

# Facts and Fiction

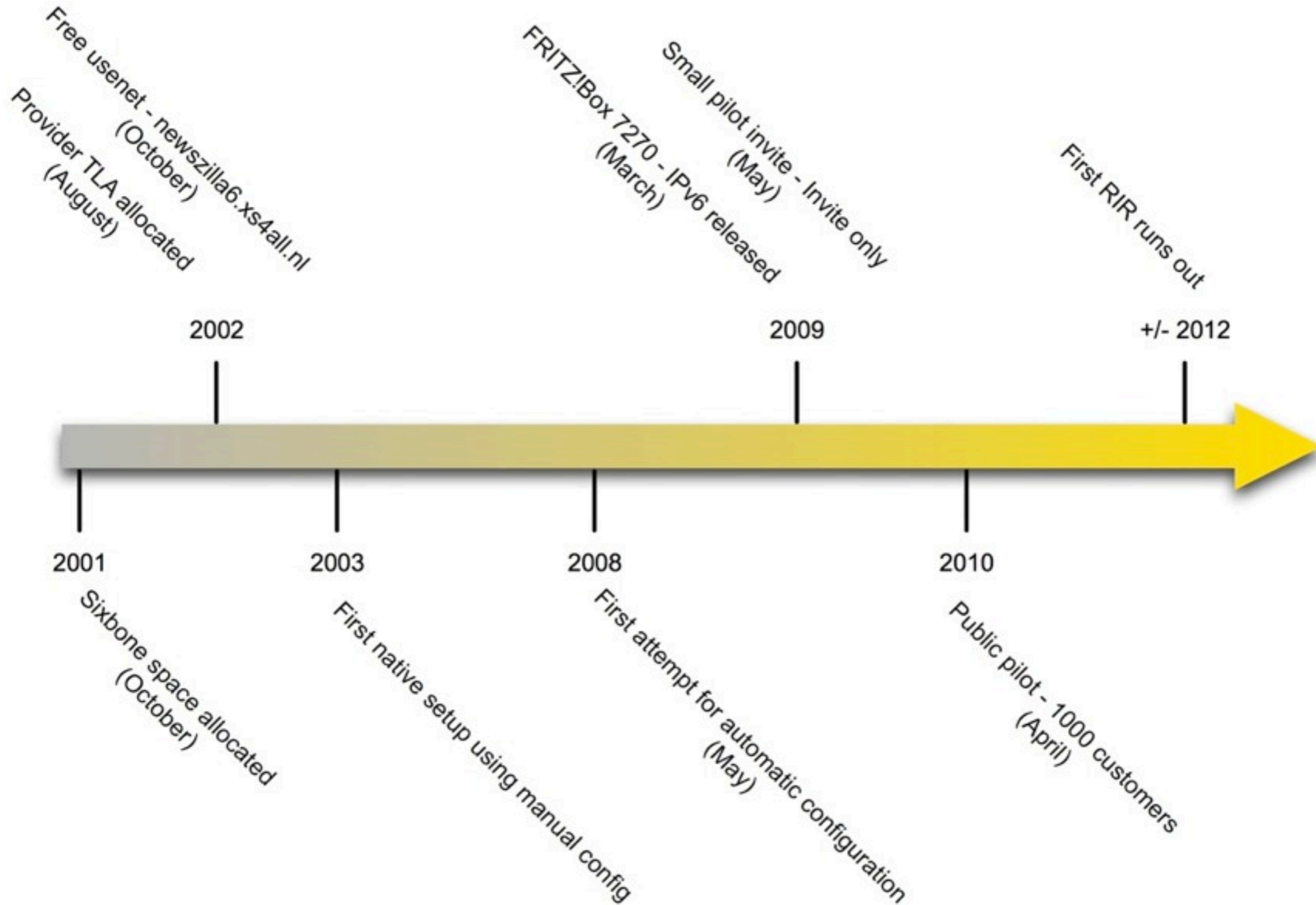
Experiences with IPv6 in the access layer

# Who is XS4ALL

XS4ALL

- One of the oldest ISPs in the Netherlands
- Founded May 1st 1993
- Originally as a not for profit
- Origins in the hacking community
- Currently 100% subsidiary of KPN NV
- Approx 300.000 DSL subscribers
- Residential and small business

# IPv6 history at XS4ALL



# What is our goal

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Make sure all our services will be available on  
dual stack before any problem occurs  
&  
Introduction of IPv6 should go unnoticed for  
most of the customers

# Solving the initial problems

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- There was no content available on IPv6
  - Introduced a free usenet service
- There is little awareness
  - Helped with AMS-IX IPv6 day (Oct 2002)
  - Activate the media
  - Talk to customers
  - Allowed people to play around
    - Tunnel server
    - Public shell server

# One problem remains until today

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- There are only few CPE available that have support IPv6
- Those that support IPv6 come in two flavors:
  - Expensive
  - Beta
- Usually a combination of both
- Standards are still draft

# CPE with IPv6 support

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- Cisco 87x/88x
  - Expensive for residential
  - Requires additional license
  - Hard to find the right IOS version
- FRITZ!Box (AVM)
  - Retails for about 200 euro
  - Beta (labor)
  - Aimed at residential market
    - Limited firewall management
    - No routing options
- Draytek Vigor 2130n (+ 120)
  - Retail approx 250 euro
  - Pretty complete box
  - Requires a separate DSL modem
  - No durability testing yet
- Juniper SSG/SRX
  - PPPoE only
  - Expensive
- Apple Airport Extreme and Timecapsule
  - Untested
  - Airport Express doesn't work
- Technicolor Speedtouch 789
  - Alpha
  - Release date unknown

# Our setup

- Juniper E320 for termination
- PPPoA/PPPoE
  - Single session, dual stack
  - IPCP and IPv6CP in the same session
- PPP interfaces 'unnumbered'
  - Only link-local addresses are used
  - Saves a lot of management problems
    - Traceability
    - Additional assignments for link addresses
    - Possible scalability issues regarding RA
- DHCPv6-PD to assign a subnet (/48)
  - Also carries DNS resolver addresses
  - built-in DHCPv6 server, controlled by radius
- IPv4 and IPv6 are static assignments
  - As long as the customer doesn't move
  - Addresses used in pilot will change once



# The pilot

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- Maximum of 1000 users
- ‘Sunrise’ system:
  - Announced March 29, 2010
  - Registration opened April 2, 2010 12:00 CEST
- Customer has to get his own CPE
- Best effort
- Goals
  - Impact analysis
  - Interoperability tests
  - Collecting information for support

# Initial responses

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- Loads of media attention
- Pretty big response for the pilot
  - 32 requests in 2 minutes during sunrise
  - Hundreds in 5 days time (incl easter)
  - Mostly professionals and early adopters
- Investment in new CPE is an issue
- Concept of Dual stack is hard to explain

# Operational results

- Only started 4 days ago
- 1st customer had link in 15 minutes
- Mostly positive responses
- Technical issues
  - DUID not as stable as it should be (LLT vs LT)
  - Lot of discussion about IOS bugs
  - Linux/BSD not that easy
    - DHCPv6 seems a challenge
- Several requests for reverse DNS
- Most people waiting for delivery of new CPE

# Questions ?



**XS6ALL**

meer adressen.