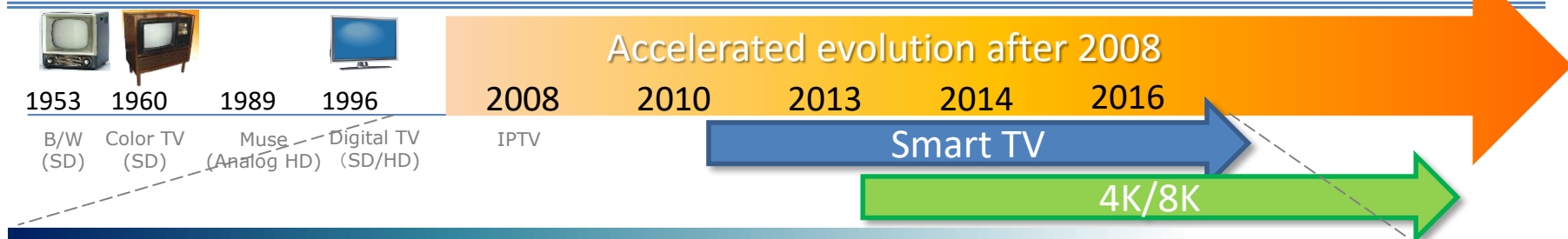




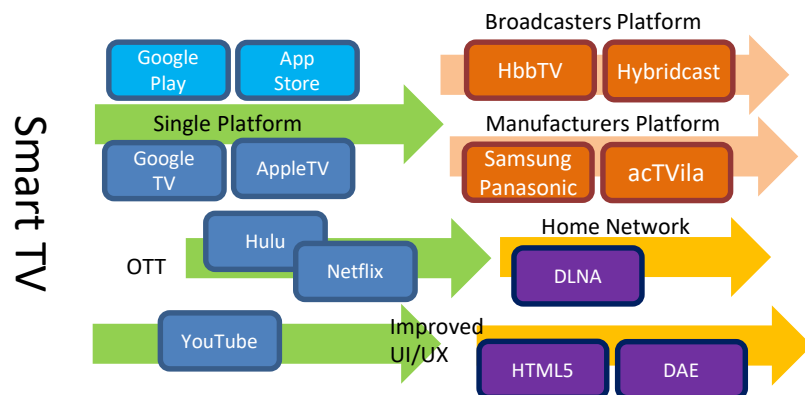
Tablet as a multi-purpose tool for television viewer

3 September 2019
Japan Cable Laboratories

Evolution of Cable STB in Japan



1st Generation Digital STB

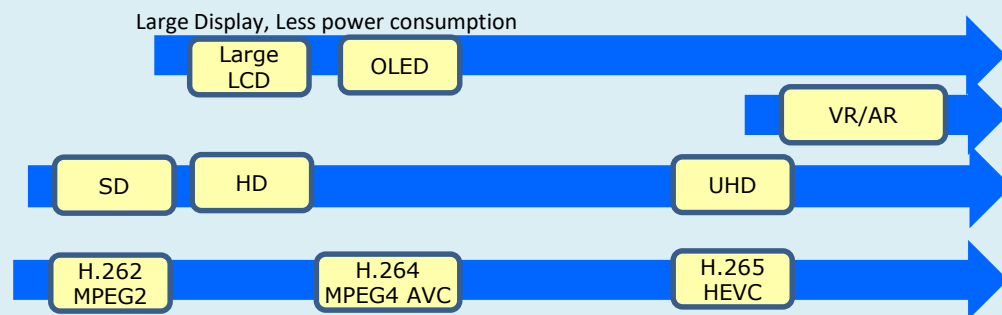


2nd Generation STB

Smart TV compatible

- Downloadable applications
- Interactive with smartphones and home network
- ITU-T J.295/296 (Hybrid Cable STB)

