TECHNICAL, COMMERCIAL AND REGULATORY CHALLENGES OF QOS: AN INTERNET SERVICE MODEL PERSPECTIVE

XIPENG XIAO, MORGAN KAUFMANN PUBLISHERS, 2008, HARDCOVER, 286 PAGES, ISBN: 978-0-12-373693-2

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XiPeng Xiao, in *Technical, Commercial and Regulatory Challenges of QoS*, manages to present an impressively comprehensive view of the provisioning of quality of service (QoS) in IP networks. After obtaining a Ph.D. degree from Michigan State University, the author became involved with product management for multiple network equipment vendors in Silicon Valley, as well as global network service providers. The author also participates in international standard organizations, including the Internet Engineering Task Force (IETF). However, most important, he is a technologist turned marketing person, currently in charge of product marketing in a world-leading telecom solutions provider. This unique background enables him to describe different aspects, views, and opinions: the big picture of QoS.

The book, as the title suggests, covers the technical, commercial, and regulatory aspects of QoS; the focus, however, is on the last two. The technical side is introduced without excessive descriptions of the existing QoS provisioning methods, which is a good approach, as the detailed technical side of the architectures is easy to find in the available literature. Instead, the author concentrates on presenting the evolution of the proposals, and the differences in the common perception of what QoS is and how it should be delivered. Moreover, more important, the author elaborates on the network parameters that are crucial for providing QoS.

The regulatory side of the book confronts the existing approaches to QoS with possible legal regulations for Internet service providers (ISP). The aspect of network neutrality is presented almost without taking any sides, which contributes to the objectivity of the book. The arguments from all the interested parties are presented and explained. The author's intention was, therefore, to force the reader to formulate her/his own opinion regarding this matter.

From the commercial point of view, the QoS business models are presented, and it is argued that most of the existing ones are doomed to fail. Finally, the author presents his vision of how to introduce QoS in the Internet in such a way that it is technically feasible, lawfully neutral, and commercially effective.

The book is organized into 14 chapters grouped within the scope of three main parts. Part one presents the status quo of the QoS in the Internet, part two formulates the challenges of the QoS architectures development, while part three suggests the new look of the business model.

After a short introduction in Chapter 1, Chapter 2 formulates the notion of QoS and presents how it is understood within this book. Then the factors that determine the quality perception and the end-to-end requirements for various types of Internet applications are identified. Finally, through examples, the optimistic, conservative, and realistic views are presented.

Chapter 3 focuses on the historical evolution of QoS solutions: starting from the PSTN service, through ATM, frame relay and Ethernet, to the IP layer mechanisms (e.g., the integrated services, differentiated services, and overprovisioning concepts). At the end, some transport and application layer solutions as well as ITU/ETSI approaches are also mentioned.

Chapters 4 and 5 concentrate on the current reality of QoS in the Internet. The common problems ISPs face are exposed. Regarding the business model, soft assurances are compared against hard assurances, and it is explained why the former are most likely to occur. Then the common technical solution for QoS provisioning is described. The commercial reality, regarding ISP-user and inter-ISP service level agreements (SLAs) is provided. The most important value of this part is that the deliberations are supported by many chunks of real SLAs.

Chapters 6, 7, and 8 present the challenges: commercial, regulatory, and technical, respectively. The commercial challenges chapter shows the problems associated with attempting to sell QoS. It elaborates on who should get better service, who should pay or be forced to pay for premium services, and, above all, how to attract interest in QoS while current best effort service works satisfactorily. The regulatory challenges chapter shows how the conflict between "hosts" and "parasites" emerged. The network neutrality issue is described in detail, including statements from the proponents, opponents, and general public, and the industry point of view. This chapter is highly valuable due to the comprehensive description of the

problem, ranging from people's wishful thinking to lawful enforcement attempts. The debate is based on, but not limited to, motions in the United States, and it is argued that should any enforcements be introduced there, they are likely to propagate to the entire world. The technical challenges chapter presents the integration, complexity, interoperability, accounting and differentiation issues related to the technical aspects of QoS. The author aims to expose the difficulties in providing perceivable differences between best effort and premium services, as this issue is not as trivial as expected. This part of the book ends with Chapter 9, which summarizes the lessons learned through the years of fruitless struggle to introduce QoS to the Internet.

Chapter 10 begins the third part of the book and presents the new business model of QoS provisioning in the Internet. It is clearly explained how the proposed model fits into all previously identified challenges. Additionally, possible concerns are addressed. Then the evidence of validity of the proposed model is shown, based on the postal and telephone services history. Finally, an assessment of how the proposed solution is good for the industry is presented.

Chapter 11 shows the proposed model from the technical perspective. The issues related to network planning, network auditing, traffic control, traffic optimization, and performance measurements are described. Moreover, the differences from the traditional QoS approaches and the benefits of the proposed solution are shown.

Chapters 12 and 13 are not written by the author. Instead, field specialists were asked to contribute to the topic by presenting their insights and sharing their experience. Although certain specific opinions differ from those presented in other parts of the book, the author explicitly considers it a good thing. Indeed, different opinions can give the readers a diversified view of QoS and help them form their own opinions. Chapter 12 consists of two case studies, in which the readers find the insights of two separate QoS deployment attempts in real networks. By studying the experiences of directly involved specialists, one can verify the appropriateness of the business model proposed in the book. In order to fully cover the issues of QoS in the Internet, Chapter 13 deals with wireless networks. First, it is shown how wireless networks differ from traditional networks. Then the QoS possibilities in

Wi-Fi and WiMAX technologies are presented, compared, and summarized.

After the conclusion in Chapter 14, the reader may find two interesting appendices: the sample peering contract between two ISPs and extracts from U.S. Senate Bill S215, the Internet Freedom Preservation Act, which contributes to the network neutrality dispute in the United States.

To summarize, this book presents a complete, insightful view of QoS in the Internet. The sole definition of QoS is presented in the beginning, and it is shown how the understanding of QoS differs in the current literature. Then the notion of QoS is examined from various perspectives: technical, commercial, and regulatory. The regulatory and commercial parts are especially unique, as it is very rare that you can find such an analysis in the available literature, not to mention all of them together.

The book is logically structured and designed to be read from cover to cover. It contains summaries after each chapter and even whole sections that summarize previous parts. XiPeng Xiao's language is easily understandable, and his argumentation lines are logical and coherent. All this makes it a good book for academic researchers and industrial parties wanting to develop QoS architecture or effectively sell it, respectively. Therefore, I am glad to join the already impressive list of endorsements and recommend *Technical, Commercial and Regulatory Challenges of QoS: An Internet Service Model Perspective* as a unique position among the existing QoS literature.

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