


Smart TV & Convergences



Dr. Mingoo Kang
(Prof. of Hanshin University)

Kangmg@hs.ac.kr





1 Digital Broadcasting

2 Smart TV

3 Smart TV & Smart Home

4 Smart TV & new Services

5 Convergences in the Future

DIGITAL BROADCASTING

SMART TV CASE : DAUM+(1)



SMART TV CASE : DAUM+(2)



www.daumtv.net

SMART TV CASE : DAUM+(3)



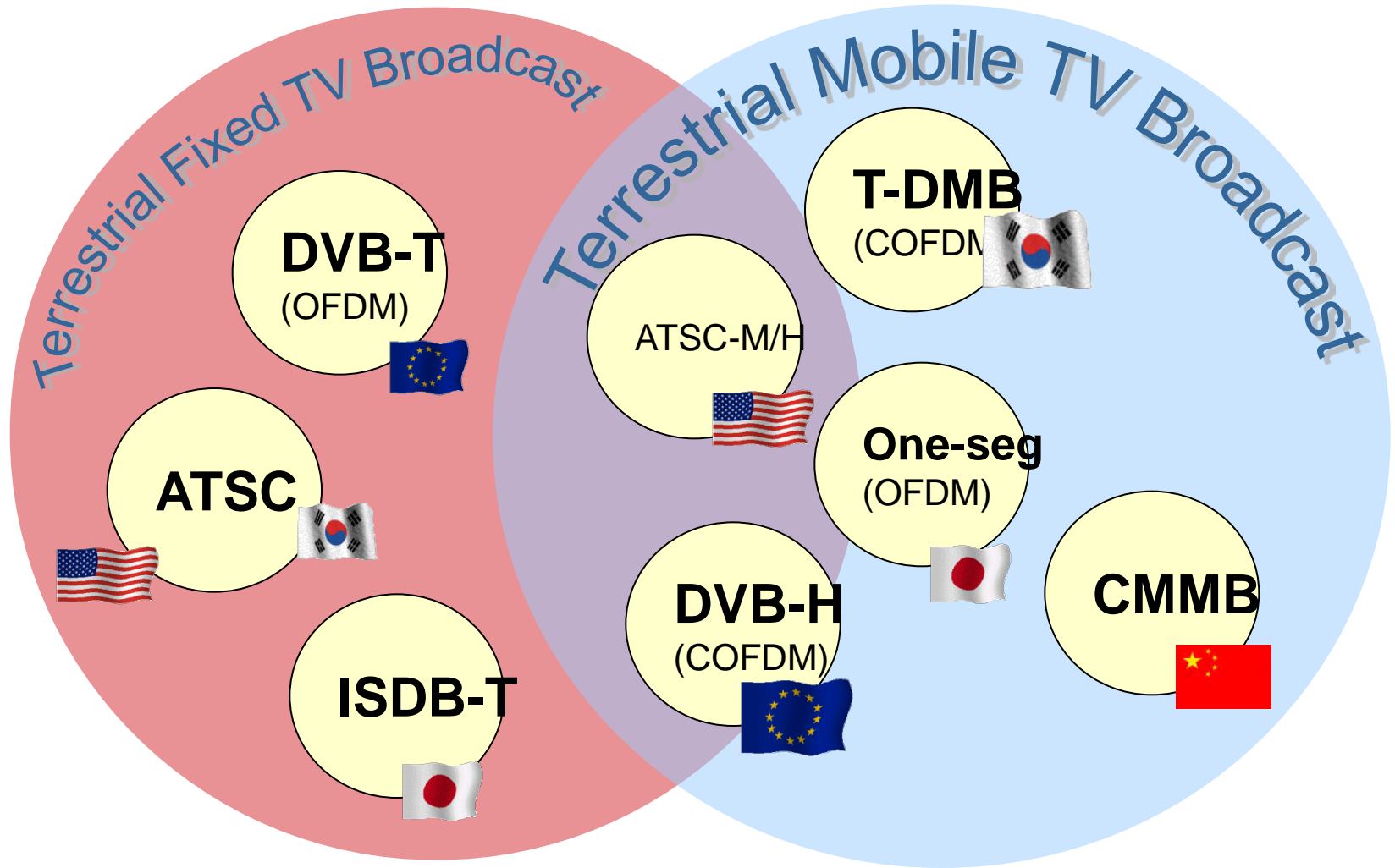
Just Talk!!
(Voice Searching)



