contract Year (which, for each liability, will be determined by when the first incident happened that gave rise to the liability).

21.2 Unless otherwise stated, all the other limitations and exclusions of liability in your LINX Membership Agreement apply to the Peering Bandwidth service and your Service Orders for that service.

22. Ending Your Service

22.1 Either party may cancel your Peering Bandwidth service by giving the other party at least 30 days' written notice at any time. If so, your service and the relevant Service Order will terminate at the end of the Renewal Period in which the notice period expires (or, if the notice period expires before the end of the Initial Term, at the end of the Initial Term).

22.2 If you need to cancel your Peering Bandwidth service urgently, you may notify LINX in writing and LINX will make reasonable efforts to terminate the service as soon as is feasible. If so, even though your service may end sooner, your Service Order will be deemed to continue as if you provided 30 days' notice as required by clause 22.1 above, and you will have to continue paying fees until your Service Order ends in accordance with that clause.

22.3 If you or we terminate your Peering Bandwidth service, this will not automatically terminate your Port Access service for the Access Port(s) to which your Peering Bandwidth is allocated. Your Port Access service must be cancelled separately.

22.4 For clarity, each party's rights to terminate a Service Order in your LINX Membership Agreement apply to the supply of the Peering Bandwidth service.

23. When a Service Order Ends

23.1 When your Peering Bandwidth service ends, you will comply with LINX's reasonable instructions and requirements when disconnecting and removing your equipment.

24. Glossary

Access Port	has the same meaning as in the Service Terms for the Port Access service.
Autonomous System	has the same meaning used in IETF RFCs
BGP	means Border Gateway Protocol.
Contract Year	means, for each Service Order, each period of 12 months beginning on the date that the Service Order became binding and each anniversary of that date.
Ethernet VLAN	means Ethernet Virtual Local Area Network.
Harm	includes a. physical harm, electrical damage, corruption of data, interruption of service, exposure to legal liability, exposure to legal risk, or causing non-compliance with any Legal Requirement; b. interruption or interference with peering by other LINX members on the IXP; or c. Traffic Hijacking.
Initial Term	means the initial term of each Service Order before it renews.
IXP	means an internet exchange point.
Link-Aggregated Access Port	has the same meaning as in the Service Terms for the Port Access service.
LINX Route Collector	means a route collector operated by LINX and connected to the LINX IXP of which your Access Port is a part.

LINX Route Server	means a route server operated by LINX and connected to the LINX IXP of which your Access Port is a part.
Peer	means a network that is a LINX member connected to the same IXP with whom you have entered into a Peering Agreement.
Peering	means the bilateral exchange of Traffic between two internet networks that are Autonomous Systems, using BGP4 to convey for which internet addresses each network will accept Traffic for delivery.
Peering Agreement	means an agreement between two networks to engage in Peering between themselves, and within the context of peering on a LINX IXP, means the agreement of two LINX members to peer over a LINX IXP Peering LAN.
Peering LAN	means a shared Ethernet domain on the IXP provided for the purpose of Peering.
Peering Session	means a BGP communications session between routers.
Quarantine LAN	means a segregated Ethernet domain on the LAN with highly restricted connectivity, used for the purpose of testing your configuration in a segregated environment so as to mitigate the risk of Harm to the IXP.
Renewal Period	has the meaning given to it in clause 3.2 of these Service Terms.
Service Description	means LINX's description of the Peering Bandwidth service set out in these Service Terms and any other written specification for the service provided to you by LINX and incorporated into your Service Order.
Service Order	in the context of these Service Terms, means a Service Order for the Peering Bandwidth service.
Service Start Date	means the date on which your Peering Bandwidth service will be deemed to start, as described in clause 3.3 of these Service Terms.
Technical Requirements	means the Technical Requirements for Peering set out in Annex 1 (*Technical Requirements for Peering*) of these Service Terms.
Traffic	means IP data packets addressed to publicly routable IP addresses based either on the IPv4 or IPv6 communications protocol, according to the context.
Traffic Hijacking	means inducing one or more LINX members to send Traffic to any of your Access Ports through a breach of the prohibitions in 9.1 of these Service Terms.

