

IPv6 in Multiservice Networks

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INNOVATION

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Buzzwords...

Triple 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
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The background features a light blue, semi-transparent illustration of a human figure with arms outstretched, overlaid with various mechanical gears and gears of different sizes. The overall aesthetic is technical and innovative. A dark blue horizontal bar is positioned 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 features a detailed anatomical drawing of a human figure, possibly a Vitruvian Man style, overlaid with various mechanical gears and gears of different sizes. The entire scene is rendered in a light blue, monochromatic style. A dark blue horizontal bar is positioned above the word 'INNOVATION'.

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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

The background features a light blue, semi-transparent illustration of a human figure with arms outstretched, overlaid with a complex network of gears and mechanical parts. A dark blue horizontal bar is positioned above the word 'INNOVATION'. On the left side, there is a vertical strip with a blue and green globe graphic at the bottom and a gear-like pattern above it.

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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 features a complex arrangement of blue and green gears of various sizes, some overlapping. In the lower-left corner, a portion of a green and blue globe is visible. The overall color palette is dominated by shades of blue and green.

谢谢!

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