High Quality Video

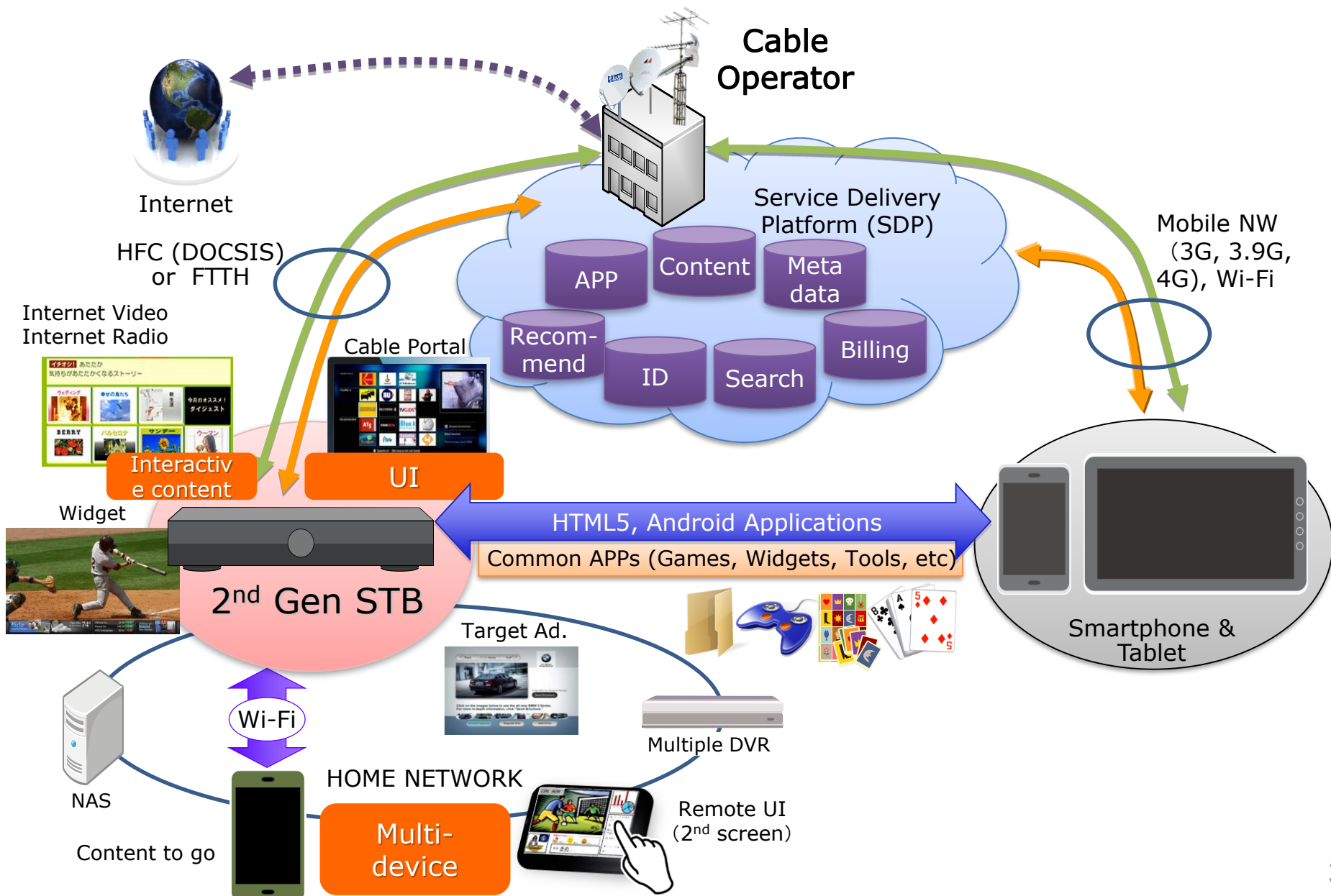


3rd Gen STB

