

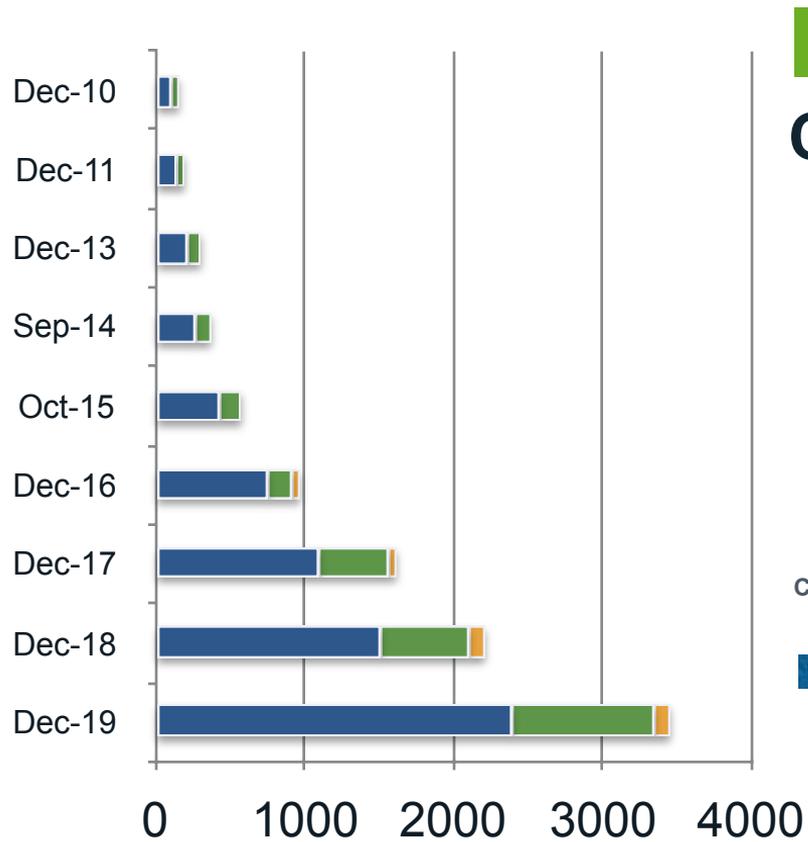


# INEX Operations Update December 2019

Barry O'Donovan

Internet Neutral Exchange Association  
Company Limited by Guarantee





## INEX Operations Update

# Connected Edge Capacity

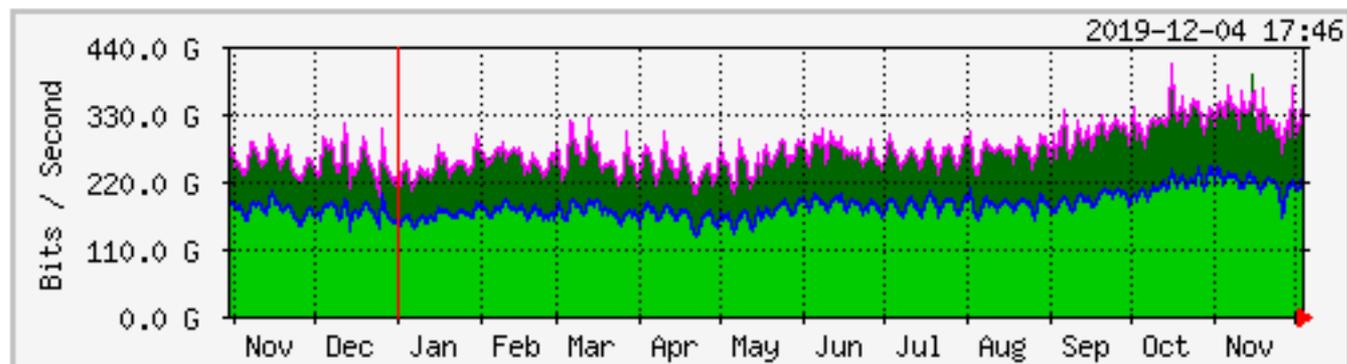
### Chart Descriptions

INEX LAN1

INEX LAN2

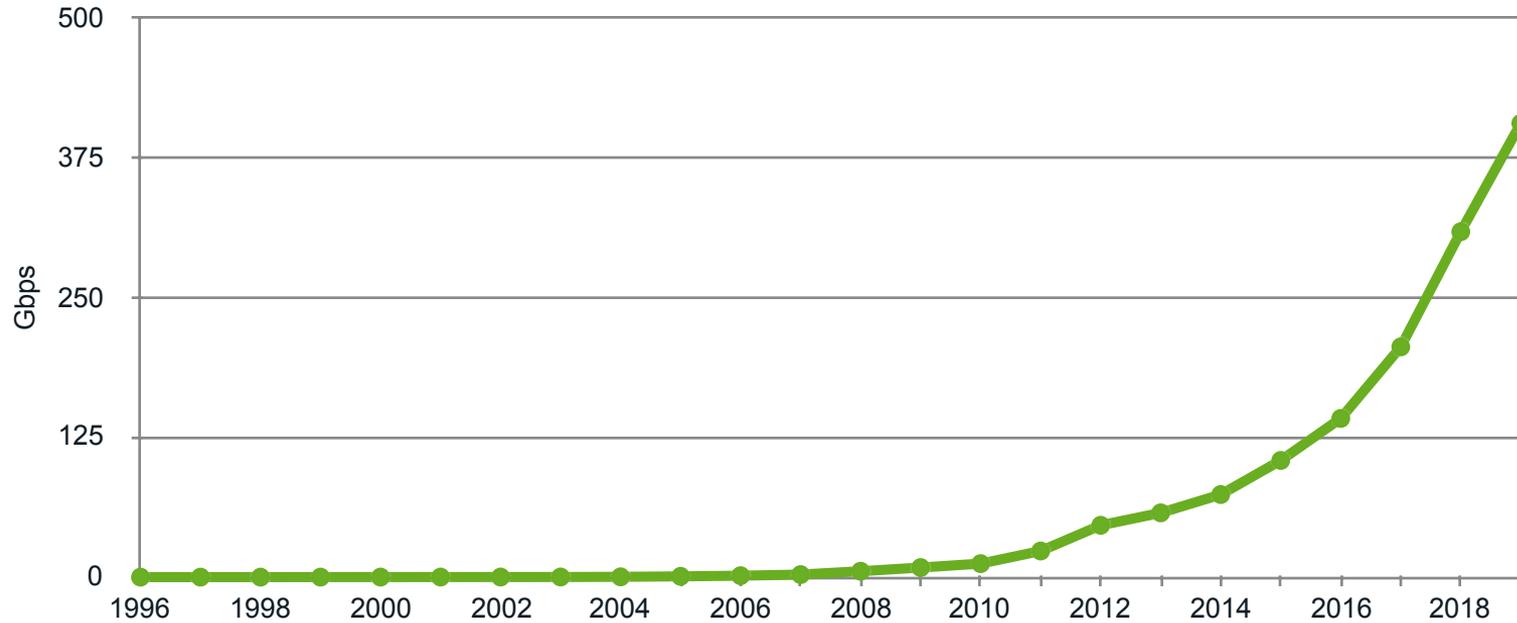
INEX Cork

## Year Graph



	Max	Average	Current
<b>In</b>	406.110 Gbits	178.819 Gbits	304.016 Gbits
<b>Out</b>	405.334 Gbits	178.888 Gbits	309.448 Gbits

## Traffic Peaks- 1996 - 2019



# 100Gb Ports - 2019

2017/8	LAN		2019	LAN
3 Ireland	LAN1		3 Ireland	LAN2
Apple *	LAN1		Amazon	LAN1
Apple *	LAN1		Amazon *	LAN2
Eir	LAN1		BT Ireland	LAN1
HEAnet	LAN1		Cloudflare	LAN1
HEAnet	LAN2		Fastly *	LAN1
RTE	LAN1		Fastly *	LAN1
RTE	LAN2		Google	LAN1
			Google	LAN2
			Limelight	LAN1
			Microsoft	LAN1
			Microsoft *	LAN2
			Stackpath *	LAN1
			Stackpath *	LAN1

