

# **ISP aspects of IPv6 transition**

## **The Armstrong IPv6 Project**

André Zehl

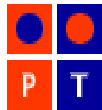
Deutsche Telekom

andre.zehl@telekom.de

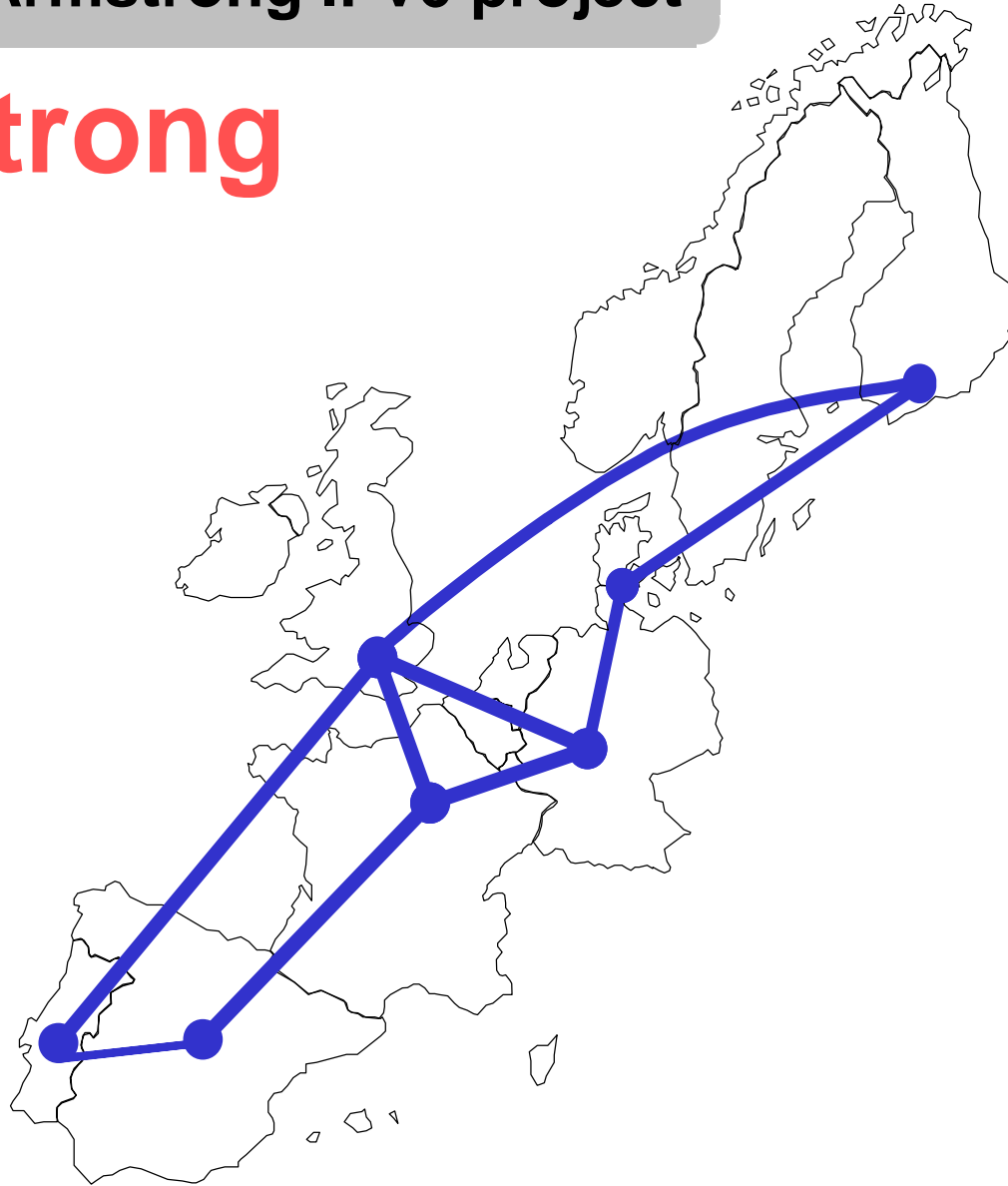
## The project title?

- We thought we get rid of the usual three-letter project acronym ...
- „One small step for IP, but a giant leap for mankind“

# Armstrong project partners



# The Armstrong Network



# Rationale for the Armstrong project

- Operational experience needs to be gained by the Internet community with the deployment of the IPv6 protocol suite
- Appropriate transition mechanisms and strategies for various scenarios are needed
- This project can be seen as an IPv6 deployment trial with a European provider testbed.

