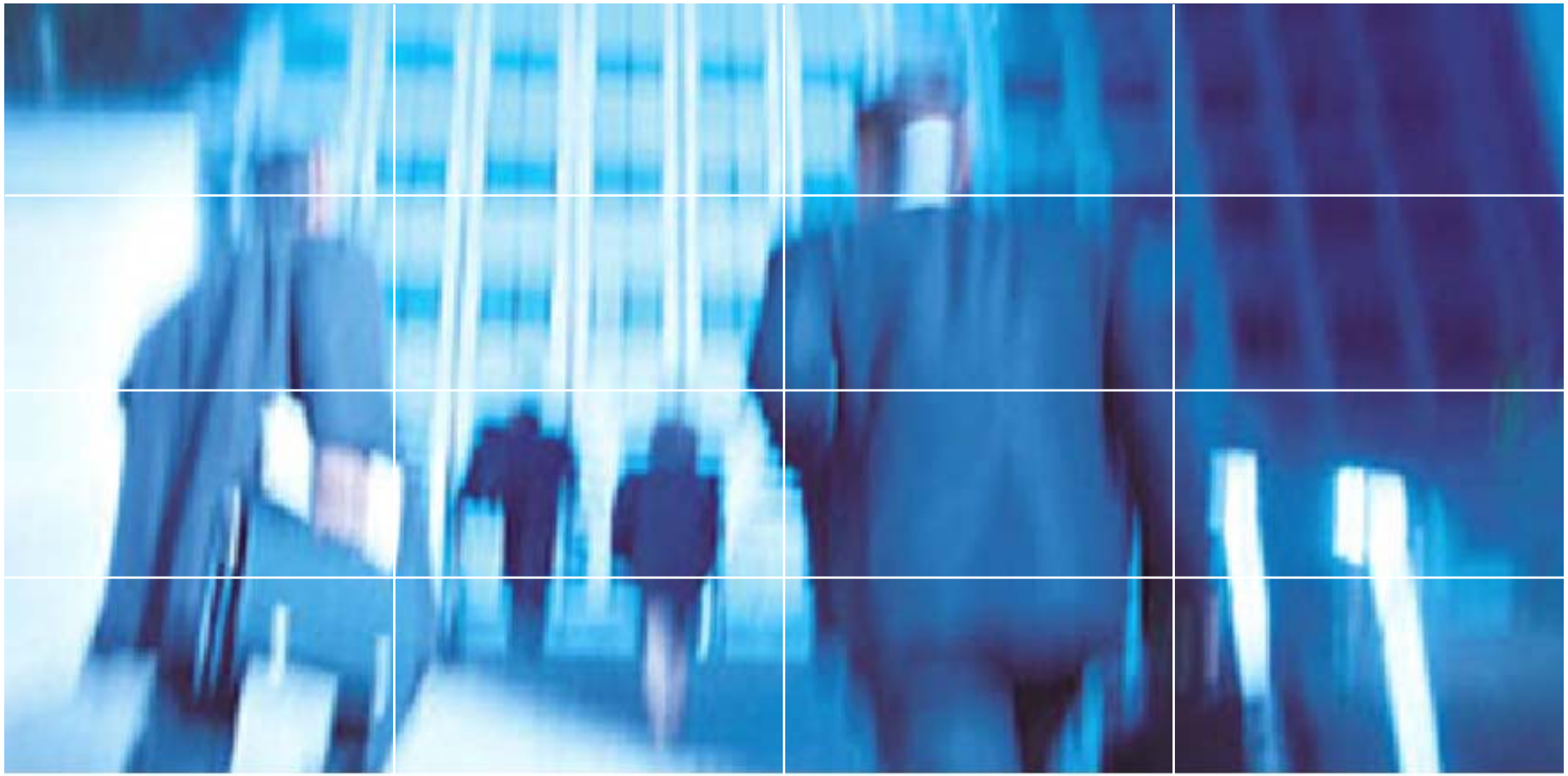


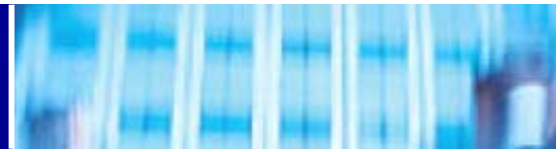
One Planet. One Network. A Million Possibilities.

Napla 2003
Second Latin American Regional NAP Meeting
Buenos Aires, Argentina
August 21, 2003

Gabriel Holgado
Director
Global Crossing

Global Crossing

Agenda



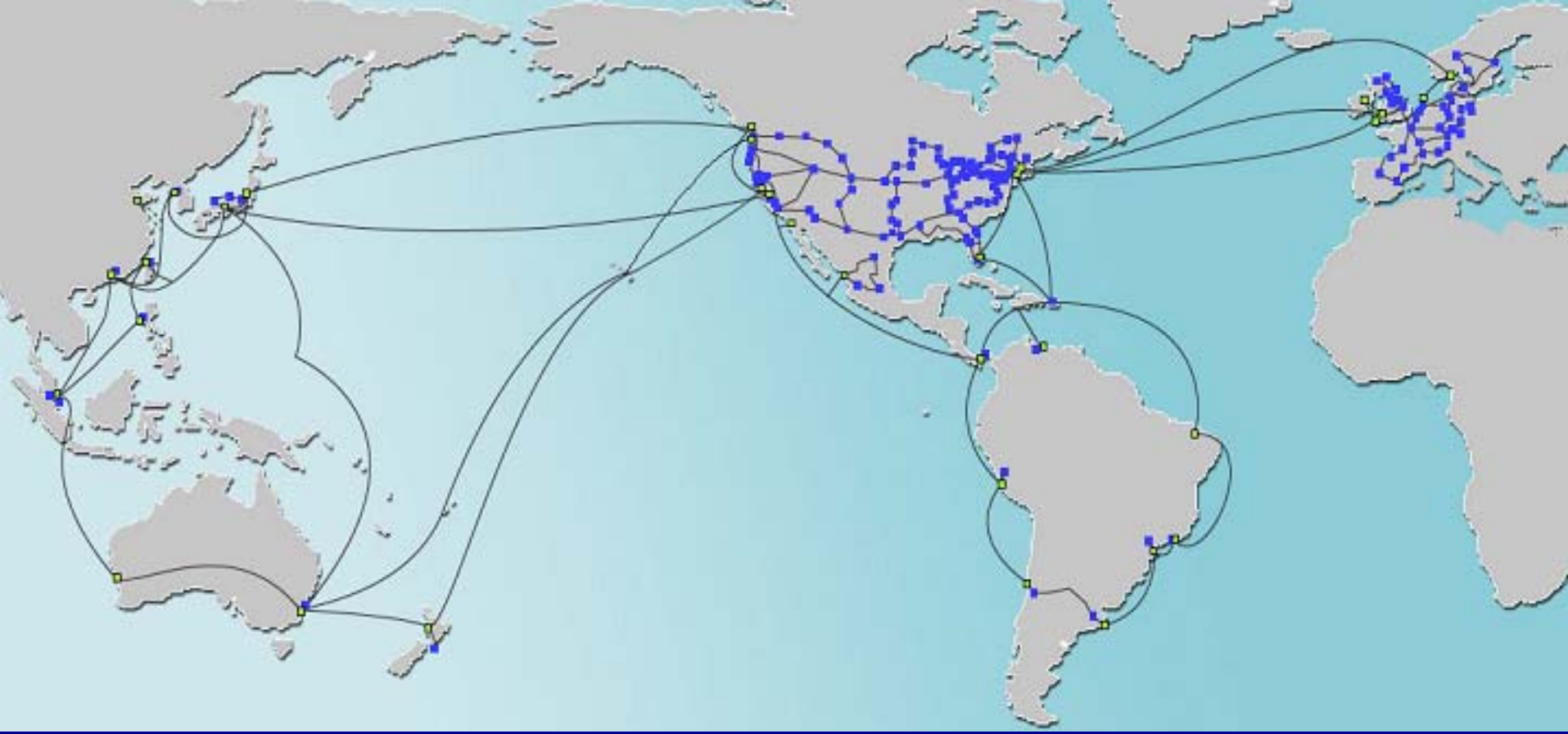
- Global Crossing
  - Global Crossing Network
  - Global Crossing Service Structure
- Global IP Network
  - GC IP Backbone Evolution
  - Regional Expansion
  - One Network – One Autonomous System
  - Global IP Network
- Peering Policy
  - Internet - Peering
  - Peering Policy
  - US, Europe & Asia Peering Policy
- Latin America connectivity and peering policy
  - Connectivity
  - GC Regional View on Internet Traffic
  - GC Peering Policy for Latin America
- Global Crossing at a Glance
- Conclusions