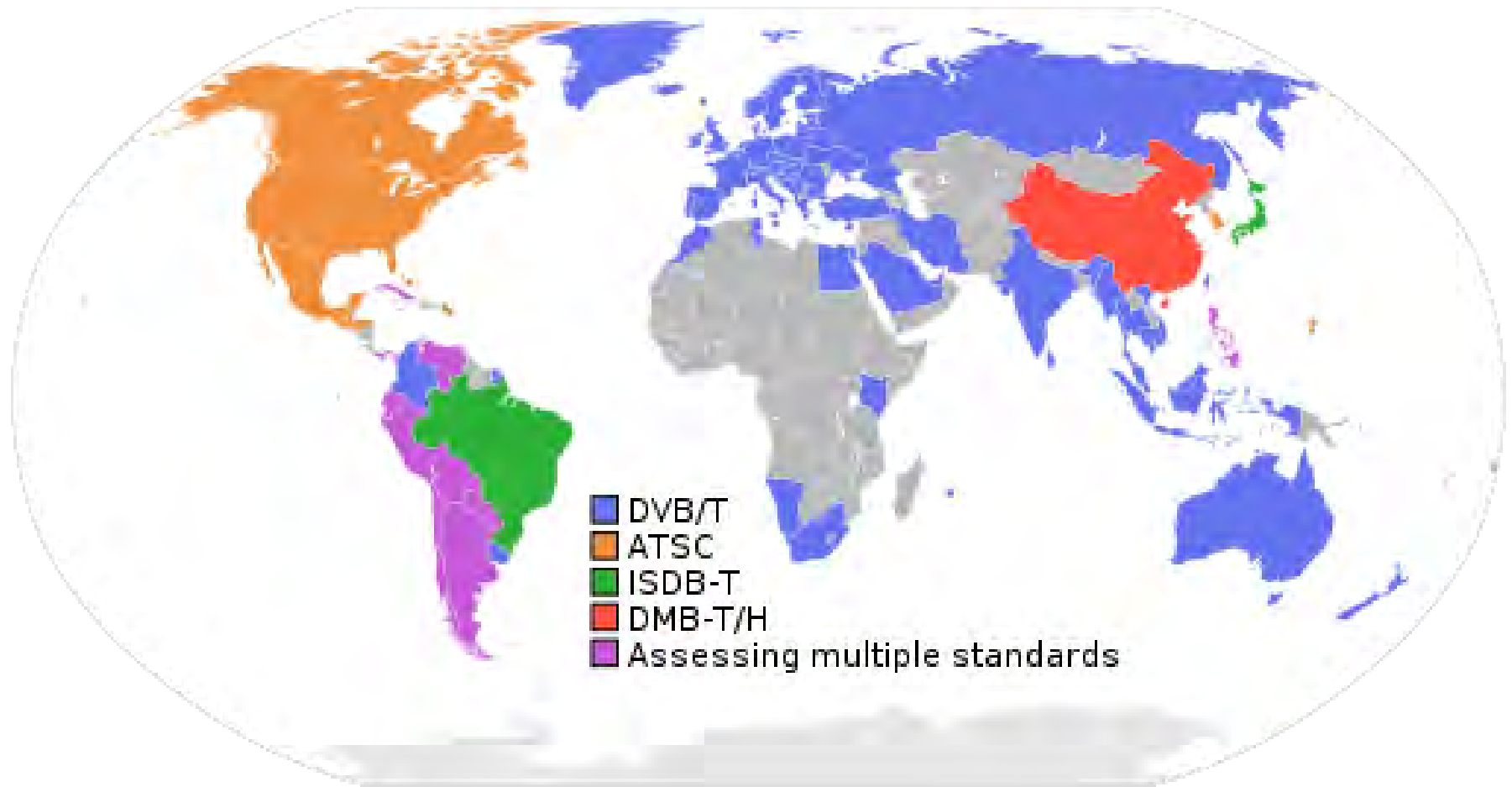
Click&Talk



DIGITAL BROADCASTING STANDARDS



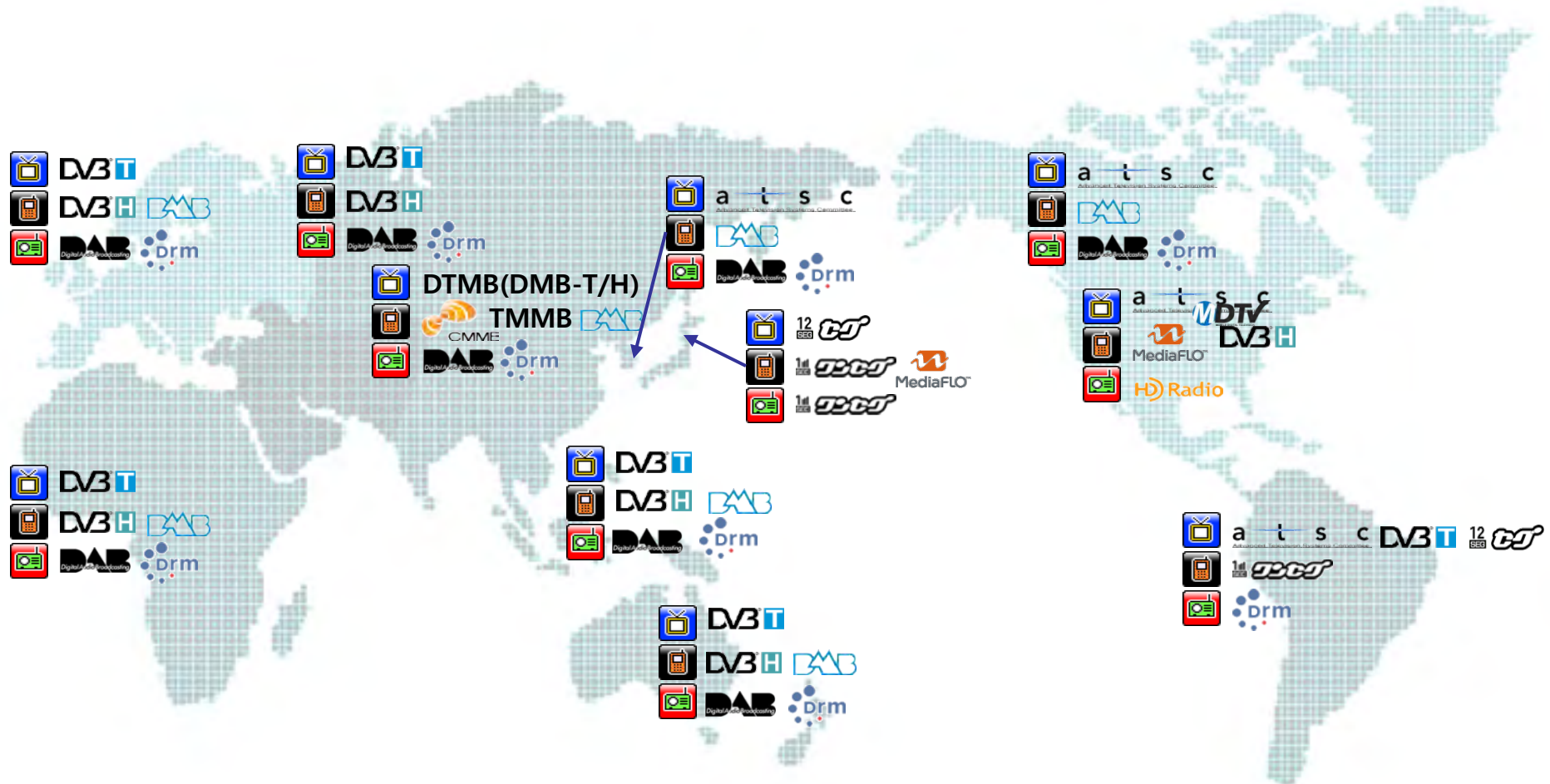
DIGITAL BROADCASTING STANDARDS



DIGITAL BROADCASTING SERVICES



 Digital TV  Mobile TV  Digital Radio



TV Standards



Terrestrial Broadcasting Transmission System

Digital TV

ATSC

HD

DVB-T(2)

SD

D-TMB(DMB-T/H)

ISDB-T (Full seg)

Mobile TV

T-DMB(2.0)

DVB-T, DVB-H

MFLO, ATSC-M/H

ISDB-T(1,3 seg)

CMMB, TMMB

Digital Radio

DAB(+)

→ DMB

DRM(+)

Digital AM

HDRadio

DigitalAM & FM

ISDB-T(3seg)