## Main Project Results

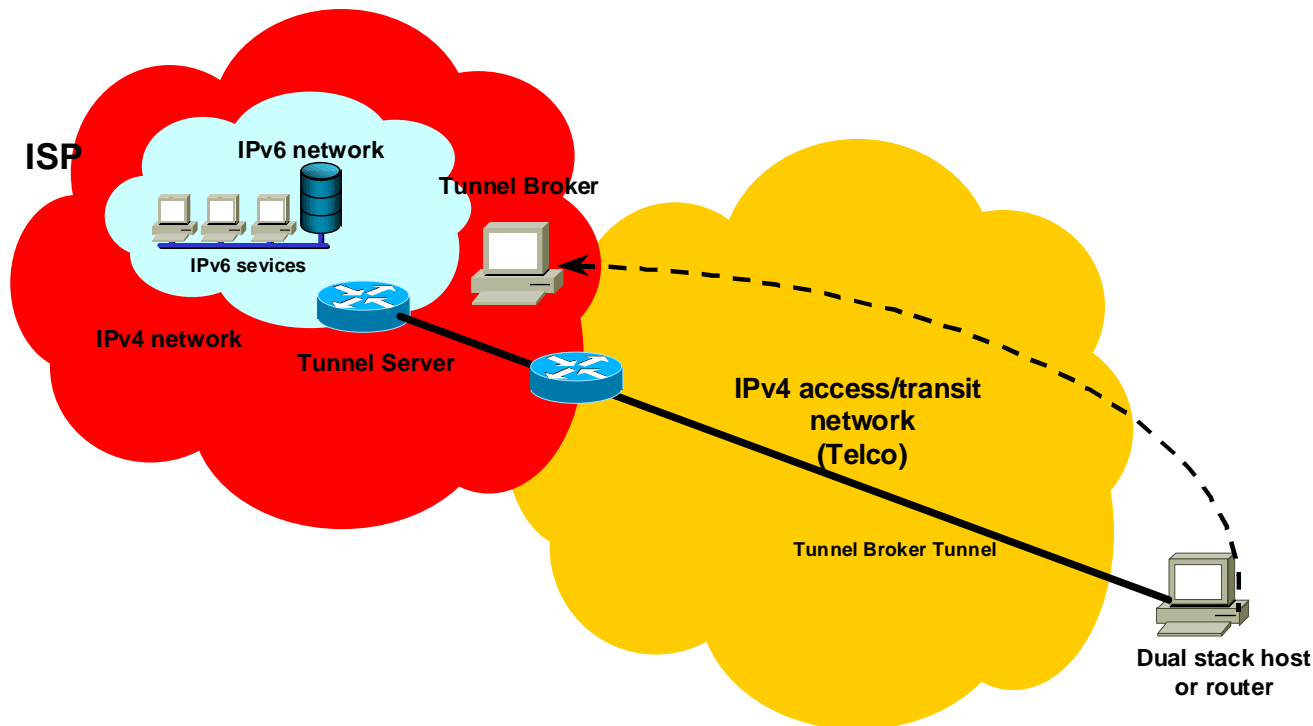
- “Transition strategies IPv4 to IPv6”
  - November 2000n (extended)  
(For Full Publication)
- “Inter-provider Routing and Peering in IPv6”
  - March 2001 (For Full Publication)
- “IPv6 in Always On and Mobile Scenarios (e.g. UMTS)”
  - April 2001 (For Full Publication)