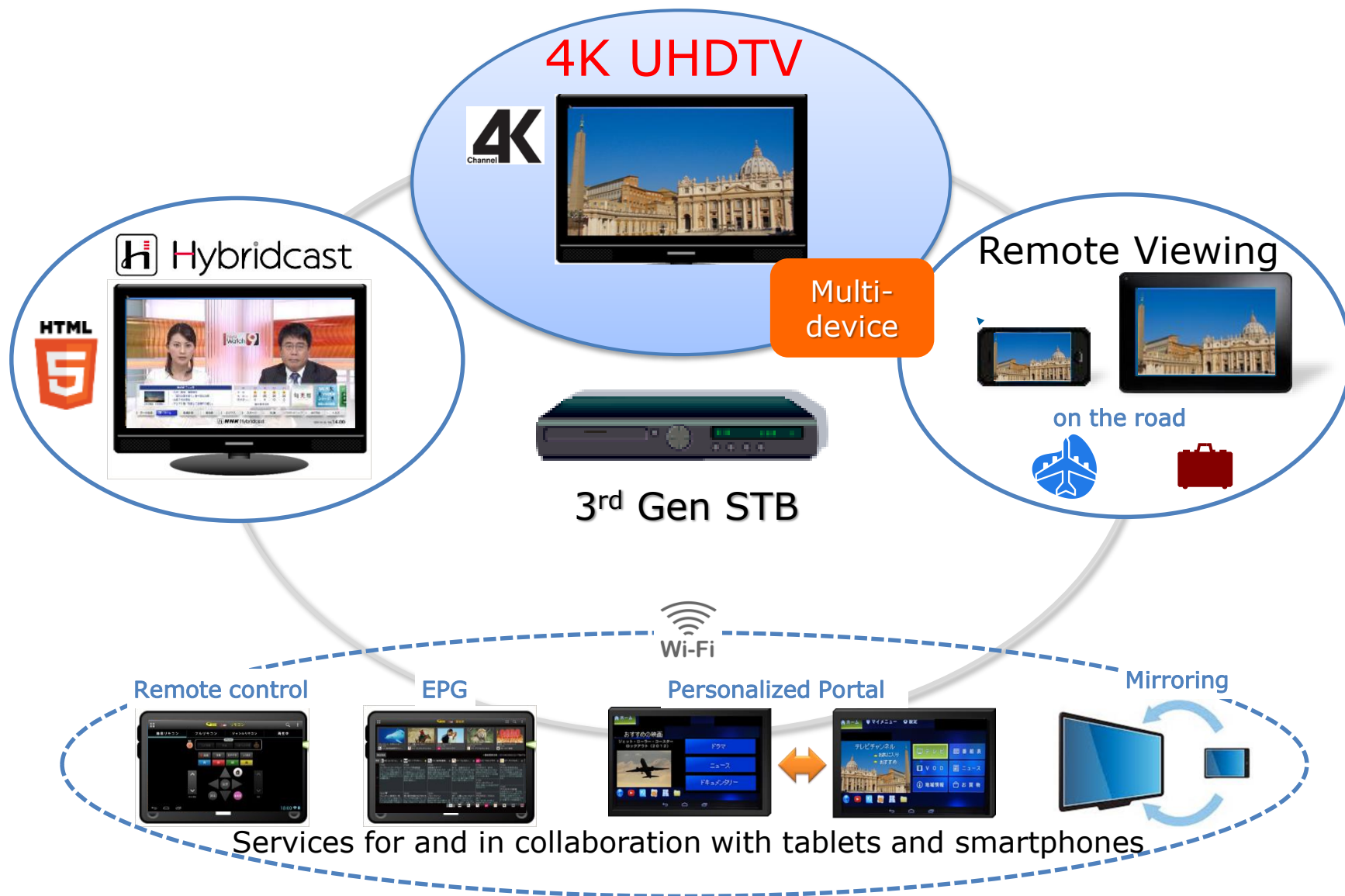
4K UHD TV

- 4K Video
- 5.1ch audio
- ITU-T J.297 (4K Cable STB)

