

Operating ISP Networks in ★Europe★

Guide for the North American Market



Andy Davidson – LoNAP
David Freedman - Claranet

Amusing Picture



50 CENT

Only worth ~~0.337~~ euro

0.316

Why come?

- Perhaps you want to extend your peering reach, to come and join exchanges in Europe and obtain more peers.
- Perhaps you are offering connectivity services and want to connect customers in Europe directly.
- Perhaps you are building your own CDN and just want to come and put some boxes down.

Getting There

Source: Map courtesy of Greg's Cable Map (<http://www.cablemap.info>) , latency information supplied by Telegeography (<http://www.telegeography.com>)

1Gbit/sec = ~ \$4k MRC, 10Gbit/Sec = ~ \$10K MRC

A satellite map of the North Atlantic Ocean showing numerous submarine cables connecting North America and Europe. The cables are represented by lines of various colors (blue, green, red, purple) and thicknesses. Four specific cable routes are highlighted with callout boxes. The map shows the coastline of North America on the left and Europe on the right.

Global Crossing AC-1 north
Brookhaven USA to
Beverwijk NL
Wet RTT **74.7ms**

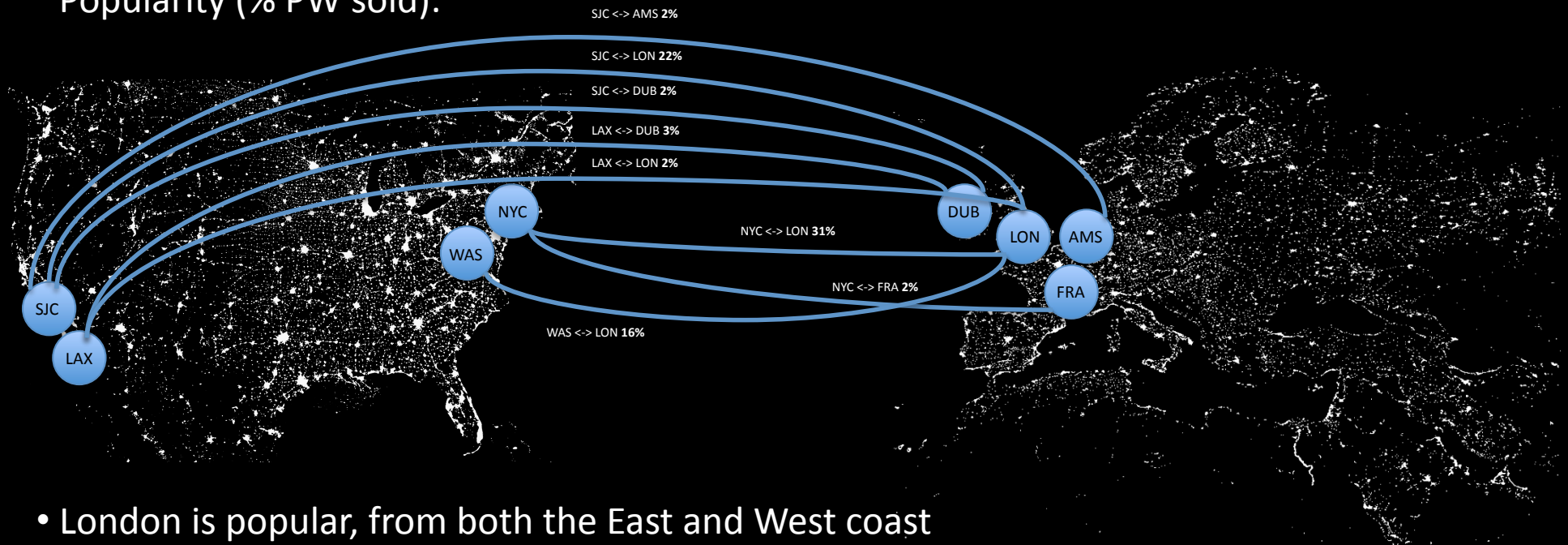
Hibernia Atlantic north
Lynn USA to
Southport UK
Wet RTT **63.5ms**