# Transition strategies IPv4 to IPv6

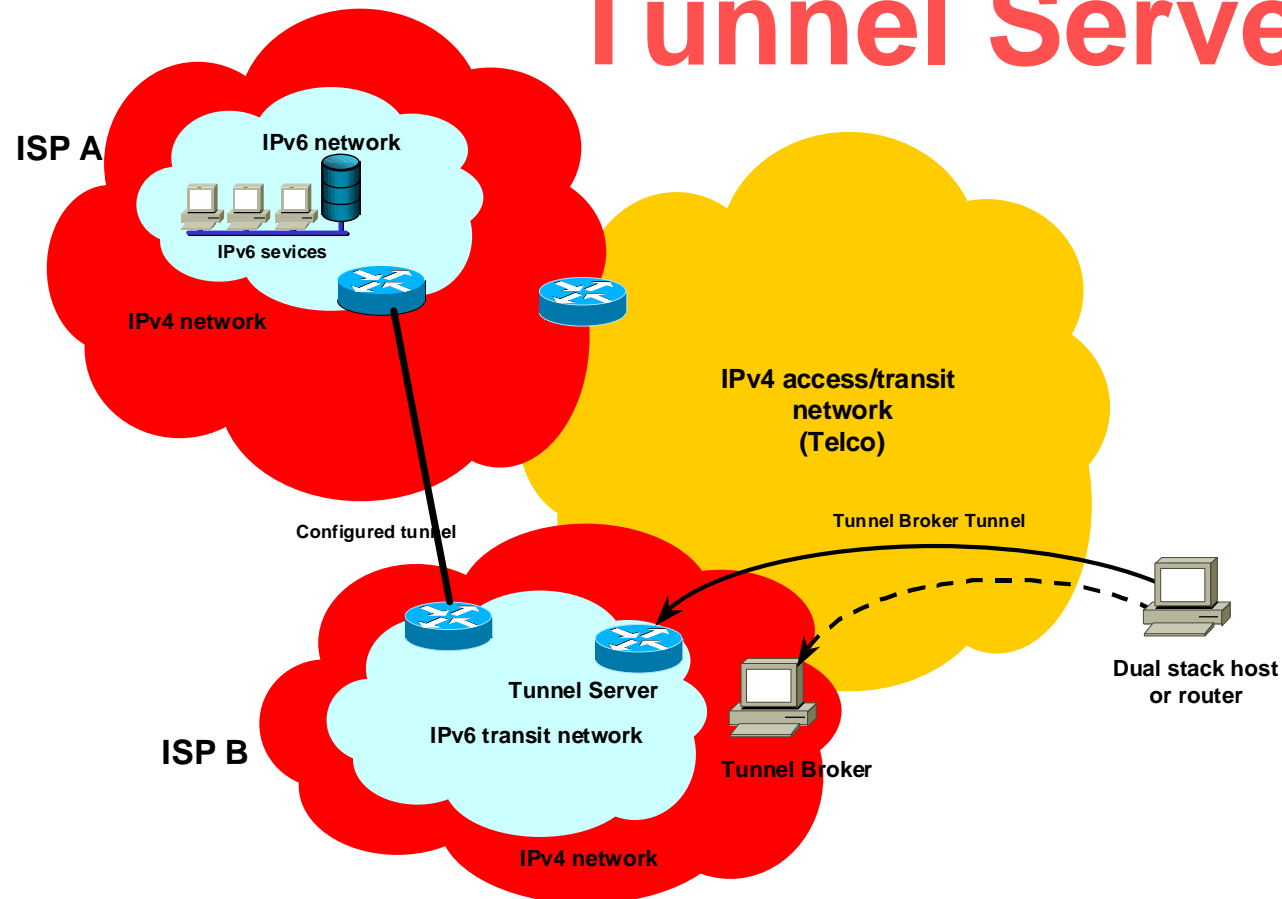
- Which are the possible transition strategies for an incremental transition from IPv4 to IPv6?
- Which advantages and disadvantages do these transition mechanisms for ISPs offer (costs, investment protection, uninterrupted operations, ...)
- What should “legacy” (IPv4) ISPs do (what could “greenfield” ISPs do)?

# Things to do as an IPv6 ISP

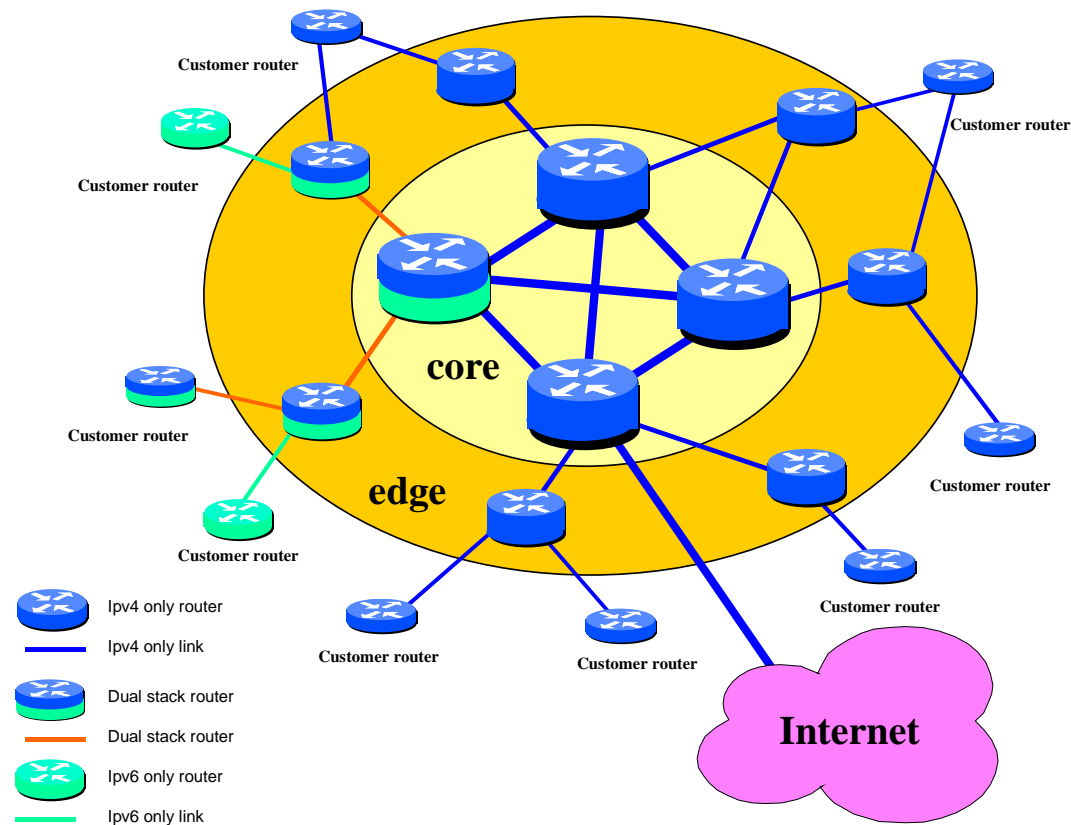
# Do nothing / Let users use external Tunnel Broker