Smart TV services with 2nd Gen STB



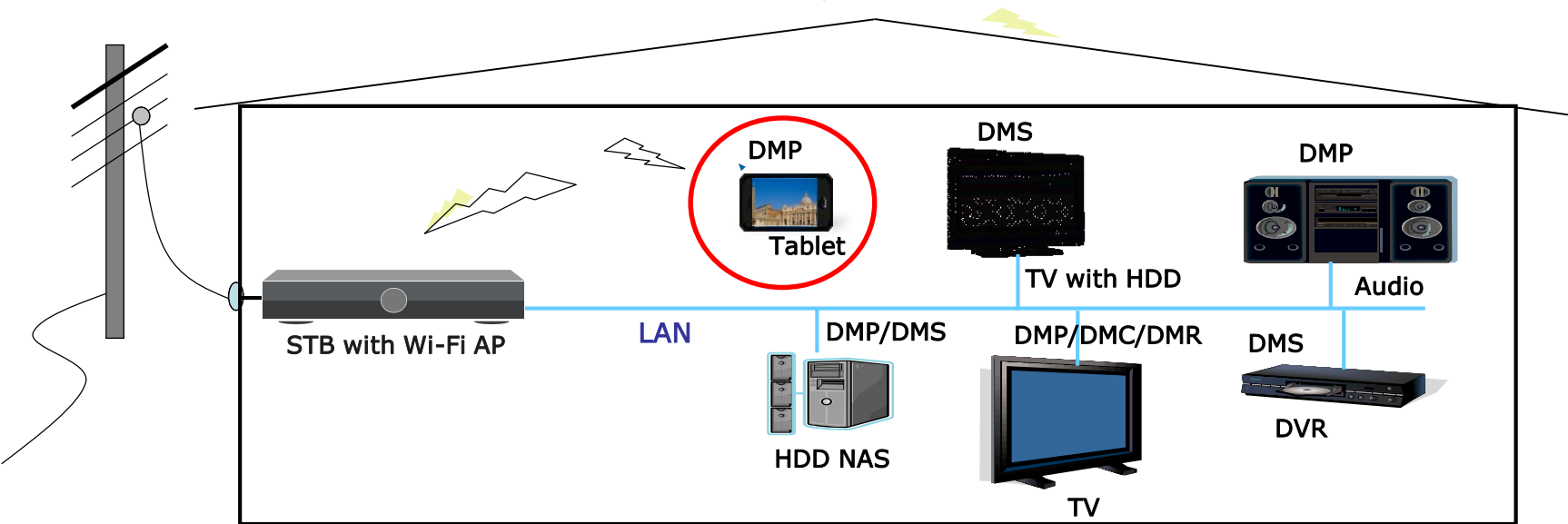
JLabs 3rd Generation STB



Tablet as a second screen

- DLNA (Digital Living Network Alliance*) enables sharing of video, audio and other content between Digital Media Server (DMS) such as STB and HDD, and Digital Media Player (DMP) such as TVs, tablets and smartphones
- Using this scheme, tablet can be used as a second screen to share the same content being shown on the main television set.

* DLNA dissolved in 2017.



