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Construction of Tencent's Video Cloud and Its Implications for IOT&WSN

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Abstract

Tencent's video cloud serves tens of millions of users across China every day, distributing pegabytes of video contents. This paper overviews the system architecture, basic building components, and several unresolved problems of Tencent's video cloud. Its construction experiences reveal heuristic and helpful implications for IOT and WSN system research.

***Keywords**: Tencent, video content distribution, cloud computing, IOT (Internet of things), WSN (wireless sensor network).*

1. Introduction

Tencent's video cloud serves tens of millions of users across China every day, distributing pegabytes of video contents. In fact, it consists of two separate video cloud systems: (1) the *traditional video cloud* system (http://v.qq.com) and (2) the *"smart" video cloud* system (http://xf.qq.com) as depicted in Fig. 1. The former employs around 10,000 servers delivering videos to nearly 15 million users per day in the traditional C/S (client to server) manner. The latter utilizes around 1,000 servers distributing videos to about 5 million users per day in a "smart" manner, *i.e.*, via the so-called *Open-P2SP download* [1][2], *cloud download* [3], or *cloud transcode* [4] methods.

This paper overviews the system architecture, basic building components, and several unresolved problems of Tencent's video cloud, in particular the novel "smart" video cloud system. Specifically, we introduce the following techniques:

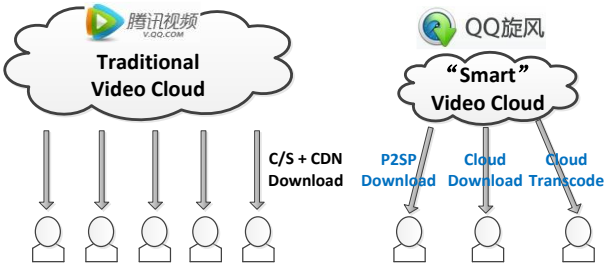

Fig. 1 Tencent's video cloud consists of two separate systems: 1) the *traditional video cloud* system and 2) the *"smart" video cloud* system.

- *Cloud tracking* which dynamically tracks and integrates various third-party servers, contents and data transfer protocols all over the Internet into a large, open and federated P2SP platform, so as to accelerate the content distribution from servers to clients and among peer swarms.
- *Cloud (bandwidth) scheduling* which efficiently schedules cloud bandwidth into users in order to maximize the "bandwidth multiplier effect" with a fine-grained model and fast-convergent iterative algorithm.
- *Cloud downloading* which achieves high-quality content distribution (especially for unpopular videos) by using cloud utilities to guarantee the data health and enhance the data transfer rate.
- *Cloud transcoding* which bridges the format and resolution gap between Internet videos and mobile devices by utilizing an intermediate cloud platform.

The construction experiences of Tencent's video cloud also reveal heuristic and helpful implications for IOT (Internet of things) and WSN (wireless sensor network) system research. For example, there is also