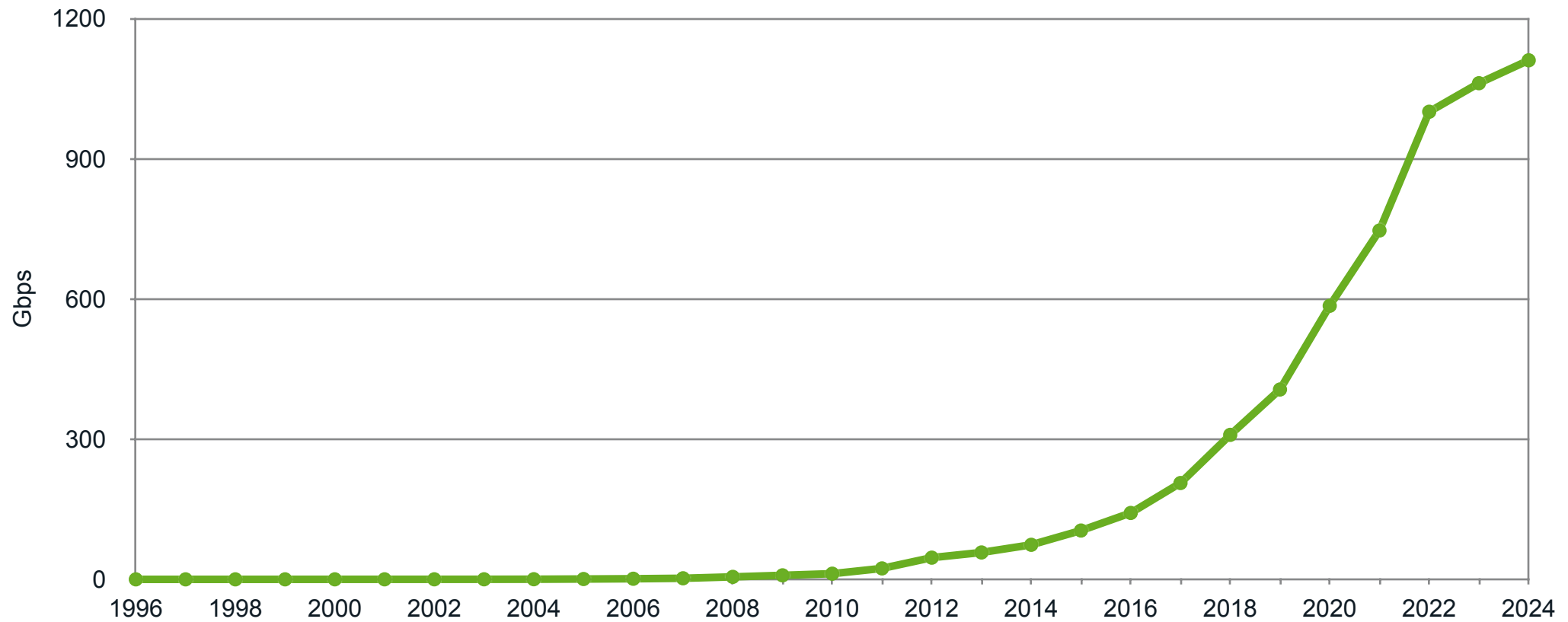Traffic & Trends

Connected Edge Capacity

Traffic Peaks :: 1996 - Now

Operations Update

Core Network

Core Network - Capacity Planning

- INEX LAN1 ring - 400Gb
- INEX LAN2 ring - 200Gb

- Typical trigger to activate capacity increases is 50% utilisation.

