



PACIFIC
TELECOMMUNICATIONS
COUNCIL

IP Procurement

Transit & Peering - Yesterday & Today



September 25, 2019

PTC Academy – Bangkok



Who Are We?

Unitas Global:

Provider of connected hybrid cloud solutions for enterprise.

Grant Kirkwood:

Internet infrastructure, hosting, networking, peering since 1996:

- Vision Imaging Internet (hosting)
- Mzima Networks (global IP network – sold to PacketExchange)
- PacketExchange (global layer 2 network operator – sold to GTT)
- Unitas Global (connected hybrid cloud – global network)



Terminology

Transit

Internet access through other ISPs. (Usually “Tier 1” or “Tier 2” ISPs)

Peering

Two networks that agree to exchange traffic directly, bypassing other ISPs.

Routing Table

Table of routes for every IP address range on the internet, and how to get to them.

Autonomous System Number (ASN)

Unique identifier for each network.



Transit

Internet Access is also called “transit” because your traffic must *transit* other ASNs (networks) to get to its destination.





Transit

Generally transit costs money (on a per-Mbps basis).





Peering

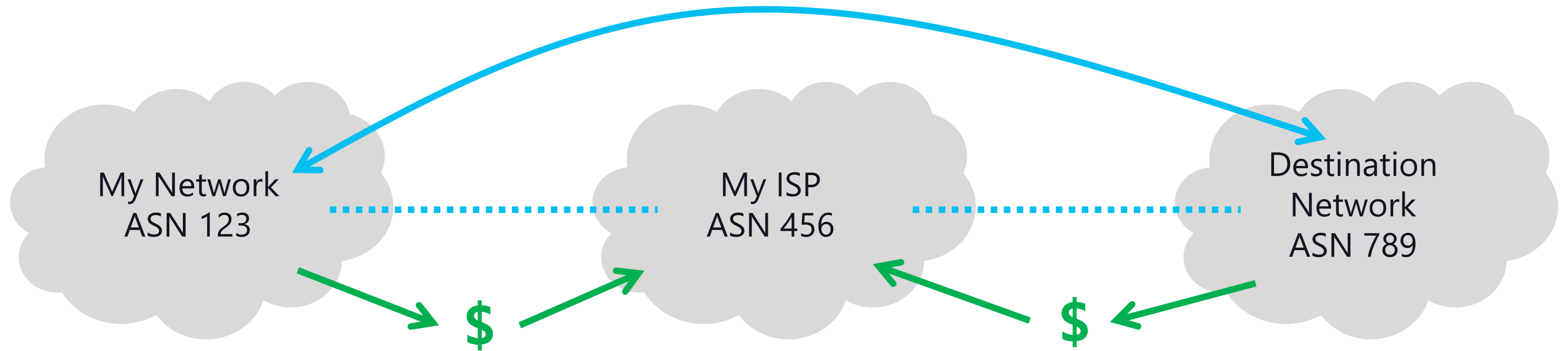


And generally speaking, both source and destination networks are paying one or more ISPs for access to the internet.



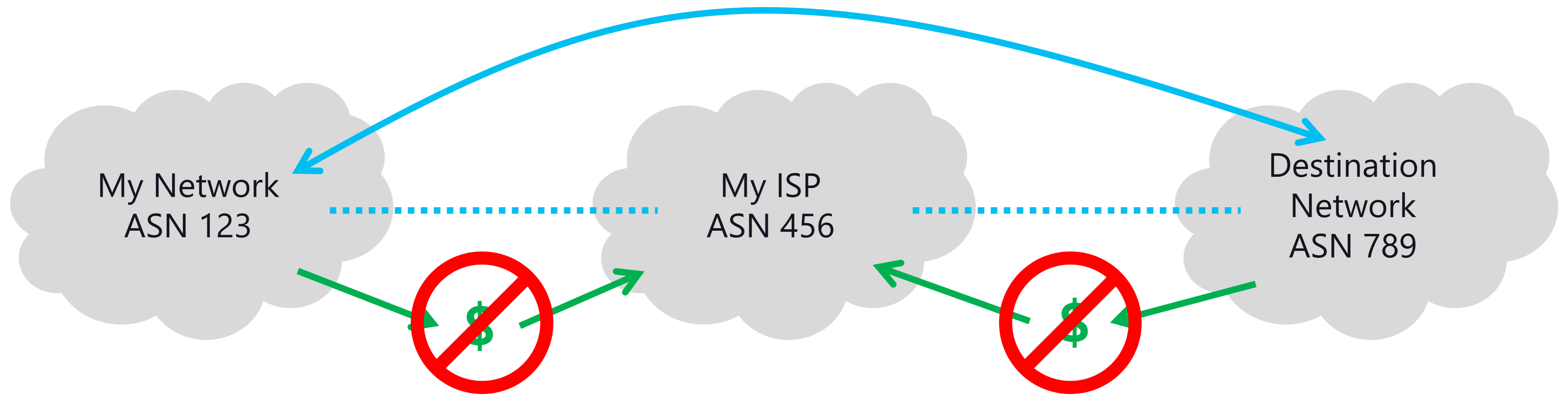
Peering

Peering is when two networks agree to bypass transit providers and agree to exchange traffic directly.





Peering



In addition to better performance, this *can* also result in lower cost.
(Subject to certain conditions, of course...)



The Global Routing Table

The directory of all available internet routes.

(Live demo via route-views.oregon-ix.net)



Types of ISPs

Misconceptions:

1. A Tier 1 ISP is “better” than a Tier 2 provider.
2. Tier 1 ISPs cost more than Tier 2 or Tier 3 providers.
3. Tier 1 ISPs are bigger than other networks.
4. Tier 1 ISPs own all their fiber.



Types of ISPs

Tier 3

Buy 100% of their bandwidth from one or more ISP transit providers.

