Deploying 5.000 IPv6 Sites: XTEC

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XTEC
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XTEC Background

- XTEC (Xarxa Telemàtica Educativa de Catalunya – “Catalonia Educative Telecom Network”)
- Originally PIE (Programa de Informatica Educativa – “Educative Informatics Programme”)
  - Today much more than just “PIE”
- XTEC is a LIR:
  - AS 21193
  - 2001:A50::/32 (17/12/2002)
- This is NOT an experimental network

The XTEC Customers

- Schools (not including Universities), adult learning, rural schools, teachers and associated administrative/management networks:
  - 2.200 Public
  - 2.700 Private
- Network limit is “political” (Catalonian autonomy vs. central government)
- Nodes (currently and minimum estimated figures):
  - 500.000 computers of public source
  - 150.000 computers from other sources
  - Printers, video edition, videconferencing, others

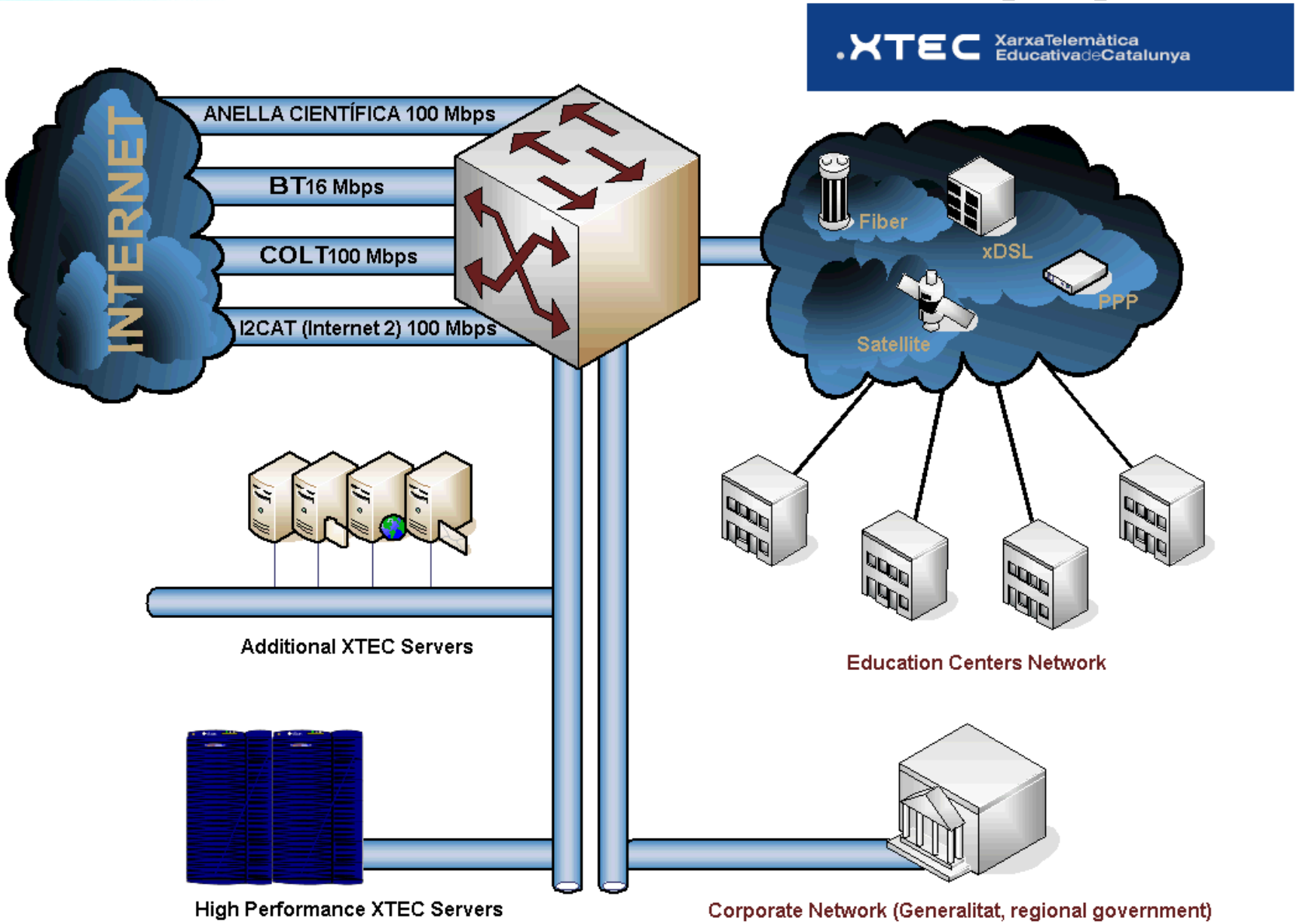
The XTEC Network (I)