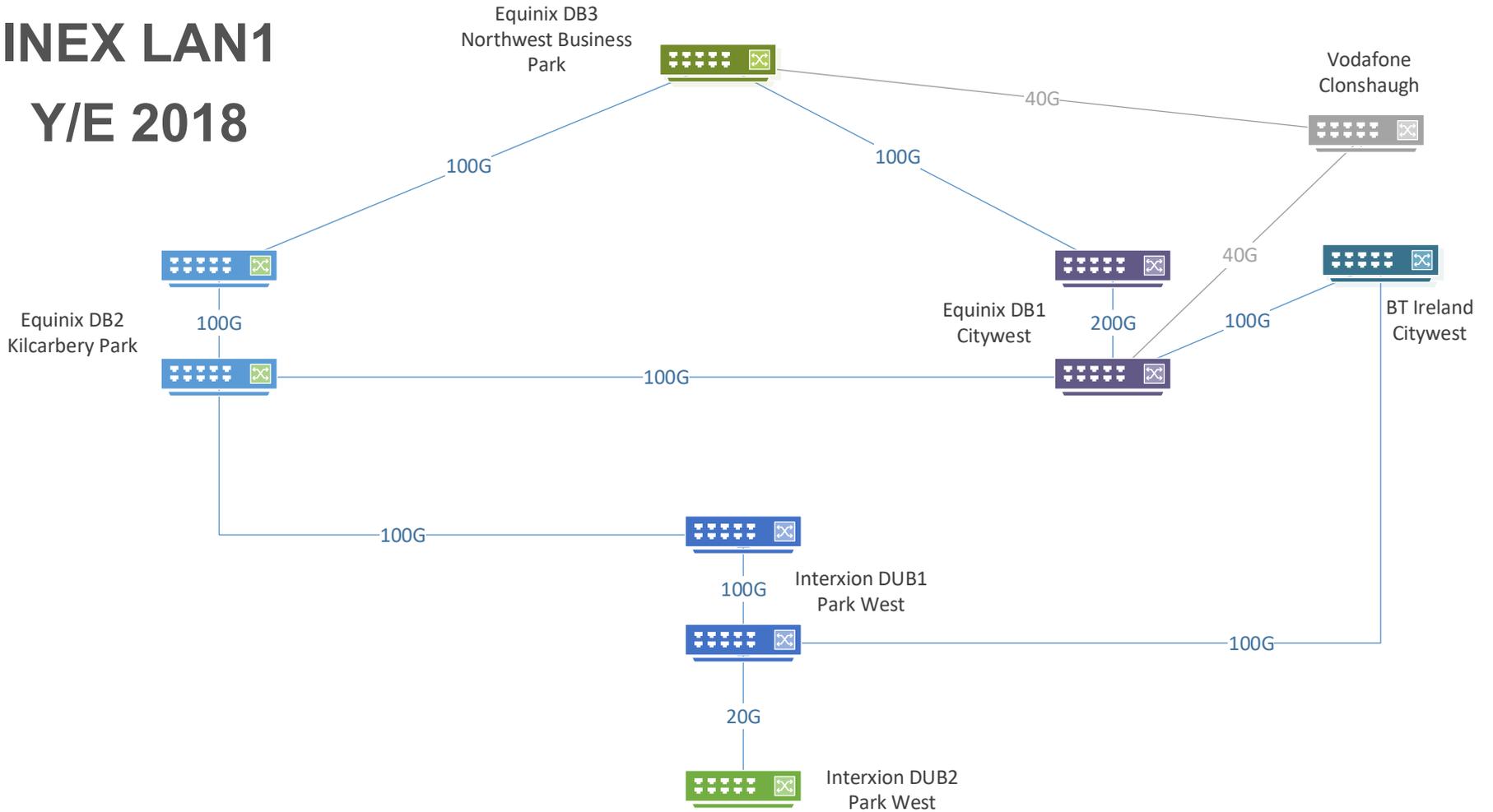
\* new connection rather than upgrade

# New Connections / Recent Non-100Gb Port Upgrades

- Stackpath - 2 x 100Gb on LAN1
- Expereo - 1Gb on LAN1 & 2
- **Amazon** - **100Gb on LAN2**
- **Microsoft** - **100Gb on LAN2**
- Sirius - 1Gb on LAN1
- Irish Telecom - 10Gb on LAN2
- **Cloudflare** - **10Gb on INEX Cork**
- RETN - 10Gb on LAN1
- Equinix - 10Gb on LAN1 & 2
- Imagine - 10Gb to 20Gb on LAN1 & 2
- Blueface - 1Gb to 10Gb on LAN1 & 2
- BBnet - 1Gb to 10Gb on LAN1
- Netflix - 30Gb to 50Gb on LAN1
- Lightnet - 2Gb to 10Gb on LAN1
- Carnsore - 1Gb to 10Gb on LAN1
- Fastcom - 1Gb to 10Gb on LAN1