Tier 2

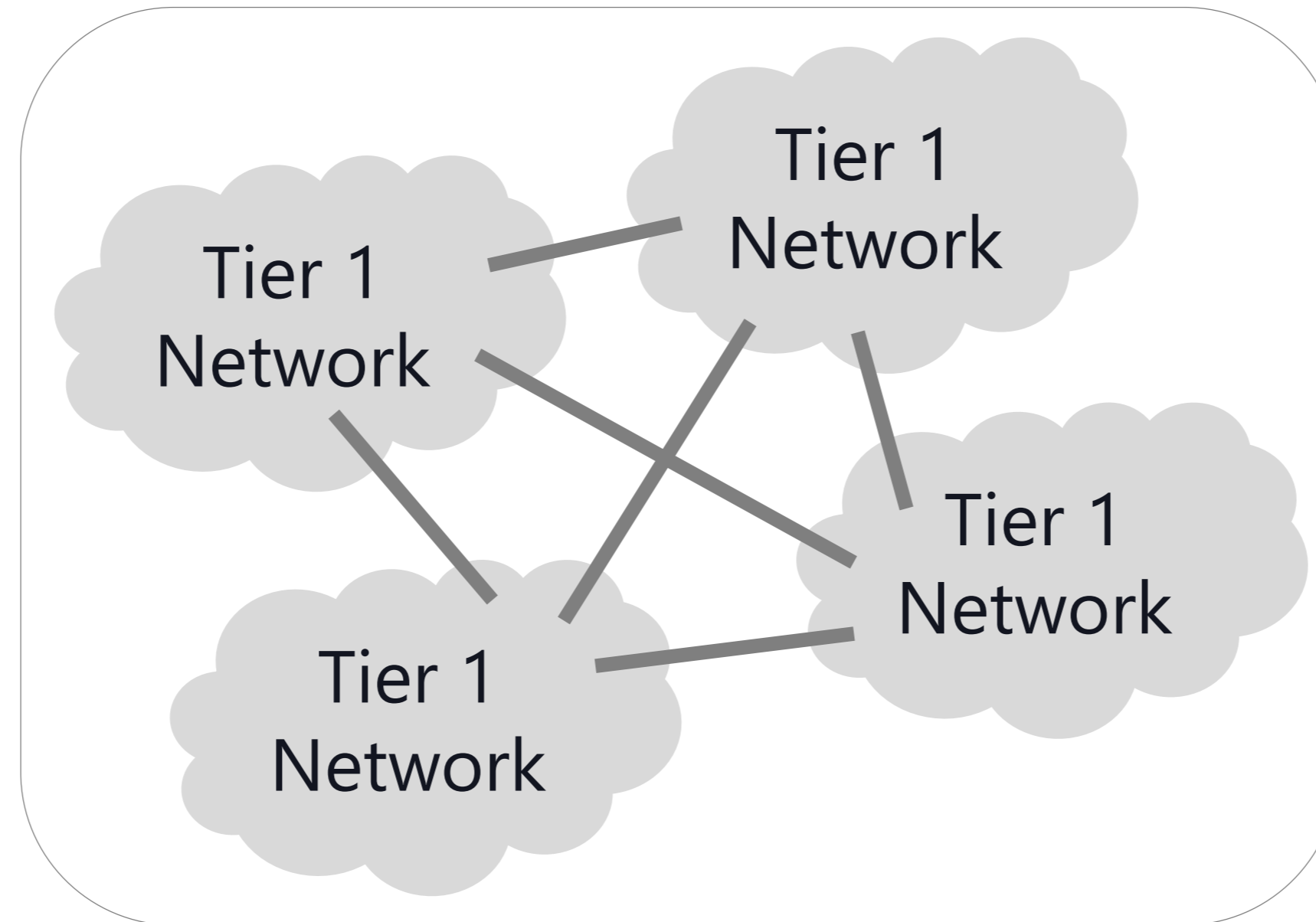
Use a mix of transit and peering to get to the entire Internet routing table. (Sometimes for lower cost, sometimes for better performance, and sometimes for both.)

Tier 1

Reach the entire internet through exclusively peering with all other Tier 1 providers, needing no transit. (The true definition of a Tier 1 ISP...)

