

Internet Exchange tour of the World

Version 2.0

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What is an Internet eXchange Point (IXP) ?

- Internet eXchange Points (IXPs) are the most critical part of the Internet's Infrastructure. It is the meeting point where ISPs interconnect with one another. Without IXPs, there would be no Internet. Interconnecting with other networks is the essence of the Internet. ISPs must interconnect with other networks to provide Internet services.
- Private and Bi-Lateral Peering are considered to be a type of IXP.

Background

- The Internet is a decentralized network of autonomous commercial interests
- Internet Service Providers (ISPs) operate by exchanging traffic at their borders, propagating data from its source to its destination
- This exchange can be settlement-free (“Peering”) or paid (“Transit”)

Why This is Important

- If you have no domestic Internet exchange facility, your domestic ISPs must purchase transit from foreign ISPs
- The large foreign ISPs who sell transit are American, Japanese, and British
- This is an expensive and unnecessary exportation of capital to developed nations at the expense of your domestic Internet industry

Second-Order Benefits of Domestic Exchange

- A strong domestic Internet industry creates high-paying knowledge-worker jobs
- Domestic traffic exchange reduces the importation of Foreign content and cultural values, in favor of domestic content authoring and publishing

A Brief History of Internet Exchanges

First Exchanges

- Metropolitan Area Ethernet

 - Washington, D.C.

 - 10mb shared FOIRL into assorted switches

 - No fixed topology

 - MFS fiber plant

 - Shared administration

First Exchanges

- Commercial Internet Exchange
 - Moved from Washington, D.C. to Palo Alto
 - Layer-3 MMLPA
 - Commodity DS1 (T1) lines into a Cisco 7010
 - Not-for-profit industry association

First Exchanges

- MAE-West / Federal Internet Exchange
 - San Jose / Mountain View
 - FDDI “dumbbell” ring
 - Bridged to 10mb Ethernet in many locations
 - Two locations, two administrations

First Exchanges

- Hong Kong Internet Exchange
 - Chinese University of Hong Kong
 - Single location Ethernet switch
 - Administered by the university
 - First major free exchange

Technological Progression

- Shared 10Base-T / FOIRL Ethernet
- Switched 10mb Ethernet
- Shared FDDI
- Switched FDDI
- 100Base-T / 100Base-FX
- Gigabit Ethernet
- 10Gigabit Ethernet

Internet Exchange Point

Layer 2 facility allowing connected routers to exchange traffic without any restriction and generally through settlement free arrangement.

And there are 100s of IXPs in operation now around the world.