Global Crossing

Global Crossing

- Global Crossing Network
- Global Crossing Service Structure

Global Crossing



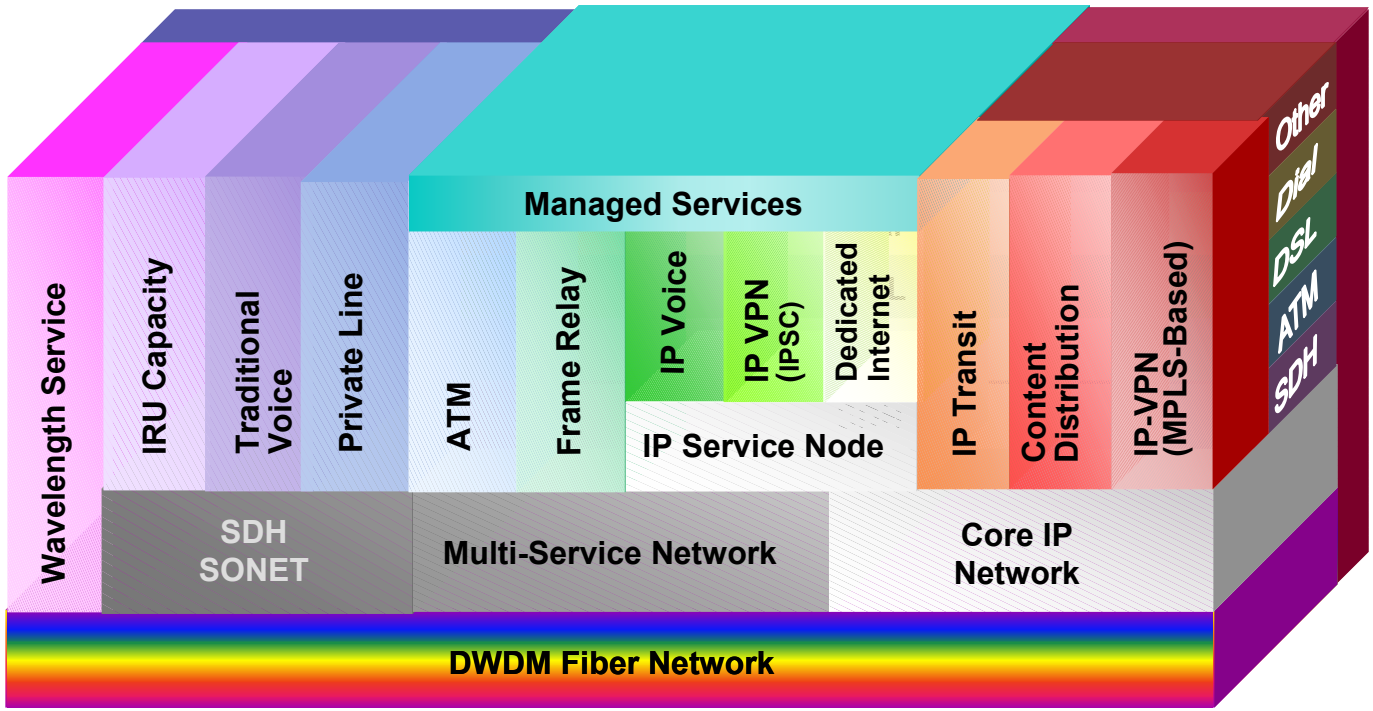
The Global Crossing Network

- ➔ 200 + On Net Cities
- ➔ 27 On Net Countries
- ➔ More than 101,000 route miles
- ➔ 26 Metro Networks
- ➔ 4,300 Employees

- ➔ 2002 Revenue ~$3B
- ➔ Network availability at 99.999%
- ➔ VoIP 8.2 billion minutes in 2002
- ➔ IP traffic grew 200% in 2002

Global Crossing®

Service Network Structure



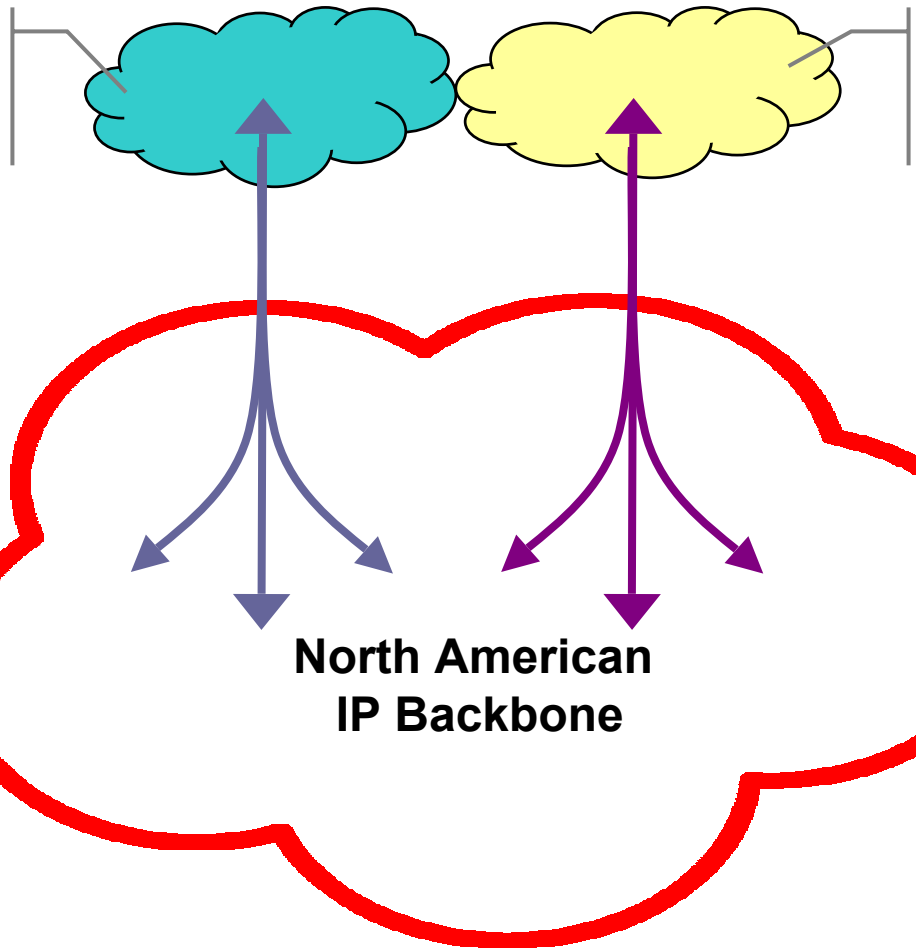
Global Crossing

Global IP Network

- GC IP Backbone Evolution
- Regional Expansion
- One Network – One Autonomous System
- Global IP Network

