# Global Crossing Government Solutions
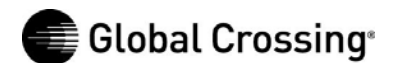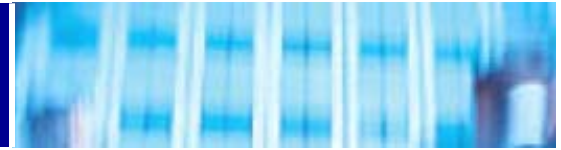
**Richard A. Fisk Jr.**
**Sr. Sales Engineer**
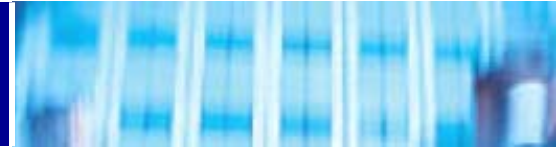**richard.fisk@globalcrossing.com**

**Global Crossing**

# Agenda

- ➢ Introduction of Global Crossing Company and Network

- ➢ Notes on IPv6

- ➢ Transition to IPv6

# Global Crossing the Company

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# Global Crossing at a Glance

**Global Crossing was founded seven years ago based on an idea ahead of its time … IP.**

## Network:

- Core network connects over 300 cities in over 30 countries; delivers services to nearly 600 major cities in over 50 countries

- Industry-leading network reliability over "five nines" (99.999+%)

- Current IP traffic over 167 Gbps;  Current VoIP traffic at 65%; 2005 total VoIP minutes:  39 billion minutes
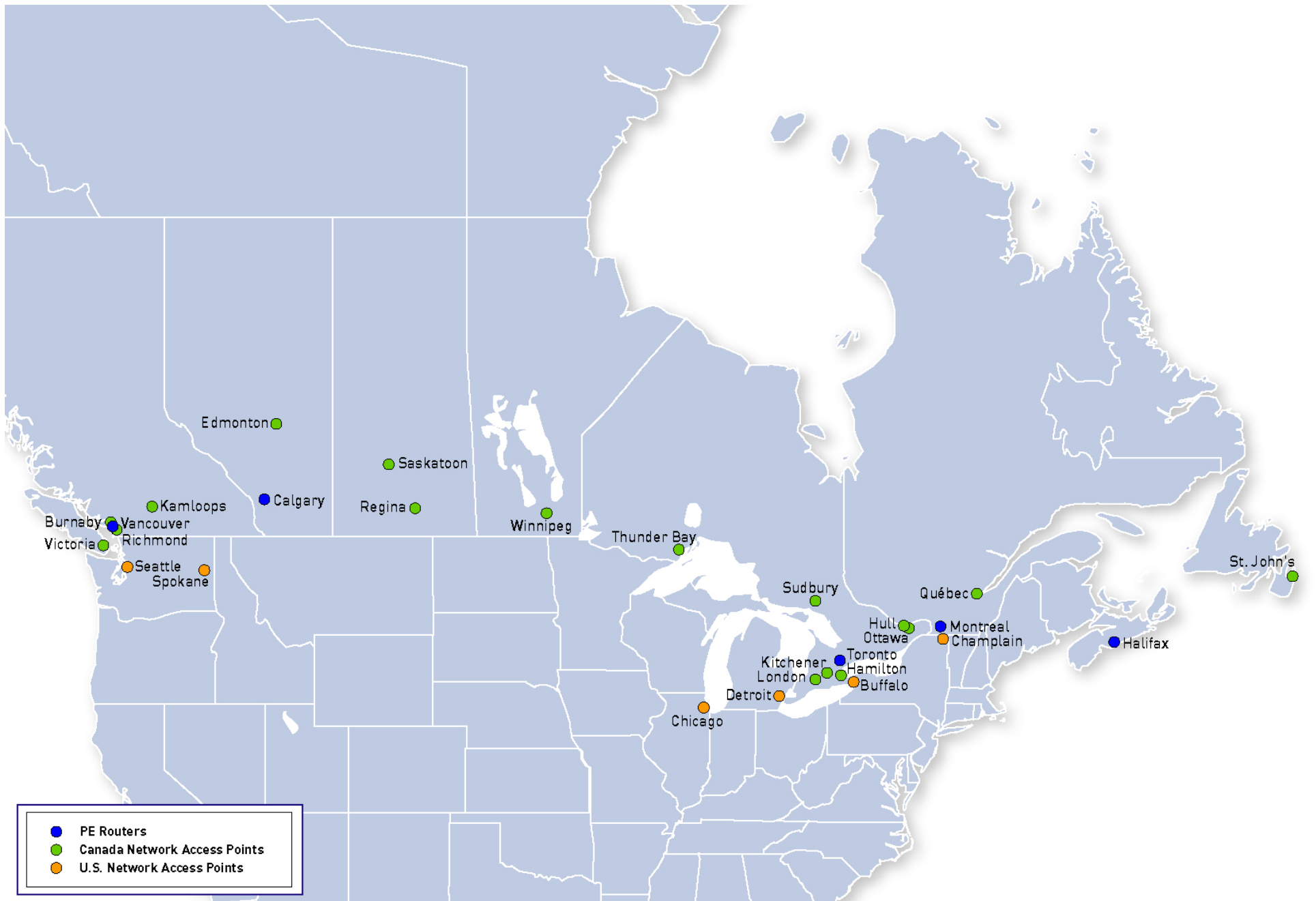
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# IPv6 Capable IP VPN
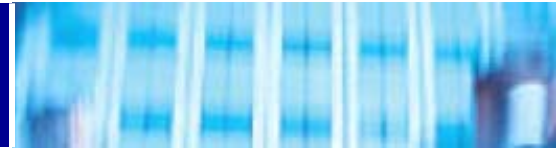


