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Quality of Service Business Models for the Broadband Internet

1. Current Situation and research question

After a period of consolidation, the internet industry is regaining momentum. Numerous new services such as Voice-over-IP, IP-based TV, Video-on-Demand or Online Gaming are ready to start or have already taken off. The numbers are impressive: The social networking platform 'mySpace' counts more than 130 million registered users; the user-based video portal 'YouTube' generates 20 million page visits and more than three million video downloads per month; and the massively multi-player online game 'World of Warcraft' has more than 8 million paying subscribers. In the business-to-business sector, mission-critical business services, such as eHealth or eFinance, are rapidly gaining momentum on a global basis.

Premium services, as described above, require high-quality broadband internet infrastructures, with advanced real-time, interactivity, security and reliability capabilities. These requirements translate into technical constraints for network bandwidth, latency, jitter or packet loss. The current model of achieving network quality in public IP networks, which is based on the 'Overprovisioned Best Effort' approach, will not be sufficient to deliver end-to-end premium services to a large user base in an acceptable quality. Its inability to differentiate service classes can be considered inefficient as it results in uncontrolled overload times and requires a network capacity that by far exceeds an optimal capacity, both from an economical and a managerial perspective.

Public discussion regarding the implementation of more advanced Quality of Service (QoS) models within the internet infrastructure focuses on two extreme positions: in the US, infrastructure providers argue that content providers are using the broadband infrastructure mainly as 'free riders'. The proponents of an 'altruistic' internet, however, claim that the neutrality of the internet ('Net Neutrality') would stand above that argument. They contend that the introduction of an extra chargeback for certain classes of service quality would discriminate small content providers and ultimately prevent innovation.

The central research question behind our research is how business models for a QoS internet infrastructure must be designed and what roles the various actors in the value chain must play. The paper will analyse the currently available QoS models and develop several business models, distinguished by which actor holds the customer relationship and whether a traditional downstream content flow or an up- and downstream flow (Web 2.0) exists.

2. Research Results

The introduction of a new QoS model will be necessary for delivering high-quality premium services across the existing internet infrastructure. In the context of this paper, a QoS model denotes the capability within a network to differentiate between service classes and to guarantee certain quality parameters for each service class. It is important to note that these QoS classes must not replace current non-classified internet traffic, but should be viewed as an additional offer to deliver premium services via the existing internet infrastructure. QoS classes should be defined as a set of quality parameters that are tailored to meet specific service requirements, such as VoIP, multimedia content or mission-critical business applications. Existing QoS models and technologies, such as DiffServ and MPLS, that are already in use in other areas, e.g. 'Virtual Private Networks' (VPN), can be utilized, but need to be supplemented by industry-wide standards for QoS classes. An end-to-end QoS regime on a global basis can only be enabled via the interconnection of several network backbones that are operated by different network service providers (NSP's). Therefore standardization is a prerequisite. Based on the agreed upon standard, contractual agreements for the exchange of QoS-data among the NSP's will have to be made.

The paper will present several business models for QoS that are built on top of the current business model of the internet industry. Based on the internet industry's value chain, the business models will have to address both content and financial streams. Figure 1 shows one of the business models.

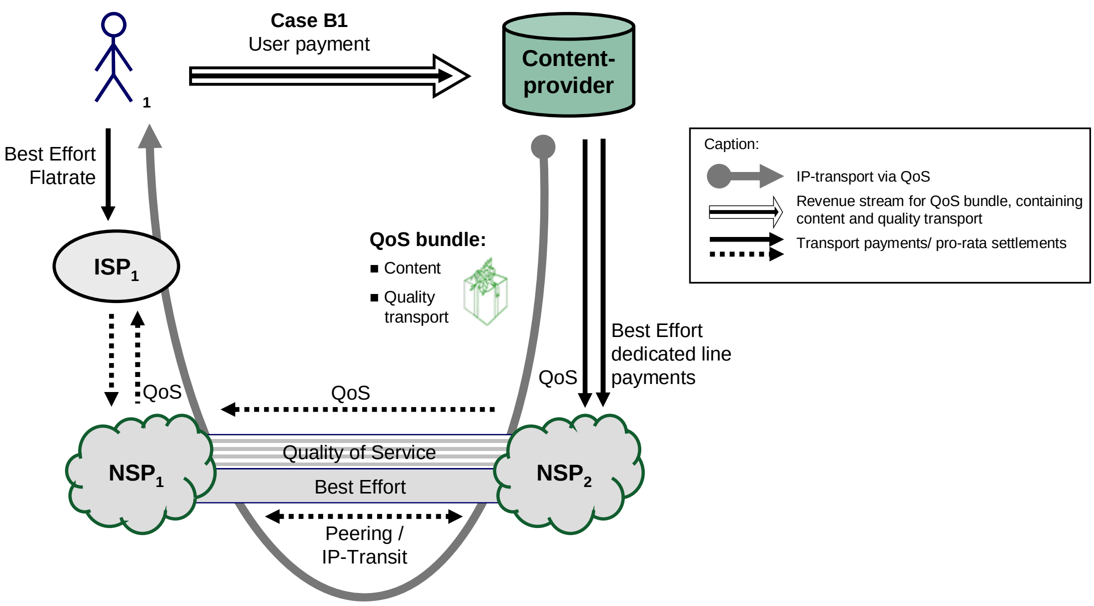

Figure 1: Exemplary Business Model B1

In a QoS business model, the infrastructure providers (carriers) will be in the central position to enable the end-to-end provisioning of high quality premium service classes. A business model for Web 2.0 services will also be presented, in which the conventional downstream content flow will be supplemented by an upstream, ‘user generated’ content flow. The paper discusses the pros and cons of different remuneration alternatives and concludes that especially such business models where the content provider holds the customer relationship or where QoS-based premium content is financed through advertising are likely to succeed in practice. Furthermore, the paper argues that premium content and distribution quality should be delivered as a bundle in order to create convenient, user-friendly service offers. Within the network backbone, the hand-over of QoS packages across network borders requires new billing models. The current peering model for public internet traffic does not seem to be suitable for transporting QoS packages.

The paper will argue that QoS can be regarded as an additional, high-quality offer on top of the existing internet infrastructure that is beneficial for all players in the value chain, if an agreement for standardization and implementation can be reached. In the long run, the success of QoS business models will be determined by the users’ and the advertising industry’s perception of the added value of QoS-enabled premium services and ultimately, their willingness to pay for them. The distribution of the additional earnings for QoS between the players in the Internet value chain will be determined by free market forces.

3. Research Methodology

For the research, an expert group of six European network and internet service providers was put together. The results are based on regular workshops and a number of expert interviews with various members of the group. The research further draws on intensive desk research and interviews with worldwide experts on internet quality of service and net neutrality.

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