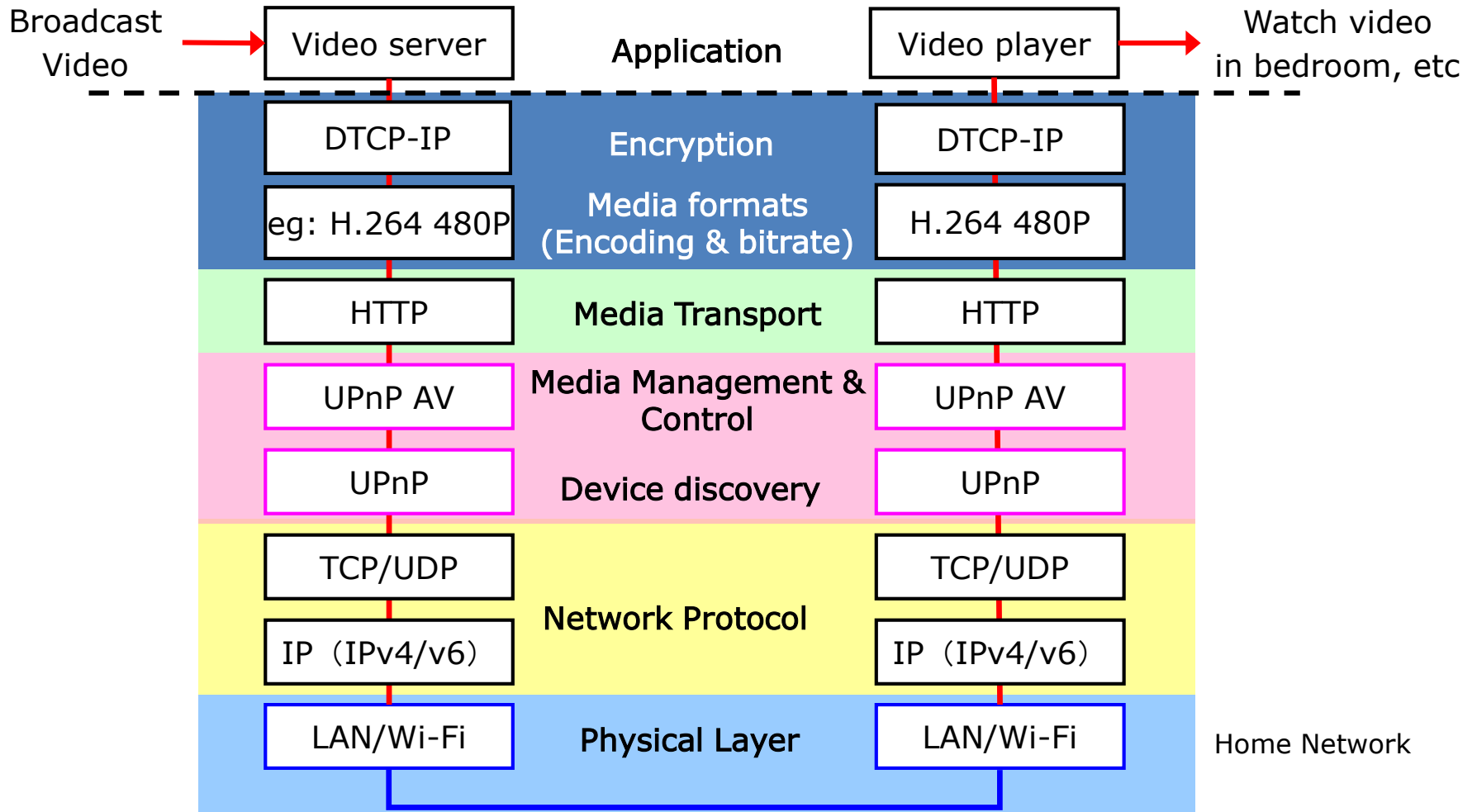
DMS (Digital Media Server): Stores video, audio and other content for delivery to other device

DMP (Digital Media Player): Plays content received from

DMC (Digital Media Controller): Requests content from DMS and assigns player to play it