➢ Increases Scalability To Include More Addresses And Routing Capabilities

➢ Transport IPv6 Natively across the network using 6PE (IPv6 over MPLS), i.e. no tunneling required

➢ Allows the use of IPv4 and IPv6 on the same VPN, enabling smooth migration plans that don't require forklift implementations

➢ Enables an EOIP Strategy – An Everything Over IP Strategy requires a robust IP address inventory

➢ Netcentric Warfare Needs – With potentially every field item identified with an IP address, an expansive amount of IP addresses is needed.

➢ Mobile IP – With remote connectivity an increasing requirement large domains of IP addresses will be needed

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# Global Crossing the Network

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**North America – Converged IP**

Legend:
- ■ Landing Points
- ● IP VPN PoP
- ● Sonus Gateway Switches
- ● ACME Session Border Controllers

**VA and D.C. area**
Ashburn, VA
Chesapeake, MD
Herndon, VA

**Northeast U.S.**
Altoona, PA
Hartford, CT
Harrisburg, PA

New Haven, CT
New London, CT
Poughkeepsie, NY
Stamford, CT

Syracuse, NY
West Haven, CT
Westfield, MA
White Plains, NY

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Canada – Converged IP

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Pan-European Crossing (PEC) – Converged IP

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**UK**

| | |
|---|---|
| Ashford | Holloway |
| Aston | Huddersfield |
| Avonmouth | Ilford |
| Aylesbury | Leamington |
| Basildon | Leigh |
| Bedford | Leyland |
| Birkdale | Longton |
| Bradford | Luton |
| Brentwood | Maidstone |
| Brighton East | Milton Keynes |
| Bristol Clifton | Newbury |
| Chesterfield | Romford |
| Chichester | Rotherham |
| Coventry | Salisbury |
| Crawley | Stevenage |
| Dagenham | Stockport |
| Doncaster | Stockton |
| Ealing | Swindon |
| Eastleigh | Tilbury |
| Ellesmere | Trafford |
| Elstree | Trowbridge |
| Falconwood | Warrington |
| Folkestone | Westbury |
| Gravesend | Wigan |
| Hale | Wilmslow |
| Harringay | Winchester |
| Hartford | Yeovil |
| Hatfield | York Central |
| Heald Green | |
| Hitchin | |

**London Area**

| | |
|---|---|
| Acton | Leicester |
| Battersea | Maidenhead |
| Beckenham | Mitcham |
| Bexleyheath | Redhill |
| Croydon | Shepherds Bush |
| Dartford | Slough |
| Feltham | Staines |
| Greenford | Upton Park |
| Guildford | Watford |
| Harrow-on-the-Hill | Wembley |
| Hayes & Harlington | Willesden |
| Hendon | Woking |
| Hounslow | Woolwich |
| Isleworth | |

