

Dynamic Composition of Functional Network Services

Possible Components for Future Internet Architecture

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Abstract

Current discussions on the next generation internet are talking about a “clean slate design” which can be found in many proposals. This is comprehensible because of countless new IETF standards trying to fix particular problems. One issue is caused by end-to-end protocols especially in heterogeneous technologies as such WLAN. In this paper we present a converging solution for end-to-end protocol behaviour by putting functional protocol elements into routers and activating them on demand.

Introduction

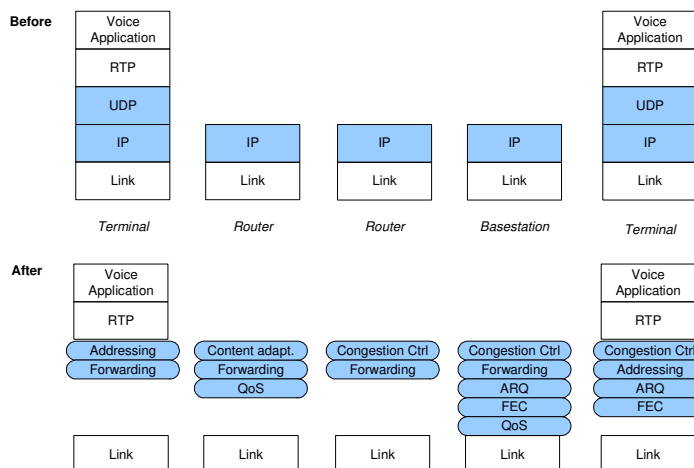
The present state of R&D on Internet services and QoS are embossed with the efforts of fundamental redesign of the existing internet all under the circumstances to get it controllable and manageable [1]. One important role will be further development of new mechanisms and functions for a flexible and dynamic configuration of communication services according to the requirements of heterogeneous networks.

The automation of protocol functions and protocol adaptations to various network environments and network qualities is actually nothing novel [2][3]. Novel would be the use of intelligent components for dynamic and flexible protocol configuration according to the requirements of applications and heterogeneous infrastructure of the future internet.

Approach

First we split current end-to-end protocols into functional protocol elements (FPE), e.g. for TCP we have Flow Control, Automatic Repeat Query (ARQ), and Congestion Control. Second we spread these elements from end-to-end position into the network presuming routers are getting more

powerful as today, though not all router need to support all FPEs. With this set-up we allow deployment on demand depending on various reasons: application requirements, properties of the underlying technology, or changing network conditions. As an example WLAN connection characteristic change over time, so FPE could be added/reduced like forward error correction (FEC) or further enable ARQ from access point to terminal.



Conclusion

With our approach we envision a non disruptive alternative to current transport protocols with the advantage of dynamic protocol configuration. It could easily be enhanced with additional FPEs.

References

- [1] EU ICT project SelfNET, Self-Management of Cognitive Future InterNET, <http://www.ict-selfnet.eu/>
- [2] I. Miloucheva, “XTP-Experimental Implementation at the Technical University of Berlin for an Integrated Services Broadband Environment (BERKOM)”, TRANSFER, Vol. 4, Number 4, July/August 1991
- [3] S. Heimlicher, R. Baumann, M. May, B. Plattner: „The Transport Layer Revisited”, COMSWARE 2007