Introducing an IPTV Platform Design

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Abstract. This paper introduces our design of an IPTV platform. This system consists of 9 subsystems: content registration system, distribution management system, metadata hub system, global interface system, user management system, operation log system, distribution log system, deploy system, and authoring system. This system allows any authorized users to upload their content to the system, retrieve content from the system, and use it.

Keywords: IPTV, content registration, metadata, log, distribution management, deploy management, authoring tool.

1   Introduction

This paper describes our design of an IPTV platform. One of the main features of this platform is to allow any authorized users to upload their content to this system and any authorized users to use content from the system. Since Internet is available everywhere and can be accessed by anyone, the main user interface of our system should be a web portal. The web portal supports Internet Explorer, Chrome, Safari and Firefox.

We build up our system by connecting many subsystems so that each of the subsystems can be developed independently. The content management system handles the process of registration and management of content. The distribution management system allows distributors to request for content distribution and system managers to process distributors' requests. This system also manages metadata. Examples of metadata of distribution include the distribution ID, content ID, content provider ID, and distributor ID. The metadata hub system handles the process of registering and managing metadata of content. The global interface system provides API (application programming interface). The user management system authenticate and authorize users. The operation log system records events and analyzes the recorded events. The distribution log system records events that occur during distribution. The deploy system transcodes essence files into the required formats for the distributors. The authoring system allows users to produce essence files by recording and editing video and to register essence files into the content management system.

2   Required Software

We need the following software in order to build up our framework efficiently.
- Internet Information Services (IIS). This is a web server created by Microsoft. A web server can host websites [1].
- Open Flash Player. This is freeware software for viewing multimedia, executing rich Internet applications, and streaming video and audio content [1].
- Kendo UI (user interface) control. This is a library that can be used to separate the UI from the business logic [1].
- Cent OS (Community Enterprise Operating System). This is a Linux distribution [1].
- Spring Framework. This is an application framework and inversion of control container for the Java platform [1].
- Tomcat. This is a web server and servelet container developed by the Apache Software Foundation [1].
- Gson. This is an open source Java library to serialize and deserialize Java objects to JSON [1].
- Apache. This is the most popular web server [1].
- cronolog. This is a simple filter program that reads log file entries from standard input and writes each entry to the output file specified by a filename template and the current date and time. When the expanded filename changes, the current file is closed and a new one opened. cronolog is intended to be used in conjunction with a Web server, such as Apache, to split the access log into daily or monthly logs [2].
- ffmpeg is a complete, cross-platform solution to record, convert and stream audio and video. It includes libavcodec - leading audio/video codec library [3].
- faac (Freeware Advanced Audio Coder). This is a software project which includes the advanced audio coding encoder and decoder [1].
- x264. This is a free software library for encoding video streams into the H.264/MPEG-4 AVC (advanced video coding) format [1].
- node.js. This is a software platform for scalable server-side and networking applications. Noe.js applications are written in JavaScript, and can be run within the Node.js runtime on Windows, Mac OS X and Linux with no changes [1].
- cURL. This is a computer software project providing a library and command-line tool for transforming data using various protocols [1].
- tinyxml. This is a small, simple, operating system independent XML parser for the C++ language [1].
- jsoncpp. This is an implementation of a JSON (JavaScript Object Notation) reader and writer in C++ [1].
- vftpd (Very Secure FTP Daemon). This is an FTP server for Unix-like systems, including Linux [1].
- Wowza media server. This is unified server software developed by Wowza Media Systems. The server is used for streaming of live and on-demand video, audio, and RIAs (rich Internet applications) over public and private IP networks to desktop, laptop, and tablet computers, mobile devices, and other network-connected devices [1].
- .Net Framework. This is a software framework. It includes a large library for user interface, data access, database connectivity, and so on and provides language interoperability across several programming languages [1].

- Declink capture and playback cards. These are used to capture and playback video and audio.