**Legend:**
- ■ Landing Points
- ● IP VPN PoP
- ● Sonus Gateway Switches

**UK/Ireland – Converged IP**

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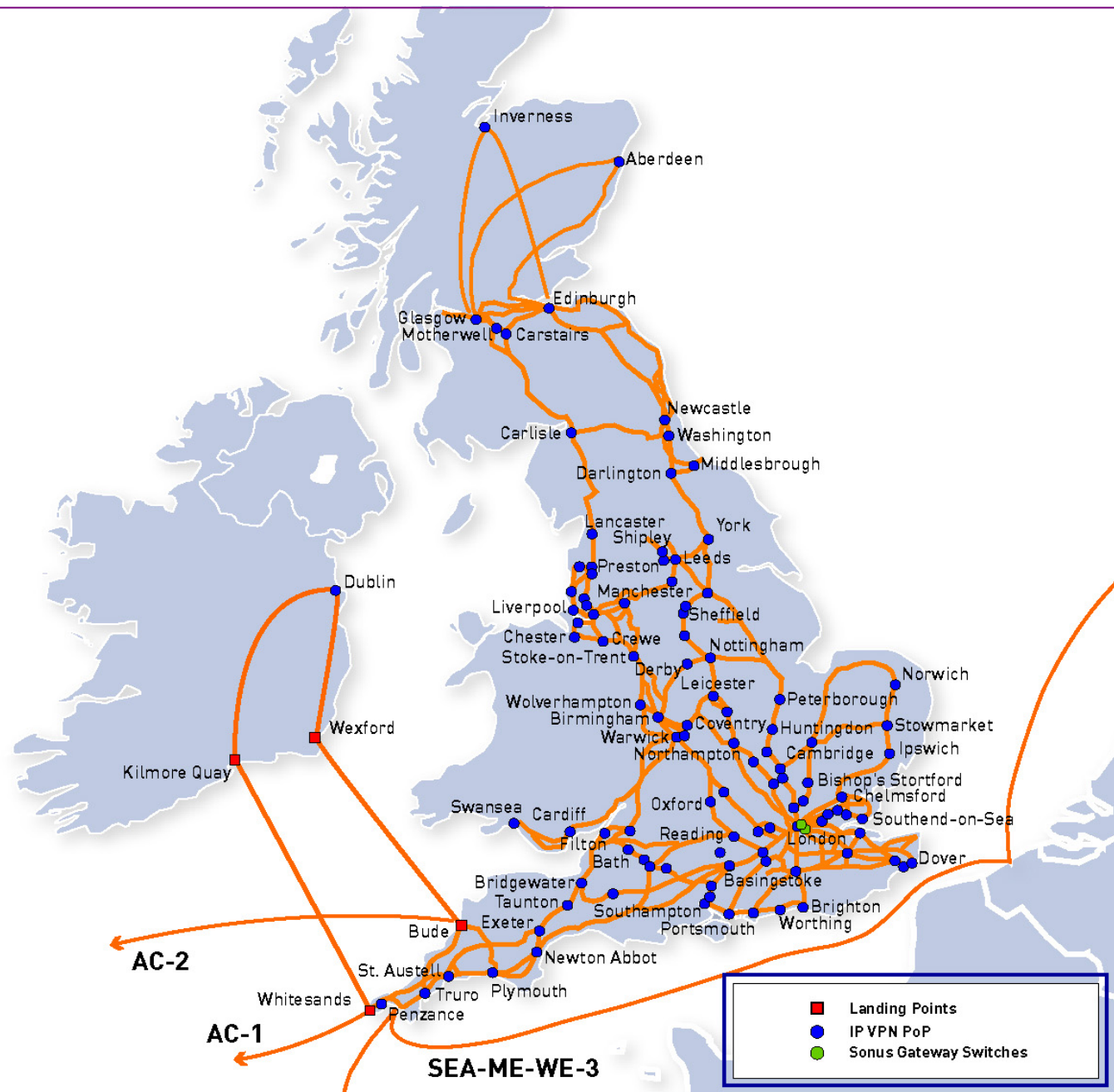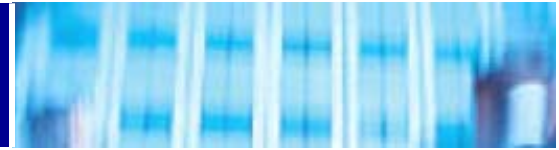
South America Crossing (SAC) - Converged IP