DMR (DigitalMedia Renderer): Plays content in response to command from DMC

DLNA Layer model

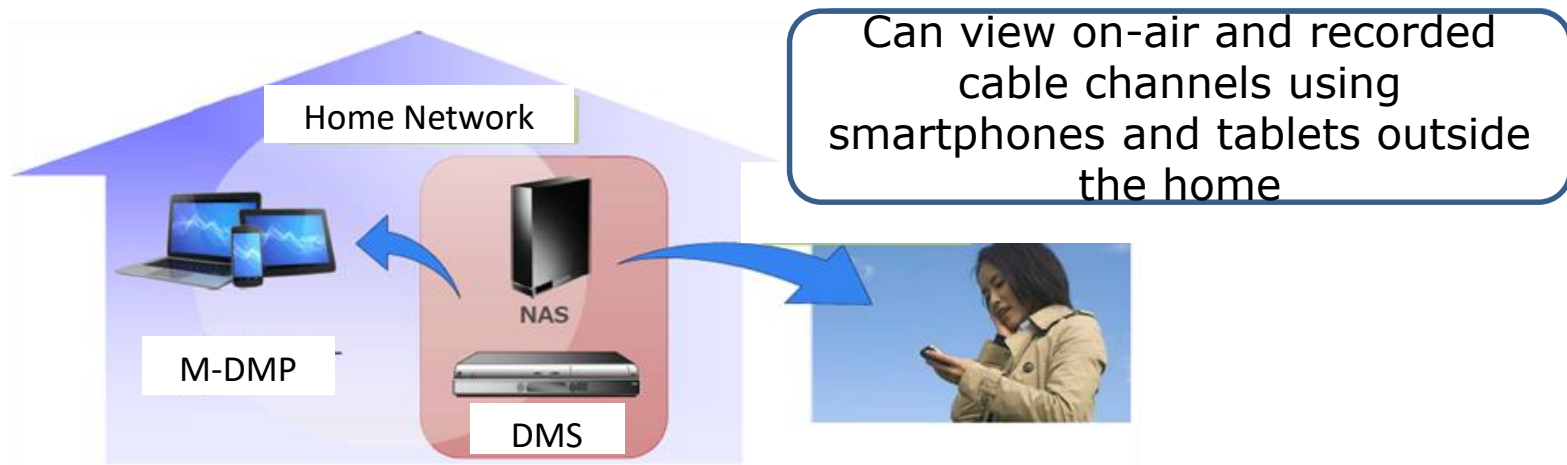


Digital Media Server (DMS)
such as STB with HDD、HDD Recorder

Digital Media Player (DMP)
such as TV, Tablet, smartphone

Tablet as a Remote Viewing tool

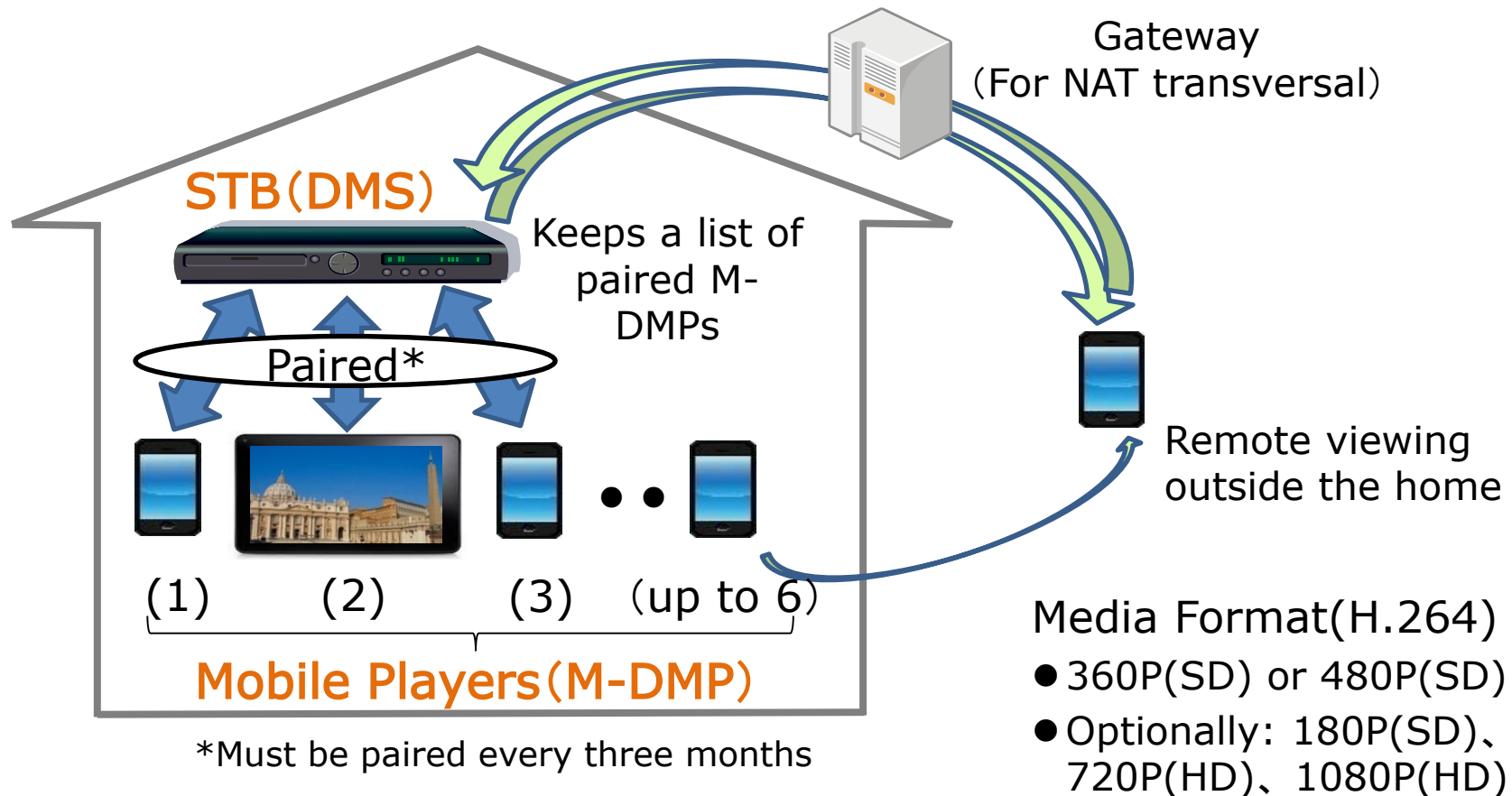
- Remote viewing extends the second screen concept beyond the living room, by enabling Mobile Digital Media Players (M-DMP) such as smartphones and tablets outside the home, to view broadcasting content (real time and recorded) from Digital Media Servers (DMS) such as TV, STB and HDD inside the home
- Channels for view include Japanese terrestrial TV channels, some satellite channels and cable channels.



