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# ELEMENTS OF EFFICIENT ITV APPLICATION DELIVERY

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A CIMARRON SYSTEMS  
WHITE PAPER

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## Introduction

The following summary describes the basic concepts, high-level assumptions, and system architecture for an iTV Application delivery system.

## Background

The primary purpose of the branded iTV Application is to welcome the cable television subscriber to the iTV Service Provider domain with a unique viewer experience designed to reinforce its brand as a pioneer in its market space e.g., movies, sports, general entertainment, music, and so forth. The iTV Application helps the subscriber discover which movies, sports events, series programs, or music videos are currently playing (or soon will be) as well as to discover links to other iTV Service-Provider related channels and other content.

Based on subscriber preferences known a priori (via the iTV Service Provider Web site service) or relative to the current viewing context, the iTV Application allows the iTV Service Provider to push content to the subscriber including:

- ◆ Online Content: refers to the iTV Service Provider Web site content that is synchronized to on-air informational, graphical, or other content processed for distribution as program metadata for the iTV Application to use.
- ◆ Regionalized Content: refers to the content classified as national, regional, and local.
- ◆ Cross-network Content: refers to the iTV Service Provider channels, programming, and services that can encourage subscriber retention and reinforce the iTV Service Provider brand.
- ◆ Live Content: refers to the content and data associated with a live television or data cast event.

Additional goals for an iTV Application are:

- ◆ Use the iTV Service Provider channels as incubators for new iTV applications. For example, on-screen applications for purchasing DVDs, CDs, event tickets, and books.
- ◆ Build links to other services such as information alerts via mobile telephone or downloads of songs, ring-tones, or short television or movie clips.
- ◆ Provide extended usage data or viewing patterns not otherwise accessible via Nielson ratings.

## Assumptions

The following high-level assumptions apply to the development and operation of the iTV Application delivery system:

- ◆ The iTV Application is an OCAP (or DVB GEM) Bound Application that will be signaled on several or many of the iTV Service channels.

- ◆ The iTV Application Platform architecture must encompass scenarios where multiple iTV Service Provider channels are in the same transport stream, as well as situations where the channels are broadcast in multiple transport streams.
- ◆ Typically, iTV Service Provider program and video lineups are published 24 hours in advance but may change dynamically throughout a day, on several minutes notice or with no notice at all in the case where the control room operator adds, drops, or substitutes a program.
- ◆ The iTV Application must handle live events. Although programs will typically be scheduled in advance, metadata associated with these events may not be available until the show is being broadcast.
- ◆ There is no need for “frame accurate” synchronization of interactive content to the video signal at this time. There is, however, a need for video-specific metadata to be available within less than five seconds of the start of a video.
- ◆ The iTV Application performance must be robust under conditions where iTV Service Provider program schedule and context-sensitive metadata is missing and/or uncorrelated to the current on-air program.

## iTV Application Delivery System Design

This sub-section provides a description of the iTV Application Platform system architecture, including the iTV Application-specific components but also standard cable network components.

### iTV Application Delivery System Components

The end-to-end iTV Application Platform architecture, as shown in Figure 1, consists of the following new components added to a standard cable network:

- ◆ **iTV APPLICATION NOC SERVER**  
The iTV Application NOC Server, which is located at the iTV Service Provider Network Operations Center (NOC), generates the iTV Application Playlists from program schedule data that it receives from the Playlist Reader and outputs the data to, via the iTV Service Provider Corporate Network, to the iTV Application Metadata Server.
- ◆ **iTV APPLICATION METADATA SERVER**  
This high-performance server, which is located at the NOC, generates the iTV Application Metadata Feed from program information and schedule data that it receives from iTV Service Provider Online Data Server and the iTV Application NOC Server respectively.
- ◆ **iTV APPLICATION SERVER**  
The iTV Application Server, which is located at the local cable headend, hosts the iTV Application at the local cable headend, receives and processes the iTV Application Metadata Feed, and outputs localized content to the DSM-CC Object Carousel for distribution to the iTV Application Clients running on the local OCAP-compliant Host Devices.
- ◆ **DSM-CC OBJECT CAROUSEL**  
The Digital Storage Media Command and Control (DSM-CC) Object Carousel, which is located at the local cable headend, spools iTV Application-related objects to the local digital video multiplexer suite. The local digital video multiplexer suite injects the objects into the appropriate MPEG-2 Transport Stream(s).
- ◆ **METADATA DISTRIBUTION VPN**  
The Internet Virtual Private Network (VPN) is used to distribute the iTV Metadata Feed to the population of cable headends that are running the iTV Application.
- ◆ **iTV APPLICATION CLIENT**  
The iTV Application Client is the OCAP-certified (or GEM) bound application running on local Host Devices (set-top boxes) at the subscriber premises.