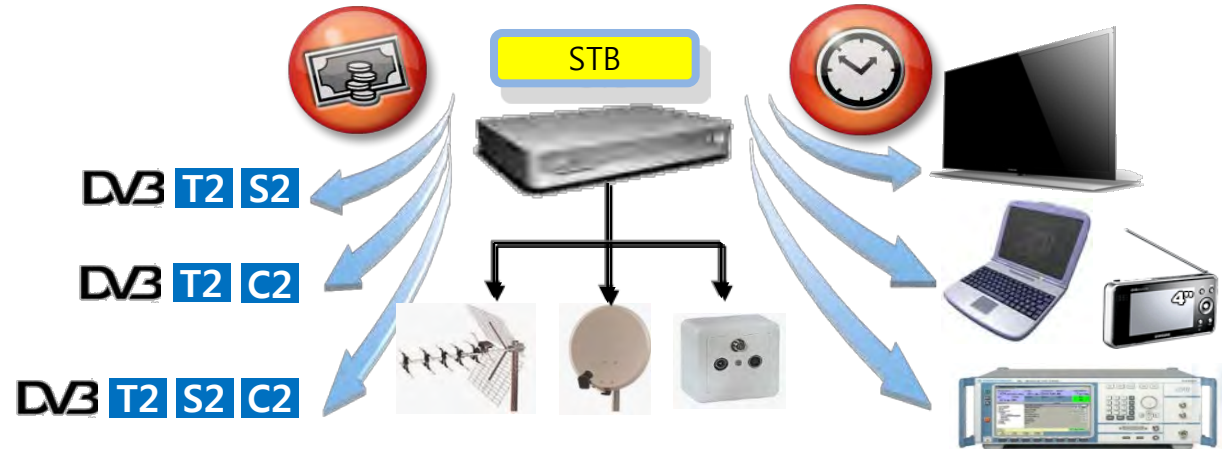
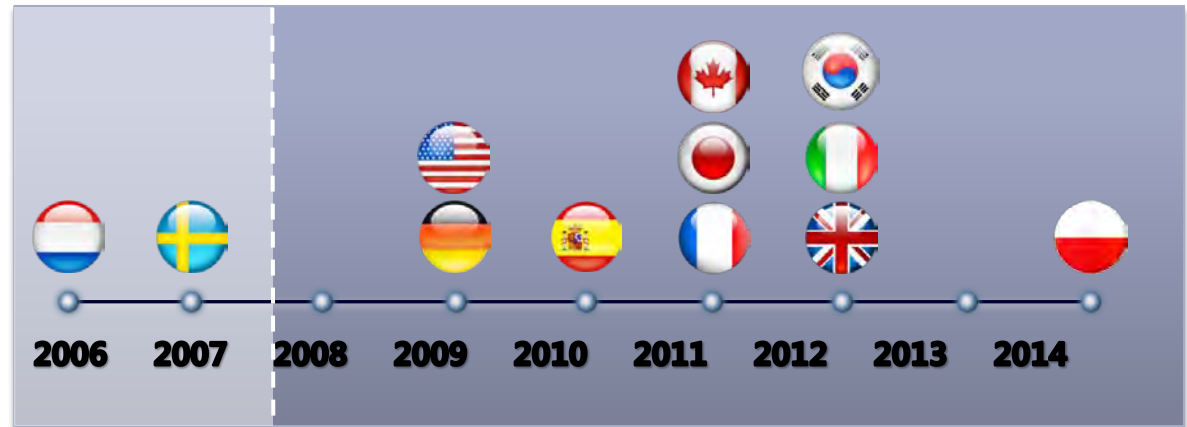
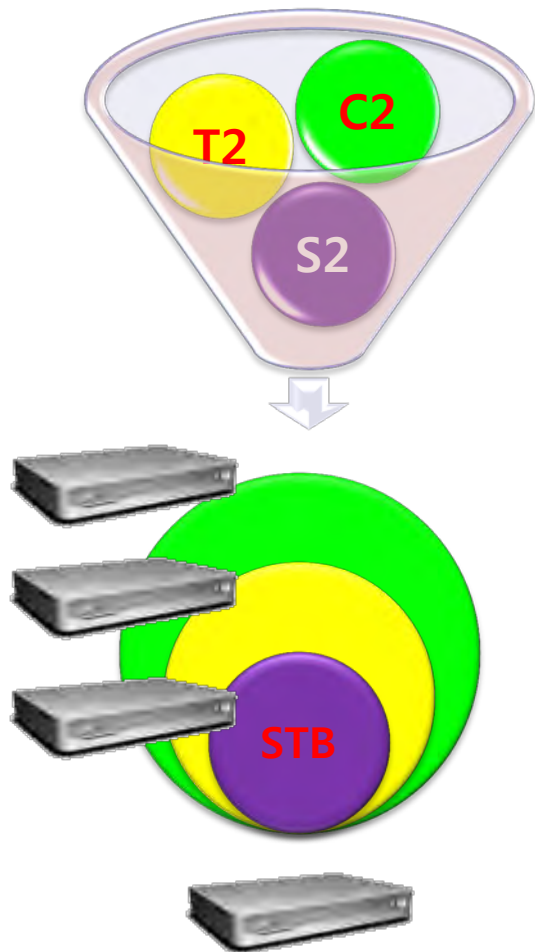
Digital broadcasting services:DVB2.0



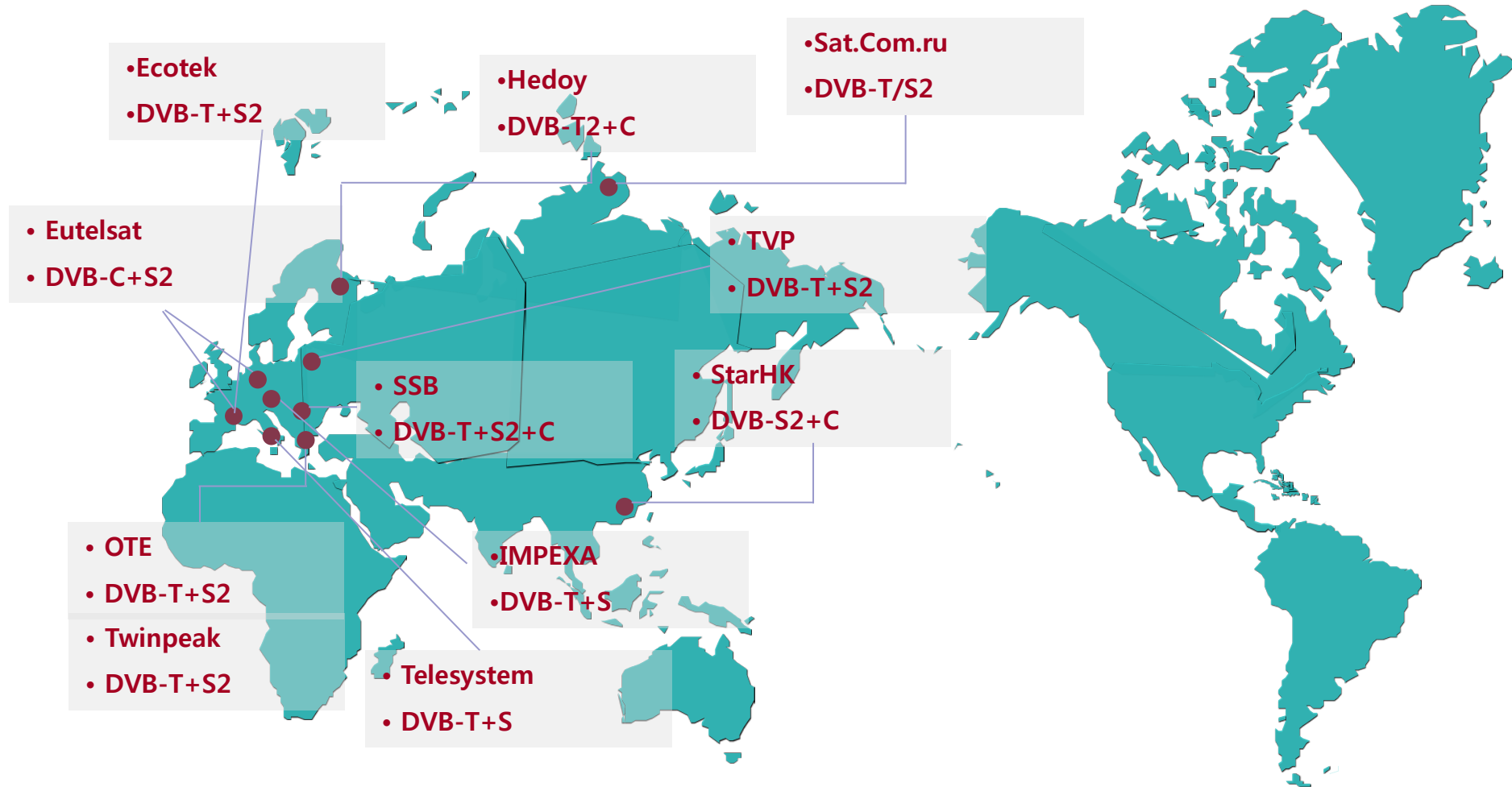
* Digital broadcasting service schedule & Definition of DVB2.0