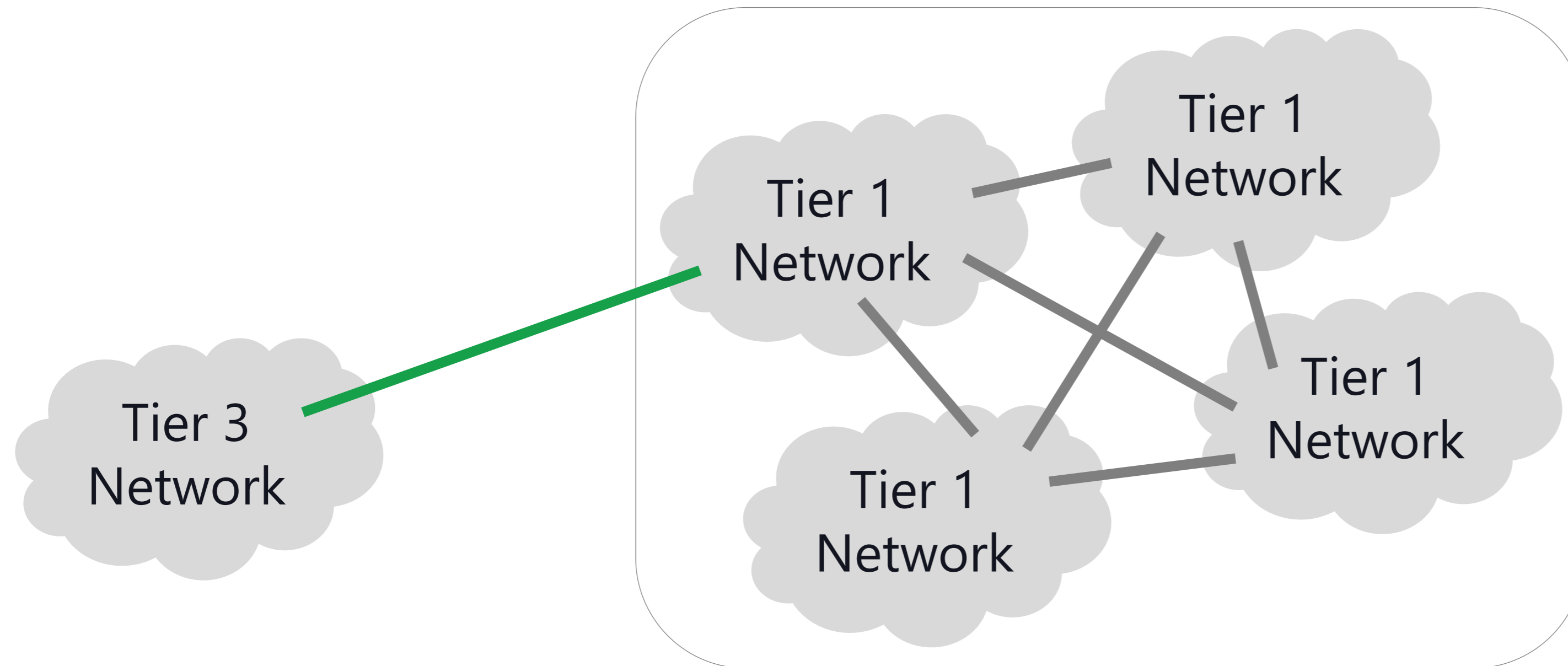


A View of the Internet



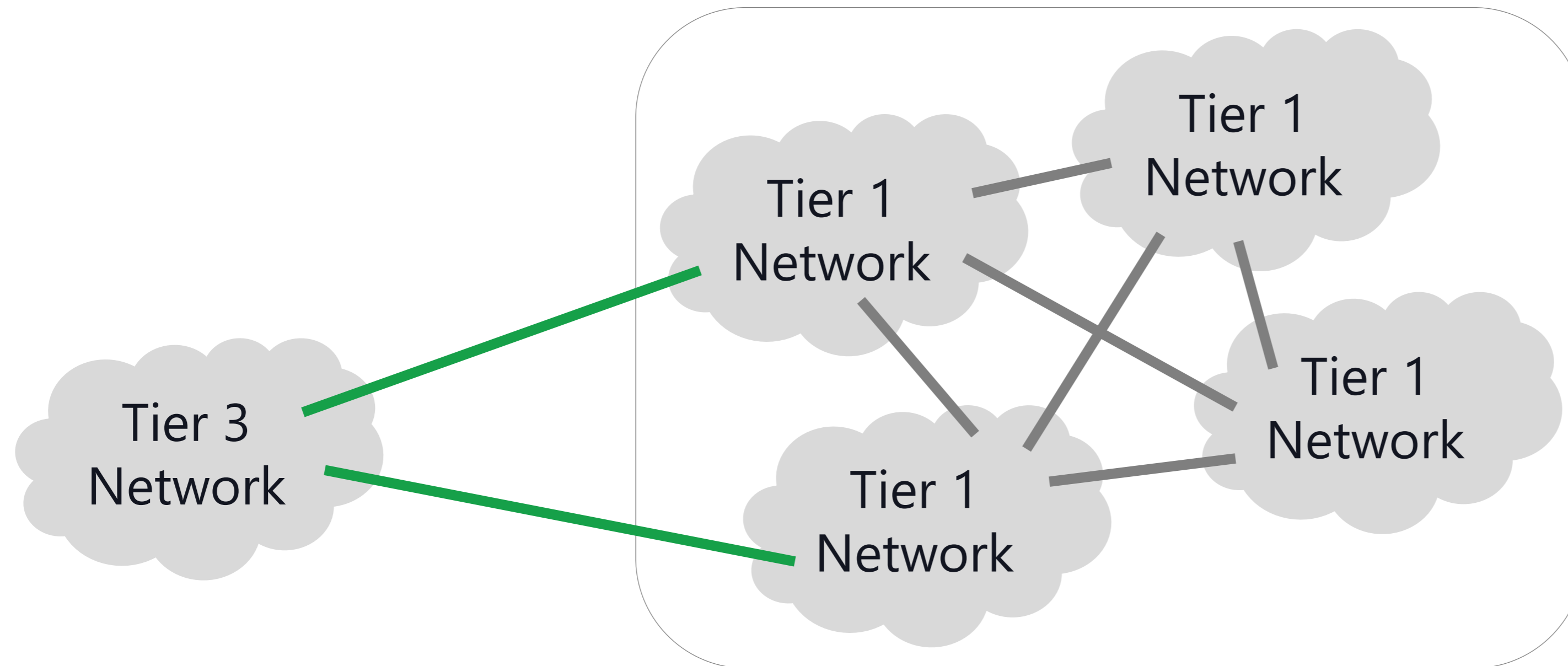


A View of the Internet