- Maintenance window for Dec 7th was to begin the process of increasing INEX LAN1 ring to 600Gb
  - Postponed until early Q1 2024

- INEX LAN1 NWBP span at 200Gb -> will increase to >= 300Gb
- INEX LAN2 ring adequate at 200Gb currently
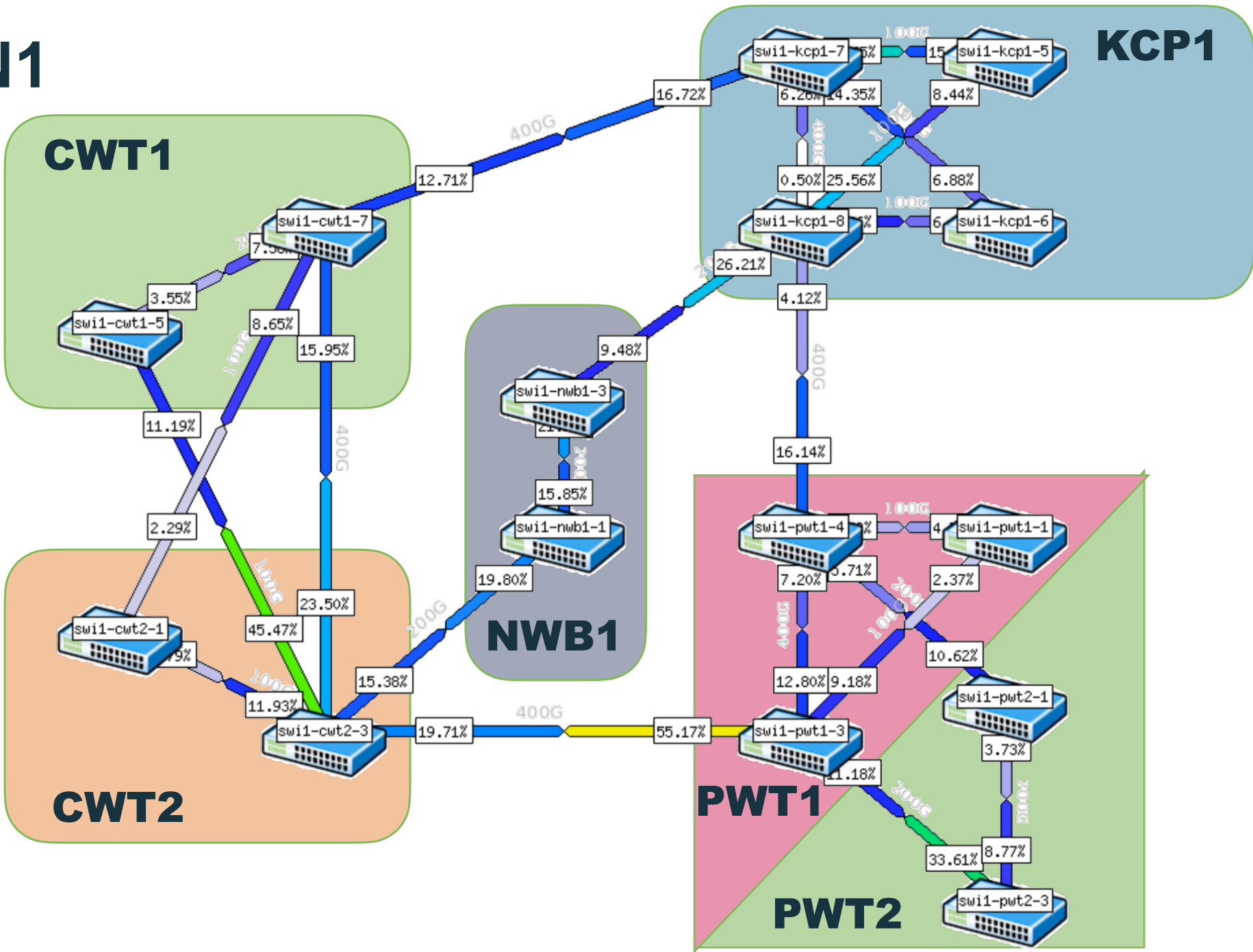
Core Network

- 7Tbps of provisioned capacity

- Own dark fibre links east/west between PoPs:
    - Specify and install appropriate MUXes to suit:
    - Coriant's Groove G30 platform *(now Infinera)*
        - *2 x 600Gb WAN => 12 x 100Gb or 3 x 400Gb LAN*
    - Distances range from 7.7Km to 39Km