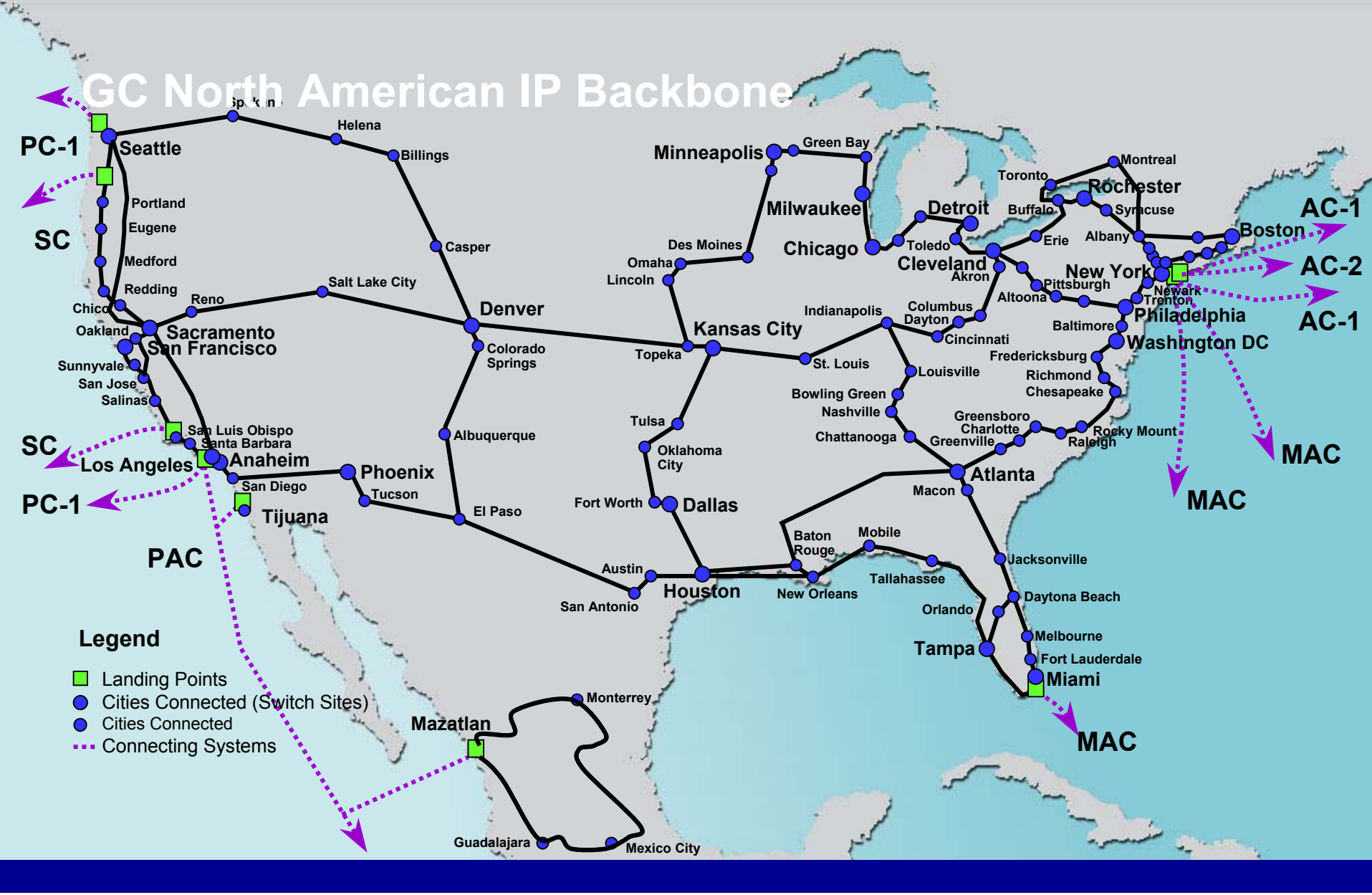
Global Crossing

GC IP Backbone Evolution



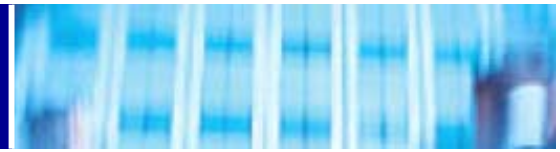
Global Crossing

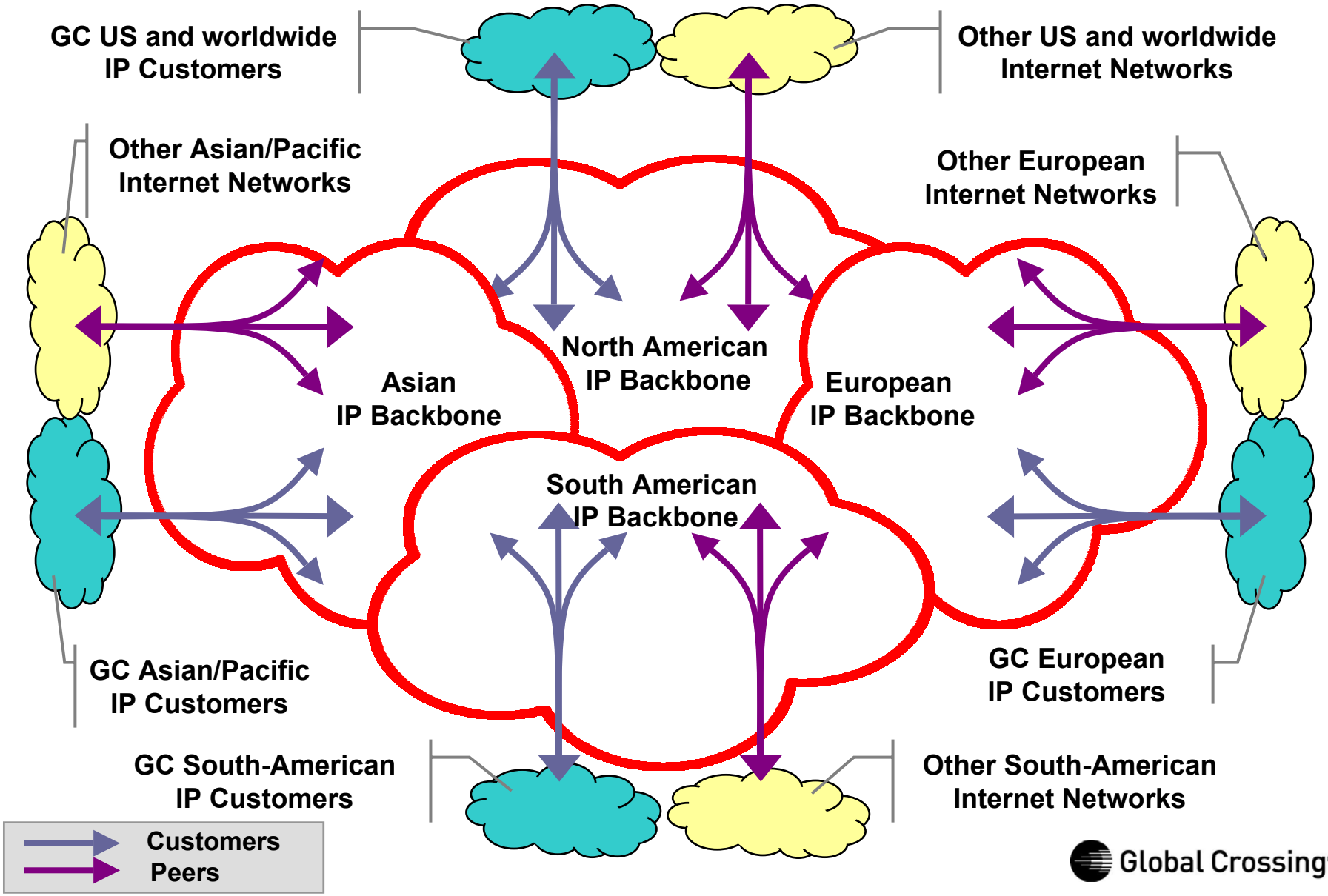
GC North American IP Backbone



Global Crossing

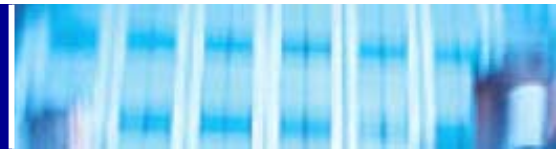
GC IP Backbone Evolution

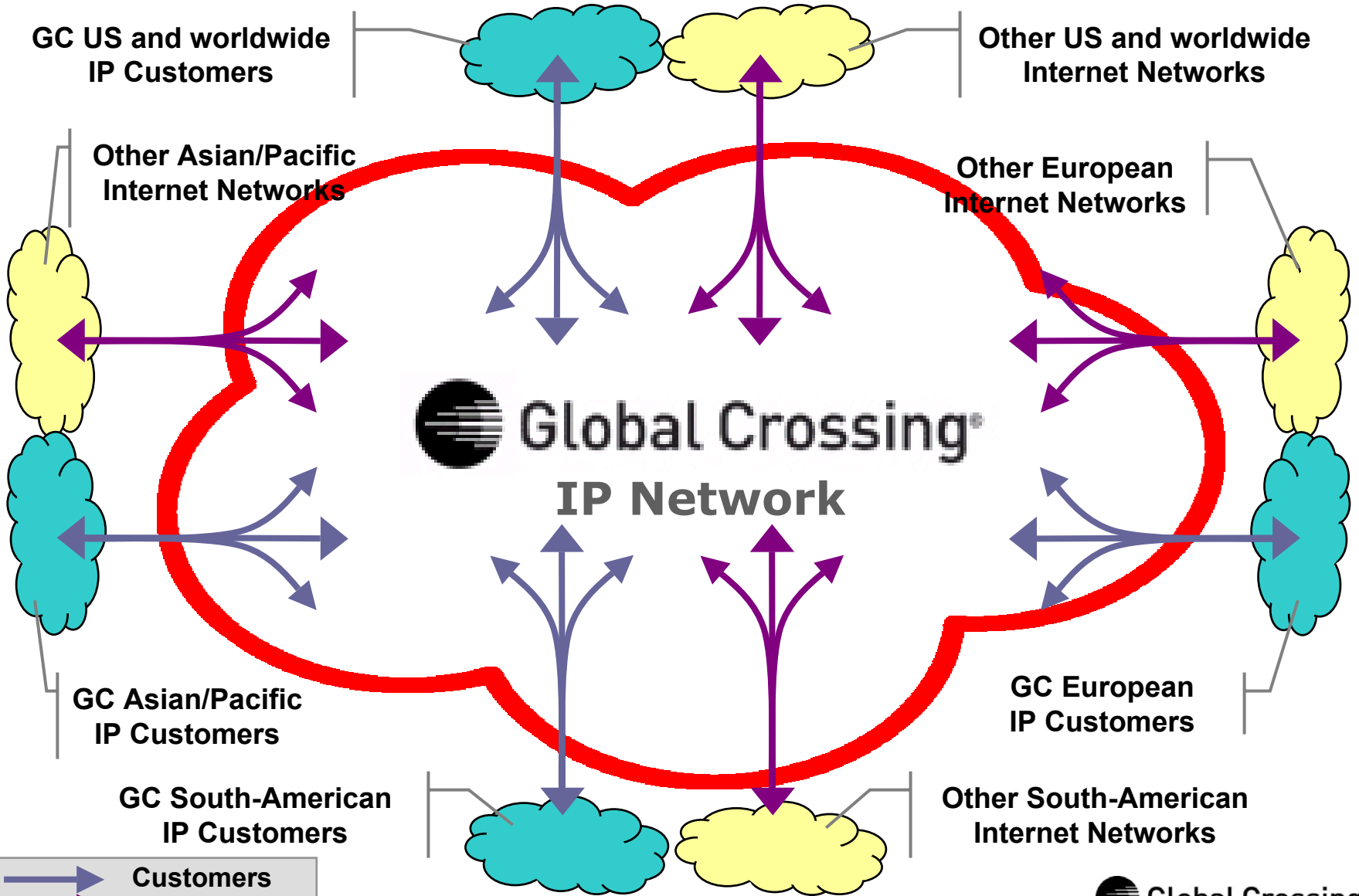




Global Crossing

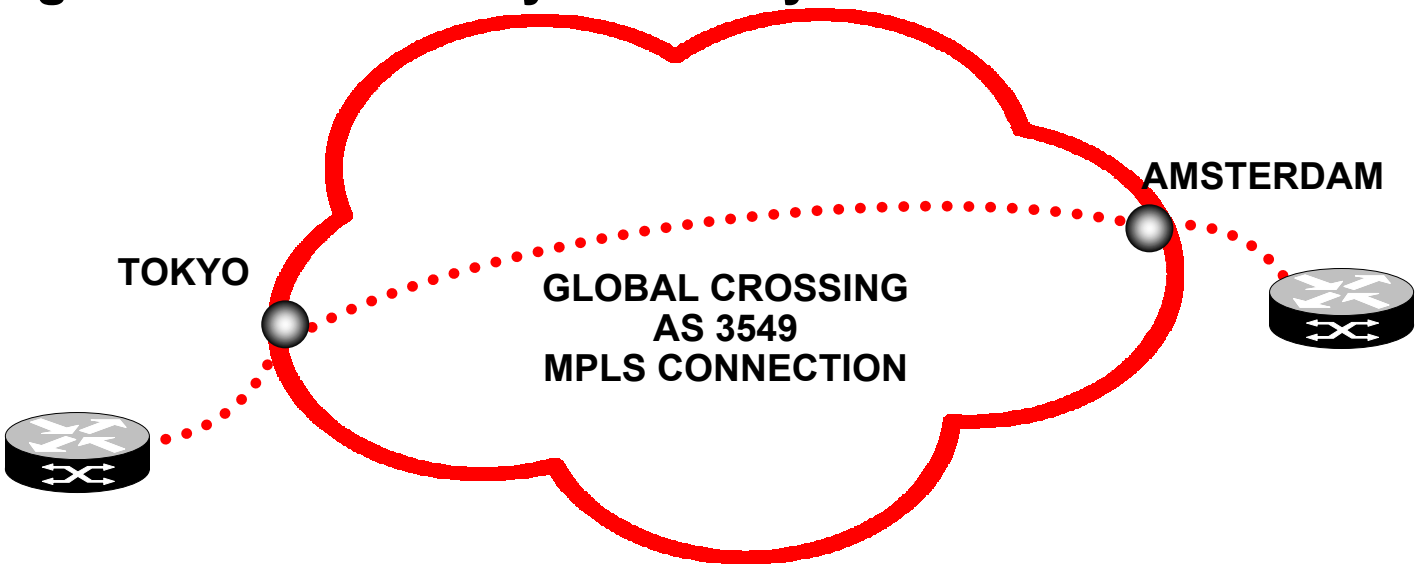
GC IP Backbone Evolution





One Network - One Autonomous System

First carrier to deploy fully-meshed global MPLS-te network into production - delivering significant improvements in traffic management and delivery efficiency

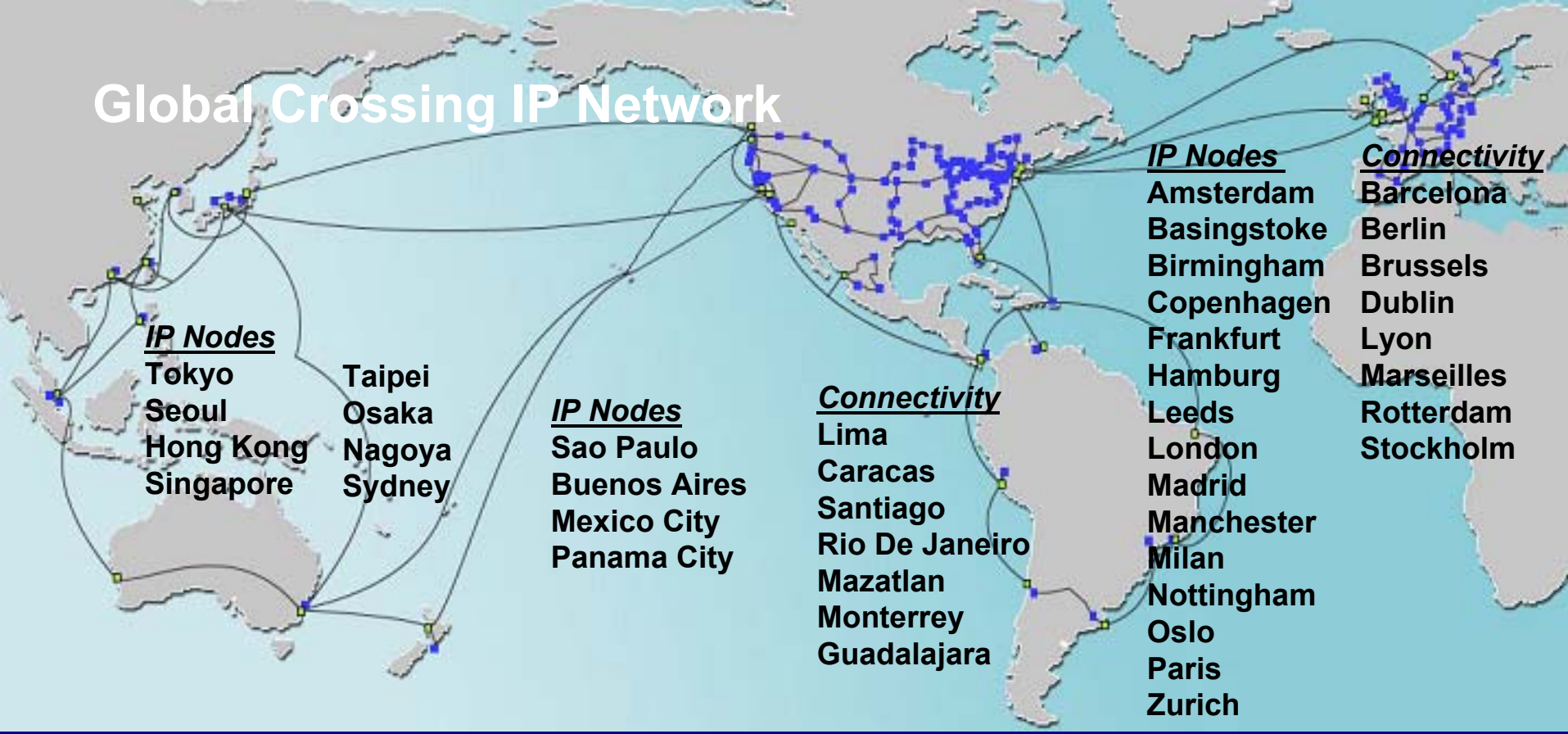


Tracing the route from Amsterdam to a Global Crossing customer in Tokyo:

1 ge1-2-0-998-1000m.ar2.AMS2.gblx.net (62.8.32.161) 0 msec 0 msec 0 msec