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Legend:
- Landing Points
- IP VPN PoP
- Sonus Gateway Switches

Map labels:
MAC, MAC, PAC, SAC, SAC, SAC

Guatemala City, San Juan, St. Croix, Santa Marta, Valledupar, Maracaibo, Barranquilla, Barquisimeto, Cartagena, Valencia, Puerto Viejo, Panama City, Caracas, San Jose, Fort Amador, Maracay, Cucuta, Bucaramanga, Medellin, Pereira, Manizales, Bogata, Armenia, Villavicencio, Buenaventura, Ibague, Cali, Neiva, Popayan, Pasto, Quito, Guayaquil, Trujillo, Chimbote, Lurin, Lima, Ica, Arequipa, La Paz, Brasilia, Belo Horizonte, Campinas, Sorocaba, Londrina, Rio De Janeiro, Curitiba, Sao Paulo, Santos, Fortaleza, Porto Alegre, Cordoba, Pilar, Mendoza, Parana, Rosario, Valparaíso, Montevideo, Santiago, Buenos Aires, La Plata, Las Toninas

Beijing
Tianjin
Dalian
Seoul
Kitaibaraki
Ajigaura
Tokyo
Wada
Shima
PC-1
JUS
PC-1
JUS
Nanjing
Wuxi
Shanghai
Suzhou
Wuhan
Hangzhou
Ningbo
EAC
Fuzhou
APCN-2
Dongguan
Xiamen
Taipei
EAC
Guangzhou
Huizhou
Pa Li
Tong Fuk
Hong Kong
RNAL
Shenzhen
Zhongshan
EAC
Australia-Japan
EAC
Cavite
Bangkok
Manila
SEA-ME-WE-3
Kuala Lumpur
Singapore
Jakarta
SEA-ME-WE-3

Landing Points
IP VPN PoP
Sonus Gateway Switches

**Asia/Pacific – Converged IP**

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Lantau Island
Tong Fuk
Hong Kong