*Next Generation Television & Broadcasting Promotion Forum

How Remote Viewing works

- Mobile players must be paired with a digital media server (DMS) such as STB inside the home, before it is carried outside the home. Up to six players can be paired with a DMS but only one player can use this service at a time.

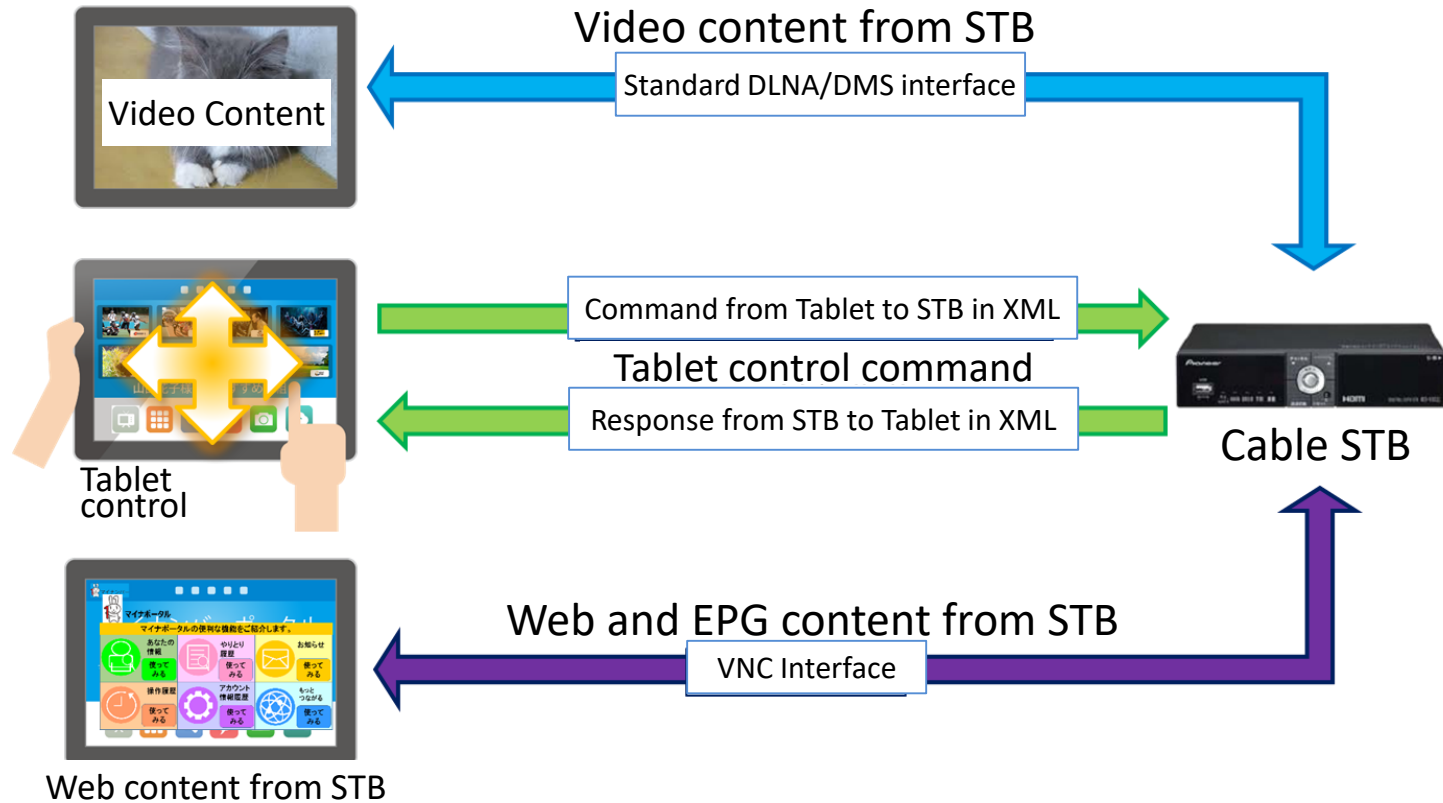


Tablet as a remote controller

- Easy control of STB by use of Tablet
- Touch and control
- Touch on the image of STB output displayed on the tablet screen, to change channels, increase or decrease volume, enlarge part of the picture, and so on



How it works