# INEX LAN1

## Y/E 2018





# INEX LAN1

Arista DCS-7060CX2-32S

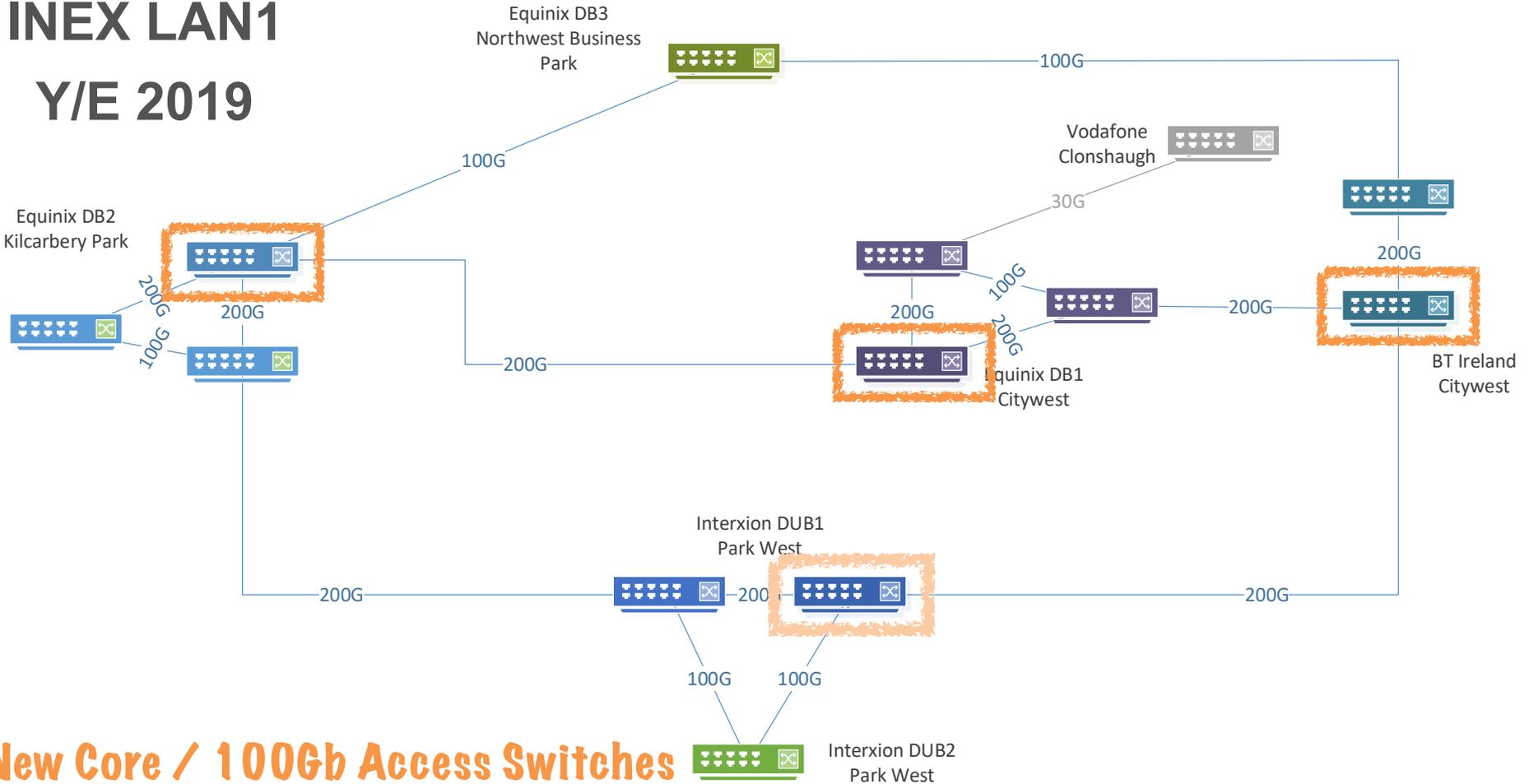


Arista DCS-7280SR-48C6



# INEX LAN1

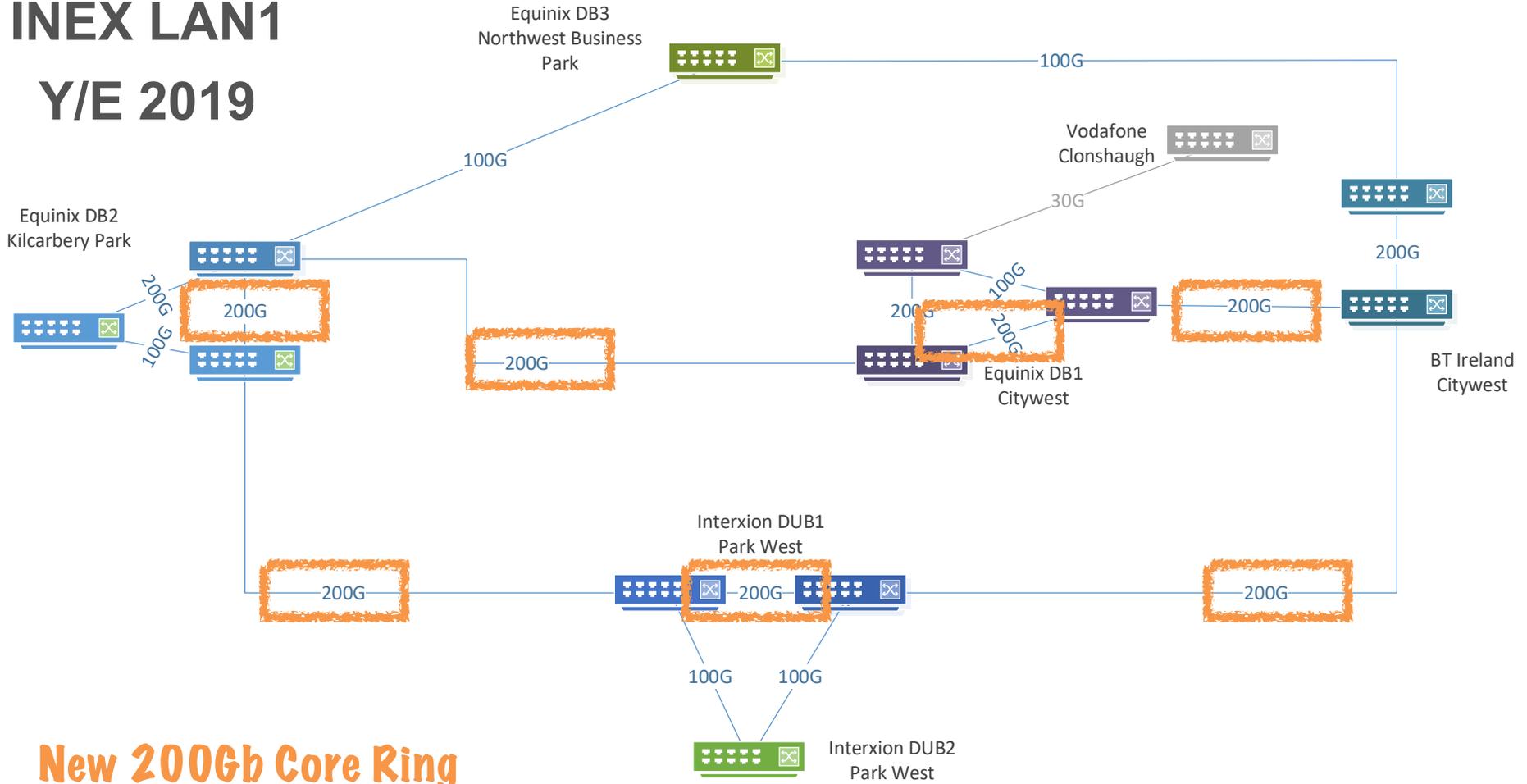
## Y/E 2019



**New Core / 100Gb Access Switches**

# INEX LAN1

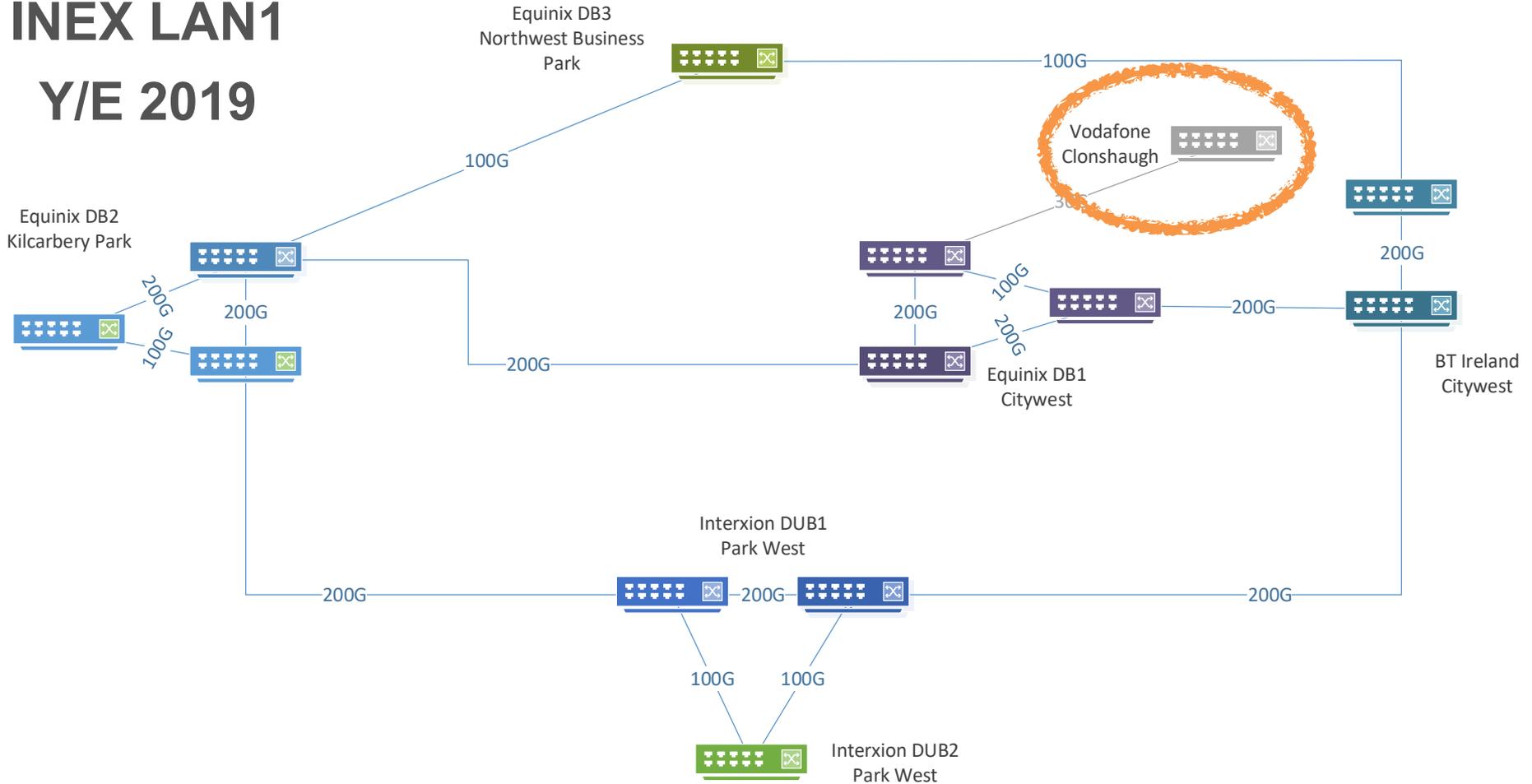
## Y/E 2019



**New 200Gb Core Ring**

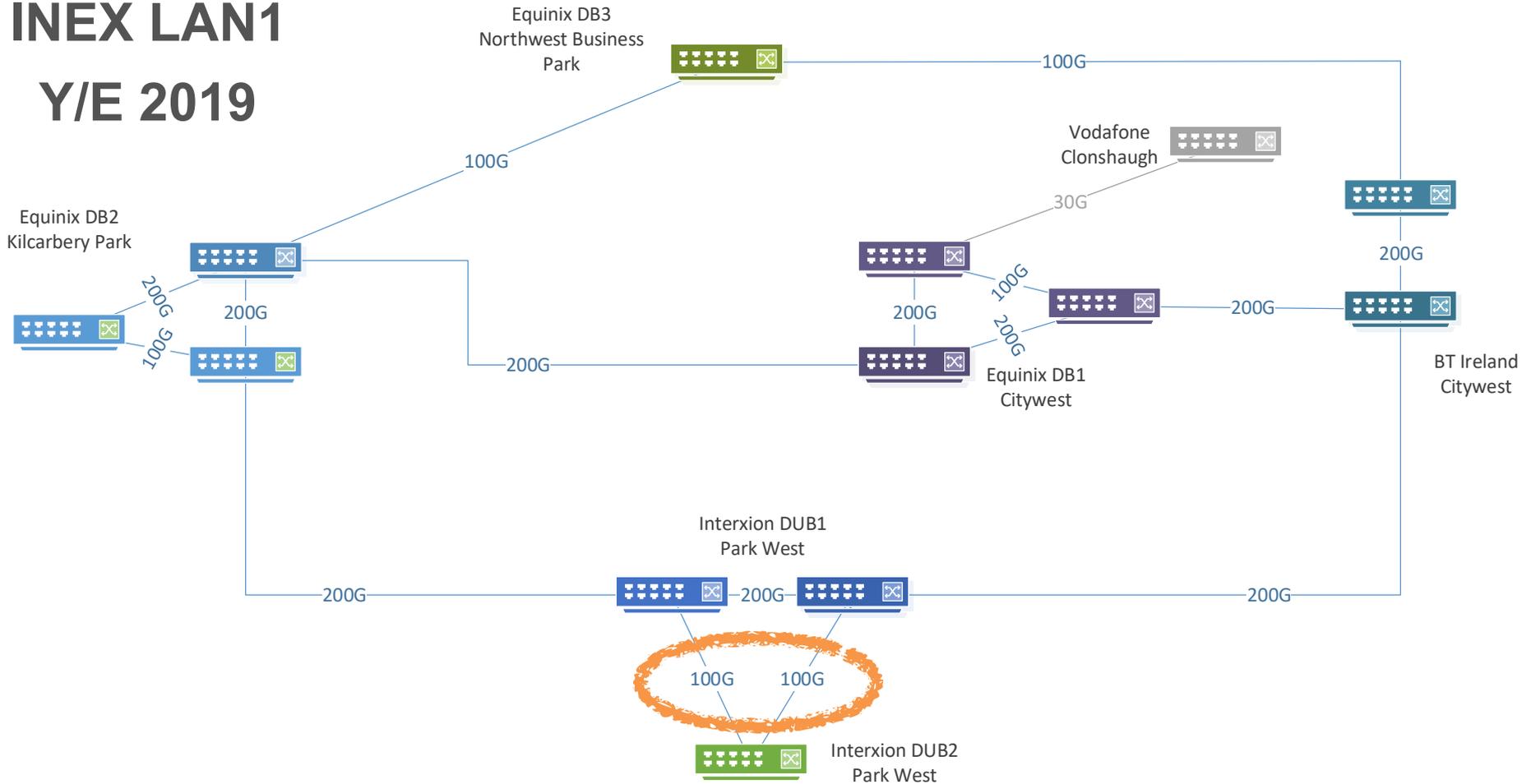
# INEX LAN1

## Y/E 2019



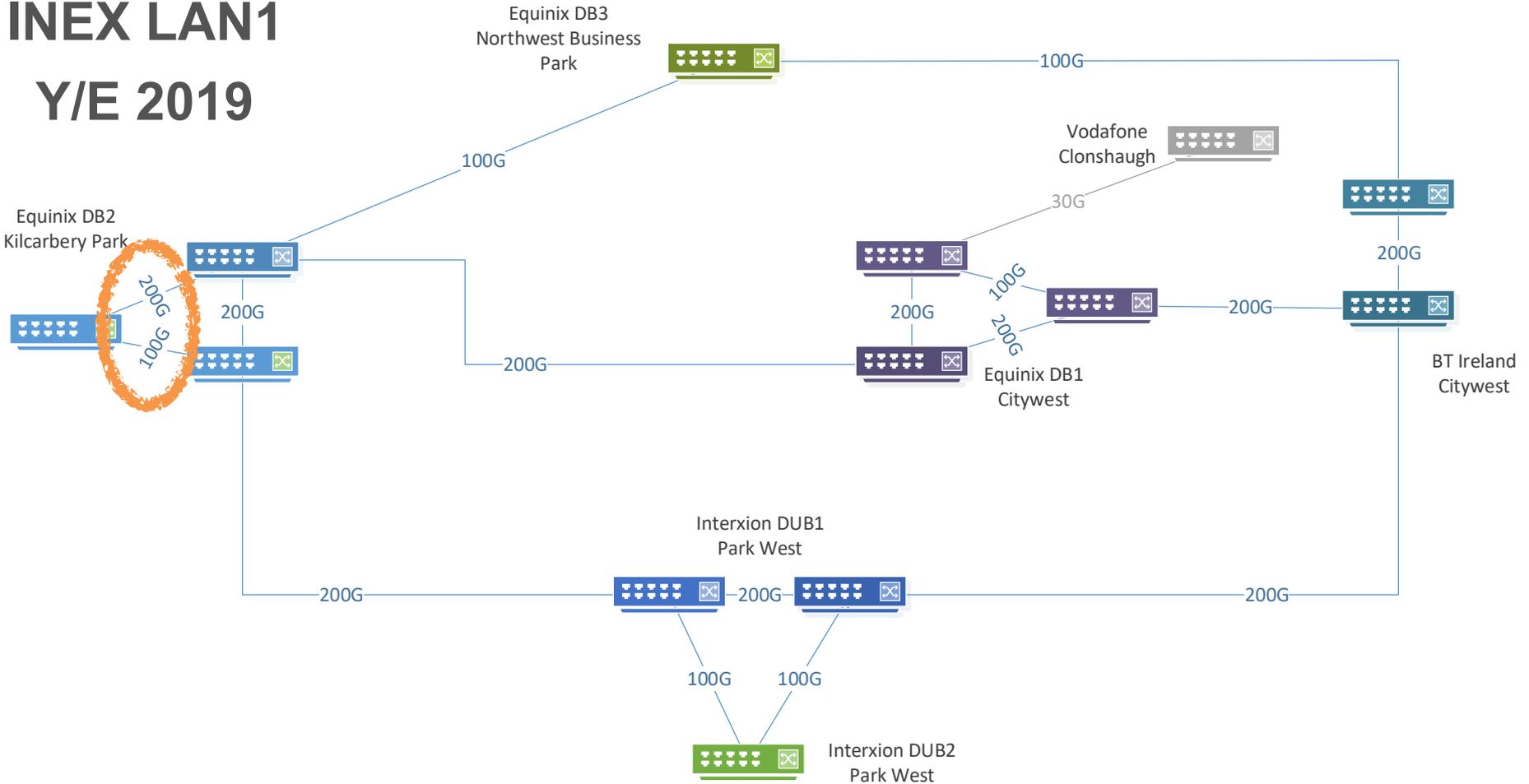
# INEX LAN1

## Y/E 2019



# INEX LAN1

## Y/E 2019



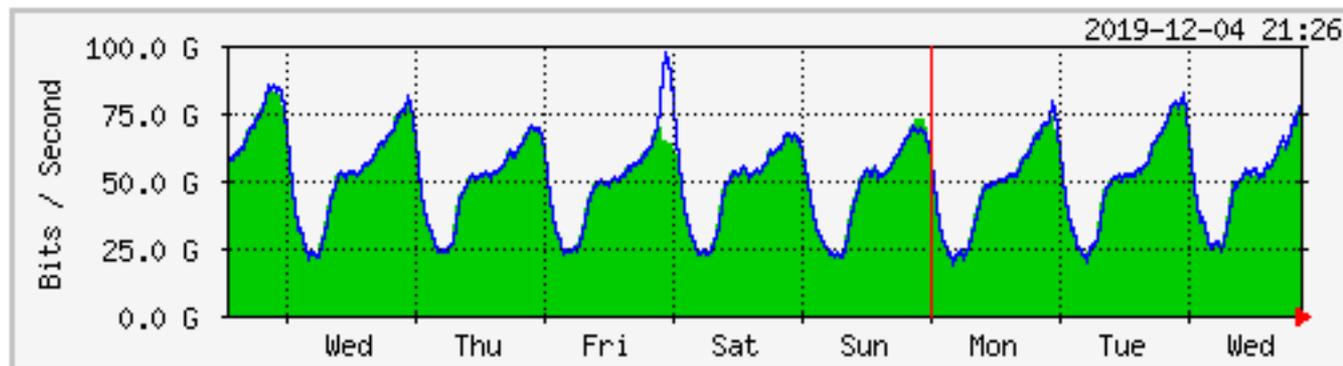
## 2019 Q4 Maintenance Windows

- Oct 10th: LAN1 Arista s/w upgrades (7/8)
- Oct 31st: LAN1 capacity upgrade (kcp1 - cwt1, add 7060 to cwt1)