2 so3-0-0-622M.cr2.AMS2.gblx.net (62.8.32.77) 0 msec 0 msec 0 msec
3 pos0-3-622M.cr1.NRT1.gblx.net (203.192.128.181) 252 msec 252 msec 252 msec
4 pos0-0-622M.ar2.NRT1.gblx.net (203.192.128.154) 264 msec 264 msec 264 msec

Global Crossing

Global Crossing IP Network



- IP deployed directly on DWDM backbone for improved throughput and rapid scalability
  - State of the art optics
- Fully redundant IP network & IP hubs
  - Minimized 'single point of failure'
  - Multiple ingress/egress paths for IP traffic
  - Multiple data paths within the hub
- First Carrier to Deploy fully-meshed global MPLS network into Production for 25% increase in data delivery efficiency

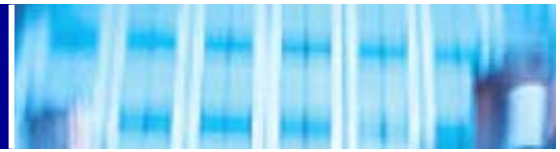
Global Crossing

Peering Policy

- Internet & Peering
- Peering Policy
- US, Europe and Asia Peering Policy

Global Crossing

Internet - Peering



- The Internet is a collection of interconnected networks that share a common addressing structure, a common view of routing, and a common view of a naming system.

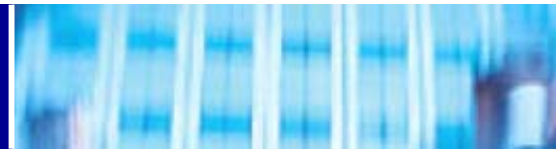
- Underneath the layer of a competitive ISP/ Carrier environment is a somewhat different environment, in which every Internet service provider network must interconnect with neighboring Internet networks in order to expand its connectivity and to ensure the end-to-end service to its customers.

- Peering adds value to our customers by expanding the connectivity to other networks in the world and at the same time it is a cost-effective instrument for the Provider to create this connectivity.