* DVB2.0 : DVB-S2/T2/C2

<Digital broadcasting service schedule>



Multi broadcasting services for DVB2.0



* DVB2.0 Services:Hybrid IP & Combo STB(SAT.+Cable+Terrestrial)

Technical Overview of DVB-T2

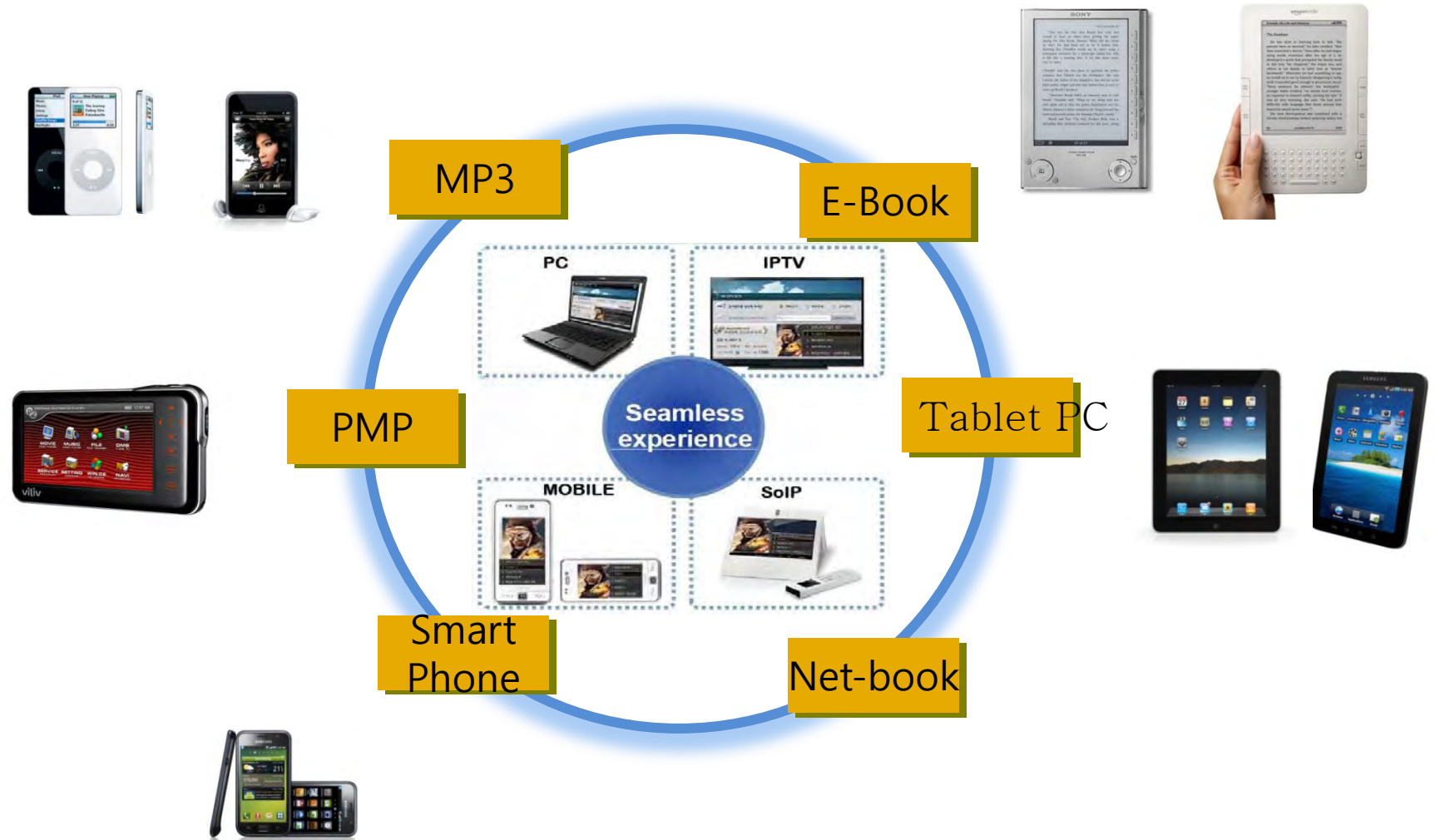


Comparison among DVB Standards : (1st+2nd) DVB-Tx/Sx/Cx for EU.