3   Design

Our system consists of many subsystems. Each of them requires computer servers. The hardware structure of the system is shown in Figure 1.
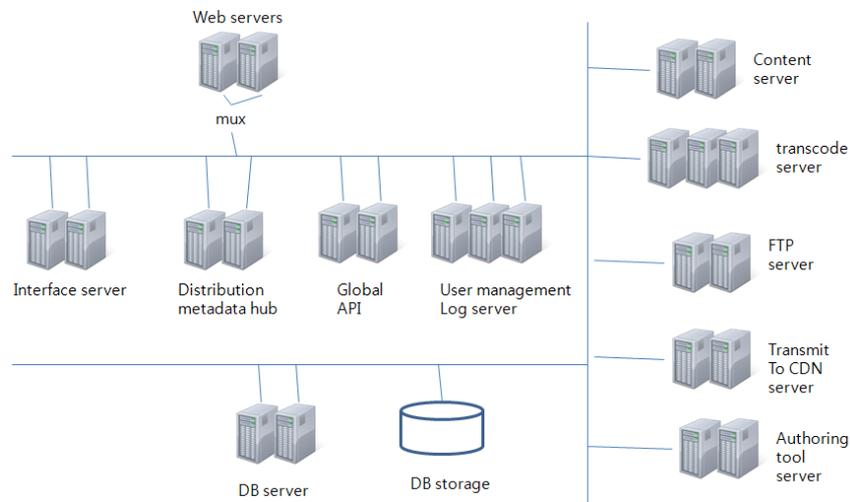
Fig. 1. Description of the hardware structure of our system

1) 2 web application servers for content registration: Windows Server 2008, IIS 7.0, Kendo UI control, content registration web application, open Flash Player, and the content registration Web application will be installed here.

2) 2 interface servers: Windows Server 2008, IIS 7.0 and the content registration web service program will be installed here.

3) 2 servers for distribution metadata hub: Cent OS 6.3, Spring 3.1, Tomcat 7.0, JAVA, distribution meta hub web application program will be installed here.

4) 2 global API servers: Cent OS 6.3, Spring 3.1, Tomcat 7.0, JAVA, global API interface program will be installed here.

5) 3 servers for user management and log: Cent OS 6.3, Spring, Tomcat, MySQL, JAVA, the distribution log system, the operation log system, and the user management system will be installed here.

6) 2 content essence hub servers: These servers allow users to store, retrieve, manage essence files. Cent OS 6.0, Spring 3.2, Gson 1.4, Tomcat, Apache, cronolog will be installed here.

7) 3 transcode servers: ffmpeg, faac, x264-0.128, yasm-1.2.0, nodejs-0.8.19, curl-7.19.7, tinyxml2-1.0.9, jconcpp-0.6.0 rc2 will be installed here.

8) 2 FTP servers: Cent OS, vftpd, and a Wowza Media Server will be installed here.

9) 2 servers for transmitting to CDN: Cent OS, nodejs, curl, tinyxml, jconcpp will be installed here.

10) 2 authoring tool servers: Windows 7, .Net framework, Declink drivers will be installed here.

11) 2 cross media DB servers: Cent OS and Oracle 11g will be installed.

12) 1 storage: A huge capacity storage to store information of content providers, metadata for essence files, metadata for distribution, and essence files.

This system provides the following functions:

1) to register, retrieve, update, and delete distribution companies, content provider companies and other types of companies.

2) to register, retrieve, update, and delete users in distribution companies, in content provider companies and in other types of companies.

3) to authenticate and authorize users.

4) to create, retrieve, update and delete profiles for transcoding video, audio, text and caption files.

5) to register content and essence files.

6) to allow distributors to purchase content

7) to deploy content

8) APIs that perform the functions 1-7.

4   Conclusions

This paper introduced our design of an IPTV platform. This system is open in that any authorized users can upload their content and any authorized application developers can use and circulate content stored in the system. We expect our system will make a great contribution to content industry by boosting circulation of content.

References

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