- The goal is to maximize the connectivity with a minimal amount of hops.

- No ISP can operate in complete isolation from others while participating in offering Internet servers, and therefore, every ISP must not only coexist with other ISPs but also must operate in cooperation with other ISPs.

Peering Policy



- A “peering hub” is simply defined as a location in which a peering interconnect is terminated. To ensure the Global Crossing quality objectives, professional agreements including service levels will be established with only trustworthy peering partners.

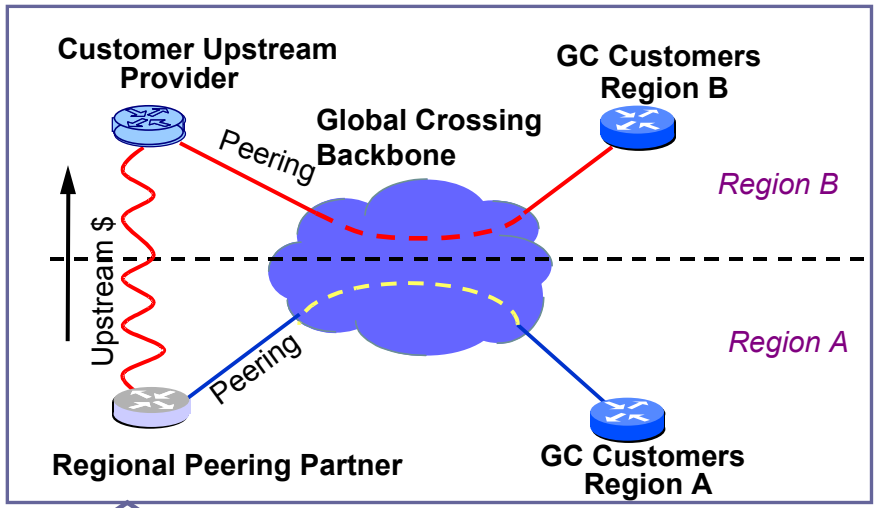
- Global Crossing has defined, within its single AS-network, four (macro)-regions:
  - Region 1 - United-States
  - Region 2 - Europe
  - Region 3 - Asia
  - Region 4 - Latin America

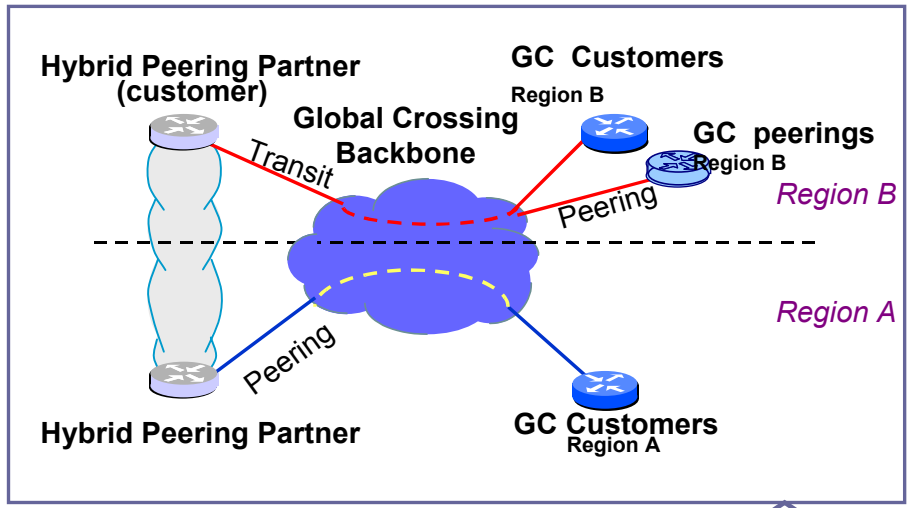
- To support marketing requirements and to provide best quality service to our customers, Global Crossing supports different types of peering relationships:
  - Regional Peering
  - Hybrid peering
  - Global Peering

Note. This peering policy is subject to change by Global Crossing at any time and notwithstanding the provisions of the Global Crossing peering policy, the Global Crossing peering committee reserves the right to decide otherwise at any time.

Global Crossing

Peering Policy

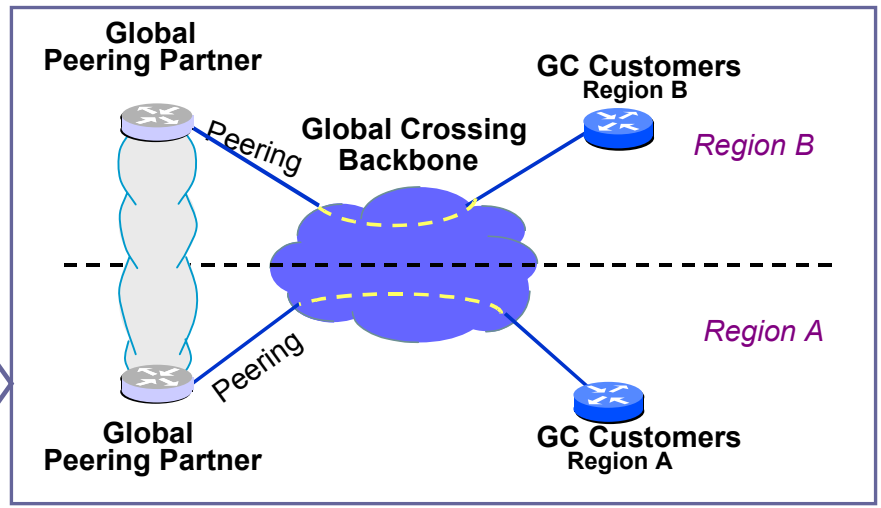




Regional Peering

Hybrid Peering

Global Peering



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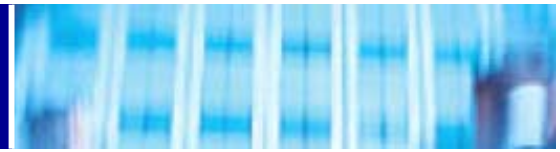
Global Crossing

GC's US & EU Regional Peering



- **US Regional Requirements**
  - 4 Interconnects per region
  - Minimum of 100 mbps inside of co-located facilities
  - Minimum interconnect of OC3/STM1 when via local loop
  - 250-300 mbps of traffic required to justify private peering