	DVB-T	DVB-H	DVB-T2	DVB-S2
Modulation	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM, 256QAM	QPSK, 8PSK, 16APSK, 32APSK
PHY FEC	CC + RS 1/2, 2/3, 3/4, 5/6, 7/8	CC + RS 1/2, 2/3, 3/4, 5/6, 7/8	BCH + LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6	BCH + LDPC 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
FFT Sizes	2k, 8k	2k, 4k, 8k	1K, 2K, 4K, 8K, 16K, 32K	-
Guard Interval	1/4, 1/8, 1/16, 1/32	1/4, 1/8, 1/16, 1/32	1/4, 19/256, 1/8, 19/128, 1/16, 1/32, 1/128	-
PHY/Link Layer I/F	MPEG-2 TS	MPEG-2 TS	BaseBand Frames	BaseBand Frames
Link Layer Protocol for IPDC		MPE	GSE	GSE
Multiplexing	Cont. CBR	Time-sliced	Time-Freq. sliced VBR	-
Link Layer FEC	None	RS(255,191)	None	None
Bandwidth	8 MHz	8 MHz	8 MHz	27.5 MHz
Service rate/RF	~22.1 Mbps (64QAM,2/3)	~8.3 Mbps (16QAM,1/2&5/6)	~32.4 Mbps (256QAM,3/4)	~58.8 Mbps (8PSK,2/3)

* CC (Convolutional Code), RS (Reed-Solomon), BCH (Bose-Chaudhuri-Hocquenghem), LDPC (Low Density Parity Check), MPE (Multi-Protocol Encapsulation), GSE (Generic Stream Encapsulation), CBR (Constant Bit Rate), VBR (Variable Bit Rate), IPDC (Internet Protocol Datacasting)

Smart terminals and Heavy Traffic



* Smart User Issues → N Screen (Seamless Contents : Tagging) : Traffic Jam (RF + Network)

3 Screen & N-Screen



MS : 3 Screen



Android Smart Phone

Application Sharing

Services Sharing

Android PC



Android TV










Contents Sharing

Google : Android based 3 Screen Platform

* 3 Screen & N-Screen : MS, Apple, Google(OS Platform, Clouding etc)

Mobile Devices



	Model	iPad2	Xoom	Galaxy Tab 10.1	Optimus Pad	TouchPad	Flyer	IDEOS™ S7 Slim
	Brand	Apple	Moto	Samsung	LG	HP	HTC	Huawei
								
	Release	Mar 11	End Feb	Mar 11	Mar 11	2Q11	2Q11	Apr 11
	Retail Price	US\$499 (WiFi only-829)	US\$799	€ 699.9/US\$970	€ 999/US\$1,385	NA	€ 669 /US\$930	<US\$300
General	3G Network	HSDPA 850 / 1900 / 1800 / 1900 MHz; CDMA	EVDO Rev. A LTE 700 MHz(4G)	HSDPA/UMTS 850, 900, 1900, 2100 MHz	UMTS 900, 2100 MHz	GSM 850 / 900 / 1800 / 1900 Mhz	UMTS/HSPA 900, 2100 MHz	HSDPA 900 / 2100
	OS	iOS 4.3	Android 3.0 Honeycomb	Android 3.0 Honeycomb	Android 3.0 Honeycomb	HP WebOS 3.0	Android Gingerbread 2.4	Android 2.2 Froyo
	CPU	1GHz dual-core A5	Dual-core NVIDIA 1GHz Processor	Dual-core NVIDIA 1GHz Processor	Nvidia Tegra 2 Dual-core 1GHz Processor	1.2 GHz Dual-Core Qualcomm Processor	Single-Core Qualcomm 1.5GHz Processor	1 GHz Qualcomm QSD8250 Processor
Display	Type	HD Capacitive Touch Screen	HD Capacitive Touch Screen	TFT Capacitive Touch Screen	HD Capacitive 3D Touch Screen	XGA Capacitive Touchscreen	capacitive Touchscreen	TFT Capacitive Touch Screen
	Size	9.7"	10.1" (1280X800)	10.1" (1280X800)	8.9" (1280x 768)	9.6 " (1024×768)	7" (1024x 600)	7" (480x 800)
Memory	Internal	16/32/64 GB Storage	1GB RAM/32 GB Storage	16GB / 32GB internal memory storage	32 GB built-in Memory	16GB / 32GB internal storage	1GB RAM/32 GB Storage	8GB storage
Camera	Primary	1.3 MP/HD	5MP	8MP	5MP	No	5MP	2MP
	Secondary	VGA	2MP	2MP	2MP	1.3MP	1.3MP	No

Smart Phone(1)



OS	Android 2.1	iOS 4	Android 2.1	Android 2.2	Android 2.1
Chipset	Samsung S5PC110 1GHz	1GHz A4	Qualcomm QSD 8650, 1GHz	Qualcomm QSD 8250, 1GHz	TI OMAP 3640, 1GHz
Camera	5-megapixel	5-megapixel	8-megapixel	5-megapixel	8-megapixel
Video	1280x720 (720p HD)	1280x720 (720p HD)	1280x720 (720p HD)	720x480 (DVD)	1280x720 (720p HD)
Flash	-	LED	Dual LED	LED	Dual LED
Front Facing Camera	No	Yes	1.3 megapixel	No	No
Height/Width/Depth (in)	4.32/ 2.52/ 0.48	4.50/ 2.31/ 0.37	4.80/ 2.60/ 0.50	4.69/ 2.35/ 0.45	5.02/ 2.58/ 0.39
Weight (oz)	4.2	4.83	6.00	4.59	5.47

