# Position Paper for The Fourth W3C Web and TV Workshop

Mingmin Wang

Oriental Cable Network

wmm@scn.com.cn

## *Abstract*

This paper introduces multiple screen technology research and services implementation in China, which has the close relationship between Web and TV.

## *Introduction to Architecture*

Multiple screen experience, which actually including a variety of service types and related technologies, can provide the content sharing, coordinated device, and unified communication for customers between multiple devices via different access networks which operated by TV MSO.

The system architecture for multiple screen application platform would be Service Delivery Platform type, and it is called a video cloud system in this paper, which designed at open architecture to convergence all kinds of video services to customers.
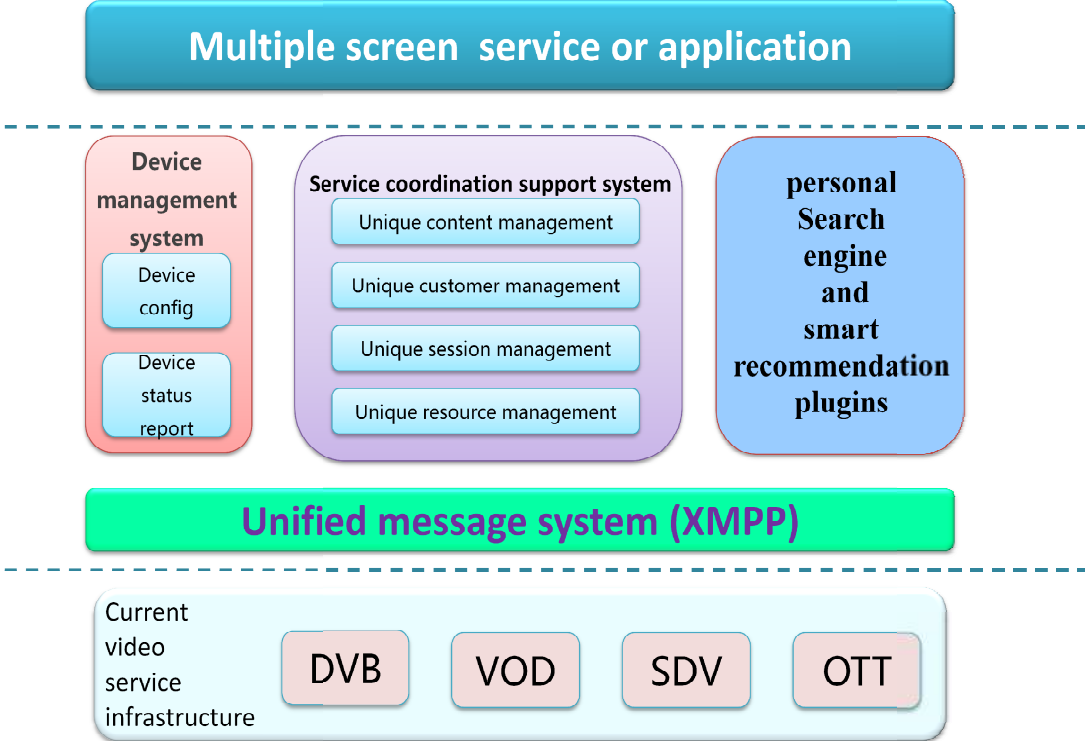


Figure 1 System Architecture of Multiple Screen Application Platform

All the low level components are existing video service infrastructures, and all these content and resource will be converged to transport video to customer via proper network and video quality for best QoS and QoE.

The unified message system will be built over XMPP protocol. XMPP is a common international message protocol and be supported by many devices such as Android phone, iPhone, iPAD and PC. And it can support legacy STB via XMPP gateway to translate XMPP code to proprietary HTML message.

A service-coordination-support system just focuses on a unique content management, unique customer management, unique resource management, and unique session management for the multiple-screen.