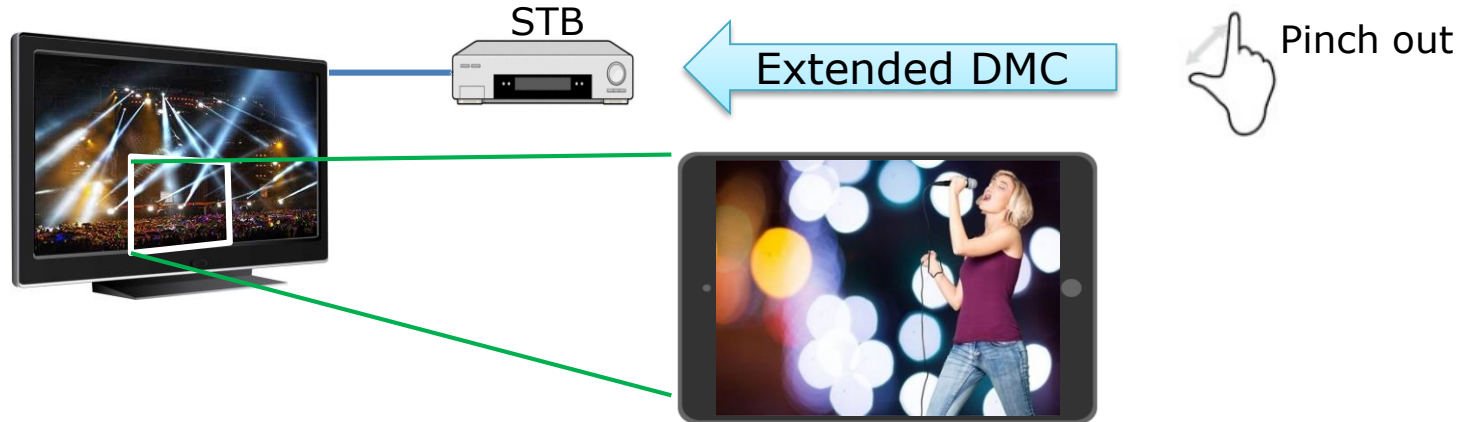


To send	How
Video content from STB to tablet	STB acts as DMS (Digital Media Server) as defined by DLNA, to send real time and recorded video
Tablet control command to STB	Extended DMC command to control STB and web browser
Web and EPG content from STB to tablet	VNC: Virtual Network Computing

Some extended DMC commands

RoI (Region of Interest)

◆ Enlarge part of 4K/8K content to view details



EPG



EPG



Enlarge and scroll

Tablet as an AI Smart Speaker

- Tablet works like a Smart Speaker
- Works with Google Assistant and Amazon Alexa
- Tablet serves as a gateway to STB and smart home devices

