Chapter 21
Recent Advances and Perspectives on Content Delivery Networks

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ABSTRACT

This chapter provides an overview on the recent advances and perspectives on Content Delivery Networks. The first section, the introduction, sets the context. The second section identifies the different types of current CDNs and also insights on their evolution. The third section deals with CDN interconnection, reporting work status such as IETF and ETSI. The fourth section, on CDN and virtualization, describes the related initiatives in this area, in standardization bodies as well as in experimental deployments and evaluations. The fifth section focuses on the convergence of CDNs and clouds, presenting new business opportunities for the market players, as well as technical challenges. The sixth section addresses another trend, which is the extension of CDNs to home networking and terminal devices. The last section discusses content delivery for mobile, introducing solutions that operators can to optimize their networks and avoid being overwhelmed by ever growing traffic.

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INTRODUCTION

A Content Delivery Network (CDN) is a set of servers specifically designed and deployed over one or several networks for optimizing the storage and delivery of content (e.g., web objects, audiovisual live or on-demand content, large files, etc.). From a high-level and functional perspective the main components of a CDN include request routing server(s) that handle and redirect content requests towards cache node servers, cache node servers that deliver the requested content, content ingestion server(s) that ingest content in the CDN, analytics and accounting server(s), and management server(s), as shown on Figure 1.

Today a large part of the Internet traffic is distributed via CDNs. As an illustration, the CDN market leader Akamai estimates that its infrastructure handles 20 percent of the world's total Web traffic (Akamai, 2014). The outstanding development of the CDNs since the late 90s has been driven by their intrinsic strengths: improved service latency thereby leading to a better quality of experience for end users, and better network resource utilization leading to a reduction of congestion risks and costs.

From a business perspective there is an increasing trend for "commoditization" in the CDN industry, with strong market competition and price decline. In this challenging context CDNs must evolve to meet the requirements of the supported applications. Among them, it is worth focusing on new promising areas such as CDN interconnection, network virtualization, convergence of CDNs and clouds, CDN extension in the home network, and content delivery for mobile users.

This chapter aims to provide an overview on these recent advances and perspectives on CDNs.

Given its strategic importance, the CDN market has attracted many new entrants these last years. Section 2 identifies the different types of current CDNs which have been deployed to address dif-

Figure 1. CDN Functional Model