

IPv6 in Multiservice Networks

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INNOVATION

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Buzzwords...

Trinle Play

MULTISERVICE NETWORK:

1. A network delivering more than one service to the consumer, in which each service places distinctly different quality demands on the transport infrastructure.
2. Something you've gotta support these days if you want to survive as a service provider.

Typical Services (Select Two or More)

- Internet Access (HSD)
- Voice
- Video
 - Business quality
 - Entertainment quality
- Wireless and Mobile
- L2 VPNs
- L3 VPNs
- Metro (and beyond)
Ethernet
- Gaming
- . . .

The background of the slide is a light blue and white pattern featuring Leonardo da Vinci's Vitruvian Man. The figure is centered, with his arms and legs extended. Surrounding him are various mechanical elements, including large gears and smaller circular components, some of which are partially visible on the left edge. In the bottom left corner, a portion of a globe is visible, showing the continents of North and South America. A horizontal band of dark blue and teal runs across the upper portion of the slide, just above the word 'INNOVATION'.

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Reality Sets In...

- Everyone has basically the same business plan
- Do users really want this??
- Is this another optical or 3G story?*
- Multiservice itself becomes commoditized
 - But can't survive without it

* The Economist, "Your Television Is Ringing," Oct. 14-20, 2006

The background of the slide features a light blue and white pattern of interlocking gears. Overlaid on this is a faint, light blue version of Leonardo da Vinci's Vitruvian Man. In the bottom left corner, a portion of a blue and green globe is visible. A horizontal bar with a dark blue top half and a teal bottom half runs across the upper portion of the slide.

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What Does This Have To Do With IPv6?

Assume 10 M Subscribers

Devices per home:

Television	2
Computer	2
Phone	2
Game player	1
Utility meter	1
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Total Devices = 80M

Case Study: Comcast

- Uses IP to manage cable modems
- 10.0.0.0/8 space = 16.8 million addresses
- 2005: Comcast exceeded 20 million customers
 - 10.0.0.0/8 no longer sufficient
 - This is just for HSD customers
- 2007: Comcast offering triple-play bundled services
 - IP used to manage HDTV set-top boxes
 - 2 IP addresses per box
 - Average 2.5 boxes per household
 - = 100 million IP addresses across current 20 million customers
- Add VoIP into mix
 - Average 2 eMTAs per subscriber
 - = another 40 million IP addresses across current customer base
- ...and, these numbers do not account for expected growth



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Comcast Transition Plan

- Began migrating to IPv6 in 2005
- Incremental, hierarchical transition
 1. Begin with backbone
 - Already completed
 2. Backoffice systems
 - Not all backoffice systems need to know IPv6
 3. Comcast Regional Access Networks (CRANs)
 4. CMTS platforms
 5. Home Systems
 - STBs
 - MTAs
 - Routers/Hosts
 6. Public access

First Ping on Comcast Backbone...

```
ping ipv6 2001:558:0:f501::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:558:0:f501::1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/5/14 ms

Jun  2 09:31:49.589, len: 162, hits: 1, i/p i/f: TenGigE0/7/0/0
00146a7d 29810014 6ac4dd08 86dd6000 0000006c 3a3c2001 05580000 f5010000
00000000 00022001 05580000 f5010000 00000000 00018000 50fae0da 00004480
3e53000f 062b0809 0a0b0c0d 0e0f1011 ...

Jun  2 09:31:53.533, len: 162, hits: 1, i/p i/f: TenGigE0/0/0/0
00146ac4 dd080014 6a7d2981 86dd6000 0000006c 3a402001 05580000 f5010000
00000000 00012001 05580000 f5010000 00000000 00028100 4ffae0da 00004480
3e53000f 062b0809 0a0b0c0d 0e0f1011 ...
```


Advantages of the Comcast Transition Plan

- Initially, IPv6 domain completely private
 - Customers do not “touch” it
 - Translation, tunneling not an issue
- Incremental, hierarchical transition
- Allows extended training and operational experience period before “going public”
- Time to research effects
- Time to pressure vendors as needed

The background of the slide features a complex, artistic composition. It includes several interlocking gears of various sizes, some in shades of blue and others in a lighter, almost white color. A prominent green and blue globe is visible in the lower-left quadrant. The overall color palette is dominated by blues and greens, with a semi-transparent white rectangular box in the center containing the text.

谢谢！

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