Electronic Service Guide within the Nokia IPDC Solution 2.2

Nokia IPDC Solution

The Nokia IPDC Solution implements Mobile TV service for DVB-H enabled handsets. A full end-to-end system for free-to-air TV requires only TV content, commercially available stream encoders and DVB-T transmitter equipment in addition to the Nokia IPDC Solution. For pay TV services the solution also needs to be integrated with the GSM service platform.

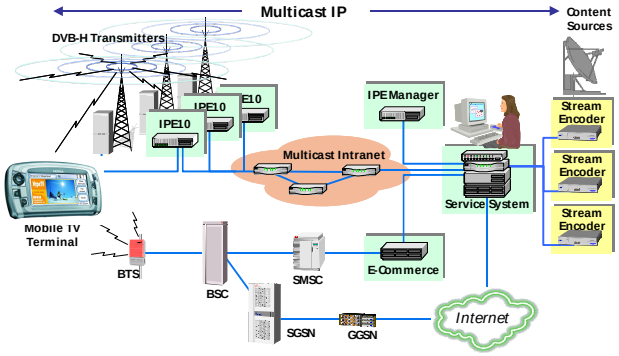

Figure 1: IPDC solution components marked against the end-to-end system

ESG Architecture

The IPDC Service System generates an Electronic Service Guide (ESG) for every network area and transmits every ESG to it's own multicast group address to the IPE transport network. A network area is a group of IP encapsulators used to broadcast the same content. ESG reception in the terminal follows the protocol stack depicted in the adjacent figure.

e.g. XML files
FLUTE
ALC
UDP
IPv6
MPE
DVB-H

A dedicated DVB-H time slice channel is used for ESG broadcasts. There are 4 ESG carousels for different file types in the Service System and bandwidth allocated for each ESG carousel is a configurable system parameter.

1. ESG hierarchy: XML files, which describe the ESG hierarchy
2. Sessions: XML and SDP files, which describe the programs or sessions broadcast on the various channels.
3. Main pages: HTML content for main page and viewer identity areas
4. Security associations: DCF files, which contain IPSec security associations

A different update interval can be configured for each carousel in the Service System. The update interval determines how often the terminal prompts the user to tune to the ESG channel to update its local data store. A more frequent update interval enables last-minute changes at the expense of terminal battery consumption and user convenience. ESG supports up to 4 languages, the correct one automatically chosen according to terminal locale settings.

ESG for the End User

When first started, the Mobile TV application scans the DVB frequencies carrying DVB-H. If several are found, the user is prompted to select one. Next the terminal lists the ESGs available and user makes an another selection. Each Service System managing broadcast on a given frequency has its own ESG root.

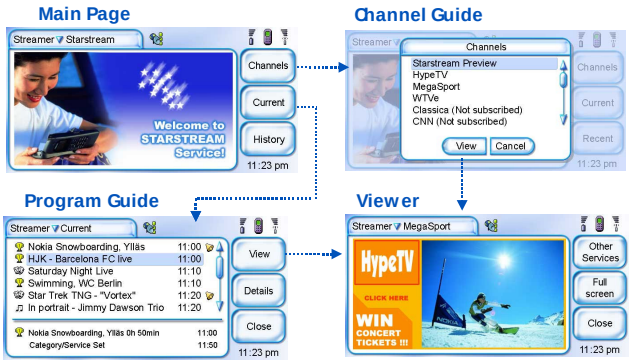

Figure 2: Navigation in the Mobile TV application

Once the user has selected the ESG, its contents are downloaded for the first time to the terminal database.

ESG makes it easy for the end user to switch channels, search for shows, get detailed descriptions about content and even to set alerts for upcoming content of interest through the 7710 calendar application.

Linking Interactive Services to a TV or Radio Channel

Both the ESG main page and the left-side channel identity area in the channel viewer are embedded HTML controls. The HTML page components can point to Internet web addresses. In addition, the "Other Services" soft key in the channel viewer leads to a list of similar URLs.

Selecting a link opens the target page in the Opera web browser, while the audio track of the channel continues to play. This feature can be used to involve the end user more deeply with the content through participation.

The links also serve as added source of revenue for the mobile operator through increased usage of packet data services for TV subscribers.

ESG for the Content Provider

The content provider who produces the content feed is also responsible for inputting the ESG data into the Service System. The maintained ESG objects for a content provider are service sets (channels), services (program types) and sessions (instances of services, i.e. programs scheduled to be broadcast at a particular date and time). The managed data for a service set include viewer identity area content while other objects only contain a set of parameters.

There are two ways to break a continuous program stream into ESG sessions:

1. A single, day-long session with programs separated only within the ESG
2. Every program in the stream as it's own session in the ESG

The latter alternative offers more freedom in terms of packaging content into sellable items and a more dynamic platform for the on-line links, while the first is somewhat simpler to manage.

There are 3 ways for the content provider to manage its ESG presence:

1. Provider web portal in the Service System offer each connected content provider a browser-based user interface for managing the ESG data interactively
2. The provider portal also offers functionality for uploading the ESG content as an XML file output from e.g. TV channel production systems to avoid unnecessary typing
3. A SOAP interface offers a two-way interface to the ESG data for fully automated system-to-system integration

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ESG for the Datacast Operator

The Mobile TV delivery operator running Service System has the control over organization of the ESG hierarchy between the root and the service sets. The Service System also provides tools for managing and monitoring ESG broadcasts of all the content providers' data.

Terminology

Term	Description of IPDC implementation
ALC	Asynchronous Layered Coding: a massively scalable reliable content delivery protocol defined in RFC3450
DCF	DRM Content Format: File format for content encrypted with DRM
FLUTE	File Delivery over Unidirectional Transport: a file delivery protocol based on ALC defined in draft-ietf-rmt-flute-07.txt (latest version)
SDP	Session Description Protocol: a protocol for describing multimedia sessions defined in RFC2327
SOAP	A protocol for exchanging XML data between applications defined by W3C
XML	eXtensible Markup Language: a text format used for data exchange between applications defined by W3C