- Some campus connections:
    - Active or Passive DWDM where cost effective / appropriate
    - Also campus cross connects with 100Gb BiDi optics
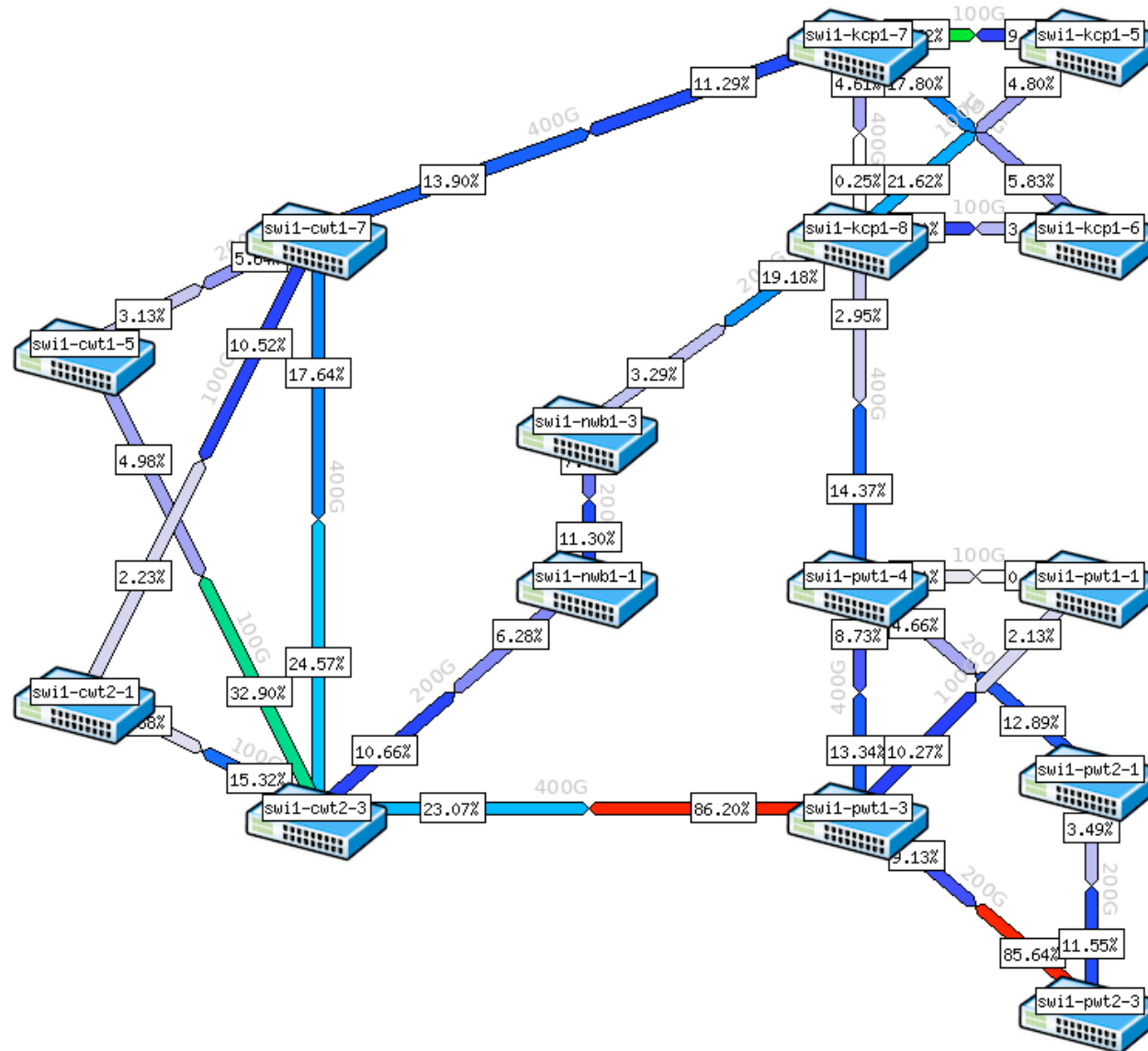
2024 Core Network Upgrade Plan / Maintenance