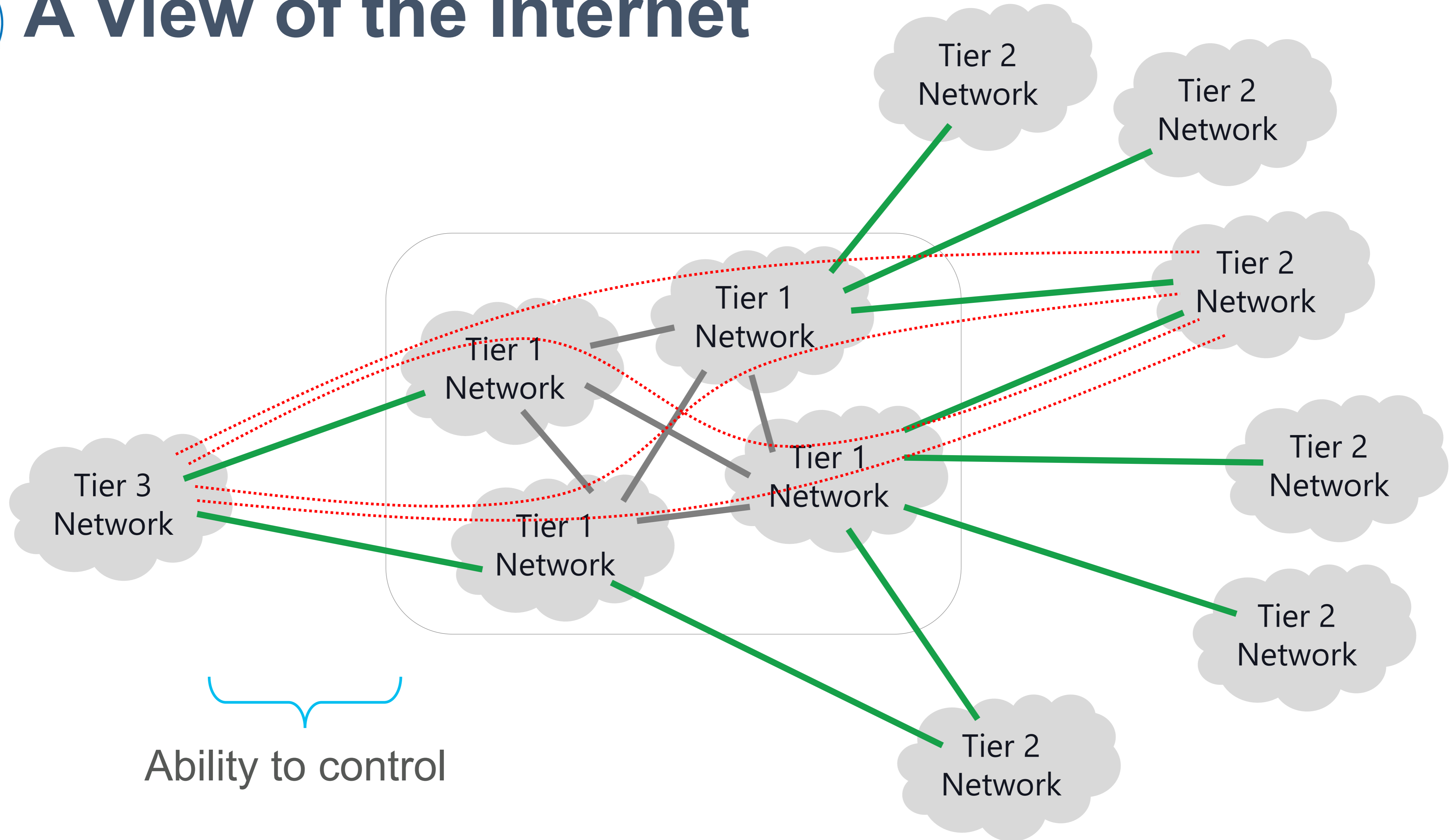


A View of the Internet



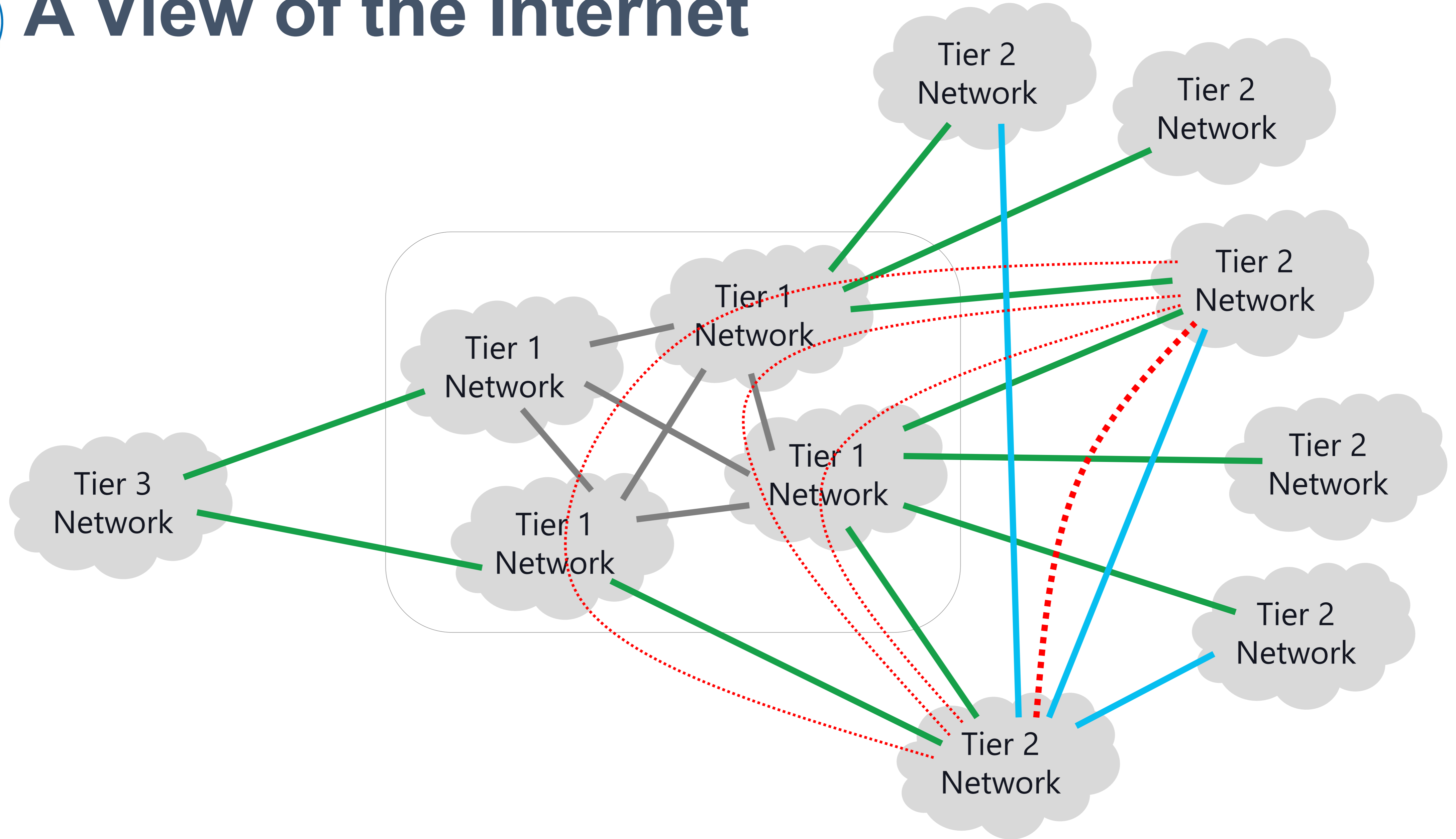


A View of the Internet