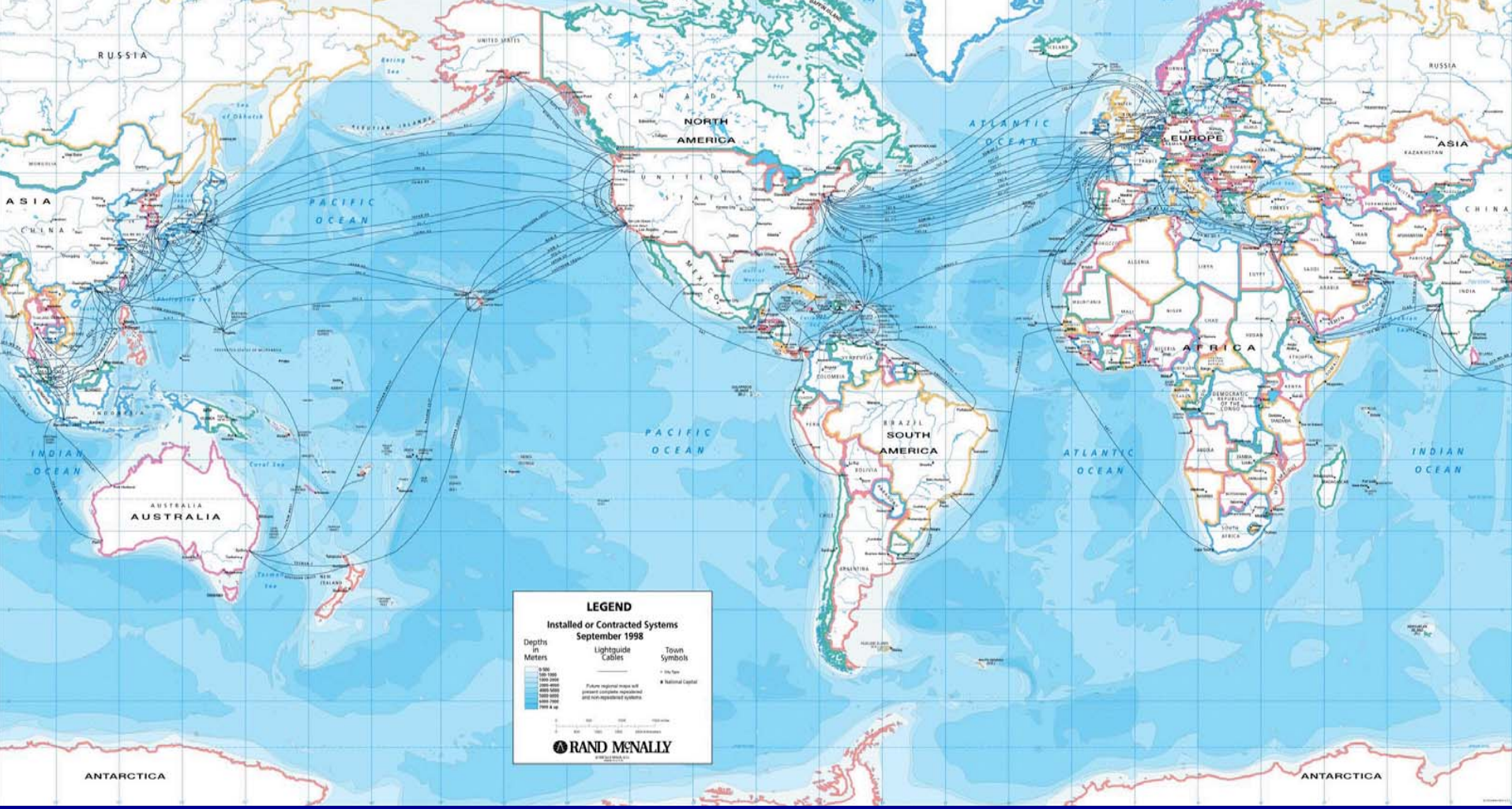
- **EU Regional Requirements**
  - 3 Interconnects per region
  - Minimum of 100 mbps inside of co-located facilities
  - Minimum interconnect of OC3/STM1 when peering via local loop
  - 75-100 mbps of traffic required to justify private peering

- **In general**
  - Strategically located at major peering locations throughout US & EU
  - 90% of peering via private connections

Latin America connectivity and Peering Policy

- Connectivity
- GC Regional View on Internet Traffic
- GC Peering Policy for Latin America

Global Crossing

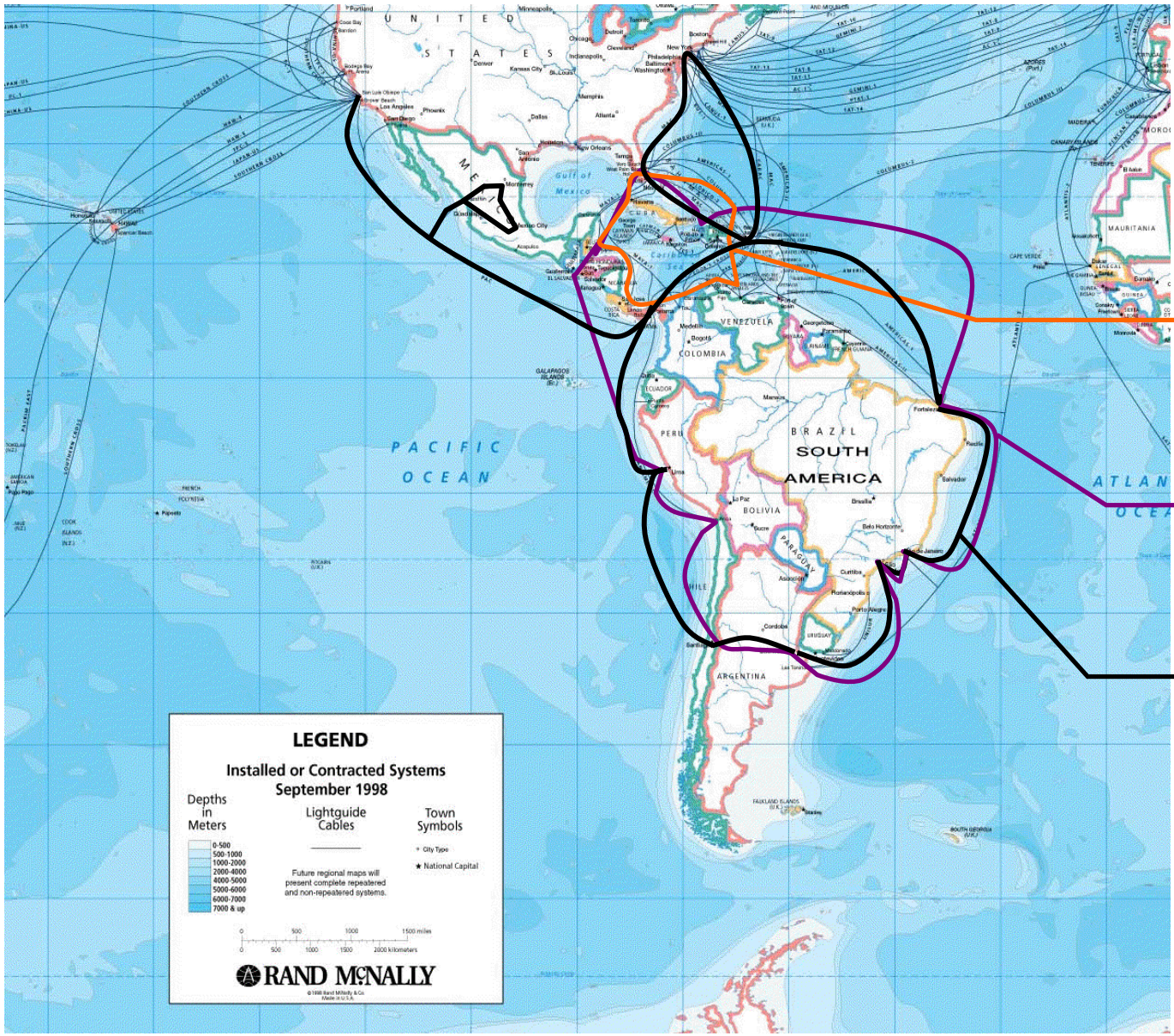


Cable Connectivity Map

➔ **No ring configuration around South America before 2000**

Global Crossing

New Submarine Cable Connectivity Map



New World Network

Emergia

Global Crossing

Global Crossing

Global Crossing IP Network

IP Nodes
Sao Paulo
Buenos Aires
Mexico City
Panama City

Connectivity
Lima
Caracas
Santiago
Rio De Janeiro
Mazatlan
Monterrey
Guadalajara

Legend

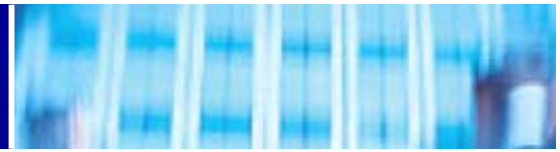
- Landing Points
- Cities Connected
- Connecting Systems