The unique content management means when the content comes, it will automatically fit for multiple devices, such as video format, bit-rate, resolution, content metadata.

The unique customer management means that whatever service the customer uses, the system should determine this person for device type, the consumed product, access network, so that whenever he or she opens the screen, the system can provide undifferentiated user interface for best experience.

The unique resource management means that the system can manage the right way to transport video stream to customer for best quality of experience.

The unique session management means the system will gather user session history so that we can push one content to another device or just pull from that device.

The device management system gathers device resource information and running status for all kinds of devices, and issue remote instructions for device diagnosis.

Personal search engine and smart recommendation module are plugins that installed over video cloud system, ao they can be easily deployed and updated. MSO can provide basic service to everyone without these plugins. And these plugins will help customer to view personal portal menu, best-loved content more easily.

## *Typical Cases Description*

There will be three kinds of classifications of multiple screen experience.

The first type is a multiple screen service. Customers can use view same content at different devices.

The second type is a real-time device shifting for same content. Customer can push video content from one screen to another, and also pull it back. The key technology is to detect these two devices and how to issue the exact content format play command.

The third type is social network based coordination of multiple screen interactive service, such as remote control, content share and present, real time video chat.

Figure 2 shows the high-level system sequence for cloud based seamless multiple device watching and social media.
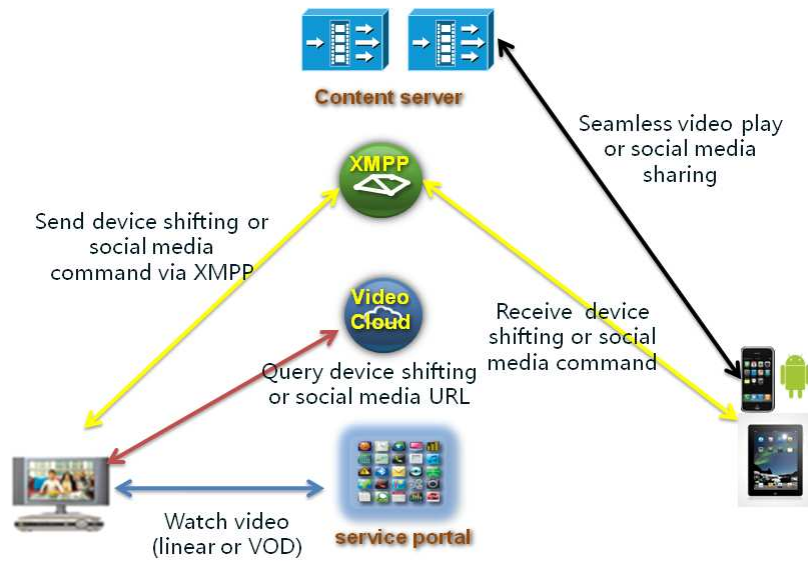
Figure 2: seamless video play and social media between multiple devices

**Device Shifting Application For Multiple Screen**

Device shifting is the most typical application for multiple screen service, it includes push and pull type.