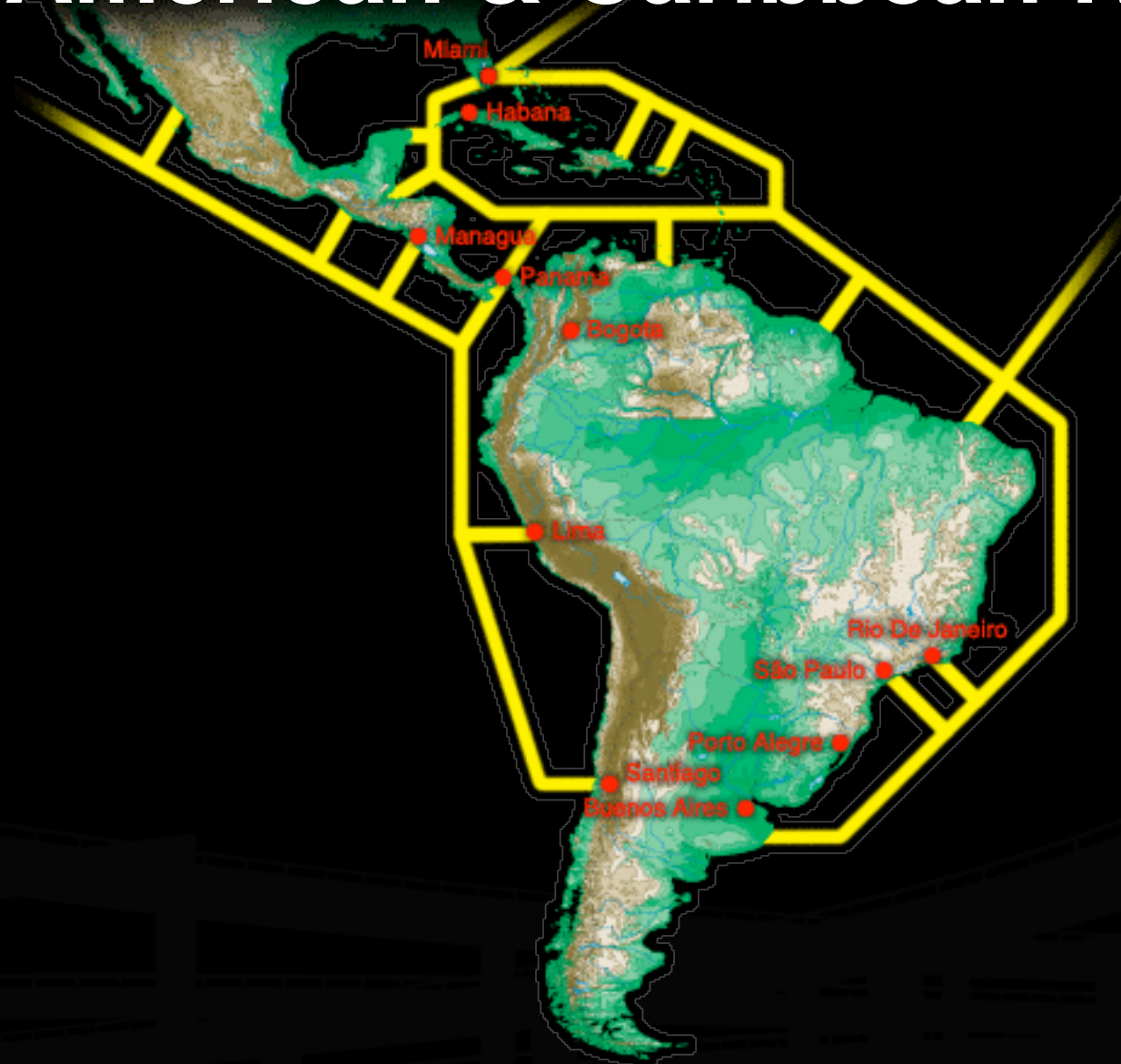
IXPs around the World



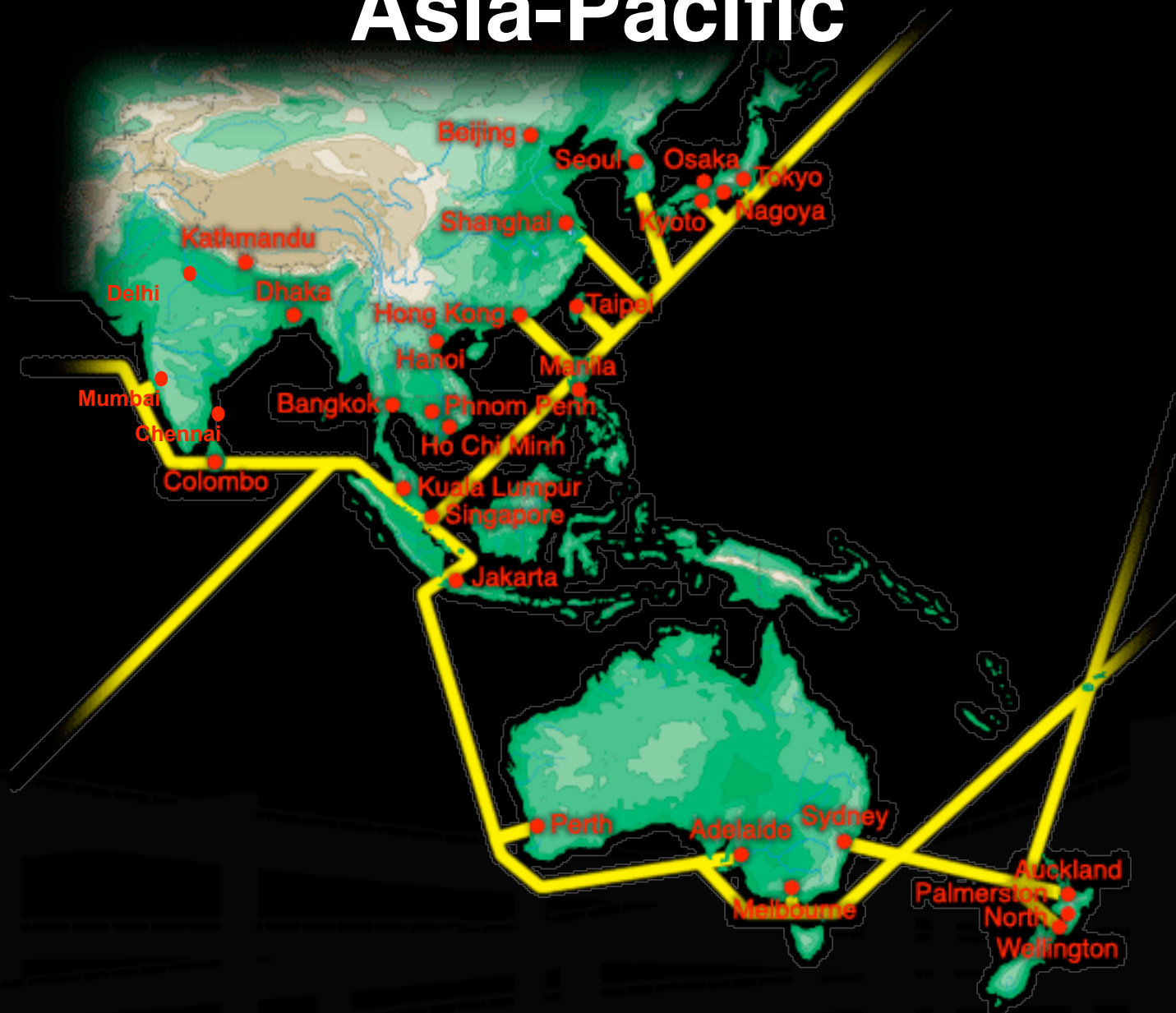
Africa



Latin American & Caribbean Region



Asia-Pacific



Europe



North America



In Summary

North America

~ 110 IXPs, Largest IXPs are commercial run operations, more cross-connects

Europe

~ 120 IXPs, Most IXPs are non-profit operations, more traffic on the switch

Asia Pacific

~ 53 IXPs, Many IXPs are community run, some majors are commercial,

Latin America

~ 25 IXPs, Most are community run. Miami is major commercial IXP.

Africa

~ 25 IXPs, All are community managed / run.

Thank you