Various
Brookhaven/Bellport USA
to Bude UK
Wet RTT ~**60ms**

Global Crossing AC-1 south
Brookhaven USA to
Whitesands Bay UK
Wet RTT **58.2ms**

Coming via Pseudowire

Popularity (% PW sold):

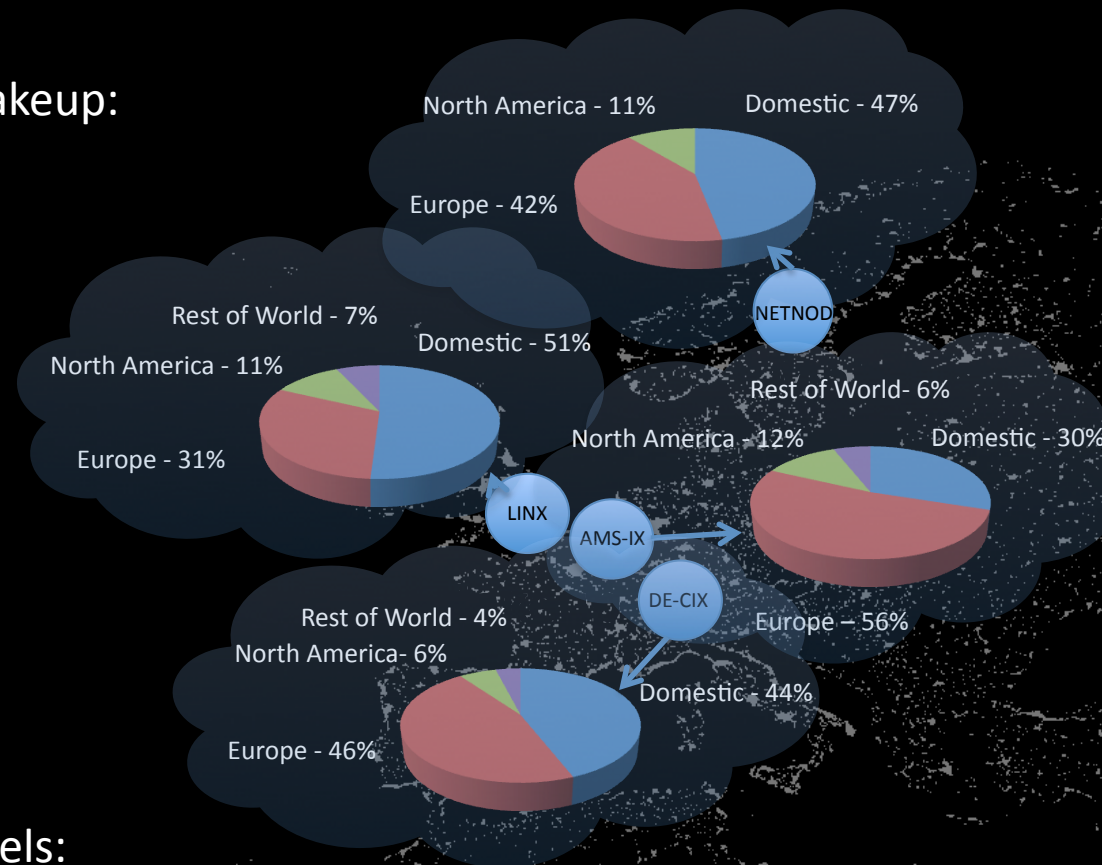


- London is popular, from both the East and West coast
- London and Dublin both popular “Hop off” points to reach mainland
- LINX and then AMS-IX are the most popular Exchanges to join
- Average costs for these Pseudowires shown here

Capacity	From	To	Avg Cost (MRC)
1G / 10G	West Coast	UK	\$6000 / \$17000
1G / 10G	East Coast	UK	\$3000 / \$11000
1G / 10G	West Coast	Mainland	\$7500 / \$18500
1G / 10G	East Coast	Mainland	\$4000 / \$12000

Joining a peering exchange

Member Makeup:



Pricing Models:

Capacity	Exchange	Membership (ARC)	Setup	Port Cost (MRC)	Total ARC
1G / 10G	LINX	\$2300	\$1430	\$622 / \$2327	\$9764 / \$30224
1G / 10G	NETNOD (Stockholm)	\$0	\$3881 (2 ports)	\$1617 / \$2911	\$19411 / \$34938
1G / 10G	AMS-IX	\$0	\$0	\$685 / \$2398	\$8220 / \$28776
1G / 10G	DE-CIX	\$0 (not eco member)	~ \$1356 - \$2192	\$1027/ \$3670	\$12324/ \$44040

What? Who? Where?

```
mysql> select mp.name, mf.name from mgmtPublics mp right join mgmtPublicsFacilities mpf on (mp.id = mpf.public_id) right join mgmtFacilities mf on (mpf.facility_id = mf.id) where mp.name in ('LINX Brocade LAN', 'AMS-IX', 'DE-CIX');
```

name	name
AMS-IX	NIKHEF Amsterdam
AMS-IX	TelecityGroup Amsterdam 2 (South East)
AMS-IX	Global Switch (Amsterdam)
AMS-IX	SARA Amsterdam
AMS-IX	Equinix Amsterdam (AM1)
AMS-IX	euNetworks Amsterdam
DE-CIX	InterXion Frankfurt 1
DE-CIX	Itenos Frankfurt
DE-CIX	Ancotel Frankfurt
DE-CIX	TelecityGroup Frankfurt (Gutleutstrasse)
DE-CIX	InterXion Frankfurt 4
DE-CIX	Equinix Frankfurt City (FR1)
DE-CIX	InterXion Frankfurt 2
DE-CIX	InterXion Frankfurt 3
DE-CIX	Databurg Frankfurt
DE-CIX	NewColo Frankfurt
DE-CIX	Equinix Frankfurt North (FR2)
DE-CIX	InterXion Frankfurt 5
DE-CIX	Global Crossing Frankfurt
DE-CIX	InterXion Frankfurt 6
LINX Brocade LAN	Telehouse London (Docklands North)
LINX Brocade LAN	Telehouse London (Docklands East)
LINX Brocade LAN	TelecityGroup London (Sovereign House)
LINX Brocade LAN	TelecityGroup London 2 (Harbour Exchange)
LINX Brocade LAN	TelecityGroup London 1 (Bonnington House)
LINX Brocade LAN	TelecityGroup London (Harbour Exchange)
LINX Brocade LAN	InterXion London City
LINX Brocade LAN	TelecityGroup London (Meridian Gate)
LINX Brocade LAN	Equinix London Slough (LD4)
LINX Brocade LAN	TelecityGroup London (Powergate)
LINX Brocade LAN	Equinix London Slough (LD5)

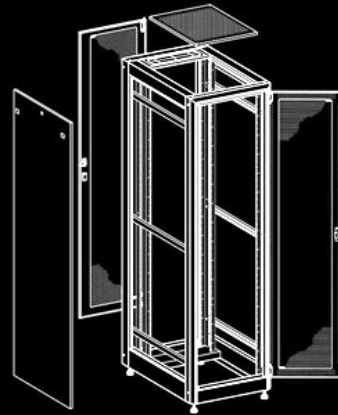
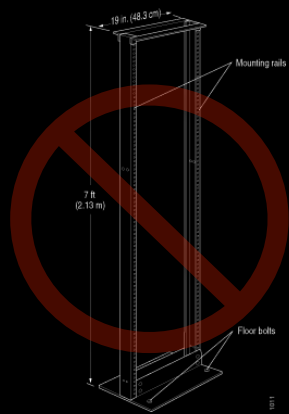
A few big names you see **everywhere**:

- TelecityGroup (all Exchanges)
- Equinix (all Exchanges, including their own)
- InterXion (LINX and DE-CIX)