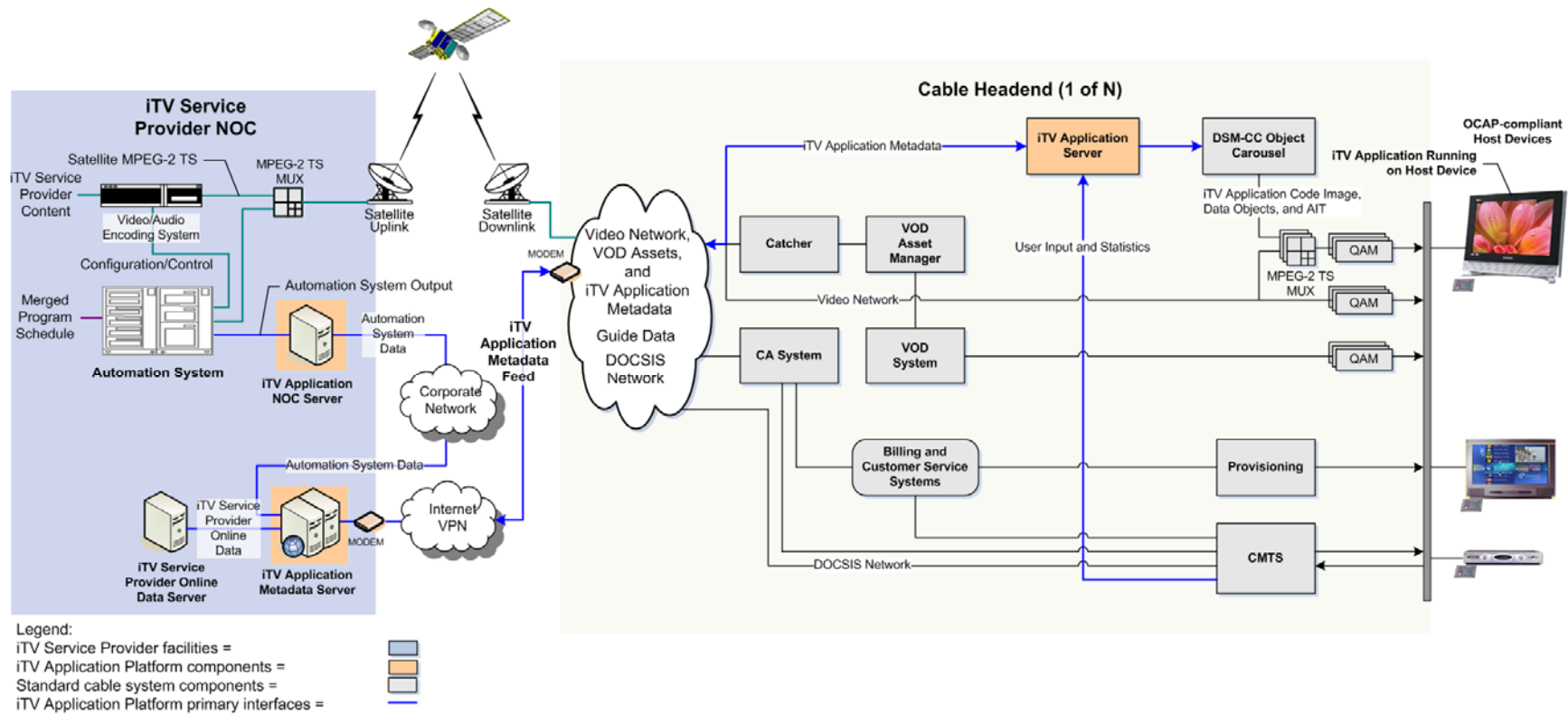


Figure 1. iTV Application Delivery System Architecture.

## System Component Functions

The left side of Figure 1 describes the backend system components that support the iTV Application. Although the specific focus of this figure is the components and functions performed at the iTV Service Provider Operations Center, it will also suffice to also describe components at the cable headend and the subscriber premises as well as end-to-end system function.

**iTV Application NOC Server:** as shown in Figure 1, the iTV Application NOC Server is a server, located at the iTV Service Provider Operations Center, that generates the iTV Application playlists using program schedule data that it receives from the Playlist Reader and outputs the data, via the iTV Service Provider Corporate Network, to the iTV Application Metadata Server.

**iTV Application Metadata Server:** the iTV Application Metadata Server uses the iTV Application Playlists and iTV Service Provider Online Data as inputs to generate the iTV Application Metadata Feed output. The iTV Application Metadata Feed output is then transmitted to the iTV Application Servers at the target cable headends via an Internet-based VPN.

The iTV Application Metadata Server also responds to messages generated by the cable headend iTV Application Servers – including requests for the retransmission of asset files from hundreds or possibly thousands of headends.

**iTV Application Server:** the iTV Application Server, located at the local cable headend, reads the iTV Application Metadata Feed and distributes a localized version of the feed to the DSM-CC Object Carousel where it is transmitted to and subsequently received by the Host Device-resident iTV Application Client.

The iTV Application Server also processes data sent from the iTV Application Client – some input may be processed and serviced locally while other inputs may require that messages or transaction requests be sent to the iTV Application Metadata Server.

**iTV Application Client:** the iTV Application Client runs on the local Host Device at the subscriber premise. The iTV Application Client is an OCAP (or GEM) bound application that provides the iTV Application functionality. Although the client application is largely a consumer of data, it will also generate messages that are sent to the iTV Application Server, the iTV Application Metadata Server, and, for most advanced functions, to the iTV Service Provider Web Site Server (not shown). Using advanced features of the iTV Application will require the subscriber to have an account at the iTV Service Provider Web site.