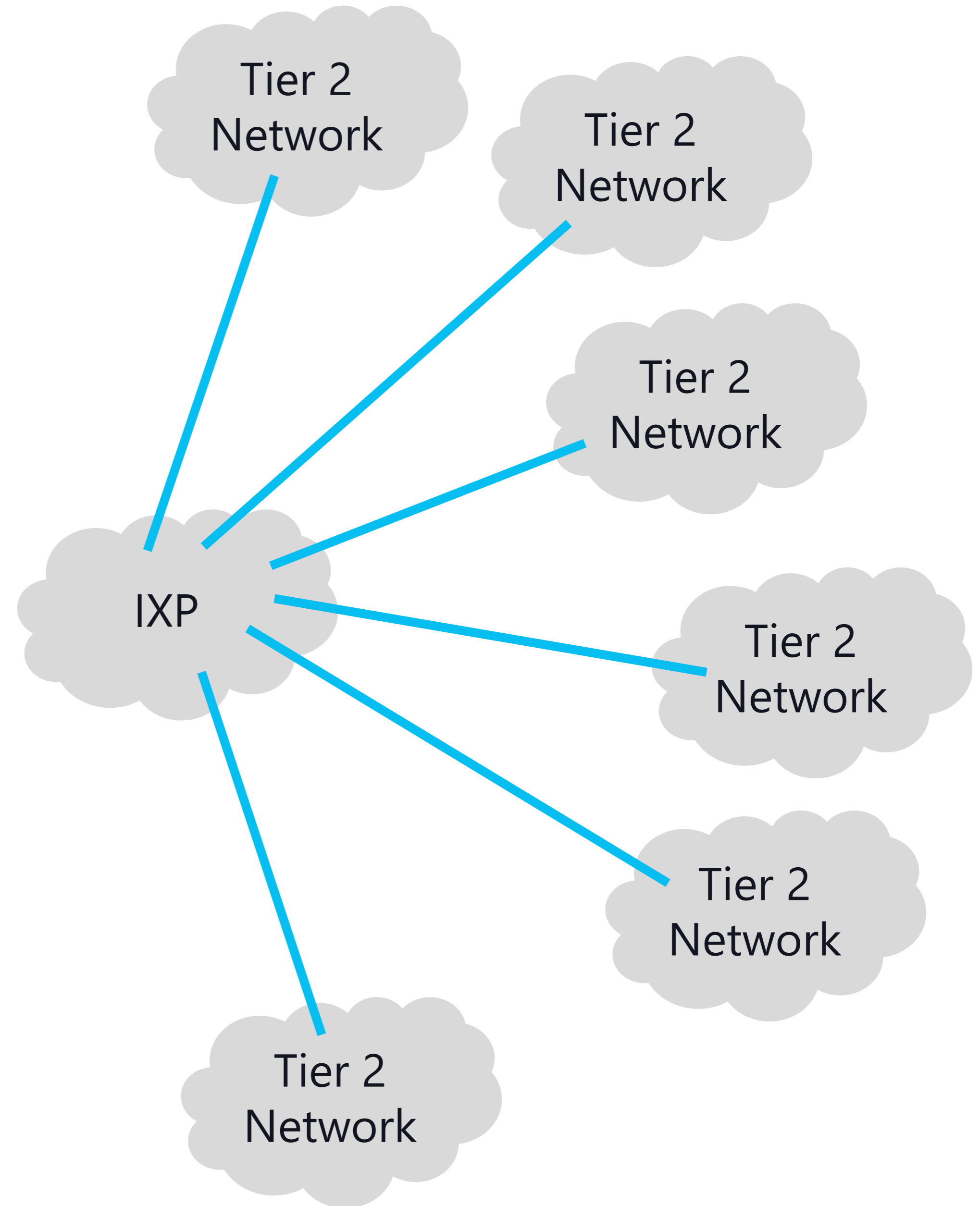
A View of the Internet





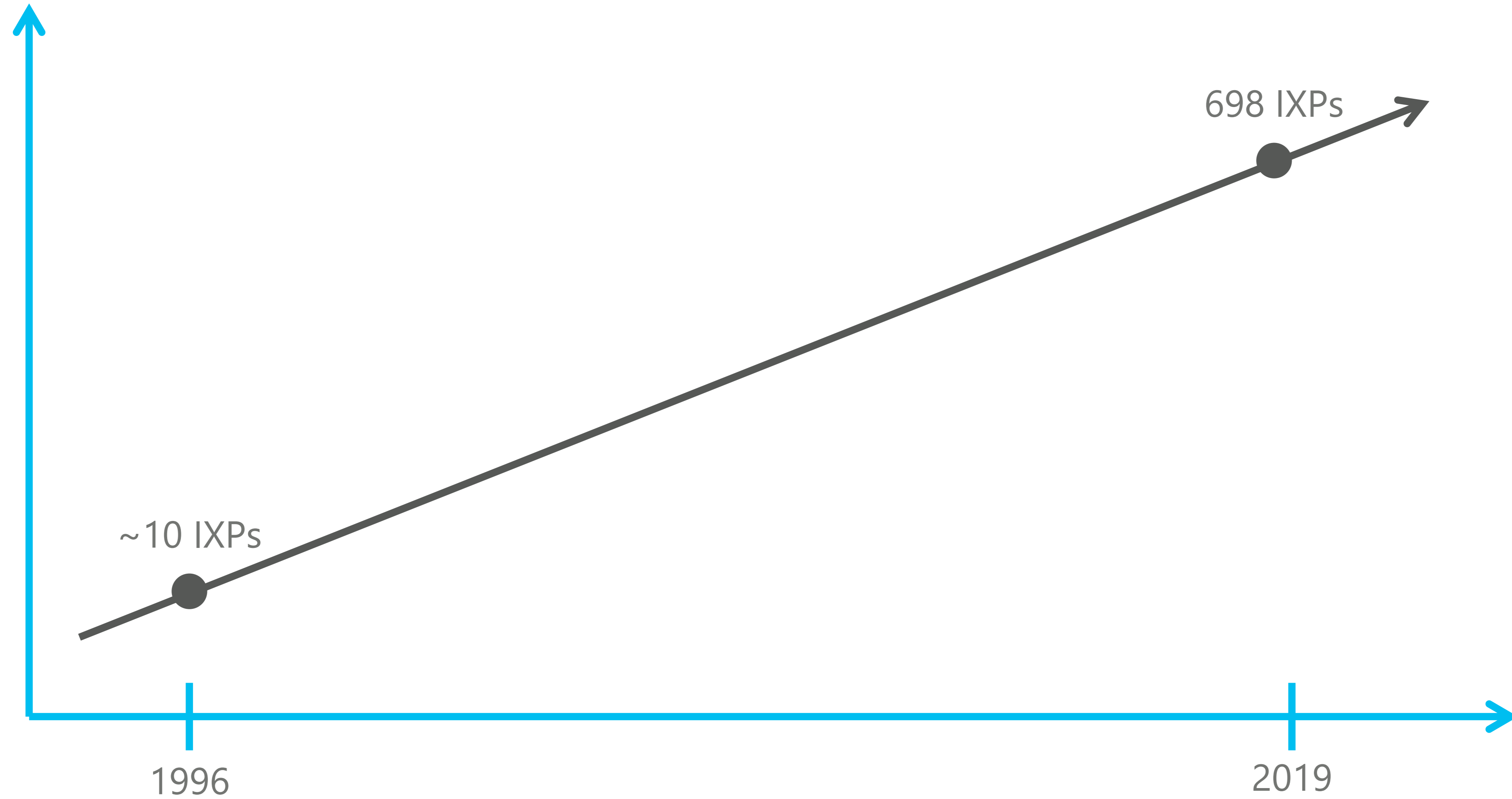
A View of the Internet