Pa Li

Taipei

APCN-2

EAC

RNAL

EAC

Cavite

Manila

EAC

Bangkok

Australia-Japan

Kuala Lumpur

Singapore

SEA-ME-WE-3

Jakarta

SC

SC

SEA-ME-WE-3

Perth

Sydney

Auckland

Wellington

■ Landing Points
● IP VPN PoP
● Sonus Gateway Switches

**Asia/Pacific – Australia – Converged IP**

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# Not All Networks Are Created Alike
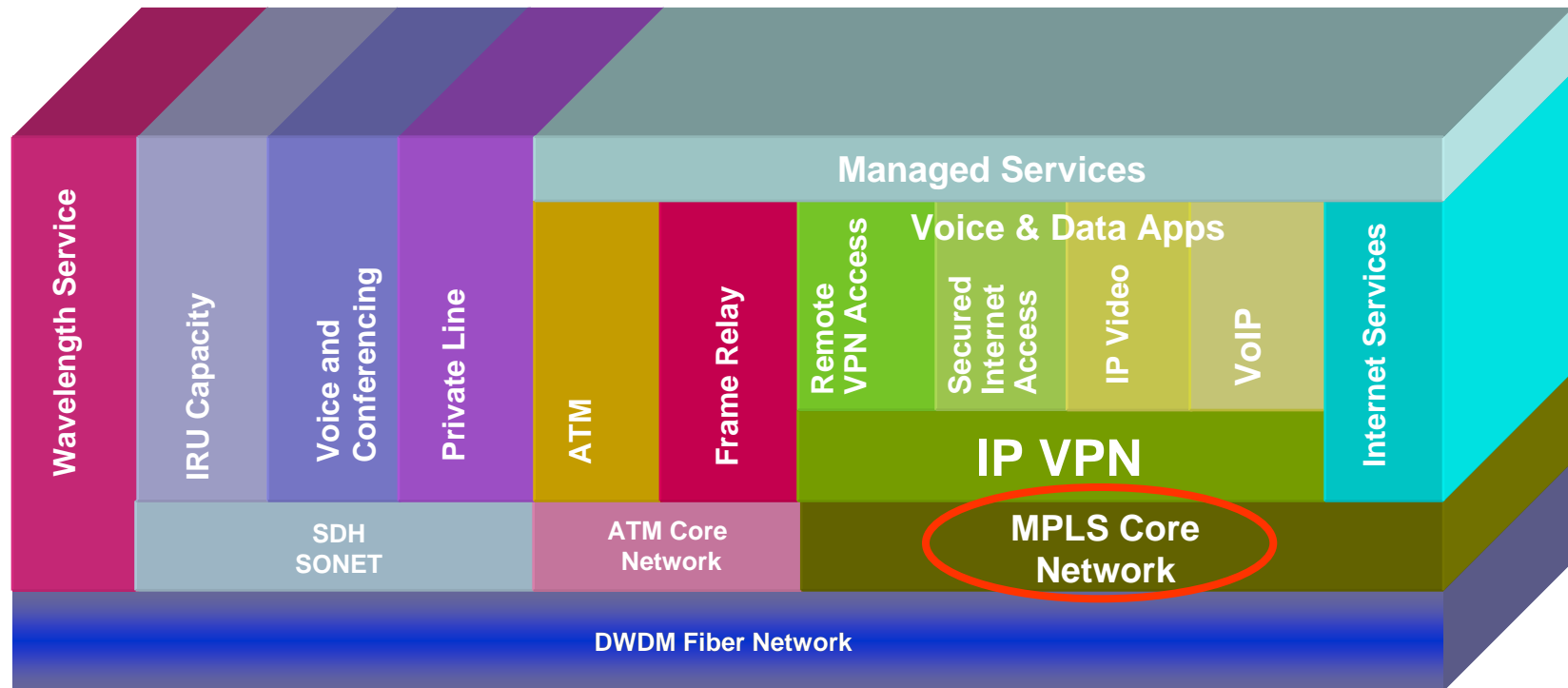


| **Reduced Protocol Layers** | **Optimal Performance** | **Scalability** |
|---|---|---|
| ↘ 30-40% more throughput | ↘ Reduced Jitter and latency | ↘ Any-to-any |
| | ↘ Reduced overhead | ↘ Bandwidth support |

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# Current Super Core



Americas IP Core Plan

Legend:
- Stage 1: NEW 10G OC192
- Stage 1: NEW 10G 10GE-LAN
- Stage 2: NEW 10G OC192
- Stage 1: NEW OC48
- EXISTING 10G OC192
- EXISTING OC48

