# **The Near Future Smart Cable**

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# Safe harbor clause of the talk

- The talk is to discuss the concept of the near future (In 1 to 3 years) smart cable. It is to conceive what the near future smart cable will look like, not try to discuss how the near future smart cable can be realized.
- Future is all about dreams and uncertainties, so basically the talk just dreams about what the near future smart cable could be.
- In the long term, hopefully the future smart cable can be the full two-way and all IP-based one, but this case is out of the scope of this talk.

### **Positioning of the talk**

The talk mainly focuses on the discussion of the access cable network portion, including the smart cloud-based service platform, the smart broadcast-broadband transport pipe and the smart IBB receiver terminal.

# Outline

- Generic architecture of the near future smart cable
- The smart cloud-based service platform
- The smart broadcast-broadband transport pipe
- The smart IBB receiver terminal

#### **Generic architecture of the near future smart cable**



#### **Generic architecture of the near future smart cable**

- The near future smart cable network should at least be consisted of the smart cloud-based service platform, the smart broadcast broadband transport pipe and the smart IBB receiver terminal.
- The smart cloud-based service platform can be centrally and physically located at a master headend or logically distributed at several interconnected places with variety of granularities.

#### **Generic architecture of the near future smart cable**

- The smart broadcast broadband transport pipe is mainly meant to be the transport/access network between the main portion of the smart cloud-based service platform and the smart IBB receiver terminal.
- The smart IBB receiver terminal can be of verities of types such as smart STBs, smart media gateways, connected smart TVs, Tablets, Smartphones, PCs, and game consoles, and so on.



- The smart cloud-based service platform should be able to deliver a wide range of content and services, not only traditional linear broadcast program content but also time-shifted, on-demand, hybrid content and data services.
- 'Hybrid content' refers to content a part of which is provided over non-broadcasting networks in parallel with broadcasting platforms.

- The smart cloud-based service platform should be able to deliver personalized content and services to audiences based on audiences' viewing behaviors, viewing hobbies, favorite devices to be used, etc., by using big data and AI technologies.
- The smart cloud-based service platform should be able to support smart storage, composition, composition play list and output profile list of content, by creatively exploring implementation of IMF concepts such as componentized content, IMP (Interoperable Mastering Packages) and track files, etc., in order to minimize the storage and processing requirements for delivery of content and services.

- The smart cloud-based service platform should be able to support smart awareness of availabilities of the transport pipe, possibly by auditing/estimating the utilized broadcast channel capacity, and sensing cable broadband network through the collaboration with key devices of the cable broadband network.
- The smart cloud-based service platform should be able to support smart switch of content transport between broadcast/multicast and unicast broadband modes, at the most appropriate point, either the platform output point or the network device point, possibly by distributing the platform's infrastructure networking elements into remote devices of the smart broadcast broadband transport pipe, such as the CMC of C-DOCSIS 2.0 or above.



#### The smart broadcast-broadband transport pipe

The smart broadcast broadband transport pipe should be able to support broadcast transport and broadband modes with big enough bandwidth, as well as intelligent switch between multicast and unicast transport based on the need of the service presentation at the smart IBB receiver terminal for the sake of the service QoE and bandwidth efficiency.

#### The smart broadcast-broadband transport pipe

- The smart broadcast broadband transport pipe should be able to sense the type of multimedia services being transported.
- The smart broadcast broadband transport pipe should be able to guarantee the QoE for such kind of services like video gaming and CloudVR that have been computed/generated at the smart cloudbased service platform, and played/presented at the smart IBB receiver terminal.

- The smart IBB receiver terminal should be able to receive multimedia services from both broadcast and broadband transport pipes.
- The smart IBB receiver terminal should be able to process different media service applications in forms of Java, HTML5, and Python, etc., that are downloaded and installed at the will of audiences.

- The smart IBB receiver terminal should be able to intelligently process multimedia services regardless of the transport pipe, streaming protocols, encapsulation formats and encoding methods that are used.
- The smart IBB receiver terminal should be able to seamlessly present these multimedia services being mentioned and processed to various screens without the damage of audiences' viewing experience.

- The smart IBB receiver terminal should be able to play and present the multimedia service applications such as video gaming and CloudVR that are computed and generated at the smart cloud-based service platform by intelligently collaborating with the smart cloud-based service platform and the smart broadcast-broadband transport pipe.
- The smart IBB receiver terminal should be able to support hardware-based service and content security with downloadable or switchable CAS and DRM mechanisms.

- The smart IBB receiver terminal should be able to support Albased 8K UHD TV processing, AI-based voice control, and interconnection with IoT.
- The smart IBB receiver terminal should be able to support second screen services, hybrid content processing, and multiscreen interaction.

Last but not least, the smart IBB receiver terminal might have embedded 5G modems, in order to support the introduction of 5G technologies into cable networks, that are needed by the hybrid internetworking between the migrating cable networks and the incoming 5G networks.

# **Thank You!**