- Nov 14th: LAN2 core switches s/w upgrade\*
- Nov 21st: LAN1 capacity upgrade (kcp1 - pwt1, add 7060 to kcp1)
- Nov 28th LAN1 capacity upgrade (pwt1 - cwt2 - cwt1, add 7060 to cwt2)\*
- Dec 12th Cork: switches s/w upgrade

## LAN2 Upgrades - Software

- Cumulus Linux 3.7.2 to 3.7.10
  - Fix for one of two outstanding sflow problems (malformed packets)
- New SNMP issue post upgrade

# Week Graph



	Max	Average	Current
In	83.982 Gbits	49.591 Gbits	75.827 Gbits
Out	98.582 Gbits	50.105 Gbits	75.810 Gbits

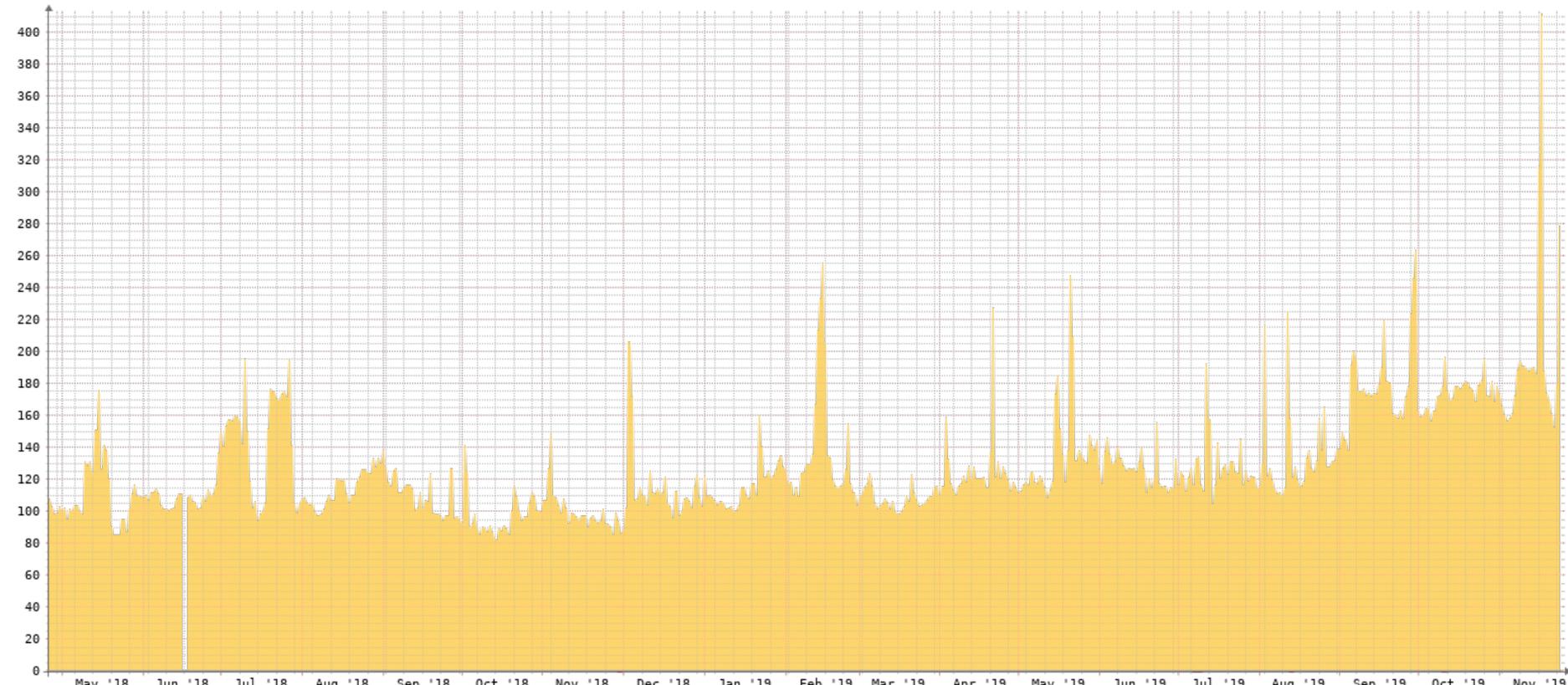
## LAN2 Upgrades - Software

- Cumulus Linux 3.7.2 to 3.7.10