ANNEX 1

Technical Requirements for Peering

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1. Eligibility Requirements

1.1 To use the Peering Bandwidth service you must:

a. have an ASN (Autonomous System Number) assigned by one of the Regional Internet Registries (or their predecessors) or an alternative agreed by the LINX members;

b. present to LINX an Autonomous System (AS) that is visible from the LINX transit router; and

c. use BGPv4 for Peering.

2. Technical Requirements

2.1 Members' use of LINX shall at all times conform to the relevant standards as laid out in STD0001 and associated Internet STD documents, which are available here: ftp://ftp.isi.edu/in-notes/std/std1.txt.

Physical

2.2 It is recommended that Ethernet and FastEthernet interfaces are configured with duplex, speed and other configurations and not be auto-sensing. GigE and higher speed interfaces shall be configured to be auto-negotiating.

MAC Layer

2.3 Frames forwarded to LINX ports shall have one of the following ethertypes:

- 0x0800 - IPv4
- 0x0806 - ARP
- 0x86dd - IPv6

2.4 Frames forwarded from attached member device(s) to a member interface on the LINX Peering LAN(s) shall all have the same source MAC address.

2.5 A member interface delivered over a LINX-Aggregated Port shall be treated as a single ingress port for the purposes of clause 2.2.

2.6 Frames forwarded to a member interface which is part of the LINX Peering LAN(s) shall not be addressed to a broadcast MAC destination address except as follows: broadcast ARP packets.

2.7 Traffic for link-local protocols shall not be forwarded to member interfaces which are part of the LINX Peering LAN(s) except for the following:

- ARP
- IPv6 Neighbour solicitations and advertisements

- PIM-SM

Link local protocols includes but is not limited to:

- IRDP
- ICMP redirects
- IEEE802 Spanning Tree
- Vendor proprietary discovery protocols (e.g. CDP, EDP)
- Interior routing protocol broadcasts (e.g. OSPF, ISIS, IGRP, EIGRP)
- BOOTP/DHCP
- PIM-DM
- DVMRP

IP Layer

2.8 Member interfaces connected to LINX Peering LAN ports shall only use IP addresses and netmasks (prefix lengths) assigned to them by LINX. In particular:

- IPv6 addresses (link & global scope) shall be explicitly configured and not auto-configured.
- IPv6 site-local addresses shall not be used.

2.9 IP packets addressed to LINX Peering LAN directed broadcast address shall not be automatically forwarded to LINX ports.

Routing

2.10 All exchange of routes across a LINX Peering LAN shall be via BGP4; or in the case where a member interface is used to exchange multicast traffic, PIM-SM and MSDP may also be run on that interface.

2.11 ASNs used in BGPv4 sessions across the LINX network shall not be from ranges reserved for private use. The only exception to this is when a BGP speaker is collecting routing information for analysis and not for immediate routing decisions. In this case the BGP speaker may use a private ASN. If it does so it shall not advertise any routes.

2.12 LINX supports good engineering practice and LINX members are encouraged to aggregate their routes in accordance with LINX Route Aggregation Best Current Practice, from time-to-time in force.

2.13 IP address space assigned to the LINX Peering LANs shall not be advertised to other networks without explicit permission of LINX.

2.14 All routes advertised across the LINX network shall point to the router advertising it UNLESS agreement has been made in advance in writing by LINX and the two members involved. For the avoidance of doubt, the LINX Route Servers are not routers and shall advertise routes pointing to the advertising router.

2.15 All routes to be advertised in a peering session across LINX shall be registered in the RIPE or other public routing registry.

2.16 Members may use more than one ASN for their LINX peering provided that each ASN presented shares the same network operations centre and peering contact details.

Forwarding

2.17 Traffic on member interfaces connected to the LINX Peering LAN(s) shall only be forwarded to a LINX member when permission has been given by the receiving member either:

a. by advertising a route across the LINX network; or

b. explicitly in writing.

2.18 Traffic shall not be routinely exchanged between two member interfaces connected to the LINX Peering LAN(s) and owned by the same LINX member.