

## Chapter 75

# A Social Relational Network– Based Architecture for Maintaining the Media Integrity and Optimizing the Quality of Experience: A Technical and Business Perspective

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### ABSTRACT

*This chapter proposes a Content-aware and Network-aware Management System (CNMS) over a converged user-environment of social networking and mobile multimedia. The proposed CNMS will focus on applying dynamic personalized multi-layer adaptation for the optimization of the Quality of Experience (QoE) level in a requested media service according to the users' preferences, favourites provided in their social network profile, and prior experiences rated by users themselves. By user's preference extraction, a service/content classification will be performed according to an estimation of the user's favourites, which will be used to provide optimized media delivery across the delivery chain. Therefore, the end-user will always receive her/his favourite service, like Internet Protocol Television (IPTV), Voice over Internet Protocol (VoIP), interactive application/on-line gaming, web browsing, at requested QoE. The system will ensure optimal allocation of network resources and optimal selection of streaming scheme according to different services/content types and user preferences, and therefore enhance the ratio of*

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*price-for-value for the specific subscription and achieve an end-to-end, holistic QoE optimisation. Although QoE is perceived as subjective, it is the only measure that counts for customers of a service. Being able to estimate the user preferences in a controlled manner through the end-user's social networks profiles, helps operators understand what may be wrong with their services and their respective QoE. The proposed multimodal management system is user-centric and applies advanced machine learning techniques in order to extract user preferences from the social network profile of the user and build up a ranking scale of the services/contents. This ranking scale will be translated to adaptation actions per service type at several instances such as before the provision of the service takes place (i.e. Time Zero), during the delivering of the service (i.e. Time T), across all the network layers and delivery-chain nodes, while ensuring throughout the process that the main focus on the QoS-adaptation of the mobile access network is maintained.*

## **INTRODUCTION**

One of the visions of mobile communication networks is that necessary capabilities will be developed to support the creation, sharing, locating and delivery of new-media content in a consumer mass market based on the provision of content adapted to the user preferences. There are numerous approaches to this marketing model, but the most important is the Quality of Experience (QoE) concept, because it provides a direct link to user-satisfaction. Today, a typical mobile end-user subscribes to a service in order to have access to, and be able to receive in real-time, media content relevant to his/her preferences. However, the subscription cost usually corresponds to a bouquet of services (e.g., various channels and contents provided through mobile IPTV) without any discrimination or specialization of the available content to the user preferences.

In fact most business models are based on charging once for a bit-pipe content-unaware connection and then for every single content or suite of them. Therefore, a subscriber today pays the same price for content that may not be her/his favourite one, as for content that ranks high in her/his ranking scale. On the other hand, the service/network provider is not aware of this service unfavouriteness from the user side, and therefore treats any requested media in a similar way both from the engineering and charging aspect, without

taking under consideration the user's preference of the requested content.

Thus, current mobile operator's infrastructure does not consider any QoE-aware management mechanism within its service provision and control system. On the contrary, existing management mechanisms (e.g. traffic prioritization and classification etc.) are only network-oriented and perform management without considering user preferences/favouriteness of the requested content. Moreover, from the psychological aspect, an end-user is usually satisfied with a subscribed service when she/he receives the content that she/he likes at good perceptual quality (e.g., her/his favourite TV show), which is also the main reason that she/he has finally subscribed to the specific service.

Consequently, this favouriteness effect is not limited to content but also applies to services themselves. For example, many users would pay for a mobile flat data rate only because they want VoIP services and will make an occasional use of the rest of available services. So, for the remaining contents that may be provided by a service bouquet, and to which the end-user may have access through the specific subscription program, the user will not be dissatisfied even if she/he occasionally does not receive them flawless or even in excellent quality. For example, consider an end-user who is a soccer fan and subscribes to a mobile IPTV service through its mobile operator for watching football games of his/her favourite team when she/

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