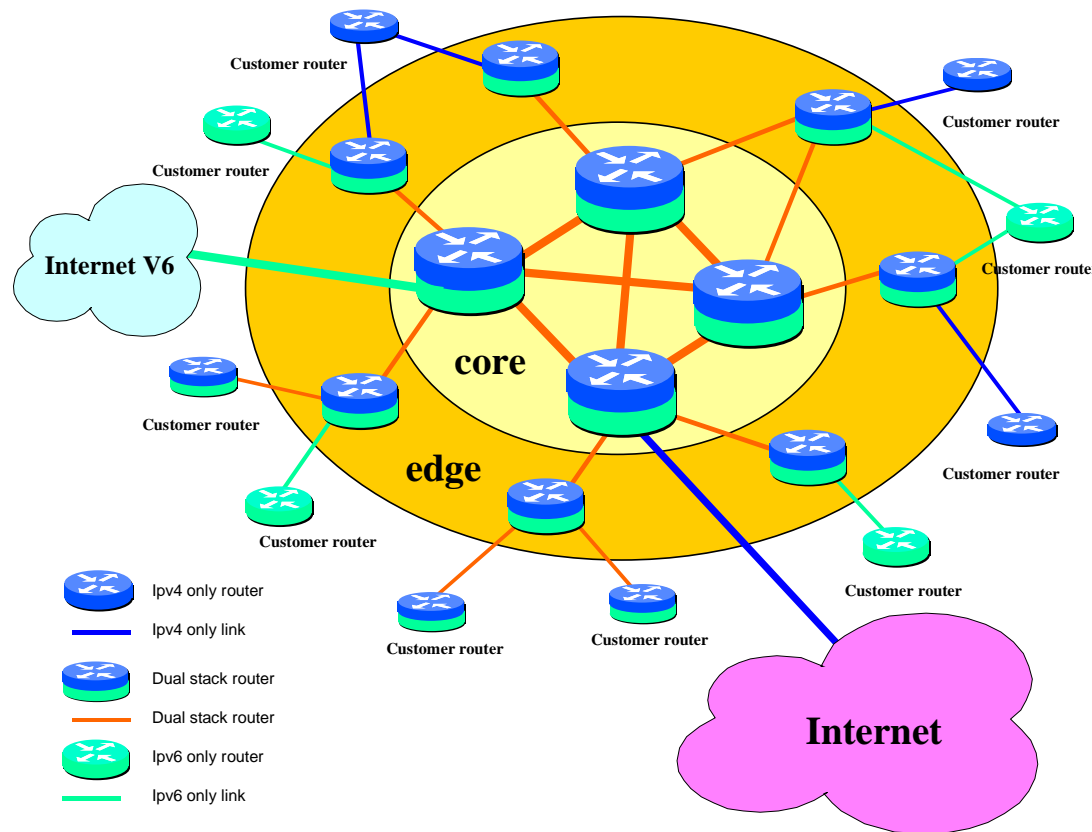
# Offer Tunnel Broker and Tunnel Server



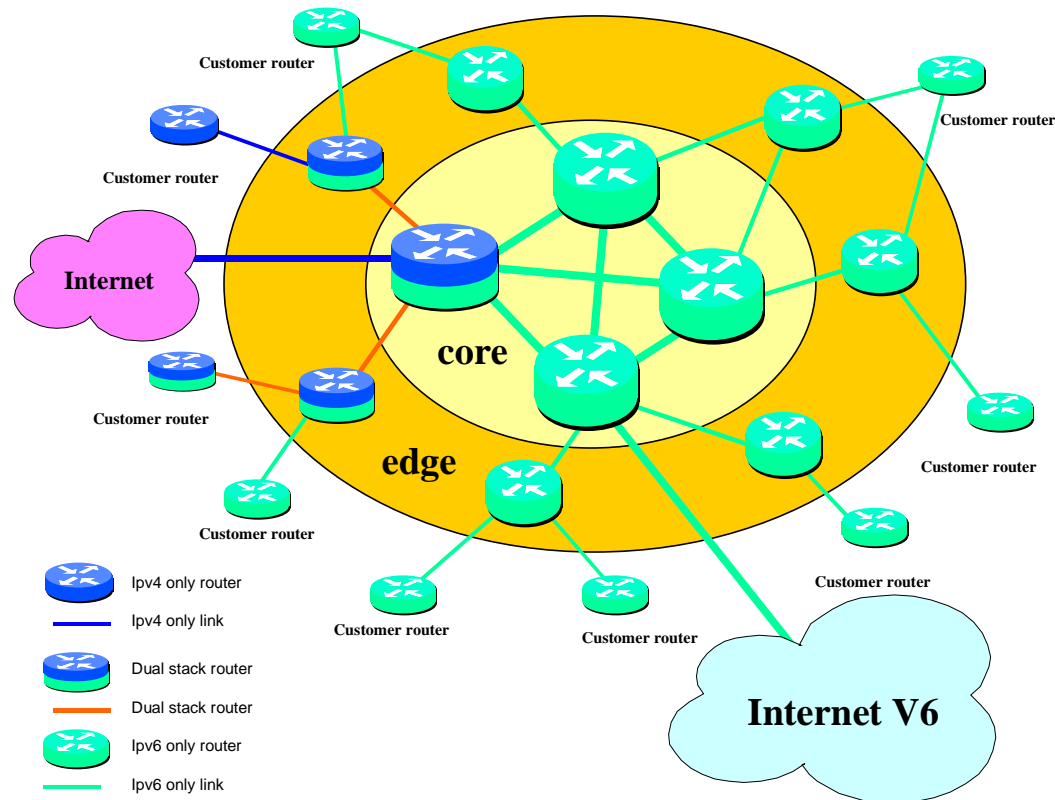
# Offer Dual Stack Network (early stage)



