Unified Architecture for DVB-H Electronic Service Guide

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BACKGROUND

Presently, there are three main ESG systems used in DVB-H (DVB, 2004) systems :

1. CBMS (DVB, 2006), promoted by the digital video broadcasting project (DVB).
2. OAI (NOKIA, 2006), promoted by NOKIA.
3. OMA (OMA, 2006), still in draft version, promoted by the open mobile alliance.

All of them have a lot of similarities and are based on same concepts and technologies. Some of these similarities are:

- The use of XML (W3C, 1998) to describe fragments.
- The use of FLUTE (Paila, Luby, Lehtonen, Roca, & Walsh, 2004) as transport protocol.
- A similar data model.
- All of them can split the broadcast contents in several sessions.

COMMON CONCEPTS

All actual ESG systems work at IP level, hiding other layers such as MPEG2-TS (ISO/IEC, 1994), PIDs. Also, all of them use FLUTE/ALC as transport protocol and allow the splitting of the broadcast in several sessions (each session is broadcasted over a different IP/port and has its own bitrate).

Another similarity at protocol level is the way of referencing media. When media is referenced, it is done by means of a session description protocol (SDP) file (Handley & Jacobson, 1998).

All ESGs systems has a global entry point called bootstrap. The bootstrap is broadcasted in a well-known IP address and port. The bootstrap carries with information about the providers present on the network and where their ESGs are being broadcasted. When a terminal switches on, it must receive the bootstrap and look inside for a valid provider checking the providers list. After that , the terminal reads the multicast address where the ESG is being broadcasted and start retrieving the service guide information.

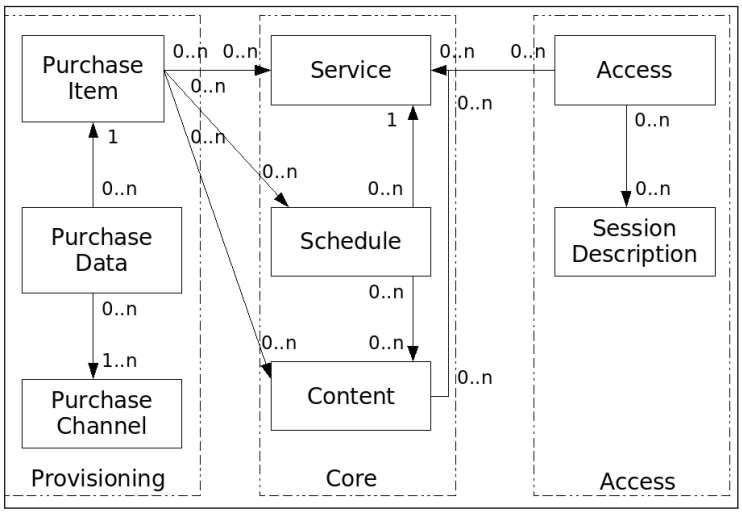
Data models have also a lot of similarities, covering three main domain concepts: provisioning, core, and access. Each concept is represented using different fragment types:

- **Core:** Service, schedule, content
- **Access:** Access and session description
- **Provisioning:** Purchase item, data, and channel

Fragment semantics are[1]:

- **Service:** The Service fragment describes at an aggregate level the content items which comprise a broadcast service. The service may be delivered to the user using multiple means of access.
  As the part of the service guide, the service fragment forms a central hub referenced by access, schedule, content, and purchase Item fragments.
- **Schedule:** The schedule fragment defines the timeframes in which associated content items are available for streaming, downloading, or render-

Figure 1. Represents this model



ing. This fragment may also be associated with a dervice fragment, in which case it defines the timeframe of the dervice availability.

- **Content:** The content fragment gives a detailed description of an specific content item. In addition to defining a type, description, and language of the content, it may provide genre, parental rating. The content fragment is always associated to exactly one service fragment. It may also have a reference to schedule or purchase item fragments.
- **Access:** The access fragment describes how the service may be accessed during the validity time of the access fragment. This fragment links to session description and indicates the delivery method. Several access fragments may be associated to one service offering alternative ways for accessing or interacting with a service. Access includes a textual session description or a URI (Berners-Lee, Fielding, & Masinter, 1998) to a session description that tells the terminal how to access the service. If there are multiple access fragments valid at the same time, the user may be given a chance to select which one to use (e.g., access to the different language variants of the same service).
- **Session description:** The session description is a service guide fragment which provides the session information for access to a service or content item. Usually, the session information is represented using SDP syntax in text format.
- **PurchaseItem:** The PurchaseItem fragment represents a group of one or more services (i.e., a service bundle) or one or more content items. PurchaseItem fragments are ordered to the end user for subscription or purchase of such services or contents.
- **PurchaseData:** The main function of the PurchaseData fragment is to express all the available information about a specific service, service bundle, or content related to purchasing or subscribing. The PurchaseData fragment collects the information about one or several PurchaseChannels and may be associated with a service bundle. It carries information about the pricing of a service, a service bundle, or a content item. Also, this fragment can include information about promotional activities, (e.g., coupons related to a certain service bundle).
- **PurchaseChannel:** The PurchaseChannel fragment carries the information about the entity from which purchase of access or content rights for a certain service, service bundle, or content item may be obtained, as defined in the PurchaseData fragment. Multiple purchase channels may be associated to one purchase data fragment.

This model does not exactly fit with all ESGs, but is a good liaiason to deal with all of them.