  - Fix for one of two outstanding sflow problems (malformed packets)
- New SNMP issue post upgrade
  - **CM-25718: internally SNMP limiting ifHCInOctets/ifHCOctets to 32-bit counters**
- **Still plan to roll it out to INEX Cork next week**

# ARP Sponge

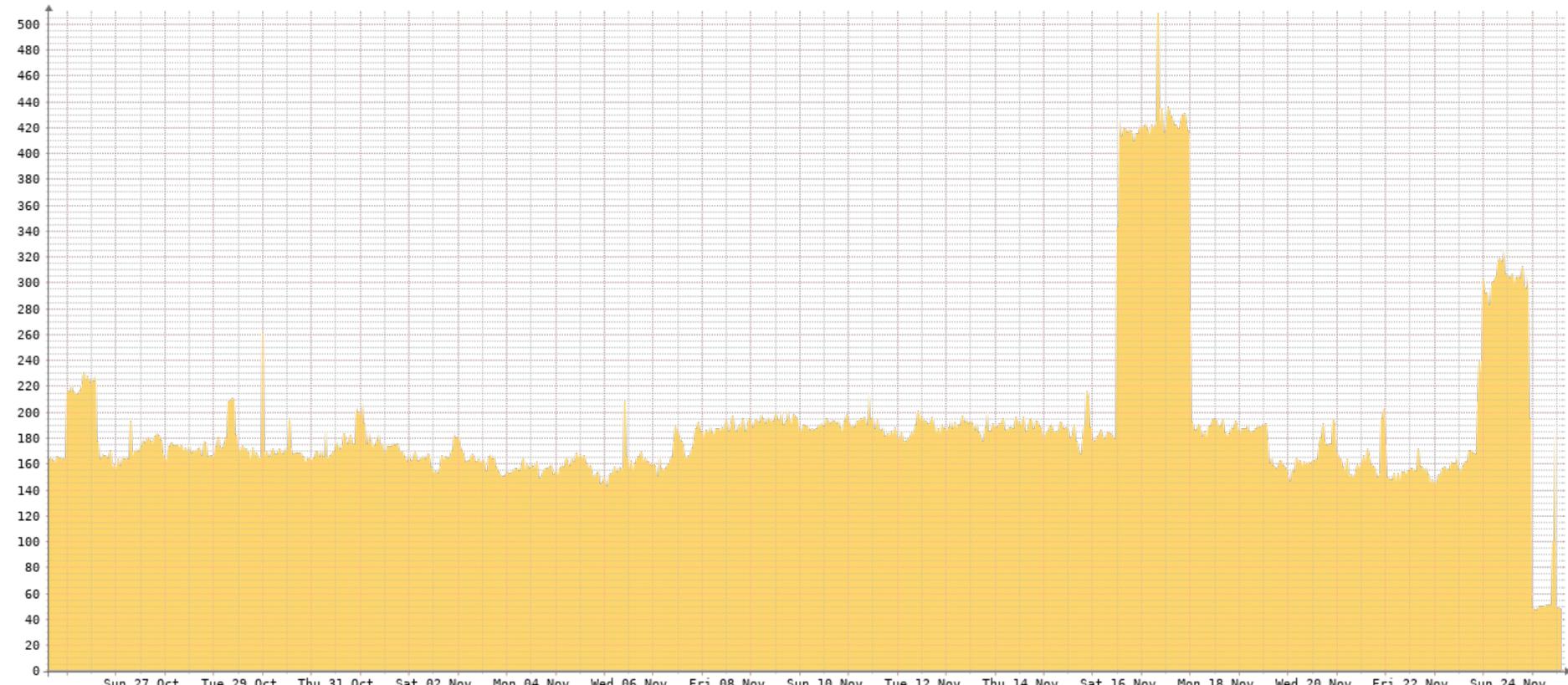
- INEX peering LANs are a shared broadcast domain
- ARP requests (broadcasts) from a member router are processed by **all other** member routers
  - In large quantities this can cause issues such as high CPU utilisation
- Typically a problem as exchanges (broadcast domains) get bigger
- Solution is to use an ARP sponge<sup>1</sup> - now live on INEX LAN1 and LAN2