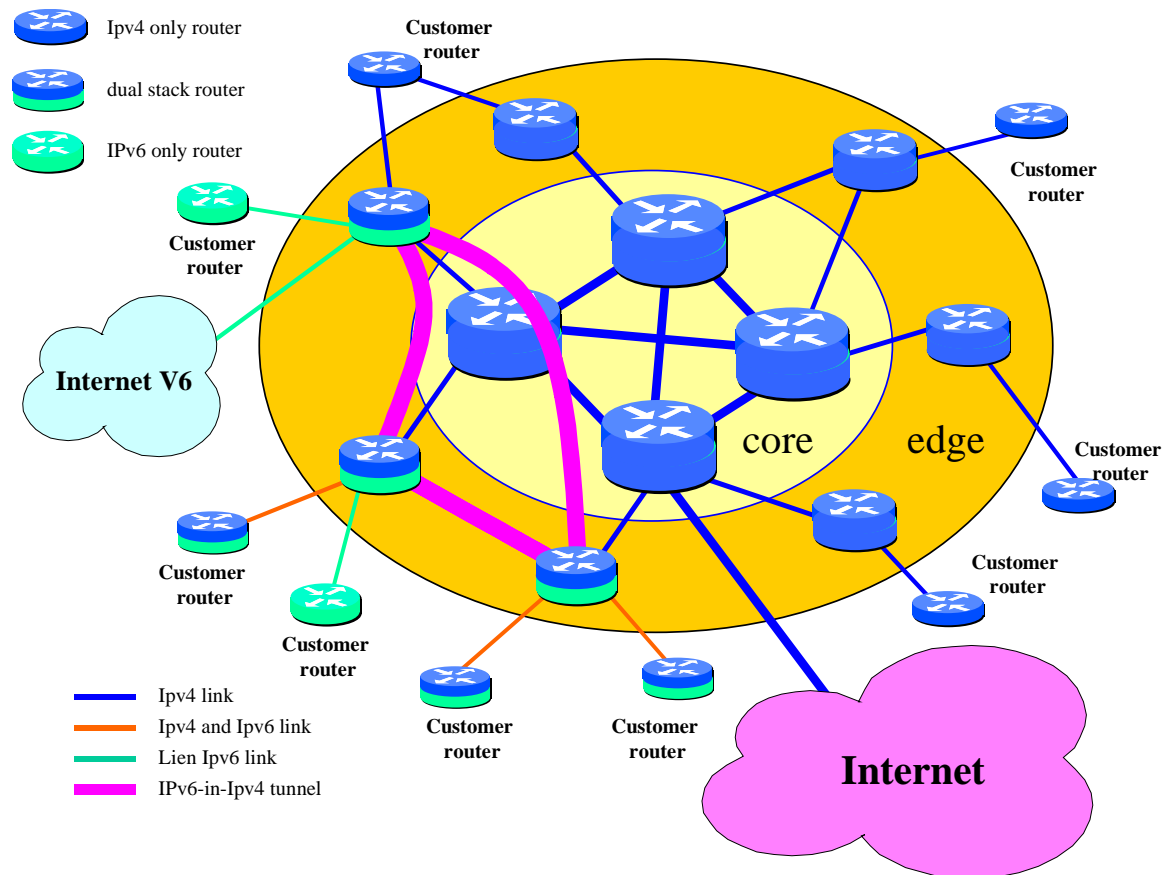
# Offer Dual Stack network (intermediate stage)