- Links:
  - ADSL (2, 4 and 10 Mbps)
  - Satellite only (2 Mbits/56 Kbps)
  - Satellite+modem (2 Mbits/56 Kbps)
  - PPP (RAS, modem & ISDN)
  - 5 centers with 100 Mbits (fiber)
- CPEs
  - Cisco 827
  - Cisco 837
  - Cisco 1721
- Transport network (Telefónica)
  - Point to point from XTEC data center to each site
  - No Internet access
  - ATM network, Ethernet from the “end to end” perspective

The XTEC Network (II)

- Internet upstream providers:
  - COLT (150 Mbps)
  - i2CAT (100 Mbps)
  - Anella Cientifica (100 Mbps)
    - The Catalonian R&D network (attached to RedIRIS/GEANT)
  - BT (16 Mbps)
- Pick traffic to Internet up to 100 Mbps, sustained at certain hours
- Squid and others used:
  - Cisco Content Engine 7305 and 500

The XTEC Network (III)



Why IPv6 ?

- Technical motivations:
  - Guarantee of end-to-end connectivity
  - Security (administrative processing)
  - Anycast
  - Multicast
  - Autoconfiguration
  - QoS
  - Mobility (future applications)
- Non-technical motivations:
  - A few people in the sites has IP knowledge. Deploying new services and applications requires investing in training and support, which IPv6 avoids (end-to-end and autoconfiguration).
  - Reduce O&M cost: With the same resources we can deliver more services, applications, etc.
  - Only have 2x/19 IPv4 addresses. Impossible to consider end-to-end to all the nodes

XTEC Applications

- Internet access
- Email
- Own applications, all web based
- Streaming
- Gnomemeeting
- Jabber
- E-Learning

New Applications

- Use of anycast (DNS, web, ftp, etc.)
- Use of multicast (multiconferencing, videoconferencing, etc.)
- Network Storage and backup
- E-Learning

XTEC IPv6 Trial

- Goal: To use only IPv6 (as much as possible)
  - Even disable IPv4 in a near future
- An initial trial has been organized with 5 sites
- VLANs to each site
- Several VLANs in the data center
- One VLAN for the rest.
- ZEBRA
  - RA at each VLAN to announce the /48 of each remote site
- Services upgraded/deployed:
  - WWW/FTP (Apache)
  - DNS (Bind 9)
  - Proxy (FFPROXY)
    - To allow using IPv6 to access all the Internet IPv4

Deployment Plan

- Deployment to be completed ASAP:
  - Update existing CPE routers (M1)
  - Setup Prefix Delegation (M1)
  - Setup DHCPv6 (M2)
  - Enable IPv6 in clients (M3)
    - Some clients need to be upgraded (Windows 98 to XP/Linux)
- Then new applications/services will be trialed and deployed
- Disable IPv4 in the access network ASAP

Thanks !

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- Madrid 2005 Global IPv6 Summit, more info soon at:
  http://www.ipv6-es.com