1. <https://github.com/AMS-IX/arpsponge>



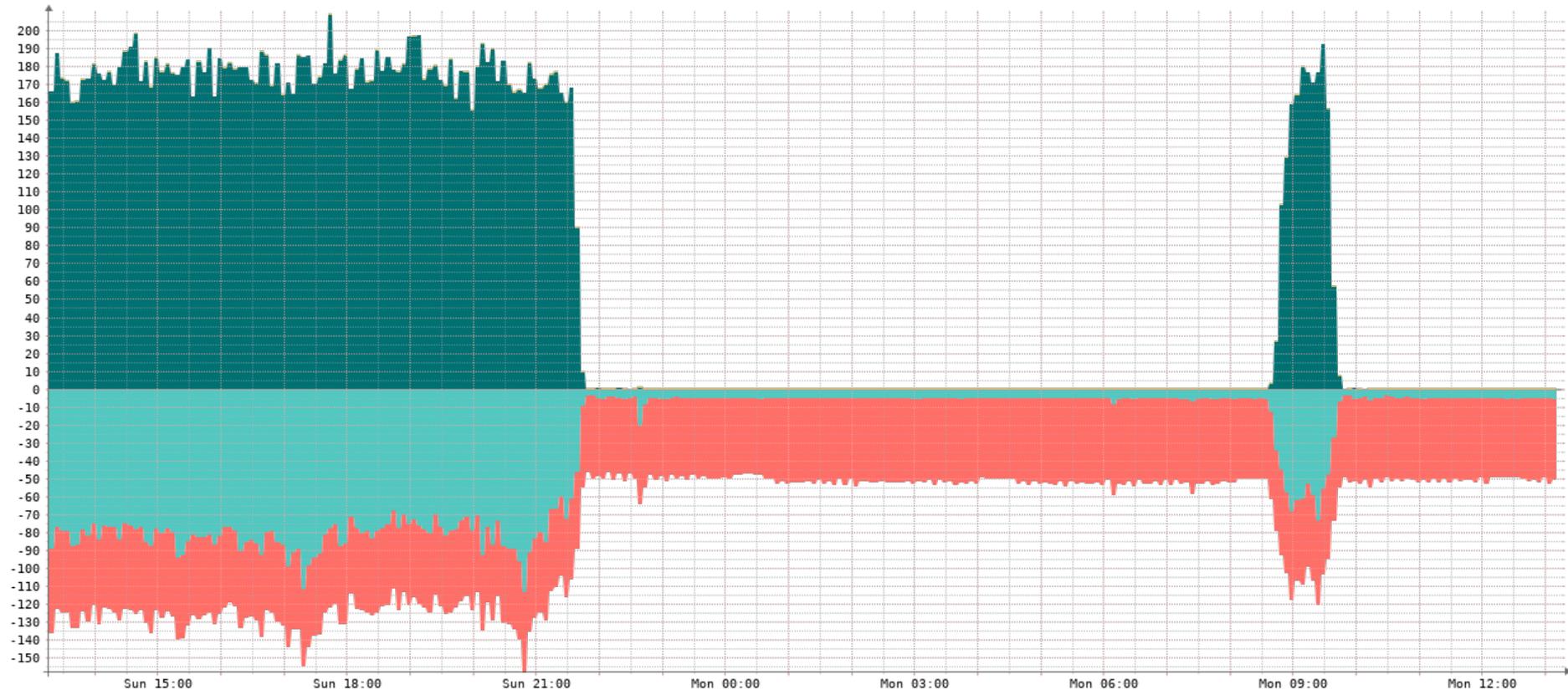
Packets		Now	Avg	Max	Total
■ Broadcast	In	0.00	0.00	0.00	0.00 B
	Out	0.00	0.00	0.00	0.00 B
■ Multicast	In	278.92	128.20	411.36	6.40GB
	Out	273.21m	246.92m	569.09m	12.33MB
□ Total	In	0.00	1.02k	3.29k	6.40GB
	Out	0.00	1.97	4.55	12.33MB
	Agg	0.00	1.02k	3.29k	6.41GB

# INEX LAN1 - Before ARP Sponge



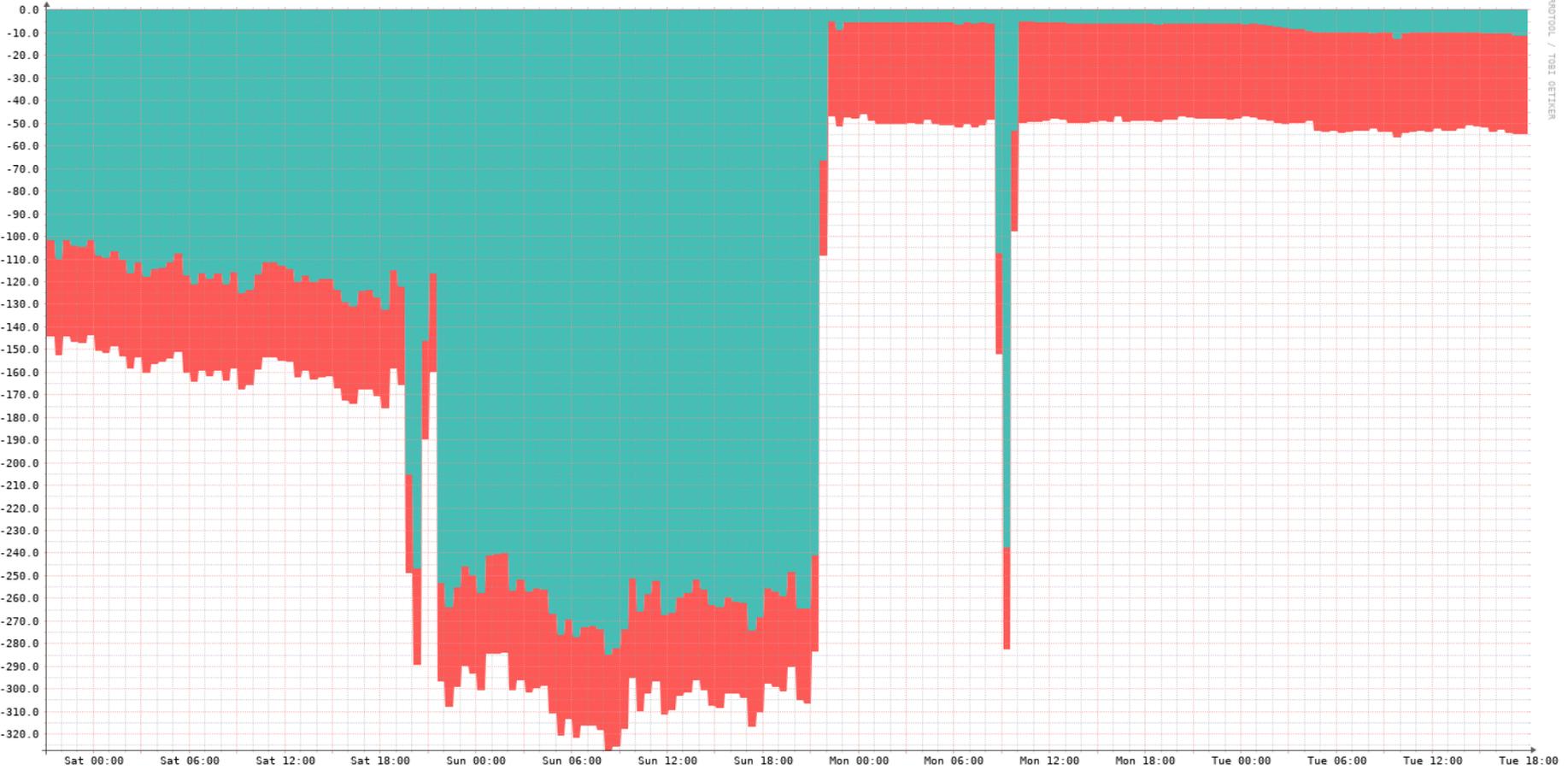
Packets		Now	Avg	Max	Total
■ Broadcast	In	0.00	0.00	0.00	0.00 B
	Out	0.00	0.00	0.00	0.00 B
■ Multicast	In	47.87	189.55	507.65	507.70MB
	Out	220.83m	261.11m	629.85m	699.36kB
□ Total	In	0.00	1.51k	4.06k	507.70MB
	Out	0.00	2.09	5.04	699.36kB
□ Agg		0.00	1.52k	4.06k	508.40MB

