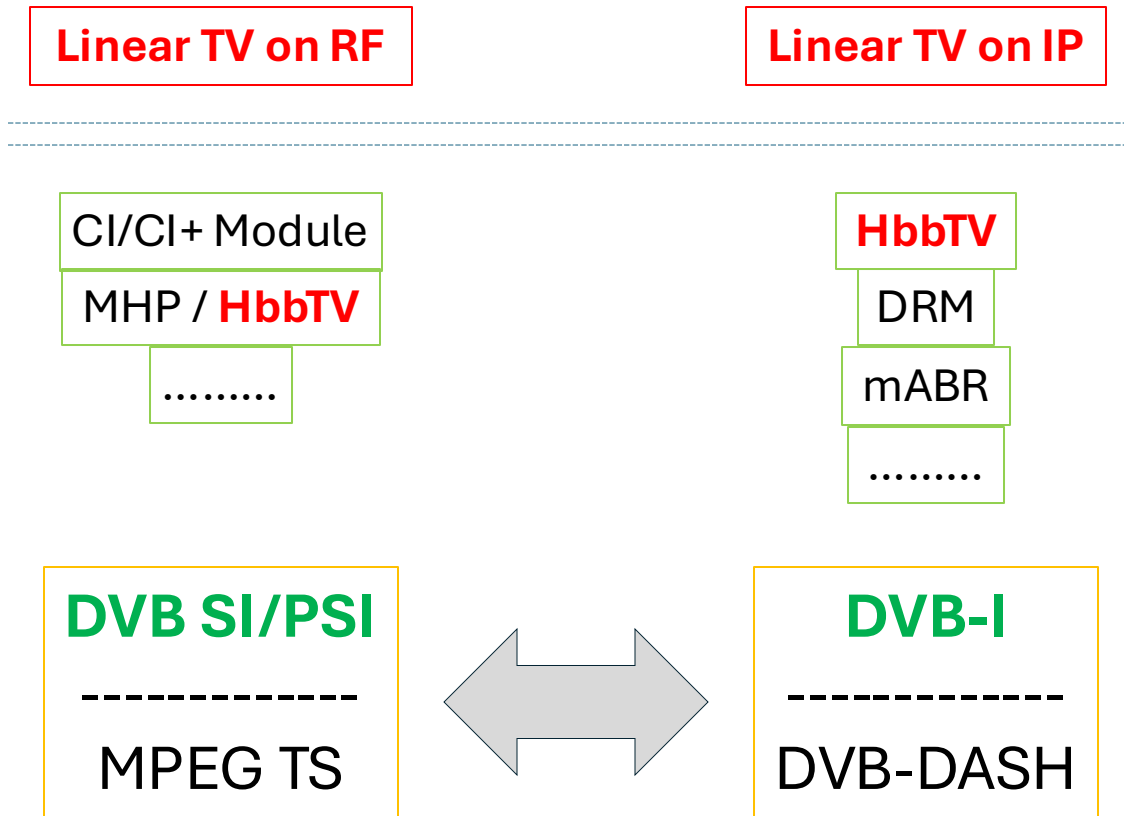


The role of HbbTV in DVB-I environment

Stefano Braghieri

Is DVB-I missing something?

- Comparing what happened in the past with DVB-I scenario



In broad terms

- In RF TV, the essential element to allow User to watch a (clean) content are the Content, in mpeg-TS format and the set of DVB SI/PSI table to create and manage the Channel list.
As soon as you have to support richer use-cases you have to put on top of them other blocks, preferably, ruled by open Standards
- In IP TV, compliant to DVB-I Standard, we have the same scenario.
Content, provided in DVB-DASH format, and metadata, provided by DVB-I Specification, allow Terminal to create and manage a hybrid channel list.
As soon as you must support richer use-cases you have to put on top of them other blocks, preferably, ruled by open Standards

Why HbbTV ...