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# Notes on IPv6

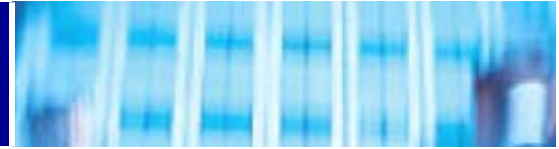Global Crossing®
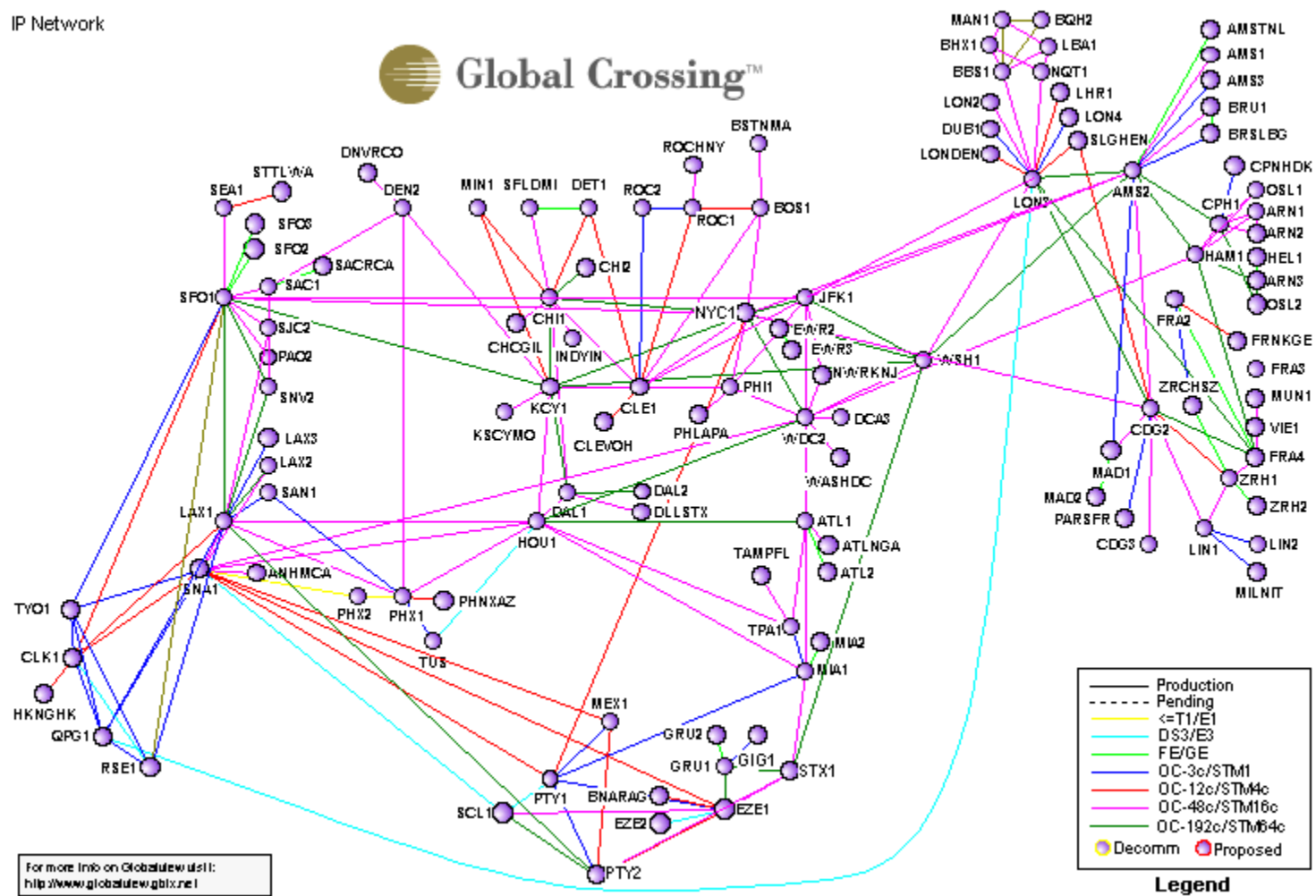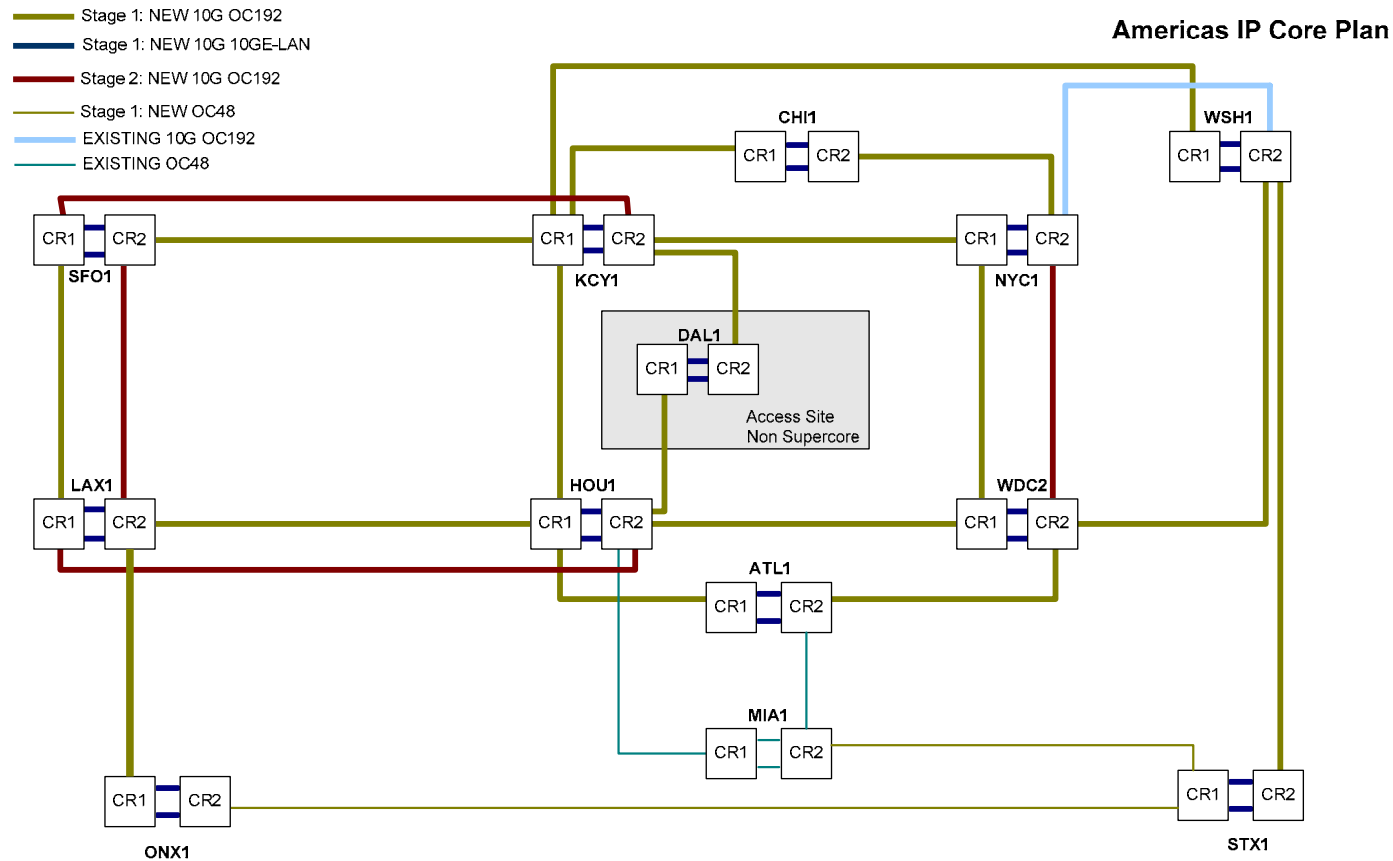
# IPv4 Addresses vs. IPv6