iPhone Comparison Chart

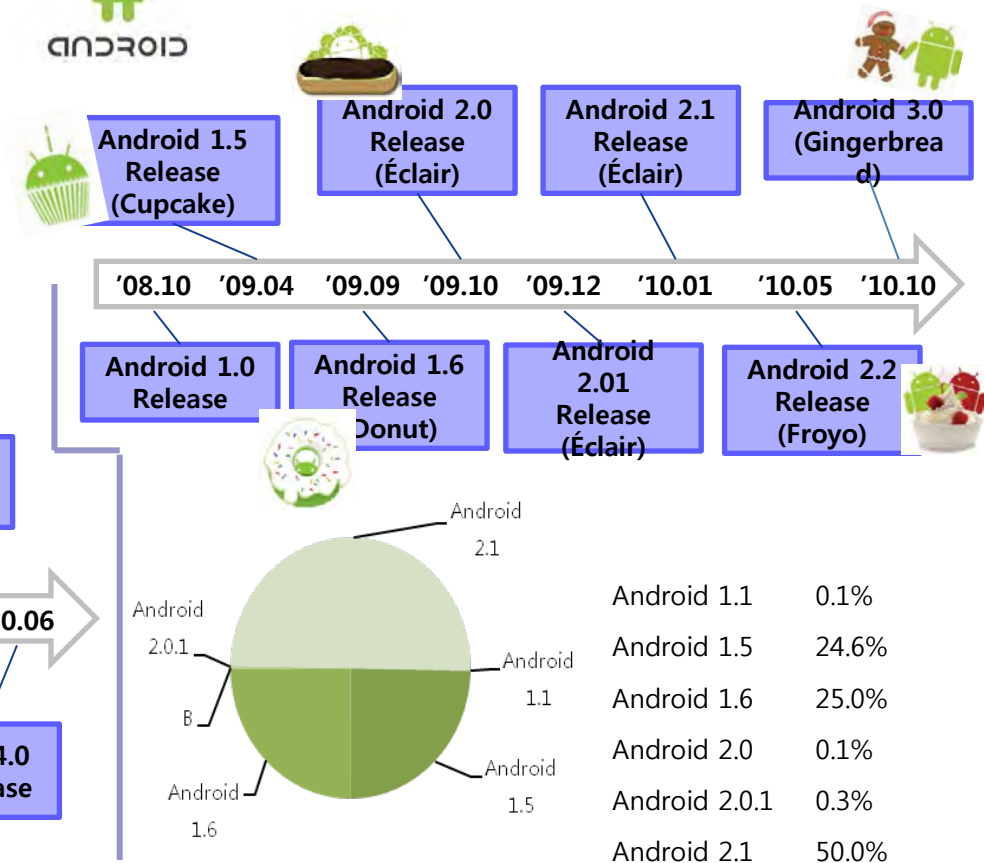
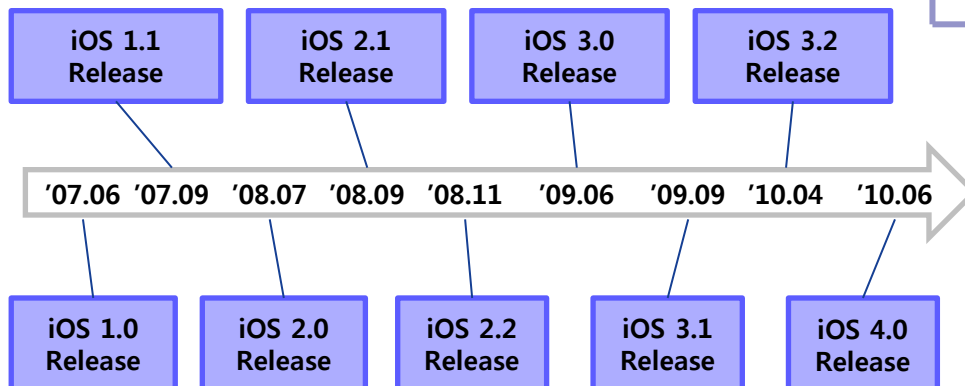
CPU	S3C6400 ARM 11 412 MHz	S3C6400 (ARM 11 412 MHz)	S5PC100 (ARM Cortex A8 600 MHz)	1 GHz Apple A4 processor
Initial OS	iPhone OS 1.0	iPhone OS 2.0	iPhone OS 3.0	iOS 4
Released	2007. 6	2008. 7	2009. 6	2010. 6
Resolution	480x320	480x320	480x320	960x480
Connectivity	WiFi, GSM, Bluetooth	WiFi, UMTS/3G, GSM, Bluetooth	WiFi, UMTS/3G, GSM, Bluetooth	WiFi, UMTS/HSDPA/HS UPA/3G, GSM, Bluetooth
Camera	2 Megapixel	2 Megapixel	3 Megapixel	5 Megapixel
Video Recording	No	No	Yes	Yes 720p HD at 30 fps

Smart Phone OS

❖ 2010: Closed platform-Apple iOS, Open platform-Google Android



Model	Initial OS	Released
iPhone	iPhone OS 1.0	2007.6
iPhone 3G	iPhone OS 2.0	2008.7
iPhone 3GS	iPhone OS 3.0	2009.6
iPhone 4	iOS 4	2010.6

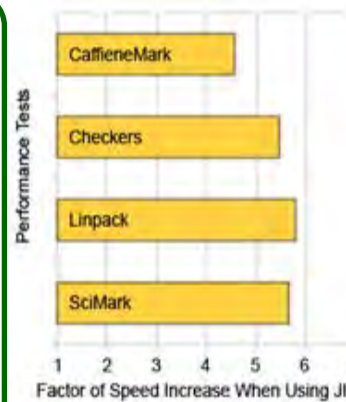


Smart Phone OS : Android 2.2(Froyo)

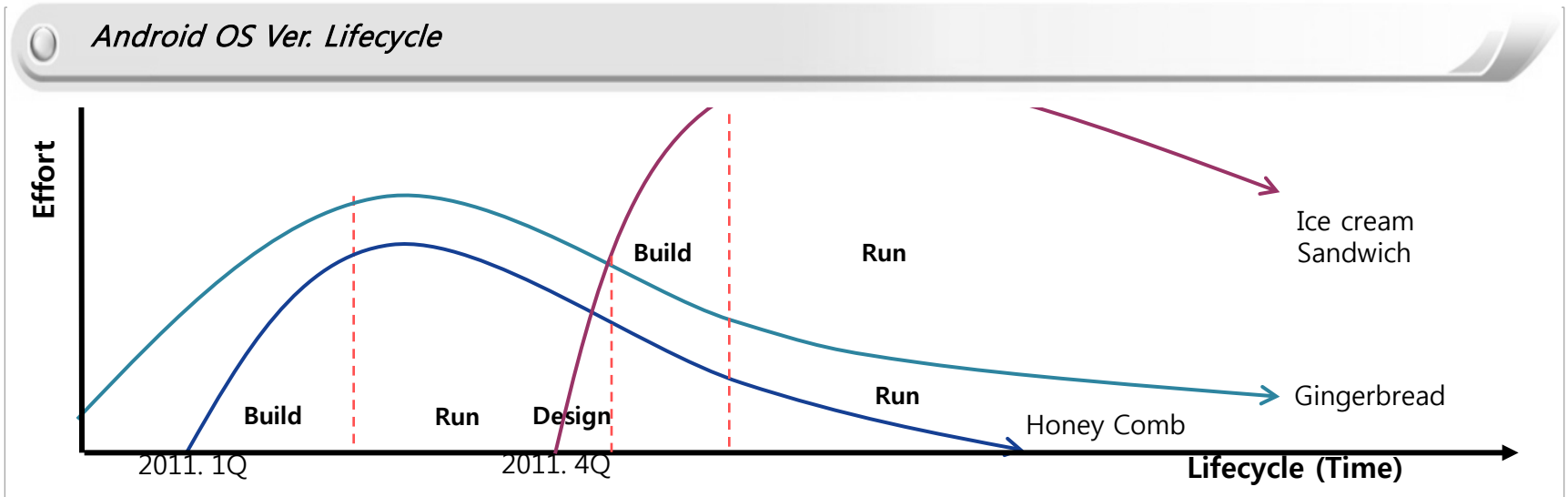
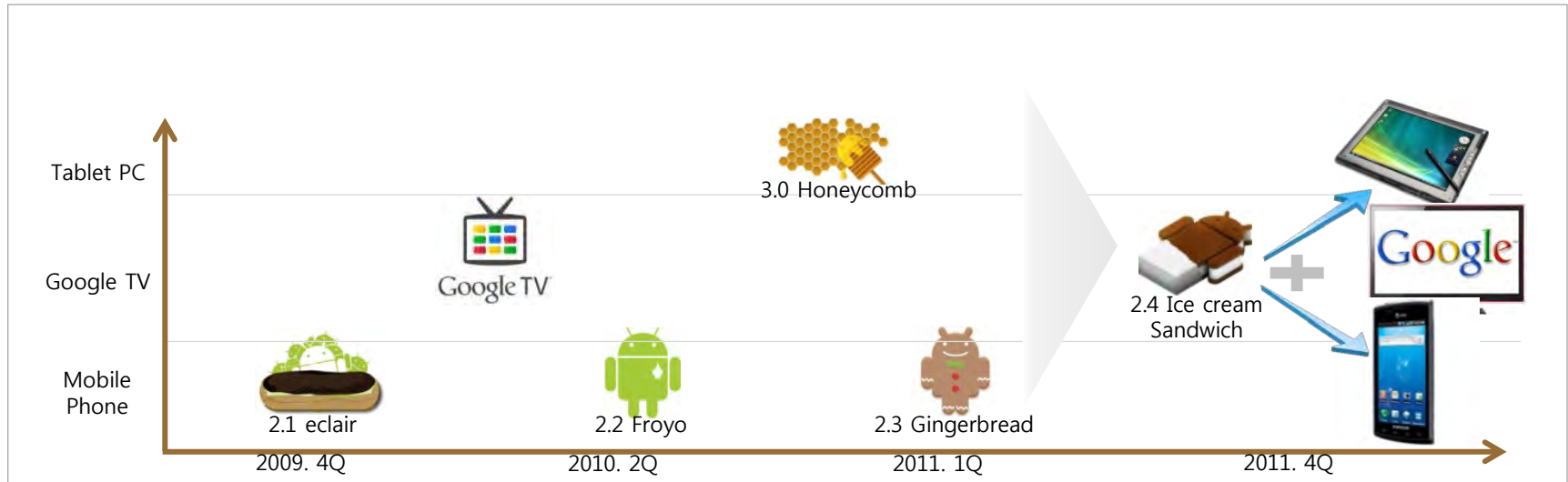