- In DVB-I ecosystem, it is important keeps managing as much functionalities as possible by the Terminal at native level

BUT

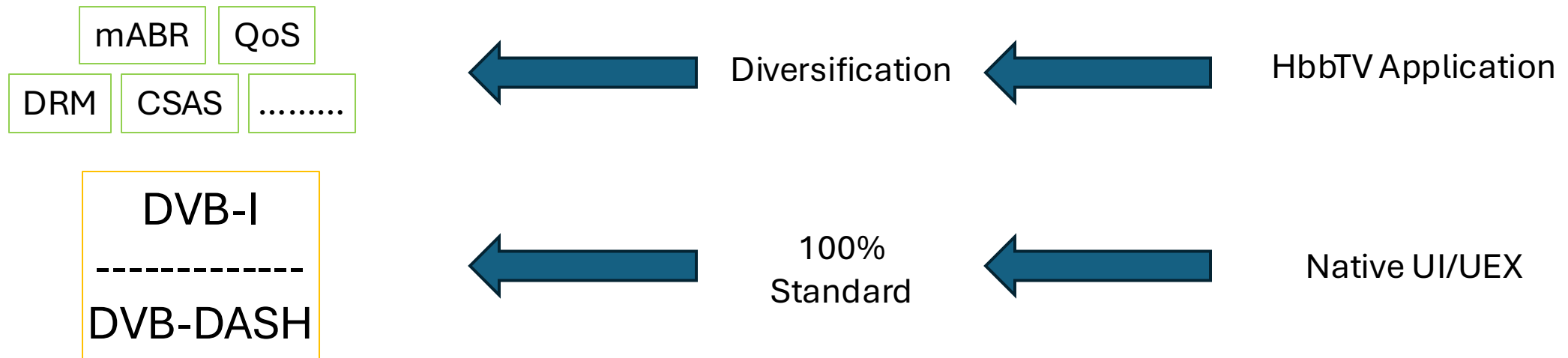
- There are functionalities that Terminals are not in the position to manage at native level, e.g.:
 - Standardized Technologies but with un-unique implementation
 - E.g. mABR
 - mABR implementation depends on ISP implementation
 - Service-Provider Customizations
 - E.g. QoS Monitoring
 - Different monitoring system available
 - GDPR for future tracking
 - Technology Provider Customizations
 - E.g. DRM system:
 - different DRM systems provide different mechanism
 - Different mechanism for license acquisition
 - Authentication
 - CSAS
 - “Client Side Ad Substitution” requires an application running on the Terminal
- There are functionalities which can only be basically managed by the Terminal at native level, e.g.:
 - Accessibility features

... and Why not HbbTV

- Functionalities the User is used to access through a cross Service-Provider UI/UEX shall be provided by the native level
 - Hybrid Channel list creation – Installation process
 - Channel banner
 - Parental Control
 - EPG
 - Multi-audio
 - Subtitles
 - ...

HbbTV \leftrightarrow DVB

- Relationship between HbbTV and DVB, wrt DVB-I, is becoming stronger and stronger:
 - DVB-I specifications introduces the **Linked Application** concept, defining signaling and management of “Generic HTML5 application” running in the device
 - HbbTV, with the Core Specification 2.0.4, introduce the “**Annex O**” to extends HbbTV functionalities to real hybrid scenario, i.e. DVB-I



HbbTV Annex O

- **“Annex O”** introduces the required mechanisms to extend the usual user experience to the hybrid scenario provided by DVB-I
 - HbbTV Application lifecycle
 - An application, if correctly signaled, keeps running on services from different medium
 - Hybrid Channel List management
 - An application is able to access to the hybrid channel list created during installation process, allowing
 - User to select services from different medium
 - B’Caster to implement smart fallback management
 - DASH management
 - Live content play
 - MPD and inband events
- **“Annex O”** implementation permits creation of a single HbbTV Application running both on broadcast and broadband instances

DVB-I Linked Application (1/2)

- R7 in Clauses “5.1.6” “5.2.3” provide mechanisms to associate an (HbbTV) Application to DVB-I ecosystem