CRQ-0008 25/12/2023	Traffic engineering to re-route some traffic from PWT to CWT2 via KCP1 due to heavy load on PWT/CWT1 span.	Rolled back
CRQ-0009 08/02/2024	Change physical cabling of x13 core bundles to allow additional ports for 400Gb to 600Gb upgrade (capacity of 800Gb created). IXP Manager FTW - ~104 L3 interfaces + ECMP/BGP.	Complete
CRQ-0010 08/02/2024	Repeat CRQ-0008 with adjustments for access switch paths to overcome the issues necessitating the rollback.	Complete
CRQ-0011 21/02/2024	Upgrade the DWDM infrastructure (new 200GHz MUXes and amps) on the KCP1/CWT1 metro fibre span to create capacity to upgrade the main fibre ring from 400G to 600G.	Complete

2024 Core Network Upgrade Plan / Maintenance

CRQ-0012 21/02/2024	Upgrade core switch in CWT1 from an Arista 7060CX2 to an Arista 7280CR3-32D4	Complete
CRQ-00xx TBD	New 100Gb BiDi links (via metro x-connects) between PWT1 and PWT2	*Delivered Awaiting MPO*
CRQ-00xx TBD	Upgrade INEX LAN1 core from 400Gb to 600Gb.	*Awaiting MPO*
CRQ-00xx TBD	Redeploy upgraded DWDM kit to NWB1 north/south links and upgrade from 200Gb to 400Gb.	*Planned*

2024 Core Network Upgrade Plan / Maintenance

CRQ-00xx TBD	Replace LAN1 fibre in CWT2 (damaged)	*Planned Non-Urgent*
CRQ-00xx TBD	Replace PDUs in Cork; pre-wire 100Gb port(s) in Cork.	*Planned Non-Urgent*
CRQ-00xx TBD	Route server Bird upgrades to latest. RPKI validator upgrades.	*Planning*
CRQ-00xx TBD	AS112 forklift upgrade (current Ubuntu LTS, Bird2, maybe switch from Bind)	*Planning*

Introducing 400Gb

Switching Equipment - INEX LAN1 - 400Gb

Arista DCS-7280CR3

- 32 x 100Gb and 4 x 400Gb
- Edge and core function
- Installed via CRQ-0012 on 21/02/2024
- First 400Gb port €39,000 / annum (€31,200 for additional)
  - Equiv 4 x 100Gb = €51k so ~75%
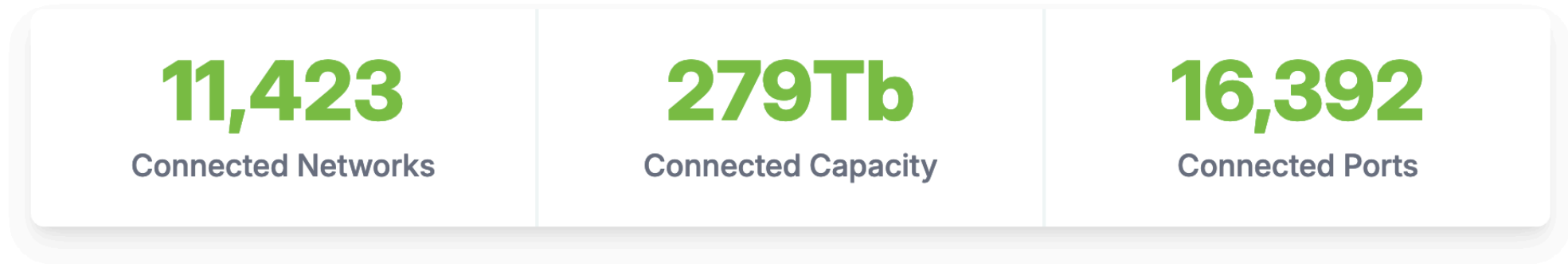 - LINX LON1 - £64.8k / LONAP - £35.4k

IXP Manager

11,423
Connected Networks

279Tb
Connected Capacity

16,392
Connected Ports

There are at least 230 IXPs Powering Peering using IXP Manager around the world to connect 11,423 networks of which 6,724 are unique. The edge peering capacity of these networks is 279Tb over 16,392 connected ports. We aggregate traffic statistics from 135 IXP Manager platforms which show us that the peak traffic exchanged is 74.4 Tbps.

