The Transition to IPv6

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Global Crossing®

Discussion Items

- The Transition to IPv6
- Global Crossing Overview
- Benefits and Challenges of IPv6
- Global Crossing's IPv6 Experience

The Transition to IPv6

Transition from 4 to 6

How does the US transition to IPv6?

- **IPv6 is NOT 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?**

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
  - Firewall
  - IPS
  - Encryption to the desktop

Countries Rapidly Converting to 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.

The Competition

- 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.

Benefits and Challenges of IPv6

IPv6 Capable IP VPN

- Increases scalability: addresses and routing
- Transports IPv6 natively with no tunneling required
- Uses IPv4 and IPv6 on the same VPN or Internet Connection (Dual Stack)
- Enables an EOIP (Everything Over IP) Strategy
- Supports Netcentric Warfare Needs
- Facilitates Anycast

IPv6 Challenges

- **Address space**
  - Readdressing Agency Domains
- **Netcentric Warfare (IPv6 Mobility)**
  - IP Address Mobility
- **Dual homing**
  - There is **no** solution to the addressing issues surrounding dual homing
- **Security**
  - IPv6 is already running on your network
- **Performance monitoring**
  - Currently same tools as IPv4

Global Crossing's IPv6 Experience

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Global Crossing's IPv6 Experience

- Current Customers
  - 50 IPv6 Customers
  - JITC Testing
  - ES Net
  - CSC Center of Excellence
  - Internet2
- Peering
  - Global Crossing has implemented IPv6 peering with more than 22 partners
  - Customer base includes significant carriers around the globe, including Japan and European traffic
- Consider IPv6 as a protocol not a product
  - IPv6 offers the exact same guarantees as IPv4 as part of our standard product offerings
  - Use dual-stack edge routers
  - Native IPv4/IPv6 over MPLS
  - IPv4/IPv6 on the same port and within the same VPN
  - All future development will support both IPv4 and IPv6
- IPv6 is available on our GSA Schedule Contract
  - GS-35F-0498S

Why GC Moved Away From Tunneling

- Global Crossing wanted to provide native IPv6 at the service edge
- Allows customers to route IPv6 efficiently between peers and other GC customers versus having to tunnel all the way back to a centralized IPv6 router
- Scalability (enables any-to-any IPv6 connectivity)
- Global Crossing ultimately decided on the 6PE Architecture

Global Crossing Customer Experience Labs

- Global Crossing IPv6 Lab (Phoenix, AZ)
  - Emulates Real World IPv6 Environment
  - Assist in Building Test Plan
  - DNS
  - Test Without Security Issues

- "The Customer Experience Lab allows customers' engineers to experience our network real time and to work with our engineers to partner solutions for their business needs." -Paul Benjes, Director of Converged IP Services.

CSC Center of Excellence

CSC and Global Crossing Launch Internet Protocol Version 6

Deployment across CSC network makes IPv6 available to government and private sector customers

El Segundo, Calif. - **October 9, 2006 -- Computer Sciences Corporation (NYSE: CSC) today announced that, in conjunction with Global Crossing (NASDAQ: GLBC), it has deployed Internet Protocol version 6 (IPv6) across the CSC network. As a leading global information technology (IT) services company, CSC will offer the new version of Internet protocol to its industry and government customers.**

As part of the launch, CSC is implementing IPv6 at its Enterprise Network Managed Services Center of Excellence, a testing and innovation center that leverages CSC capabilities managing several million local and wide area networks, and voice ports for the company and its clients. Customers can learn about the advanced security features of IPv6, which is the next network step forward from today's infrastructure, Internet Protocol version 4 (IPv4). IPv6 is interoperable with IPv4 and provides a platform for new Internet functionality that will be required in the near future.

"At CSC, we are always seeking new innovations and ways to advance our customers' businesses with advanced technologies and services," said Dave Bittenbender, vice president of CSC's Networks and Telecommunication Integrated Solutions (NTIS) division. "We're proud to be working with Global Crossing to bring IPv6 to our customers, especially to federal civilian agencies that are required by the Office of Management and Budget to add IPv6 to their network backbones by June 2008. At our center of excellence, customers can test IPv6 and learn more about how we can seamlessly migrate this new protocol onto their existing networks…"

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ESNET

U.S. Department of Energy's ESnet Peers With Global Crossing to Support IPv6 Traffic Exchange

New peering agreement supports high-speed IPv6 traffic exchange between thousands of DOE scientists and collaborators around the world

Florham Park, N.J. - February 19, 2007 **-- Global Crossing (NASDAQ: GLBC), a leading global IP solutions provider, today announced that it has established a new peering agreement with Energy Sciences Network (ESnet), a high-speed network serving thousands of Department of Energy scientists and collaborators worldwide. The new peering agreement will utilize dedicated interconnections to support the exchange of Internet Protocol version 6 (IPv6) traffic between ESnet's users via Global Crossing.**

"ESnet has long been a proponent of leading edge technology and was an early provider of native IPv6 services to its users," said Bill Johnston, department head of ESNet. "This new peering agreement with Global Crossing is another way we're forging the path of technology by increasing the exchange of IPv6 traffic among carriers and major networks."

IPv6 is a new version of Internet Protocol, which is the designated replacement for today's Internet Protocol version 4 (IPv4). IPv6 is interoperable with IPv4 and provides a platform for new Internet. IPv6 is needed to support mixed levels of quality and security through a single Internet connection. It also allows for the exponential growth in Internet connectivity driven by new users in rapidly-developing economies as well as the deployment of new services and devices for all users…

JITC

U.S. Department of Defense's JITC Conducts IPv6 Testing Over Global Crossing's IP Network

Florham Park - November 14, 2006 **-- Global Crossing (NASDAQ: GLBC), a leading global IP solutions provider, today announced that the Joint Interoperability Test Command (JITC) is using the Global Crossing IP network to test the global capabilities of Internet Protocol version 6 (IPv6). JITC supports the U.S. Department of Defense (DoD) by providing testing, evaluation and certification of information systems and equipment…**

…Global Crossing has given the JITC access to and termination from its Phoenix Network Operations Center (NOC) to a nearby Point of Presence (PoP) to help JITC simulate a network environment that is similar to the DoD's existing network.

"JITC has expressed a real vote of confidence in Global Crossing, and we're eager to share with them our knowledge of IPv6 as they continue to test the newest generation of Internet Protocol," said Alan Rosenberg, Global Crossing's vice president of federal solutions…

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Thank You

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