South American Crossing

➔ **IP platform connected to GC Tier 1 backbone**

Global Crossing

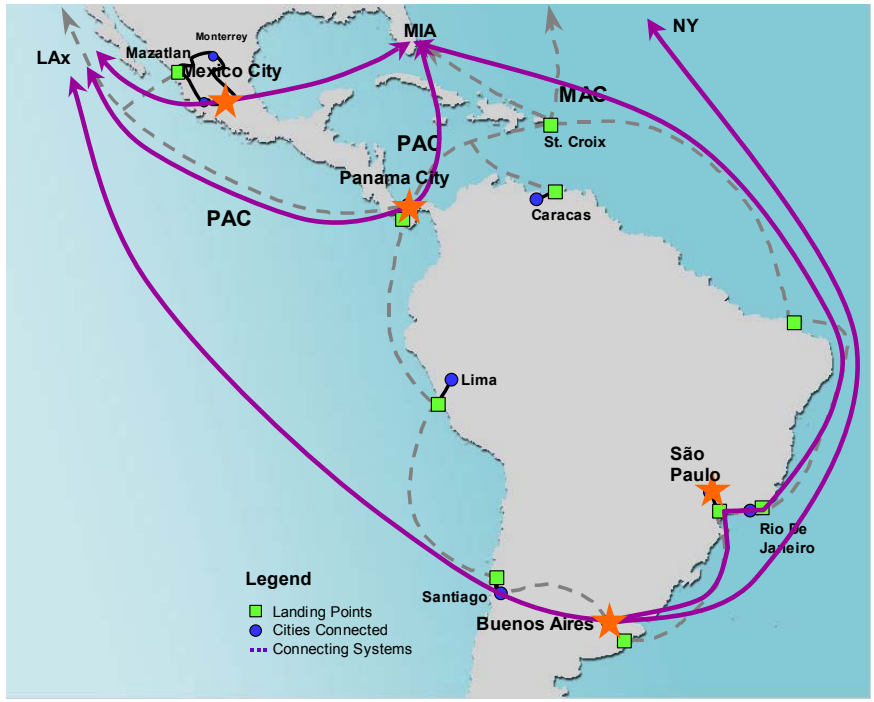
GC's Regional View of Internet Traffic



- Latin America Content growing at a very fast rate and with the same priority among users as the US content
- Latin America produces important amount of Spanish and Portuguese content
- Multimedia, E-commerce and VoIP applications demand high network performance with;
  - Minimum Packet Loss
  - Very low Latency
  - High Service Availability
- It is a priority for IP Providers to built robust local peering agreements and provide direct IP network connections within the region

Global Crossing

GC's Latin America Peering Policy

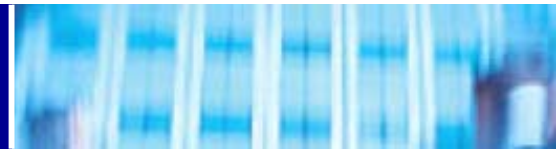


- **LATAM Regional Links**
  - Buenos Aires to Sao Paolo –
  - Anaheim (US) to Buenos Aires -
  - Buenos Aires to NY –
  - Sao Paolo to Miami (US) –
  - Mexico & Panama to MIA –
  - Mexico & Panama to Anaheim

- **Peering Policy Adjustment**
  - Only 1 interconnect required in region (previously required 3 interconnects)
  - Minimum 45 Mbps preferable 100 Mbps FE peering connections
  - Allows exchange of peering traffic via Multilateral Peering Agreements (MLPA) enriching local connectivity

Global Crossing

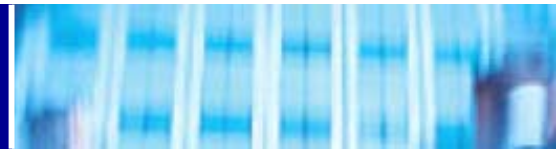
GC's Latin America Peering Policy



- GC will ramp up local connectivity quickly by connecting to local internet exchanges in parallel with the expansions of GC IP POPs
  - Provide improved local content access to GC customers
  - Provide national ISPs access to GC routes.
- Current Peering Connections
  - Cabase – Argentina
  - Fapesp - Brazil
- Possible Peering enhancements 2003-2004
- Exploring Peering Connections to NAPs
  - Mexico (existing IP POP)
  - Panama City (existing IP POP)
  - Santiago, Chile (future IP POP)

Global Crossing

Global Crossing at a Glance



- **A Snapshot of Global Crossing Peering Today**
  - **Global Crossing is a Tier 1 provider**
  - **Peering with every major network on the Internet without exception**
  - **>90% Egress traffic is exchanged via private peering**

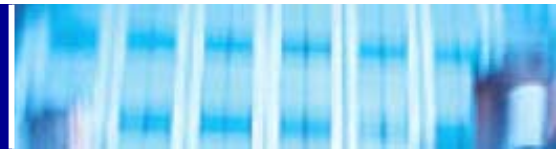
Private Peering Interconnections		157	
Public Peering Interfaces		9 circuits in place with multiple Public peering connections	
US Peering (not all listed)	**Europe peering**	**Asia Peering**	**Latin America peering**
GX peering point	GX peering point	GX peering point	GX peering point
Anaheim	Amsterdam (GC IP-POP / AMS-IX)	Singapore	Sao Paulo/FAPESP
Atlanta	Copenhagen (GC IP-POP)	Taipei	Buenos Aires/CABASE
Boston	Frankfurt (GC IP-POP / DE-CIX)	Hong Kong	
Chicago	London (GC IP-POP / Telehouse No	Tokyo (GC IPPOP / JPIX / NSPIX)	
Dallas	Paris (GC IP-POP / Parix telehouse)	Sydney	
Ashburn	Milan (GC IP POP / MIX-ITA)		
NY (2 different peering points)	Stockholm (GC IP-POP / NetNOD)		
Los Angeles (WILSHIRE)	Oslo (GC IP-POP)		
Palo Alto	Zurich (GC IP POP / IX Europe)		
Seattle	Hamburg (GC IP-POP)		
San Francisco			
Washington. DC			

Global Crossing

Conclusions

Global Crossing

Conclusions



- Internet traffic growing at a faster rate in emerging markets such as Asia and Latin America.
- Robust peering connections in the Latin America Region will foster regional Internet traffic growth
- In a few years, content and eyeballs will be less concentrated in the US and will be evenly distributed among all regions
- Global Crossing commitment
  - To provide redundant and reliable global IP Backbone
  - Provide access to 100% of the internet with robust peering agreements worldwide
  - To become a leading player in the Latin America Internet evolution by providing state of the art IP Network and robust peering agreements throughout the region

Global Crossing

Thank You

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