Android 2.2 Froyo

- ❖ Based on Linux Kernel 2.6.32
- ❖ Improved performance
 - ❖ Performance of the browser
 - ❖ Dalvik Performance Boost
 - ❖ Kernel Memory Management Boost
- ❖ Portable hotspot
- ❖ Increased Microsoft Exchange support
 - ❖ Improved security
 - ❖ Remote wipe
 - ❖ Exchange Calendars, Auto-discovery, etc
- ❖ Support for installing applications to the expandable memory
- ❖ Adobe Flash 10.1 support

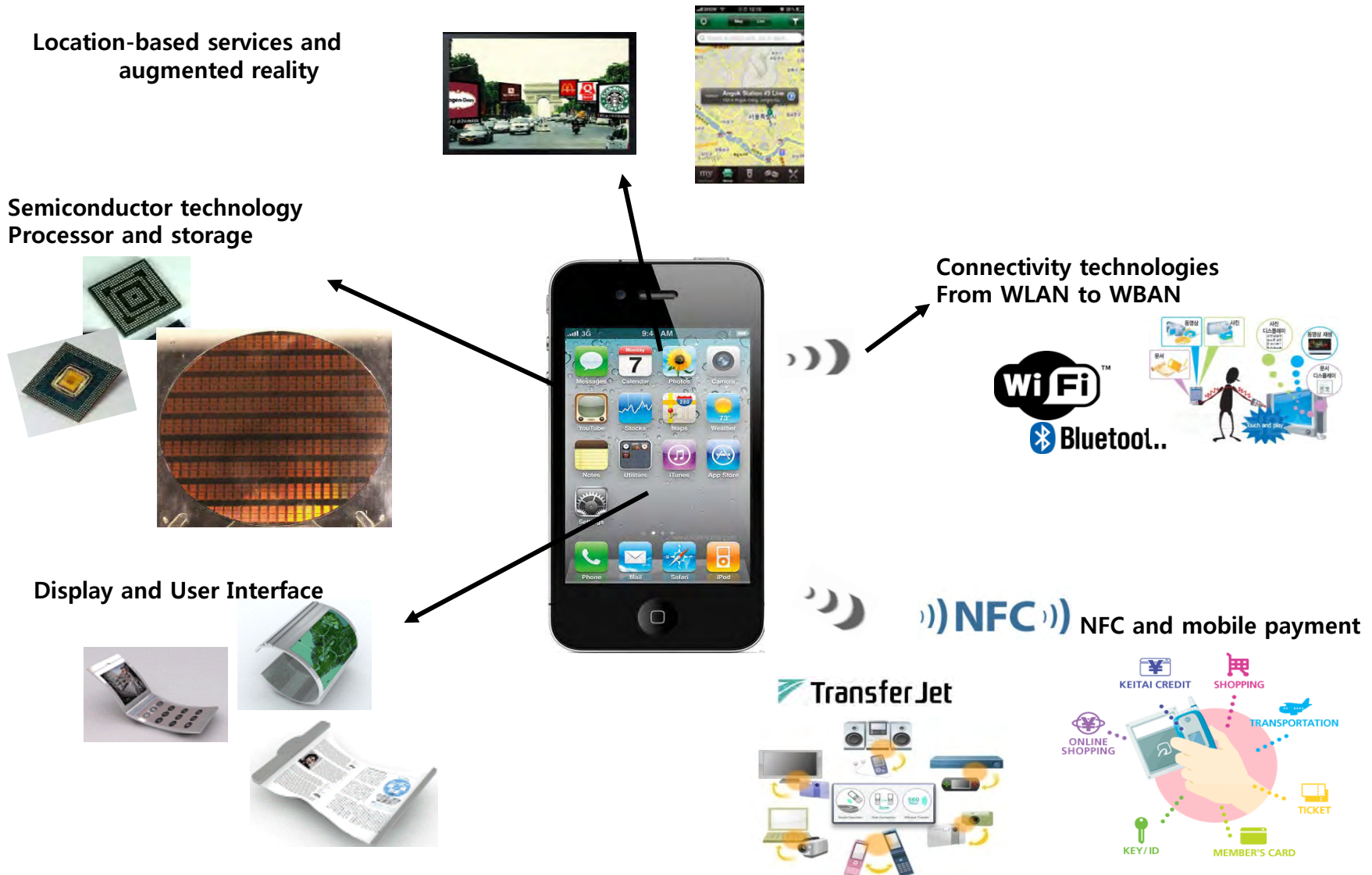


Android OS and Life cycle



* Google, M&A Motorola (H/W Devices : Phone&STB, Patents)