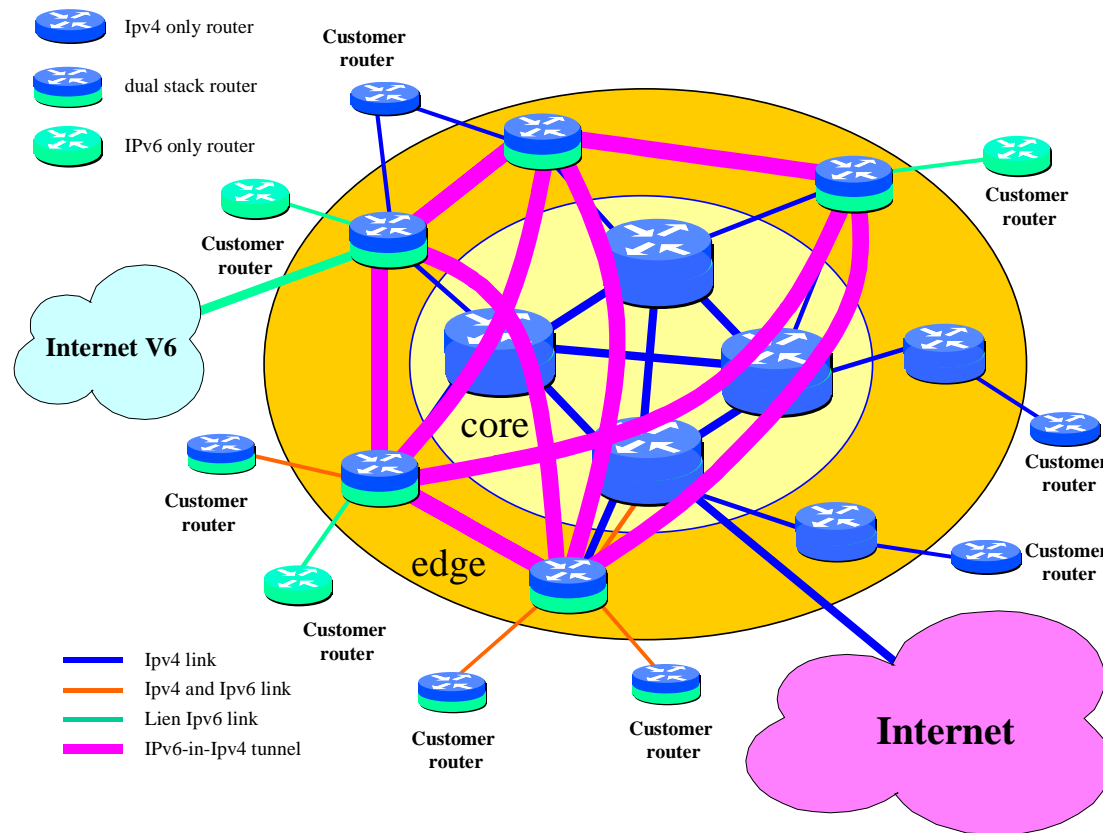
# Offer Dual Stack Network (late/final stage)



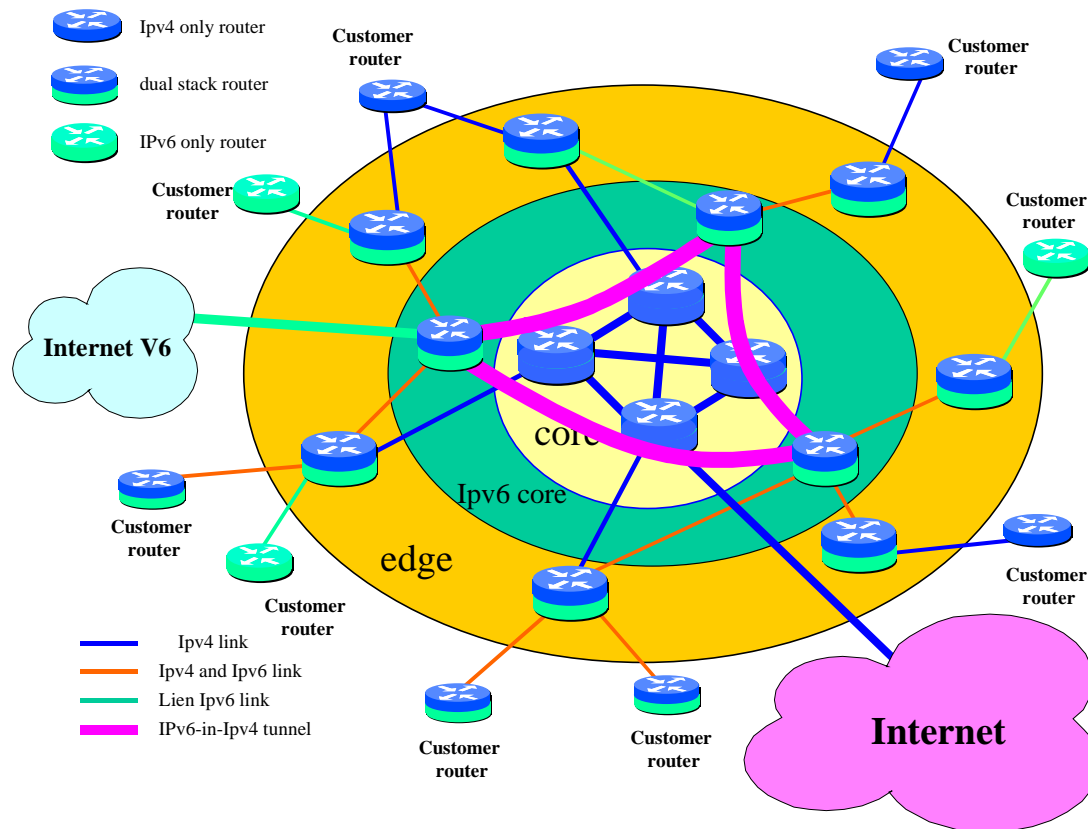
# Alternative path: Offer edge only IPv6 networks (first)



