Concepts for the Future Internet from the Network Perspective

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March 13, 2012

Abstract

For many of its users, the Internet appears to be novel and state of the art. However, its basics are by no means new but are based on almost 40 years old ideas. Services are realised by layered, hierarchical protocol stacks, for which an interaction of non-neighbouring layers is not intended. This ossified structure makes the adaptation of the Internet architecture to the requirements of today's applications – such as file sharing, video telephony and mobile devices – complicated. The big challenges of the Internet of the future – which is denoted as the Future Internet – with application scenarios like Cloud Computing, Internet of Things, sensor networks and many others – even makes significantly more extensive adjustments necessary. Furthermore, a great flexibility is needed in order to adapt to further – and as of today not foreseeable – requirements.

In this habilitation talk, the problems of the current Internet as well as the challenges of the Future Internet will be introduced first. After that, a selection of possible evolutionary and revolutionary approaches for the Future Internet will be presented. Here, the focus is on the still relatively new revolutionary approaches, which are currently very actively discussed in the research community. These approaches are intending a clean slate, which means to build a new Internet architecture from scratch. In particular, the approaches of functional composition, content-centric networking and virtualisation of networks will be introduced. Finally, the talk addresses the question of how to apply the presented approaches in practise and which of these approaches are likely to be deployed in the future.