Traffic exchange happens at Internet Exchange Points (IXPs)





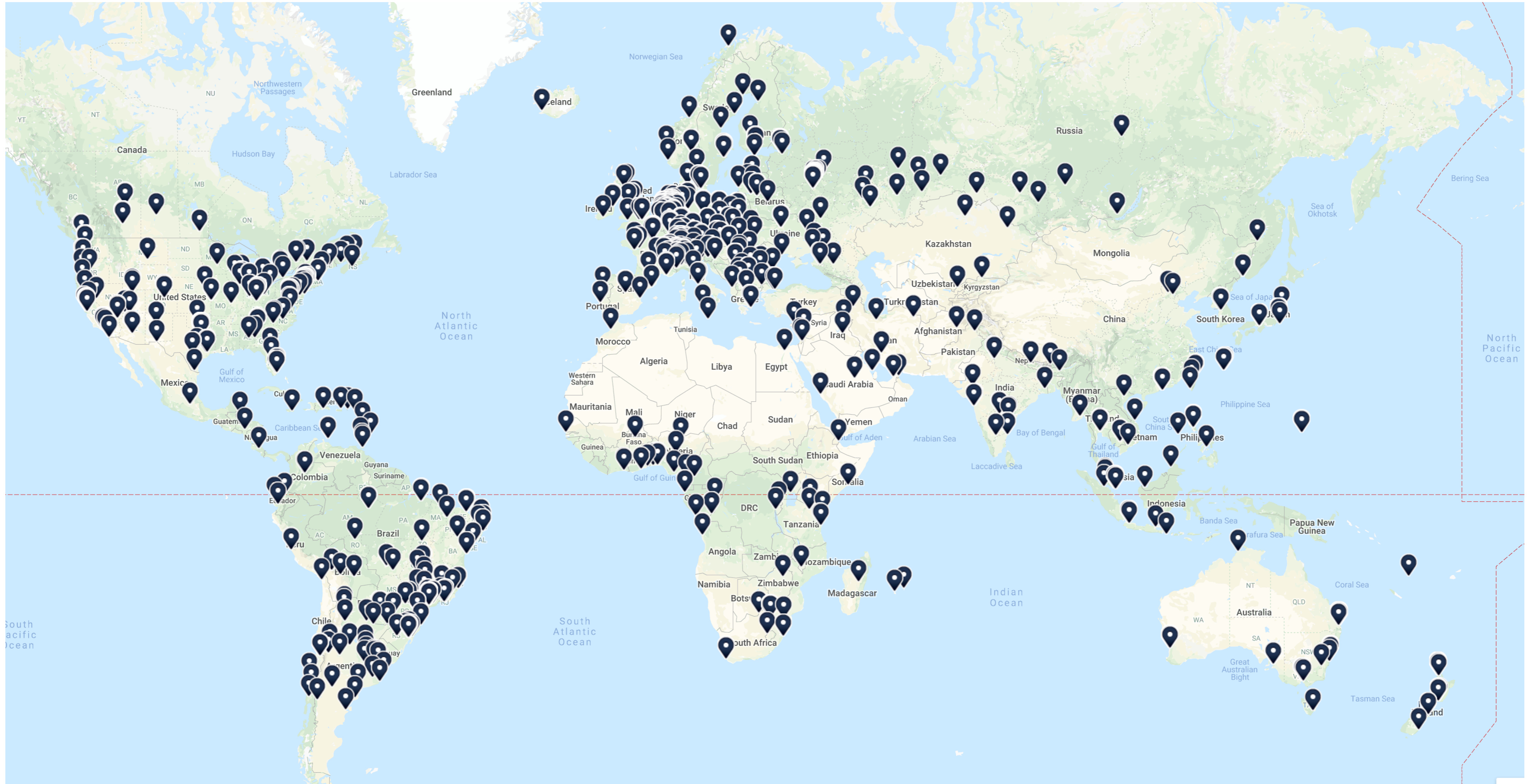
Peering Points (IXPs)



