

VTrans: A Distributed Video Transcoding Platform

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Abstract. This demo presents a distributed video transcoding platform named VTrans, which utilizes the technology of distributed video transcoding. It can realize the fast transcoding of videos. The fast video transcoding method used in this platform is a video GOP-level and slice-level combined parallel mode, which can accelerate the process of video transcoding in time and space respectively. By using the system, users' waiting time of transcoding a video is reduced, and the use ratio of system resource is enhanced.

1 Introduction

Along with the development of Internet technology, video has become an indispensable part of people's daily life, as an example, there are roughly 24 hours of new videos uploaded to YouTube every minute, and YouTube hits over a billion daily video views [1]. At the mean time, users have different requirements for video qualities, codecs and formats, etc. Especially, most Internet videos are PC oriented [2], not fit for mobile devices. Since a mass of demands of video transcoding exist, a kind of high performance video transcoding system is desired.

In this presentation, the VTrans transcoding platform can exactly meet the tremendous transcoding demands, it adopts distributed video transcoding technology in the background of the transcoding system, supporting various common video formats, which can realize rapid video transcoding and reduce the user's transcoding waiting time.

2 System Overview

2.1 System Architecture

Fig.1 shows the architecture of the VTrans transcoding platform, the system mainly contains four parts, namely video download module, video transcoding module, video management module and message notification module. The four modules are all data-driven, which communicate with each other through the message queue in the database, as a result, the four modules are fairly loose coupled. The process of that an

Internet video enters the system is as follows, video download → video transcoding → video information extraction → message notification, which is a 4 parts pipeline.

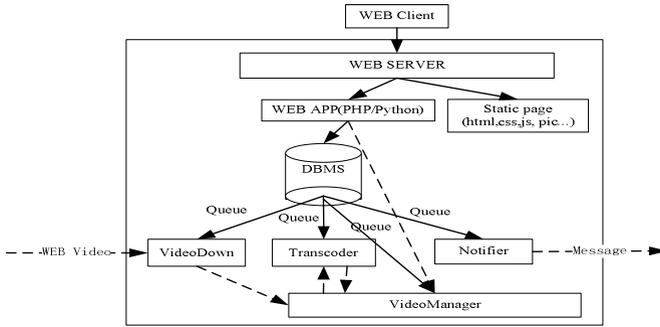


Fig. 1. The architecture of VTrans

2.2 Distributed Transcoding

The architecture of the video transcoding module is distributed. There is a controller and many transcoders, the controller fetches video transcoding tasks from DBMS, then analyses the video and divides the source task into some sub-tasks, after that, the transcoders get the sub-tasks from controller and do the transcoding work, after all the sub-tasks have been completed, a merge task must be done to combine the multiple video clips into a integrated video. The task splitting procedure is not trivial, many factors must be taken into account, such as the video duration, the codecs and resolutions of source videos and target videos, etc. For example, the hierarchical structure of H264 has six levels: sequence, groups of pictures (GOPs), pictures, slices, macroblocks (MBs) and blocks [3][4]. Theoretically, the parallel transcoding can be realized on the above six levels, but not all the codecs supporting the parallel transcoding on the all the six levels and for the sake of simplicity of realization, we adopt only the GOP level parallel transcoding, while, if the target codec is H264, just as Fig.2 shows, the GOP level and slice level parallel transcoding will be used together, and we will have a significant gain in transcoding speed.

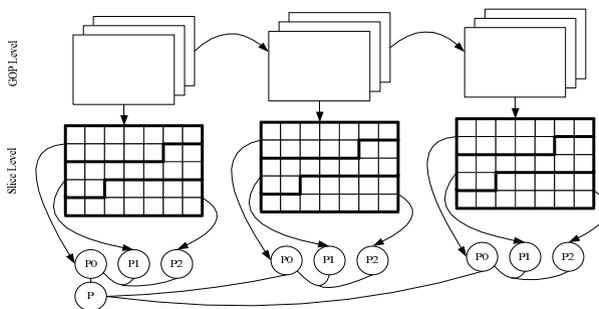


Fig. 2. GOP level and slice level combined parallel mode

3 Demonstration

Fig.3 shows the task management page of VTrans, we can create multiple video transcode tasks one time and have a centralized control of them. For example, we can cancel a running task or restart a stopped task. The statuses of tasks are clearly displayed, it's convenient for us to monitor the transcoding process and estimate the time remained.

Task ID	URL	Input URL	Input length	Output Num	Submitted Time	Status	Progress Bar	Operating
144	http://v.ifeng.com/ml/mainland/201209/2db696fc-12c4-4971-b58d-3406751f614e.shtml		--	1	2012-09-28 15:07:51	Downloading	69	Cancel Restart
143	http://v.ifeng.com/v/abjshl/index.shtml#f8b5f13b-59ce-4041-bebb-4aa8b7677a4a		--	1	2012-09-28 15:07:38	Download fail	0%	Restart
142	http://tv.sohu.com/20120926/n354008974.shtml#297		--	1	2012-09-28 15:07:28	Downloading	12	Cancel Restart
141	http://tv.sohu.com/20120920/n353592970.shtml		--	1	2012-09-28 15:07:18	Downloading	30	Cancel Restart
140	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 14:56:52	Transcoding Success	100	
139	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 14:55:04	Transcoding Success	100	
138	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 14:54:09	Transcoding Success	100	
137	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 14:54:09	Transcoding Success	100	
136	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 14:54:06	Transcoding Success	100	
135	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-28 11:59:18	Transcoding Success	100	
134	http://www.tudou.com/programs/view/X5Y22zlQSI0/?fr=rec2		00:02:05	1	2012-09-27 11:08:48	Transcoding Success	100	
133	http://v.ifeng.com/ml/mainland/201209/2db696fc-12c4-4971-b58d-3406751f614e.shtml		00:00:44	1	2012-09-27 11:07:57	Transcoding Success	100	

Fig. 3. Task management page of VTrans

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