HYBRID ACCESS DEPLOYMENT @ DT

BANANA BOF
IETF97, SEOUL
VERSION 1.4

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AGENDA

1. Overview
2. Home Gateway
3. Requirements
4. Architecture
5. Summary
Hybrid Access is a commercial product offered in Germany by Deutsche Telekom which bundles an existing DSL access with an LTE based access

- Initially aimed on the residential market but now also offerings for business customers, provides higher bandwidth as well as redundancy for end customers
- New home gateway which integrates DSL and LTE (external antenna possible), customers can either rent or buy it

There is no difference in price if hybrid access is booked on top of a fixed line access product

- e.g. 50 Mbit/s VDSL has the same price as Hybrid M (50Mbit/s DSL + 50 Mbit/s Mobile Network) (exception is the LTE speed option on top of the (16+16) Mbit/s access)

Currently up to 200 Mbit/s, (DSL vectoring + LTE), plans to offer up to 550 Mbit/s in the future

- note: high benefit for customers with low fixed line bandwidth

Customer base end of 2015\(^{(1)}\): roughly 155,000

Development started in 2012, roll out in 2014 in Germany, other NatCos are following

\(^{(1)}\) http://www.geschaeftsbericht.telekom.com
Hybrid Access

Bandwidth

- Higher bandwidth by packet based bonding of DSL and LTE.

Resilience

- Always online since mobile will jump in in case of an DSL outage (Data & VoIP).

Innovation

- Bonding solution combining DSL and mobile for consumer market.

Easy Order

- One contract covers whole solution.

Easy Usage

- No user interaction necessary.
HYBRID ACCESS REQUIREMENTS

Requirements

- Available for all clients in the home network without software changes at the clients
- Support for TCP and UDP (e.g. QUIC, trend to move more towards UDP based protocols)
- Single session should be able to consume full tunnel bandwidth (from fixed and mobile network)
- Support for IPv4 and IPv6 (with the tunnel being an IPv6 only tunnel)
  - mobile and fixed line network are IPv6 enabled, supporting DT’s strategy to move towards IPv6
- Cheapest pipe first (including the ability to move traffic from mobile path back to fixed line if capacity is available)
- Bypass traffic (e.g. multicast, traffic from certain service areas, VoIP, gaming, ...)
  - no bypass at mobile network
- OTT solution (e.g. decoupling of tunneling from underlying fixed/mobile network)
  - ensures interoperability to old “legacy” network architecture
  - no tight integration within existing network architecture (currently, new BNG architecture being rolled out)
HYBRID ACCESS ARCHITECTURE (TUNNEL)

Hybrid Channel

Mobile Network

GRE tunnel via LTE

GRE tunnel via DSL

Fixed Network

migration to BNG architecture (single node)
HYBRID ACCESS
SOME IMPLEMENTATION DETAILS

- Due to the requirements and time line, a GRE based approach was chosen (more details see [1]) in close cooperation with a partner (for Home Gateway and HAAP)
  - protocols extensions are public (IETF Draft)
- GRE based IPv6 only tunnel, per packet mechanism (with „cheapest pipe first“ enabled)
- Only best effort traffic is send over the tunnel
- Traffic control, traffic can be dynamically moved to/from tunnel interfaces without interruption of session
  - e.g. if traffic needs to be moved from wireless/mobile interface to fixed line interface
- Customer can define filter rules to bypass the tunnel
  - also used for DT specific services, e.g. IP Multicast/IPTV (no multicast replication @ HAAP) or VoIP
- Not only bundling of interfaces possible, also other use cases possible
  - e.g. redundancy
Hybrid Access

Bypass Traffic („Filter“)

- Customer is able to switch on/off the LTE modem (aka: enable/disable hybrid access)
- In addition, bypass traffic can be defined using different rules
  - specific devices inside LAN environment
  - based on domain name
  - based on IPv4/IPv6 addresses
  - destination port
  - DiffServ traffic (non BE)
HYBRID ACCESS
MORE INFORMATION

[7] draft-zhang-banana-problem-statement-03.txt, Banana Problem Statement
THANK YOU