* source: PeeringDB



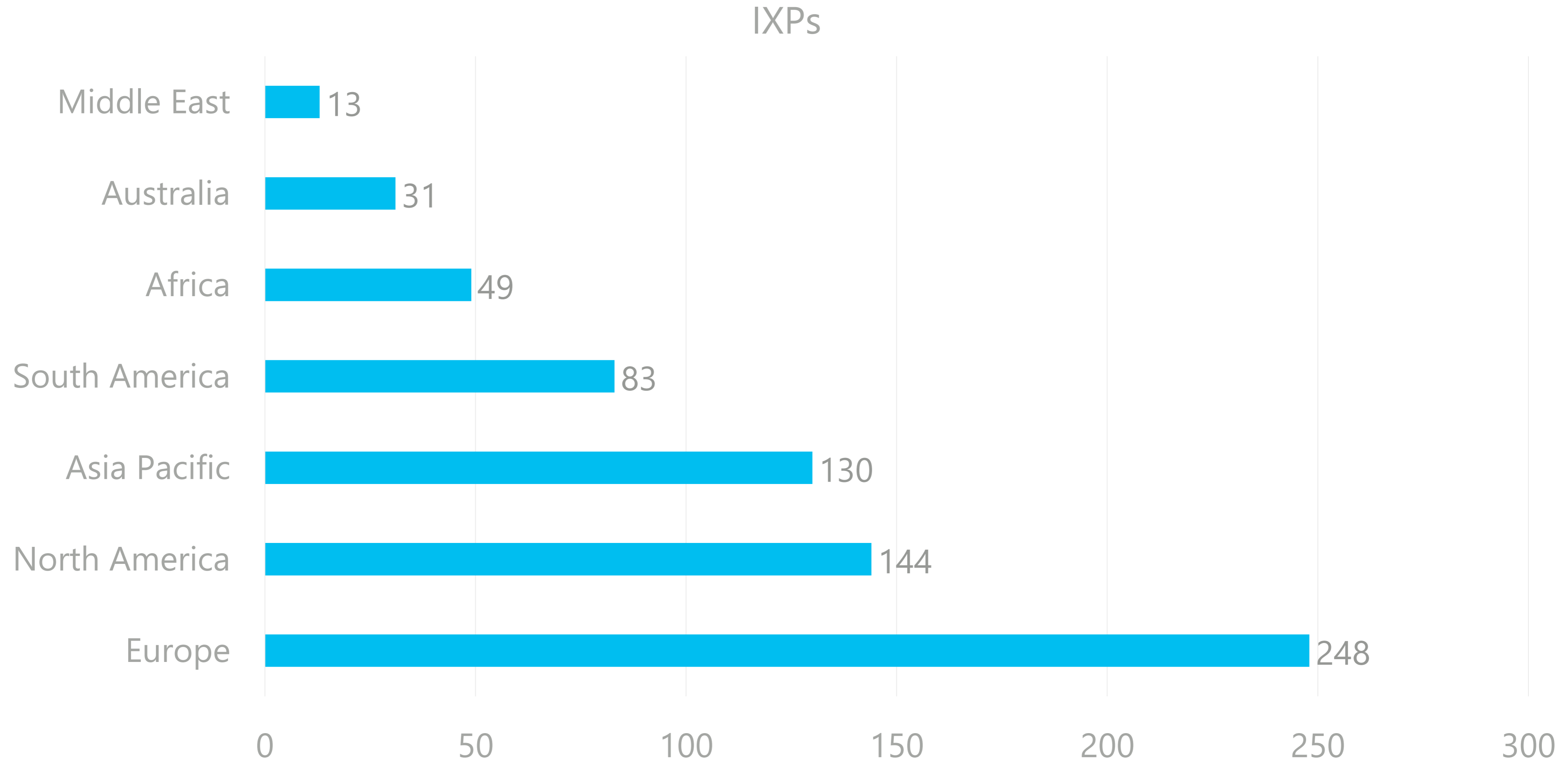
Peering Points (IXPs)



* source: PeeringDB



Peering Points (IXPs)



* source: PeeringDB Sept 2019



IP Procurement - what's best?

Who should I buy from? It's complicated!

Tier 1 Advantages

- The most on-net customers.
- Often times, the largest network reach.
- Well-known operators.

Disadvantages

- Often the most expensive.
- The most restrictive peering policy. (Only peer with other Tier 1s)

Tier 2 Advantages

- More open peering policies create better routes to many internet destinations.
- The best route flexibility.
- Often lower cost.

Disadvantages

- Not usually as well-known.
- Relies on Tier 1s for routes not available via peering.

Tier 3 Advantages

- Simplicity.
- Often the easiest to work with.

Disadvantages

- The least route diversity and control over routing.
- Limited network reach.
- Can be expensive.



Strategy for Cost and Performance

Recommendation: A Mix of Tier 1 and Tier 2 Providers

** If you buy most or all of your bandwidth.*

Route diversity and well-known networks: the best of both worlds.

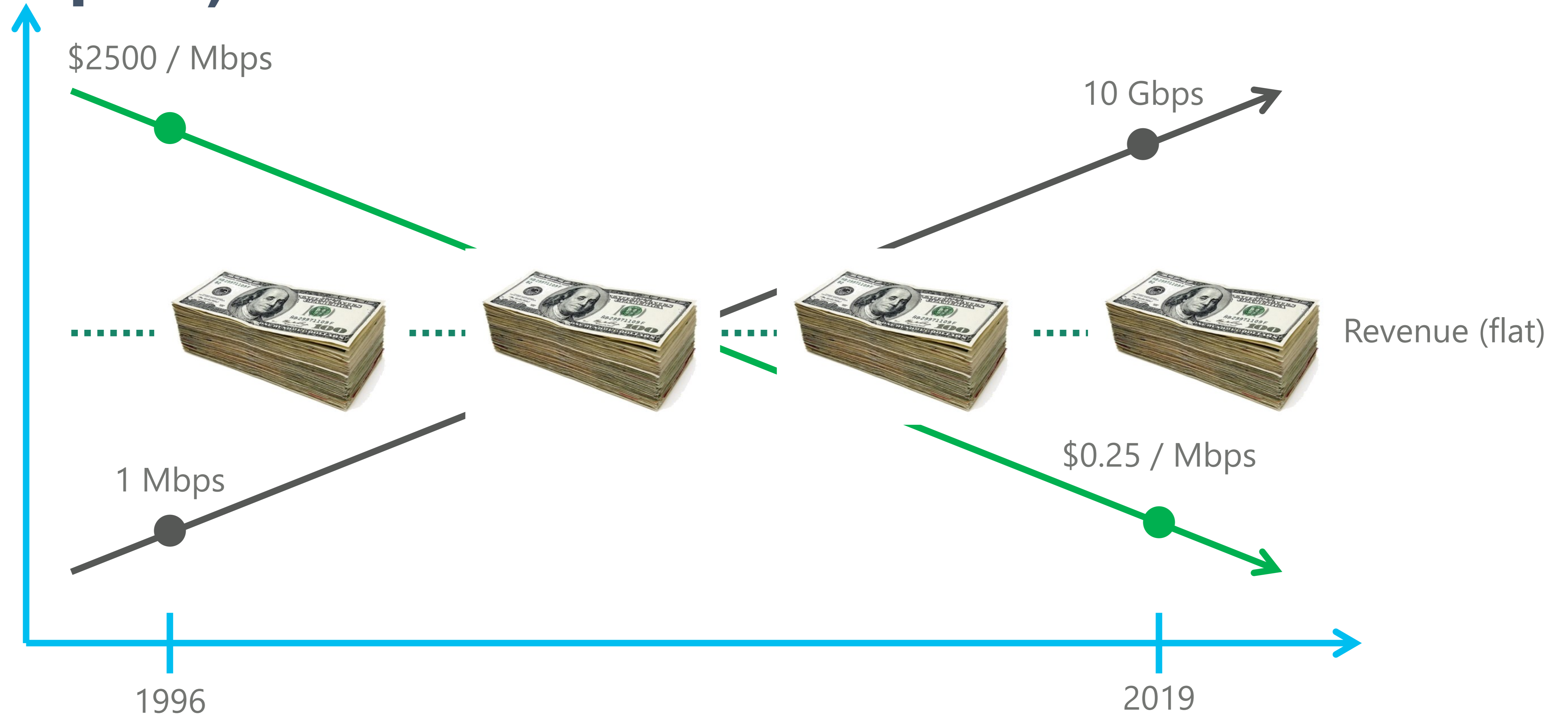
Pick your providers carefully!