Convergence Terminals



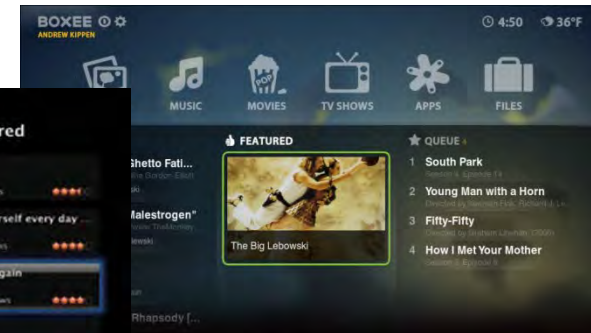
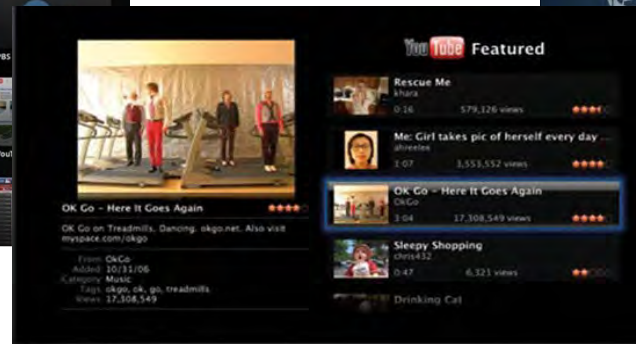
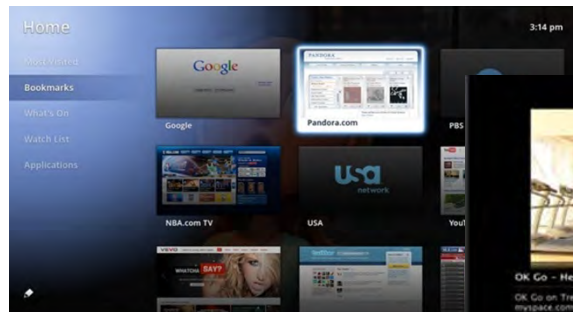
*Smart Devices :LBS, Flexible Display, Banking, WPAN→N-Screen

SMART TV

What is Smart TV?



Smart TV?



IT'S INTEGRATED

One Screen for User's Everything
which is connected TV

IT'S INTERACTIVE

New Connection to Channel and Website

Smart TV



Smart TV to Users

one TV Interface
"Broadcasting Program"
"Personal Programs"
with online searching

"Social Network"

Customized &
Social Networked



Downloadable Application
Programs

"New Input Devices"
TV control
(Voice, Motion...)

*Smart TV: Smart USER(?) → User needs smart services by paying(?)

Google TV *(M&A Motorola:17,00Patents, many Devices)*



* Google for Motorola's 17,00Patents, many Techs for smart TV & Phone(Android)

Introduction of Smart TV



Smart TV & Web TV

	Terrestrial TV	Cable TV /IPTV	Broadband TV /Web TV	Smart TV
Media	Radio	Cable / QoS Network	Internet	Internet
Duplex	none	Partial	O.K.	O.K.
Contents	Terrestrial's contents	Company's contents	On line contents	On/Off line contents
Application programs	Data application programs	Company's program	Device's application programs	User's application programs
Company	Terrestrial	Cable & IPTV	Samsung/LG Internet TV OTT(Hulu/Vudu) AppleTV	GoogleTV Apple iTV

* Smart TV : Internet, Duplx, User pushed Contents/Programs ,Apps)

Google TV(1)

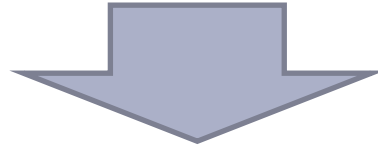


Max size
Screen

Max Users

Max Times
(USA:5hours/day)

Big Ad.
Markets



Google TV™

TV MEETS WEB. WEB MEETS TV.

* Google focus on Big Ad. Markets, Contents, Apps)

Google TV(2)

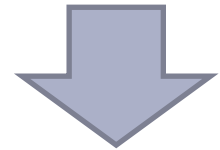
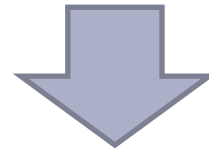
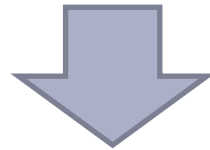


TV + Web

Web

Closed Maker

Choice of
TV or Web



Google TV™

Chrome
Browser

Android +
Chrome
Open Source

Simple

Google TV
SDK Open

TV like Web Contents
Personalize
Searching

* Google TV : personalized Contents, Apps)

Google TV(3)



ANDROID



GOOGLE CHROME



FLASH 10.1



BROADBAND
CONNECTIVITY



EASY
INTEGRATION



STRONG
PROCESSOR

* Google TV : Intel ATOM, WiFi Services

Google TV(4)

31

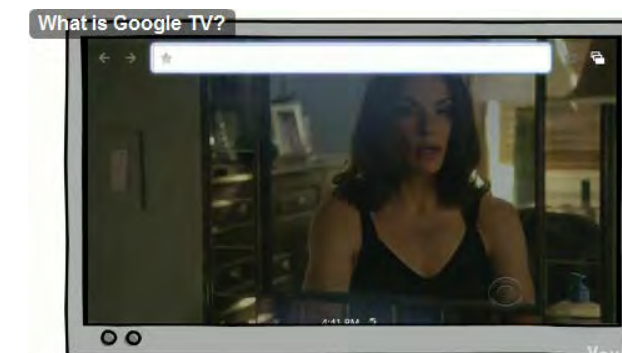
Search

Web Video

Social Network



Google TV™

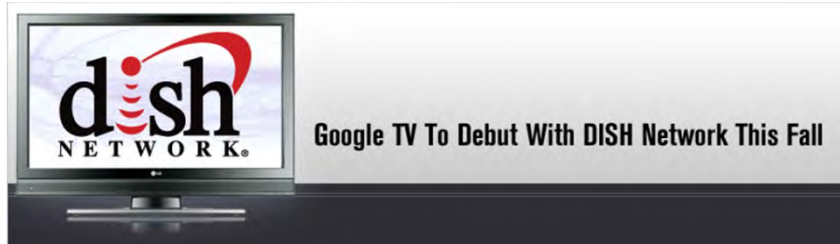


PIP

Market

Search over Video

Google TV(5)



* Google TV : TV Marketing & App. Store

TIME LINE

**OPTIMIZE
YOUR SITE
FOR TV**

**ANDROID MARKET,
GOOGLE TV SDK,
TV WEB APIs**

**OPEN
SOURCE**



TODAY



EARLY 2011



SUMMER 2011

* Google TV Delayed Due to UX(User Experience) Devices