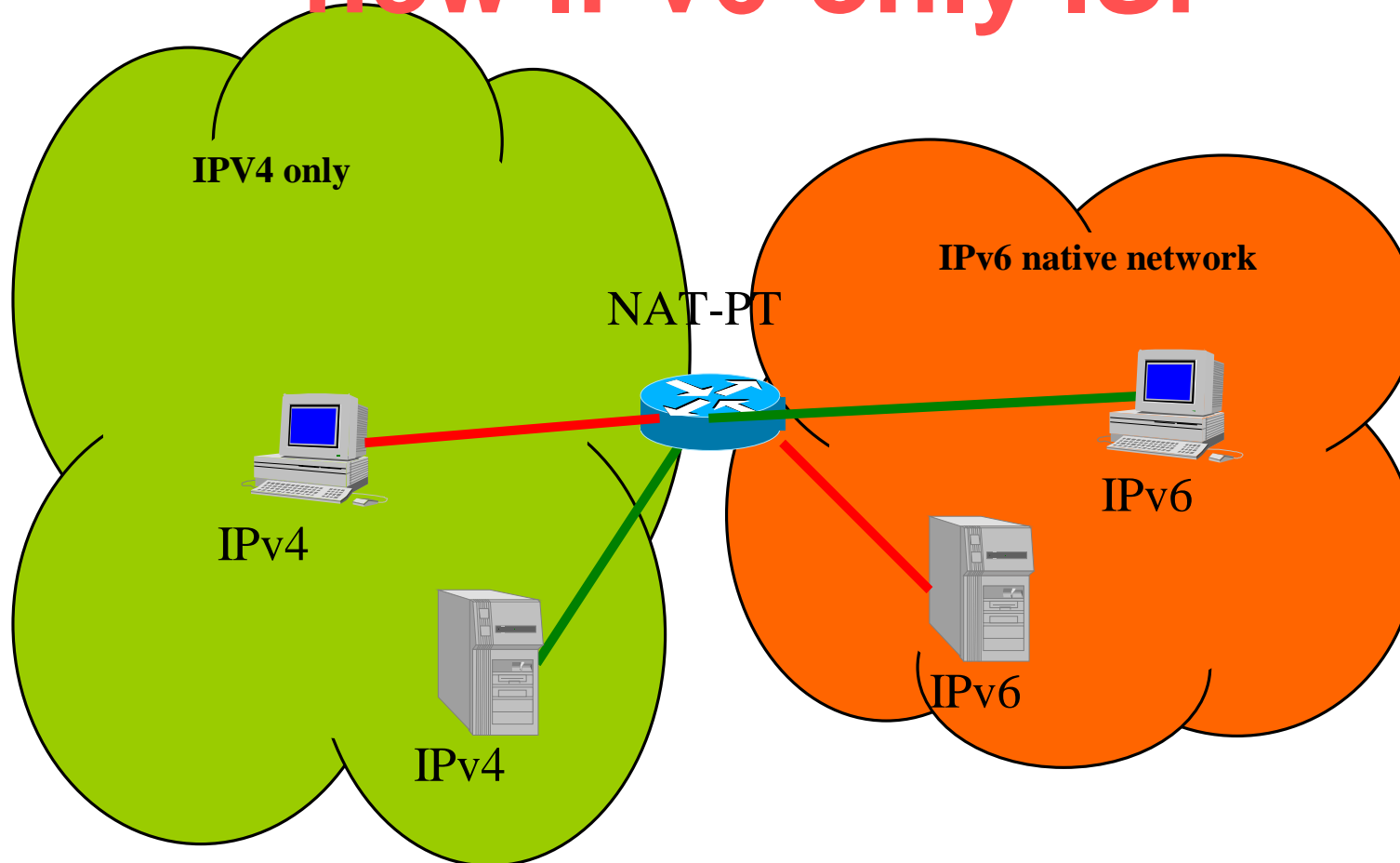
# Alternative path: Offer edge only IPv6 network (intermed.)