**U.S.-based organizations have more than 1.2 billion IP v4 addresses, close to 30 percent of the theoretical total**

➔ (Keep in mind that unicast addresses are limited to the A, B and C classes of addresses while the Class D addresses are for multicast and the Class E addresses are for experimental use.)

**IPv6 has $3.4 \times 10^{38}$ addresses**

➔ a. Enough for every grain of sand to be numbered

➔ b. Each person on earth could have 50 octillion unique IP addresses

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## Peoples Republic of China

→ China has 2 percent of the world's IPv4 addresses, or around 60 million—about as many as Stanford University.

→ China is expected to surpass the US in Internet usage by the end of 2006.

→ China is home to a population of 1,313,973,713 as of July 2006.

→ With IPv4, 26 Chinese share one Internet protocol address, while each American possesses six IP addresses

→ The Chinese had no choice but to adopt IPv6.

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# ZDNET Article
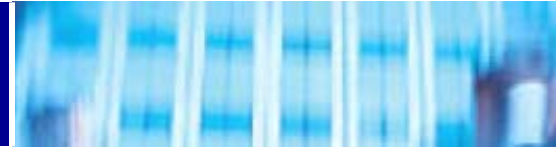
**ZDNet Tags:**

**[Web sites](#),**

**The number of Internet users in China made its highest recorded jump to reach 137 million at the end of 2006, a state information center said Tuesday.**

**China's Net users grew by 26 million, or 23.4 percent, year over year-- the highest jump since the report began in 1997--to reach 10.5 percent of the total population, [China Internet Network Information Center](#) said in its 19th Internet development report.**

