

Requirements and Options for Layer-2 Packet Transport in 100G Next Generation Networks

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This talk gives an overview of the requirements and considers some design options for the layer-2 packet transport in 100G next generation networks (NGNs). The underlying activities are closely connected to the 100GET project [1].

Today's voice and data communication networks are converging towards integrated, packet-oriented multi-service NGNs. Although first NGN solutions are already provided to customers in the access network (e.g. integrated phone/DSL access), the architectural design of NGNs in the metro and core environment is still under heavy development.

The voice and data network convergence together with the steady traffic growth, the need for high-quality services, and the providers decreasing revenues per bit require a change of the packet transport infrastructure and the packet transport network technologies (pTNT) applied in it. Hence, for a 100G NGN, these evolving infrastructure and pTNT must become cost-efficient, QoS-guaranteeing, scalable, and reliable to satisfy the needs of all concerned parties, i.e. telecom customers, providers, and equipment manufacturers.

The 100GET project [1] considers among other things, new concepts for the layer-2 packet transport through metro and core NGNs. Regarding the latest developments in the area of packet transport networks, multiple options have emerged to suffice the above mentioned requirements. On the control plane of these networks, the GMPLS protocol family [2] seems to be the defacto standard for signalling across multiple layers. On the data plane, a dominating technology has not yet emerged and three alternative options are currently discussed as promising candidates. The first candidate is a combined IP/MPLS approach where IP is considered as service convergence platform at the network edge and MPLS [3] is used for traffic engineering in the network core. A second option comes along with PBT (provider backbone transport, aka. PBB-TE) [4] where Ethernet, originally an access or local area network technology, is pushed to conquer the network core. The third candidate is T-MPLS (transport MPLS) [5] which is a simplification of MPLS with focus on packet transport functions. Together with the pseudowire [6] approach, actually a virtual connection concept for the network access implemented e.g. with simplified MPLS methods, T-MPLS represents another complete framework for the envisaged end-to-end layer-2 packet transport.

In the light of recent developments in standardization, implementation, and field trial application, the above options for implementing the future layer-2 data plane are presented and questions are posed whose answers may give hint to the outcome of the competition.

References

- [1] BMBF press release on the 100GET project; http://www.bmbf.de/media/press/pm_20071211-250.pdf
- [2] IETF working group on common control and measurement plane (ccamp); <http://www.ietf.org/html.charters/ccamp-charter.html>
- [3] IETF working group on multiprotocol label switching (mpls); <http://www.ietf.org/html.charters/mpls-charter.html>
- [4] Combined ITU-T / IETF ad hoc group on T-MPLS; <http://www.itu.int/ITU-T/studygroups/com15/ahtmpls.html>
- [5] IEEE working group on PBT; <http://www.ieee802.org/1/pages/802.1ay.html>
- [6] IETF working group on pseudowire emulation edge to edge (pwe3); <http://www.ietf.org/html.charters/pwe3-charter.html>