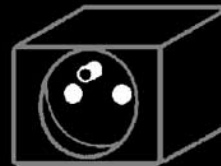
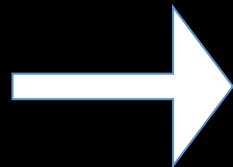
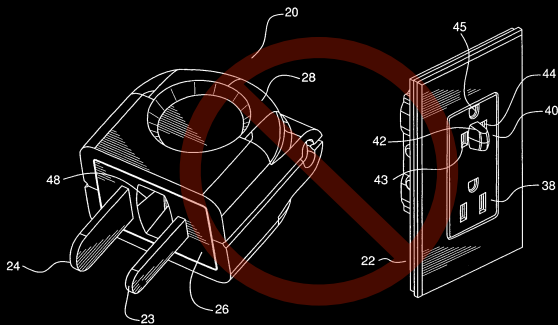
The rest are either **classic** facilities, where lots of people originally started (and are still there) and **new entrants** which are usually modern but house few customers to date.

How much?

Making the following assumptions:



Computer racks mainly in .eu
19" , 42u



20A @~110v -> 10A @~220v

How much?

Source: Various

Country	10A ~220v Rack / Year
UK (London)	~\$30K
NL (Amsterdam)	~\$22K
DE (Frankfurt)	~\$20K
SE (Stockholm)	~\$24K

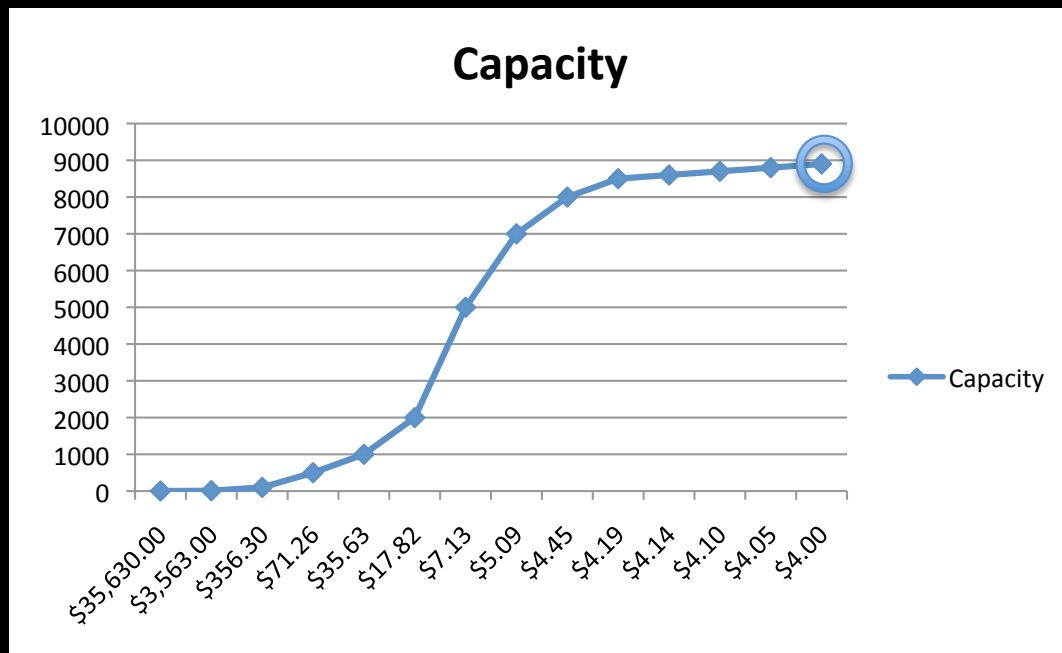
Racks usually provided in 8A, 16A and 32A feeds

Some exchanges provide co-location for network equipment *only*, DE-CIX for example charge \$20K/Yr for rack with dual 16A feeds

How much?

Wrapping this up with an example:

Cheapest option (*) for both 1G and 10G are pseudowires to the AMS-IX in Netherlands, and associated co-location, either with AMS-IX directly or another provider.



Peered-off capacity, assuming 10G PW from East coast to AMS-IX, break-even 8.9Gbit/sec assuming \$4/mbit for 10G commit!

(*) Based on market rates displayed here, does not include equipment capex depreciation and any setup fees.

Questions?