**In China, which is close to launching the data-rich third-generation wireless standard--17 million people use their cell phones to go online, and 104 million have broadband Internet access, the report added.**

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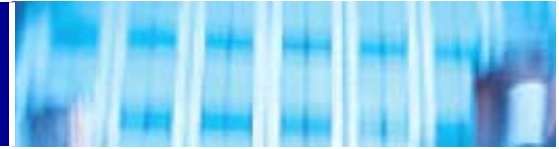# What's Driving IPv6
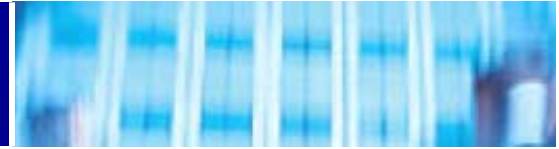
## What Countries Have Taken the Lead

➔ Japan

➔ France

➔ Korea

➔ Taiwan

➔ Nordic Countries

**In Japan, each cell phone has its own IPv6 address enabling the cell phone to control, monitor, and create IP traffic to another IPv6 address.**

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# IPv6 Extant Applications

➔ **A refrigerator that monitors it contents and transmits a shopping list directly to your grocery story for home delivery or quick pick-up.**

➔ **Bridges and smart structures with embedded sensors that can signal to a central station about need for repair and maintenance.**

➔ **Cars to which IP addresses are assigned so that they can more easily offer interactive diagnostic and maintenance services.**

➔ **Of particular interest to IEEE-USA and its Medical Technology Policy Committee is the real-time monitoring of health-related information and its collection in medical databases accessible through a National Health Information Network. Many doctors are already carrying PDAs to help them with diagnosis, to warn of drug interactions, and to record their observations electronically into a digital medical record. In an IPV6-enabled world, every medical device could be linked directly to the database.**

Referenced from http://www.IEEE.org.

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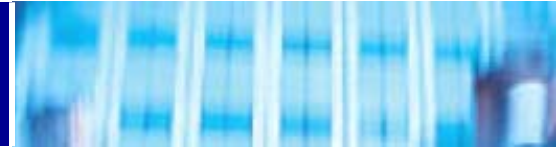# Transition from 4 to 6
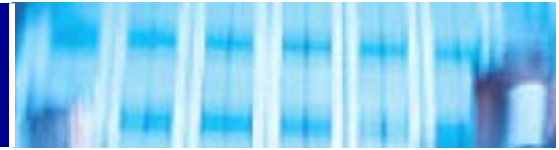
**How does the US transition to IPv6?**
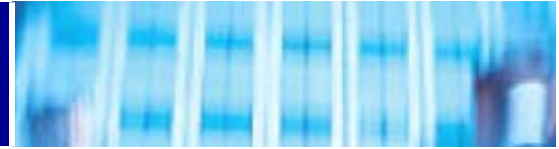
➔ **IPv6 is <u>NOT</u> the Y2K!!!!**

   ➔ Don't change your existing network or equipment

   ➔ All new network purchased up to 2008 must be IPv6 capable

   ➔ All new hardware purchased up to 2008 must be IPv6 capable

   ➔ All new software purchased up to 2008 must be IPv6 capable

   ➔ Set up a test IPv6 network now!!!

   ➔ Educate your engineers

   ➔ What is changing?

      ➔ What is staying the same?

      ➔ What questions should they be asking vendors when evaluating technology.

   ➔ How much will it cost to convert?

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# Transition Cont.

➔ **This transition is future proofing your network and your investment in applications**

➔ **Get perspective on what IPv6 could transform your IT organization into**

    ➔ Is there a cost savings to converting?

    ➔ What new applications become enabled?

    ➔ Which devices are no longer needed?

        ▪ Network Address Translators

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# Transition Cont.

# What is the cost of not moving?

➔ **Both the government and private industry are investing millions into this technology.**

  ➔ The Chinese are committed to moving to IPv6.
  ➔ Japan and Korea are not far behind.
  ➔ The US is falling further behind each year.

➔ **What applications are being limited**
  ➔ Network Appliance
  ➔ Netcentric Operations
  ➔ Security & Assurance Applications

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# Thank You

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