

# **A Brief History of Internet Exchanges**

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# First Exchanges

Metropolitan Access Experiment

Metropolitan Area Ethernet

Metropolitan Area Exchange

WorldCom MAE-East™

Washington, D.C.

10mb shared FOIRL (Magnums) into assorted switches

No fixed topology, four initial locations

MFS fiber plant

Shared administration

Late 1992

Sprint/ICM, Altnet, PSI, SURAnet, NSFnet

# First Exchanges

## MAE-West / Federal Internet Exchange

San Jose / Mountain View (1994)

FDDI “dumbbell” ring

Bridged to 10mb Ethernet in many locations

Two locations, two administrations

# First Exchanges

## Commercial Internet Exchange

Palo Alto (1994)

Layer-3 MMLPA

Commodity DS1 (T1) lines into a Cisco 7010

1991 Not-for-profit industry association

Altnet, PSI, Cerfnet

# First Exchanges

## Hong Kong Internet Exchange

Chinese University of Hong Kong

Single location Ethernet switch

Administered by the university

First major free exchange (1995)

# Technological Progression

Shared 10Base-T / FOIRL Ethernet

Switched 10mb Ethernet

Shared FDDI

Switched FDDI

100Base-T / 100Base-FX

Gigabit Ethernet

10Gigabit Ethernet

40Gigabit Ethernet? OC-768 POS?

# Other Technologies

Layer-3 route-servers

Frame Relay

ATM

Wireless Ethernet

Crossconnect mesh

DPT

# Common Services

Route-server

Looking-glass

Measurement and instrumentation

Network Time Protocol

Web cache parent

News server

Root server mirror

# Common Business Models

Hosted by a university or government

Informal

Industry association

Neutral for-profit

Anything else may not be recognized

# Size Differentiation

Municipal

Large metro-area

National

“Regional” (meaning changing)

# Peering / Transit Differentiation

## Peering exchanges

- As inexpensive as possible

- Exactly one per area

- All-inclusive

- Reliability is not a major issue

## Transit exchanges

- Reliability is critical

- Cost can reflect the need for reliability

- Redundant pair per area is desirable

- At least three buyers and at least three sellers

# Thanks, and Questions?

Copies of this presentation can be found  
in Keynote, PDF, QuickTime and PowerPoint formats at:

**[http://www.pch.net / resources / papers / brief-history-of-ixes](http://www.pch.net/resources/papers/brief-history-of-ixes)**

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