Port Breakdown

1,922
100Gb

7,918
10Gb

3,101
1Gb

3,496
Other
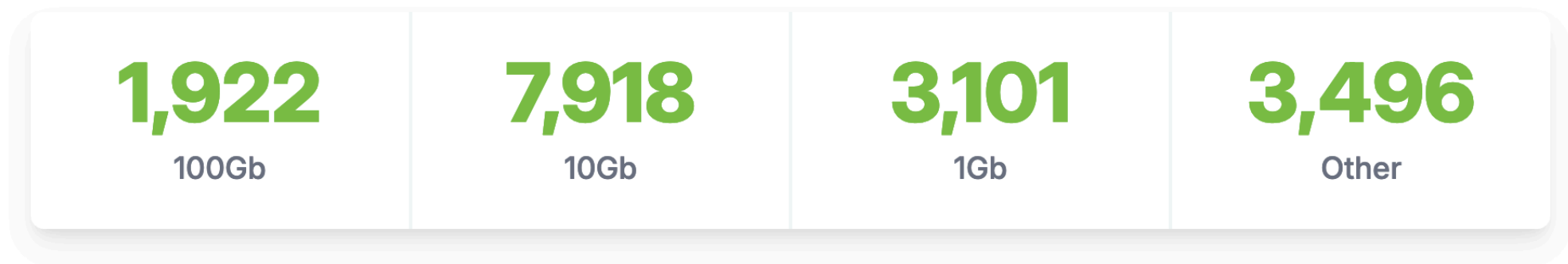
IXP Manager - Most Connected Networks

NETWORK	ASN	# IXPS
Packet Clearing House	3856	80
Packet Clearing House AS42	42	78
Hurricane Electric	6939	78
Cloudflare	13335	78
Akamai Technologies	20940	56
Microsoft	8075	46
Google LLC	15169	46
Facebook Inc	32934	46
Amazon.com	16509	45
DNS-OARC-112	112	41

IXP Manager - New Developer

- Feb 2024 - second attempt at hiring
- "PHP Developer - Help Build the Internet"
  - \>= 3 years professional PHP development
  - Hybrid but requires some office attendance
  - Desirable: Laravel; 'full-stack'; FOSS experience
- Job accepted yesterday with a start date of next Monday
- Fully funded via the "IXP Manager Sponsorship Program"
  - https://www.ixpmanager.org/sponsorship/terms
  - Funding on hand to cover the next year
  - Reviewing other possible sponsorship streams

Route Servers

Route Servers / Bird

- Route Servers - Ubuntu 22.04 / Bird 2.0.9
  - Likely to stick with 22.04 through to 2025
  - Bird versioning scheme changed April 2023
  - 2.0.12 -> 2.13
  - Upgrades planned for 2024 for Bird
- AS112 - Bird 1.6.x
  - Full platform upgrade planned for 2024
- IXP Manager - Route server filtering
  - Live at INEX since Q4 2022
  - To be released to the community ASAP

Euro-IX Route Server Workshop

- Two-day event next week
- Reps from OpenBGPd; Bird; and rpki-client. ~30 attendees.
- Agenda of 11 sessions / talks
- rfc8950 - Advertising IPv4 Network Layer Reachability Information (NLRI) with an IPv6 Next Hop
- Google depeering from route servers
  - Announced for INEX but still in place
  - Actioned in other IXPs in Euro-IX region
  - May suggest PNIs rather than bilateral peering over INEX but have accepted requests for bilateral in all cases we know of.

Thank you

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