The video push mode is, when customer watch video on one device such as STB, he can send this video to a new device which login by the same username to continue watch this video. The shifting between two devices should be seamless, that means the last picture displayed on source device should be the first picture on target device.
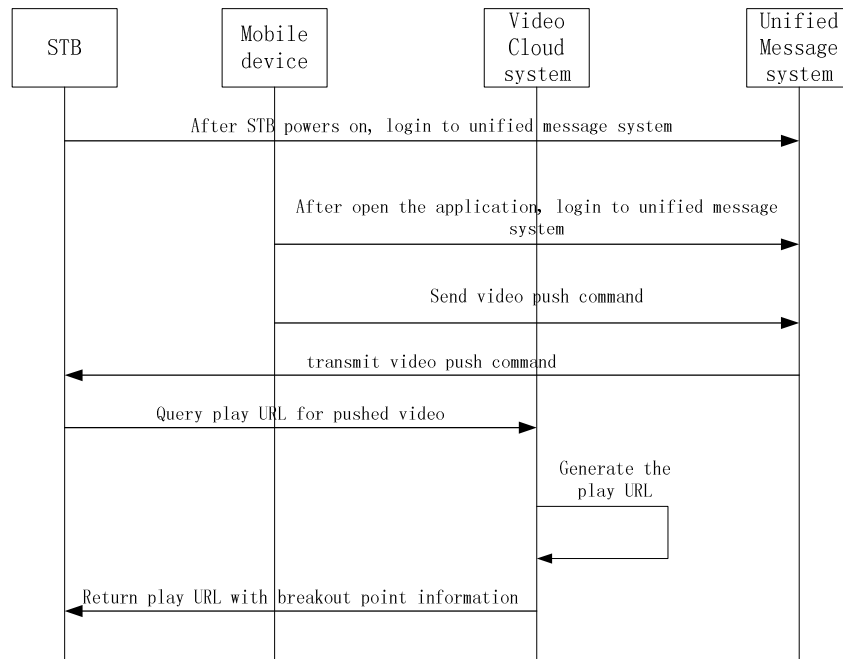


Figure 3 Sequence of Video Push Operation

And the video pull mode is, customer can pull the playing content from remote big screen such as TV to nearest iPAD.
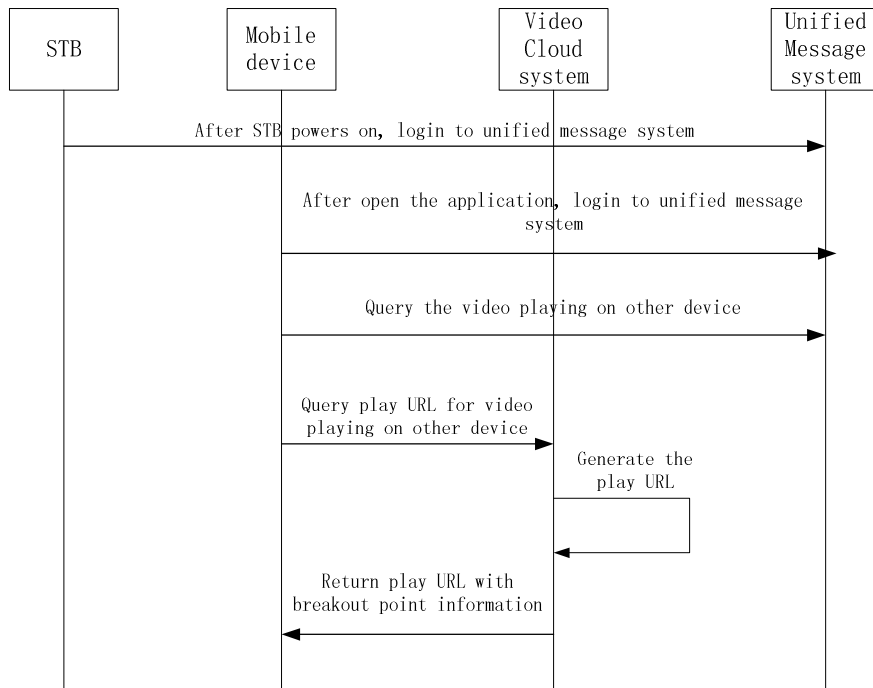
Figure 4 Sequence of Video Pull Operation

## Smart Control To STB device

The traditional remote control for STB is quite simple, and it is not easy to input complex words. So the smart mobile device such as phone or pad can be used as smart remote control to simplify the interactive with viewer and STB.

For better experience, the smart mobile device should query the current status of STB, then provide corresponding remote pattern. For example, the application should show the channel and volume change buttons if user is watching live broadcast program, or the application shows the character input form if user is in a web based application on STB so that it is easy to input word to search or comment one content.