# INEX LAN1 - Before ARP Sponge



Packets		Now	Avg	Max	Total
Broadcast	In	339.38m	68.37	209.24	5.89MB
	Out	5.46	34.17	113.51	2.94MB
Multicast	In	65.21m	122.96m	466.41m	10.59kB
	Out	44.66	45.23	50.88	3.89MB
Total	In	0.00	544.18	1.68k	5.90MB
	Out	0.00	630.81	1.26k	6.84MB
	Agg	0.00	1.17k	2.72k	12.73MB

# Sample Member Port (1/2)



Packets		Now	Avg	Max	Total
Broadcast	In	0.00	95.01m	190.77m	31.98kpps
	Out	11.28	104.54	285.00	35.19Mpps
Multicast	In	37.30m	38.24m	49.99m	12.87kpps
	Out	43.79	42.91	45.70	14.44Mpps
Total	In	298.41m	1.07	1.83	44.85kpps
	Out	440.54	1.18k	2.62k	49.63Mpps
	Agg	440.83	1.18k	2.62k	49.68Mpps

# Sample Member Port (2/2)

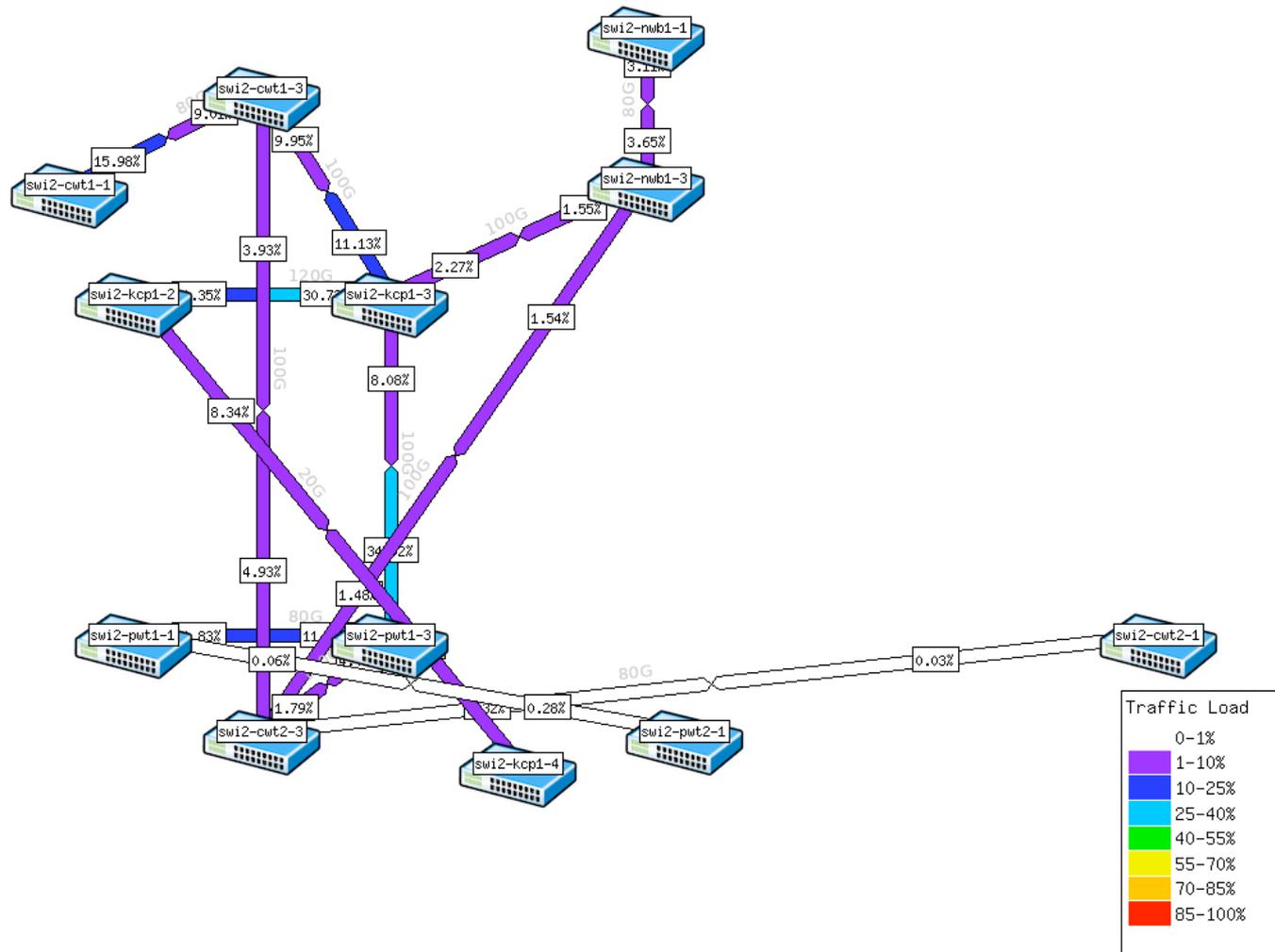
# IXP Manager

- IXP Manager v5.2 released in Sept with:
  - OAuth support: PeeringDB
  - RFC1997 BGP Community pass-through
  - Lots of other improvements and bug fixes
- IXP Manager v5.3 due soon with:
  - 2fa, login session management
  - 1st pass on memory usage for route server config build
  - Core bundle improvements