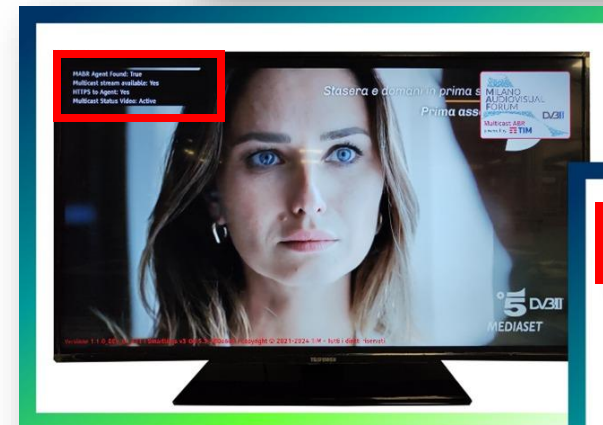
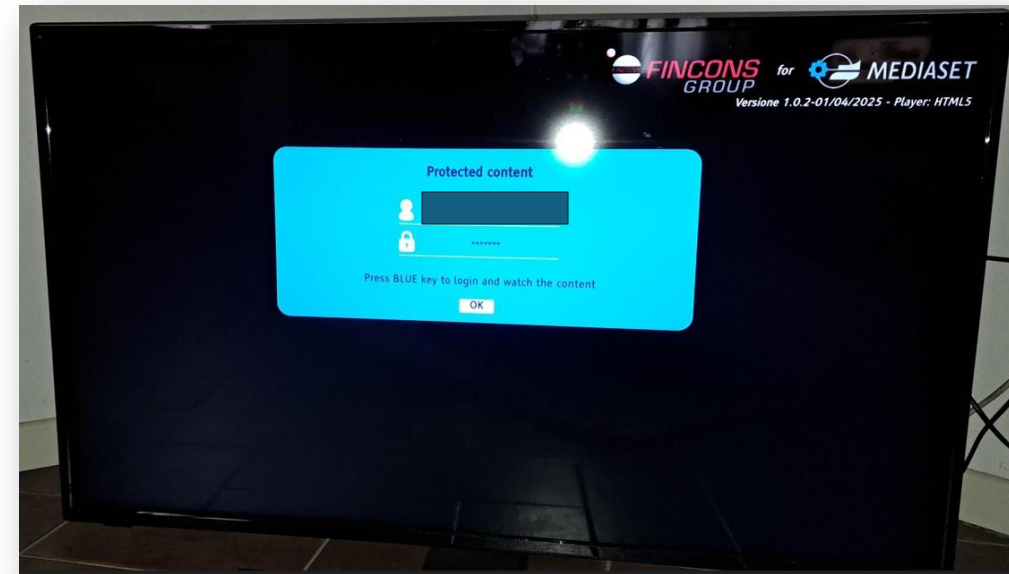
Application type	When Started	Note
App. with media in parallel (type 1.1)	When service instance is selected	The application runs “on top” of the content It correspond to the usual “red button” application
App. controlling media presentation (type 1.2)	When service instance is selected	The application manages the content play. It can rely on HbbTV player (e.g. HTML5) or integrated library (e.g. dash.js)
App. in series with media (type 1.3)	When service instance is selected unless a previous execution of the application returned the persistent key.	The application is not intended for playing video but for more platform-specific topics (e.g. GDPR consent, single sign-on and some variants of DRM license acquisition). It can be used in combination with a type 1.1 or a type 1.2 app to keep the two sets of functionality in separate apps or developed by separate teams
Outside of availability window (type 2)	1) When service is selected and all instances are outside their availability window. 2) When all service instances of currently selected service become outside their availability window(s).	The application provide User a better UEX than a «black screen» or a «fixed info screen»
Service provider home page (type 3)	User selection from DVB-I player UI.	The application is launched from native UI, e.g. EPG or Info-banner

DVB-I Linked Application (2/2)

Application type	When Started	Note
Service list installation (type 4.1)	During service list installation process.	The application could manage regulated access to particular ServiceList -- agreement or consent, user authentication including single sign-on
Withdrawal of agreement (type 4.2)	User selection from DVB-I player UI.	Used in combination with service list installation app. It enables user to withdraw agreement or consent given when that app was run
Renew Agreement (type 4.3)	Started by DVB-I player based on information provided when service list installation app exits.	Used in combination with service list installation app It enables service list provider to require users renew agreement or consent

HbbTV in DVB-I – Examples

- DRM management
 - The application manages the license acquisition in agreement to Service Provider policy. The application manages different DRM system and different access policy.
 - In the example content is accessible after User authentication.
- mABR
 - In collaboration with TIM
 - The application integrates a third-party company library to manage the mABR system provided by a particular ISP.
- Hybrid Application
 - Please look at [HybridEnabler1](#) & [HybridEnabler2](#)
- CSAS
 - Please have a look at [IA-in-DVB-I](#)



Thanks
Stefano Braghieri