The further use case is the application can integrate voice recognition function so that it can replace the button press or hand input, and user can control STB more easily.

## Social Network Applications

The social network application will run between friends, so in multiple screen experience, the system should maintain the relationship and status among friends.

Content share and present application need the relationship between two users. At this application, one user can share his content to another user, or buy content or service for another user to watch.

Another type of social network application is real-time video communication, it can occur between different size devices, such as STB to iPAD .
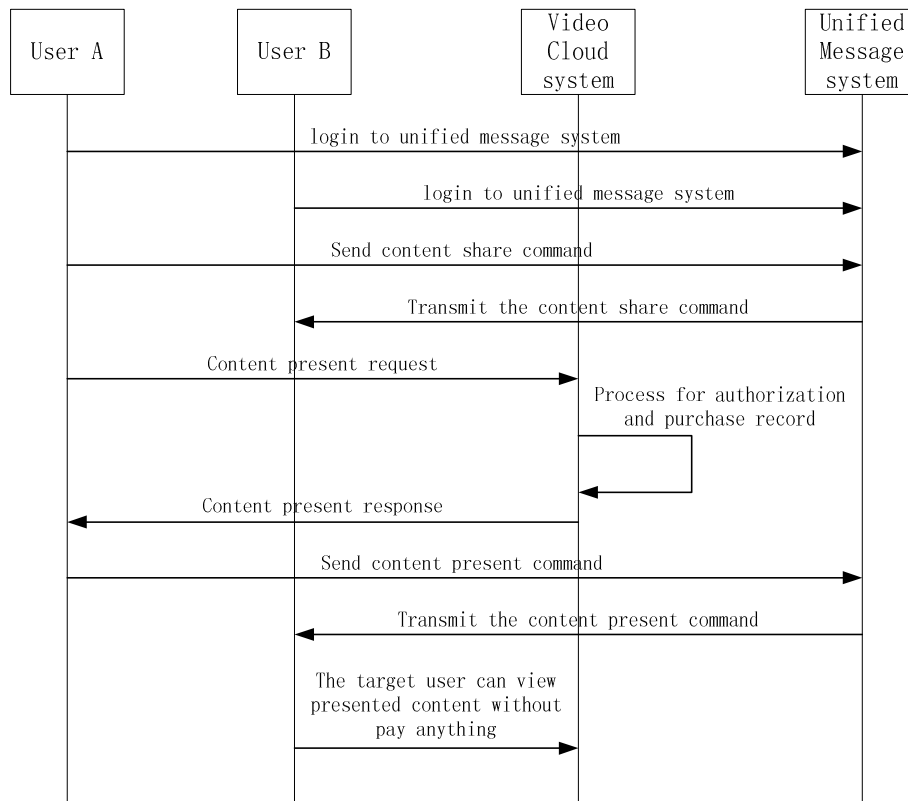
Figure 5 Sequence of Content Share And Present Between Friends

## *Possible standard research suggest*

The multiple screen services can be implemented in various method, such as DLNA protocol at home network, using XMPP message via cloud mode. And what we focus is to normalize the interoperate between smart devices. So our opinion is:

1．To use XMPP protocol to build message infrastructure, so that all interactive commands can be easily translated to any format, that we can connect many operators' user to share the content and information. And OCN has established its enterprise technical specification for XMPP to develop and deploy multiple screen services.

2．To use HTML5 as middleware protocol between various types of devices. Because smart mobile devices have native HTTP streaming video player, and HTTP streaming server is quite easy to develop and maintain, so it is very convenient to push video from HTTP protocol. So we need improve HTML5 specification for better video experience, especially to reduce resource consuming at low cost smart devices – such as STB.

3．Metadata specification for video exchange. Now cable operators just follow CableLabs' ADI metadata standard system, and internet video service providers just use their own metadata format. So we are prefer to set a new specification so that any content and its metadata information can be easily to be adopted by any operator's system.