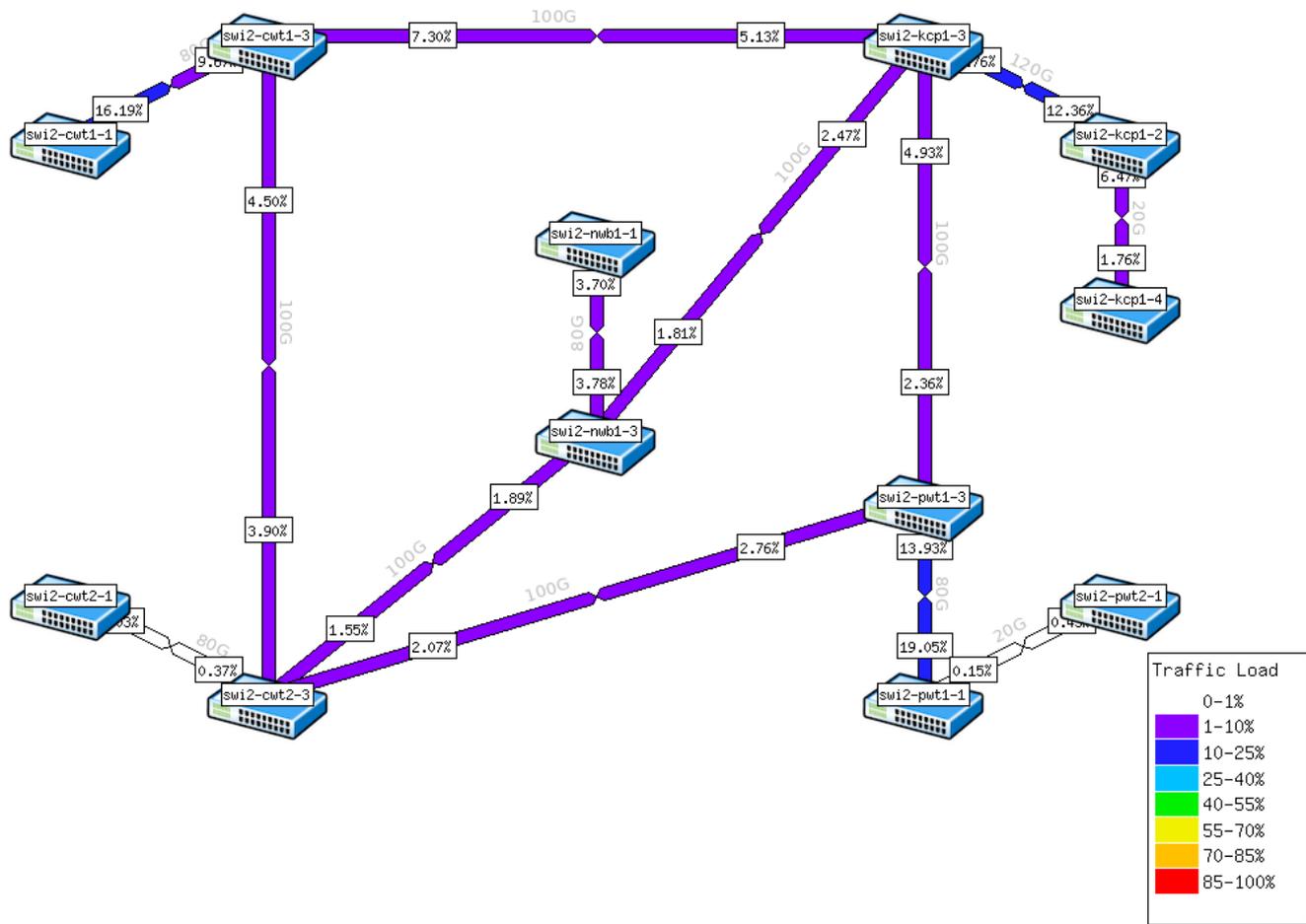
## IXP Manager - Core Bundles (aka Inter-Switch Links)

- Hidden feature since June 2017 (v4.6.0)
- Supports: ECMP, L2-LAG, L3-LAG
- Smart wizard (next subnet, next interface, etc.)
- Links into automation system (disable individual ports, L3 BGP, traffic engineering)
- Graphing has been recently automated:
  - <https://www.inex.ie/ixp/statistics/core-bundle/42> (A/B side support)
  - Weathermap a work in progress

INEX LAN2 - Weathermap



# INEX LAN2 - Weathermap



# IXP Manager - Core Bundles (aka Inter-Switch Links)

- Hidden feature since June 2017 (v4.6.0)
- Supports: ECMP, L2-LAG, L3-LAG
- Flexible database schema
- Smart wizard (next subnet, next interface, etc.)
- Links into automation system (disable individual ports, L3 BGP, traffic engineering)
- Graphing has been recently automated:
  - <https://www.inex.ie/ixp/statistics/core-bundle/42> (A/B side support)
  - Weathermap a work in progress
- Nagios monitoring and alerting

## Service Status Details For Host 'swi1-cwt1-3.mgmt.inex.ie'

Limit Results:  

Host 	Service 	Status 	Last Check 	Duration 	Attempt 	Status Information
swi1-cwt1-3.mgmt.inex.ie	Arista switch chassis	OK	12-04-2019 23:18:01	0d 3h 12m 50s	1/3	OK - Fans (speed actual/configured): Tray 1: 1/1 ok (31%/30%): Tray 2: 2/1 ok (29%/30%): Tray 3: 3/1 ok (30%/30%): Tray 4: 4/1 ok (30%/30%)Tray PowerSupply1: PowerSupply1/1 ok (33%/30%): Tray PowerSupply2: PowerSupply2/1 ok (34%/30%). PSUs: PSU #1 PWR-500AC-F: ok (87.125/500W): PSU #2 PWR-500AC-F: ok (79.625/500W). Temperature (current/max/warn/crit): overall system temperature status: ok. TempSensorP1/1 (Hotspot temperature sensor): ok (39/41/95/100): TempSensorP1/2 (Inlet temperature sensor): ok (29/31/70/75): TempSensorP2/1 (Hotspot temperature sensor): ok (40/41/95/100): TempSensorP2/2 (Inlet temperature sensor): ok (32/33/70/75): TempSensor1 (Cpu temp sensor): ok (48.601944161143/53.480433313925/90/95): TempSensor2 (Cpu board temp sensor): ok (38.875/40.125/75/80): TempSensor3 (Back-panel temp sensor): ok (35.75/37.375/75/85): TempSensor4 (Board sensor): ok (38/39/65/75): TempSensor5 (Front-panel temp sensor): ok (27/29/65/75): TempSensor6 (Switch chip right sensor): ok (41/43/95/105): TempSensor7 (Switch chip left sensor): ok (41.25/42.625/95/105): TempSensor8 (Tomahawk top left outer sensor): ok (57.90285/60.82515/100/110): TempSensor9 (Tomahawk top right outer sensor): ok (54.00645/57.4158 /100/110): TempSensor10 (Tomahawk bottom right outer sensor): ok (51.5712/54.4935/100/110): TempSensor11 (Tomahawk bottom left outer sensor): ok (54.00645/56.92875/100/110): TempSensor12 (Tomahawk top outer sensor): ok (51.08415/54.98055/100/110): TempSensor13 (Tomahawk left inner sensor): ok (52.5453/54.98055/100/110): TempSensor14 (Tomahawk bottom inner sensor): ok (50.5971/54.4935/100/110): TempSensor15 (Tomahawk bottom outer sensor): ok (49.623/54.00645 /100/110): . Memory OK (80.64%). System uptime looks okay: 60636 minutes. System load looks okay: 0.26 0.33 0.35.
	Core Bundles	OK	12-04-2019 23:18:01	0d 19h 32m 57s	1/3	swi1-cwt1-3 - swi1-cwt1-1 OK - 2/2 links up. swi1-cwt1-3 - swi1-cwt1-2 OK - 2/2 links up. swi1-cwt1-3 - swi1-kcp1-3 OK - 2/2 links up.
	IXP Manager Switch Status	OK	12-04-2019 23:17:38	0d 19h 33m 28s	1/3	Last polled 2 minutes ago.
	SSH	OK	12-04-2019 23:15:58	42d 2h 34m 3s	1/3	SSH OK - OpenSSH_7.6 (protocol 2.0)
	ping - IPv4	OK	12-04-2019 23:17:40	42d 2h 32m 36s	1/3	PING OK - Packet loss = 0%, RTA = 0.51 ms

# IXP Manager Member Facing Tools

- LG: <https://www.inex.ie/ixp/lg>
- Peering Matrix: <https://www.inex.ie/ixp/peering-matrix>
- Member details: <https://www.inex.ie/ixp/customer/details>
- Switch config: <https://www.inex.ie/ixp/switch/configuration>
- Statistics: <https://www.inex.ie/ixp/statistics/ixp> (plus your own port, latency and p2p)
- Add your logo via dashboard if you haven't already
- Cross connect details
- IRRDB database entries (and ability to update)
- Peering manager

## INEX Operations Update

# Operations Availability for 2019 Holiday Period

- Normal cover until Fri Dec 20th 2019 at 1800 UTC
- Normal cover resumes Mon Jan 6th 2020 at 0900 UTC
- During the holiday period:
  - No changes to critical production services
  - Technical support provided via normal channels:

<https://www.inex.ie/support/>

**Get your upgrades in now!**



THANK YOU

**Any Questions?**