Tier 1: Contract terms are important. (Refer to the golden rules.)

Tier 2: Pick a network that uses peering primarily for performance and route diversity, not cost. (Can be subjective...)



Speaking of Cost (and volume) (...and CapEx)



* carrier-neutral data center pricing, US



Golden Rules of IP Procurement

- 1. Volume always goes up!**
Never down. (The Netflix effect ... SD, HD, 4K)
- 2. Price only goes down!**
It never, ever goes up. (1996 vs 2019)
- 3. Don't over-commit!**
You can always buy more if you need it.
- 4. Don't pay extra for burst!**
Creates a false incentive for upgrade and extending a contract.
- 5. No long-term contracts!**
Only benefits the carrier and lock's in today's rate tomorrow. (See rule 2.)

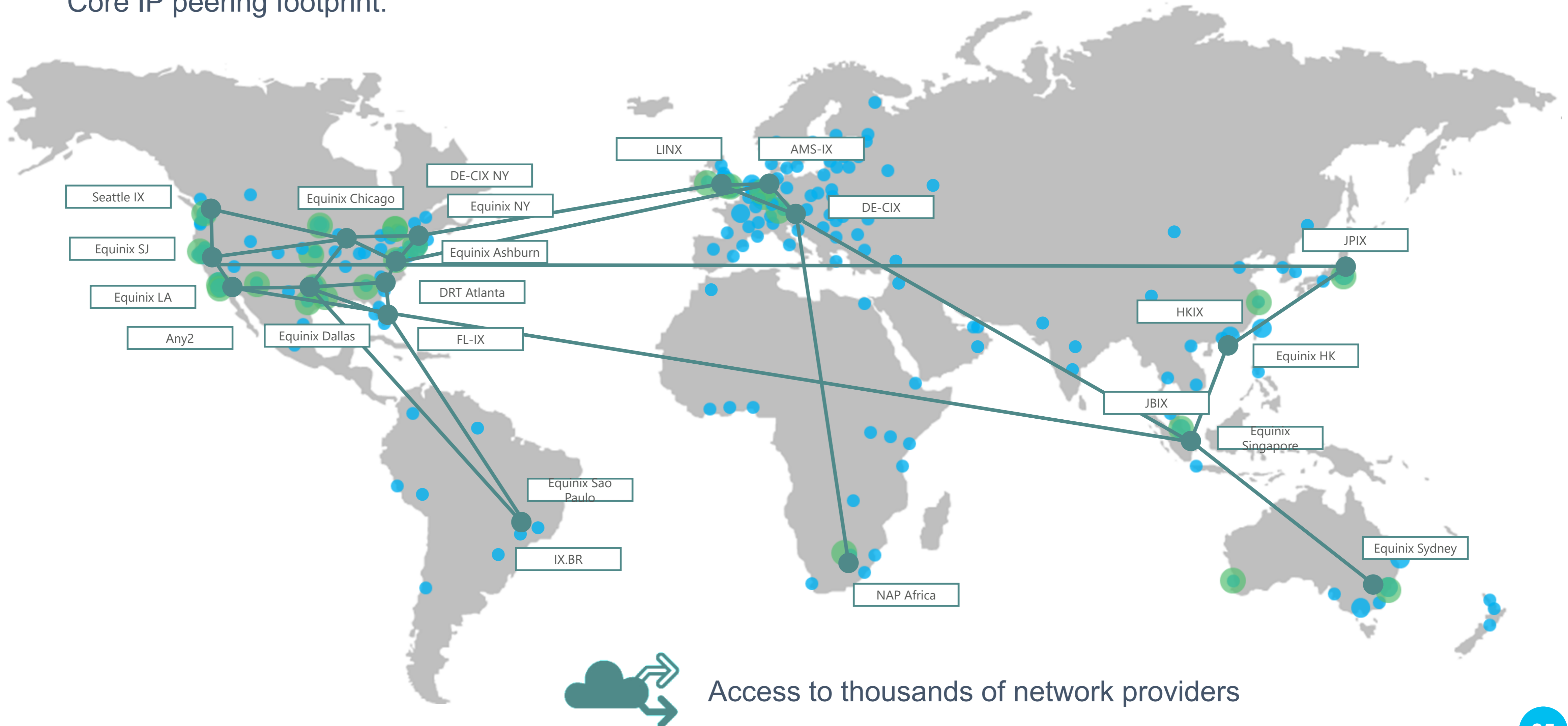
* Exception to rule 5: bandwidth delivered via last-mile access.



My network (ASN: 1828)

Unitas Global's international layer 3 IP network maintains interconnections with network providers at key peering points around the world.

Core IP peering footprint:





Thank you!

Questions?

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