# Alternative path: Offer edge only IPv6 network (late/fin.)

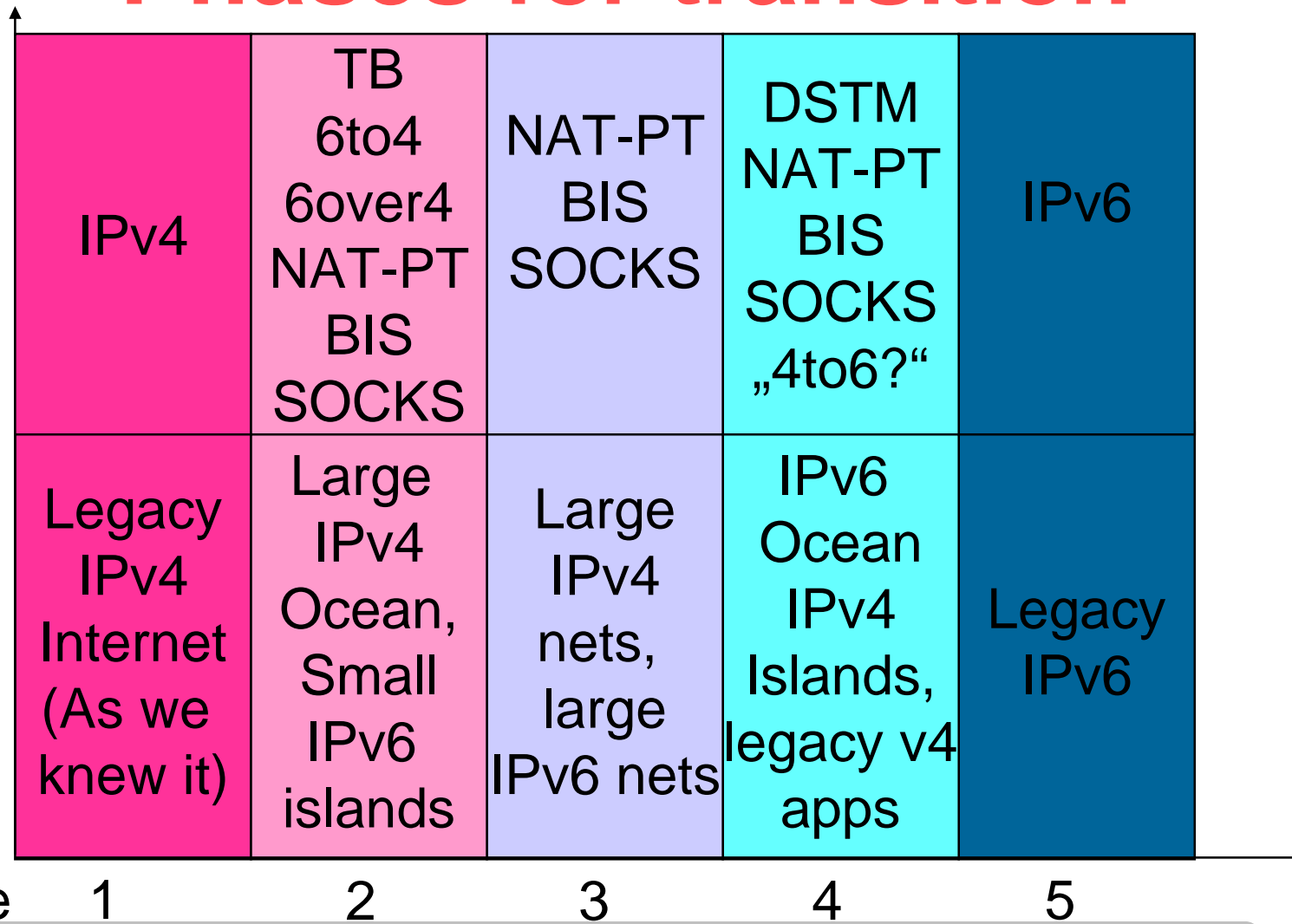


# Things one could do as a new IPv6-only ISP



# Which transition mechanism to use?

## Phases for transition



# Prelim. Interoperability table (work in progress)

Src \ Dest	6to4	Tunnel Br	DSTM	SOCKS	NAT-PT	BIS	6over4
-----							
6to4	x	Yes	No	No	No	Yes	No
Tunnel Br	Yes	x	No	No	No	No	Yes?
DSTM	No	No	x	Yes	Yes	No	No
SOCKS	No	No	Yes	x	Yes	No	No
NAT-PT	No	No	Yes	Yes	x	Yes	No
BIS	Yes	No	No	No	Yes	x	No
6over4	No	No?	No	No	No	No	x

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Yes="Yes, it works"

No="No, it doesn't work/there might be problems"

# Forthcoming project results

## “Inter-provider Routing and Peering in IPv6”

- Which are the viable IPv6 inter-provider core architectures?
- Which are the Inter-provider router issues (BGP, peering, etc)?
- How can ISPs take advantage of special services on top of IPv6 features in inter-provider environments (e.g. Mobility, Anycast, QoS)?

## “IPv6 in Always On and Mobile Scenarios (e.g. UMTS)”

- How can IPv6 aid new service deployment, e.g. "Always On"?
- How can IPv6 be deployed in an UMTS network?

## For more information ...

- <http://www.eurescom.de/public/projects/P1000-series/p1009/P1009.htm>
- IPv6-enabled Web-site in preparation  
<http://www.armstrong.eurescom.de>
- Email [andre.zehl@telekom.de](mailto:andre.zehl@telekom.de)

**Thank you for your attention!**