Mobile TV in Japan

Technology Overview, Business Models,
Deployment Experiences

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Workshop: Mobile TV – Quo Vadis?

Overview

▶ Mobile TV in Japan: Service overview

▶ 1SEG: Technical briefing

▶ Handsets

▶ Services & Business Models

▶ First Experiences

▶ Conclusions

Mobile TV in Japan – Service Overview

▶ Japan: Mobile TV in commercial operation since 2003

▶ With four different services

- Mobile terrestrial analog TV
- Mobile satellite digital TV
- 3G-network-based video
- Mobile terrestrial digital TV: 1SEG service started 2006-04-01

Background: Existing Mobile TV services in Japan

Mobile terrestrial analog

▸ Mainly in cars
(integrated into navigation systems)

▸ Vodafone's V601N from NEC offered in 2003

▸ KDDI AU EZ-TV offered in 2005-07

- Analogue TV reception linked to interactive services
- Link to TV program websites, EPG info
- Downloading background music from TV programs: linked to existing EZ Chaku Uta Full service
- Online purchase of soundtracks

下のサムネイル画像をクリックするとこちらで拡大画像がご覧になれます。

Background: Existing Mobile TV services in Japan

Satellite-based

▸ MobaHO consumer satellite broadcasting service

▸ Available since 2004-10

▸ MPEG-4 Version1 Simple Profile

- Maximum resolution: 320x240 pixel, 15fps
- Maximum video bitrate: 384 KBit/s

▸ AAC audio (LC profile)

- Maximum audio bitrate: 144 KBit/s

▸ Conditional access by MULTI2 cipher

▸ 8 video channels, 30 audio channels, data information services

▸ Complete coverage in Japan

▸ Charges: basic monthly fee + package fee (up to ¥ 2080)

▸ Optional premium video channels

Background: Existing Mobile TV services in Japan

3G network based

▶ Video download services
- DoCoMo i-motion, introduced 2001-11
- KDDI EZ Movie, introduced in 2001-12
- Vodafone live! BB, introduced in 2004-11
  - iPod-approach: Multimedia download
    (on home PCs, then transferred to mobile phone)

Internet/EZweb network

Large-volume download
via low traffic
around midnight
(Up to 3MB)

Normal download
based on Object Download
(Up to 1.5MB)

Push-type Delivery
Servers

Content Servers

External memory
transfer

Serial transfer

1X WIN terminal

List of registered programs
for EZ Channel

Source: KDDI

▶ Push-based content distribution
- KDDI EZ Channel, introduced in 2004-09
  - Automated distribution of SMIL presentations at night time
  - 36 programs (April 2005)
- KDDI EZ Channel Plus, introduced in 2006-09
  - Enhanced EZ Channel Plus, based on BCMCS (CDMA2000 EV-DO Broadcast Service)
- Vodafone live! CAST, introduced in 2006-03
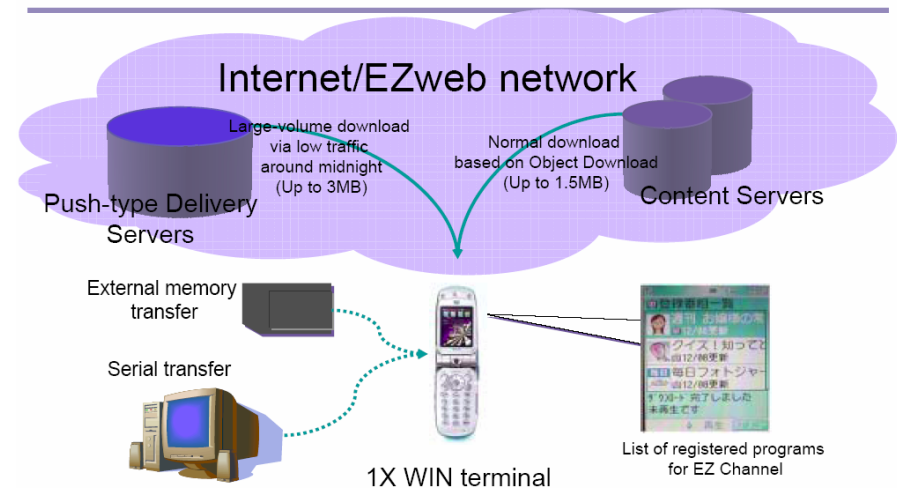
Mobile Digital TV in Japan

▶ 1SEG: Digital terrestrial broadcast service for mobile devices
  - Officially started on 2006-04-01
  - Intended for mobile phones and car navigation systems
  - Public, free to air broadcasting service, independent of mobile operators

▶ Coverage
  - Started in main areas (Tokyo, Osaka, Nagoya)
  - 80% coverage end of 2006

▶ Number of channels
  - Depending on region (9 for Tokyo as of 2006-12)

▶ Penetration
  - More than 10,000,000 1SEG phones sold as of 2007-09
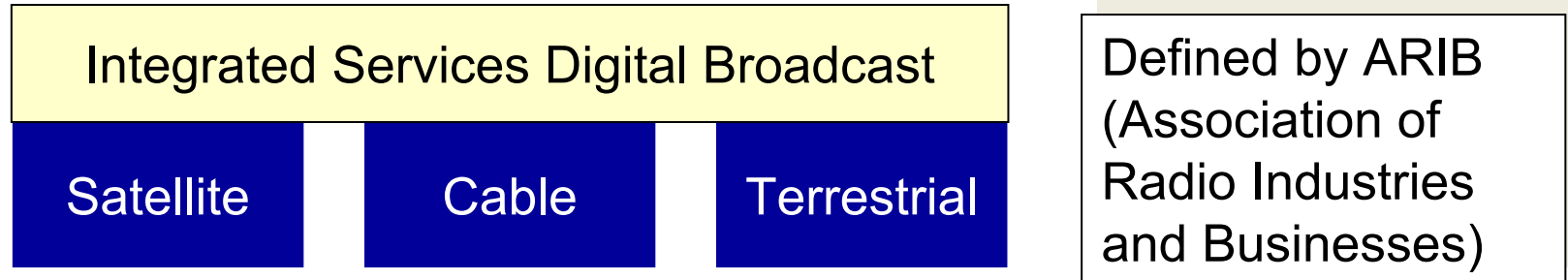
Digital Terrestrial Broadcasting Standards
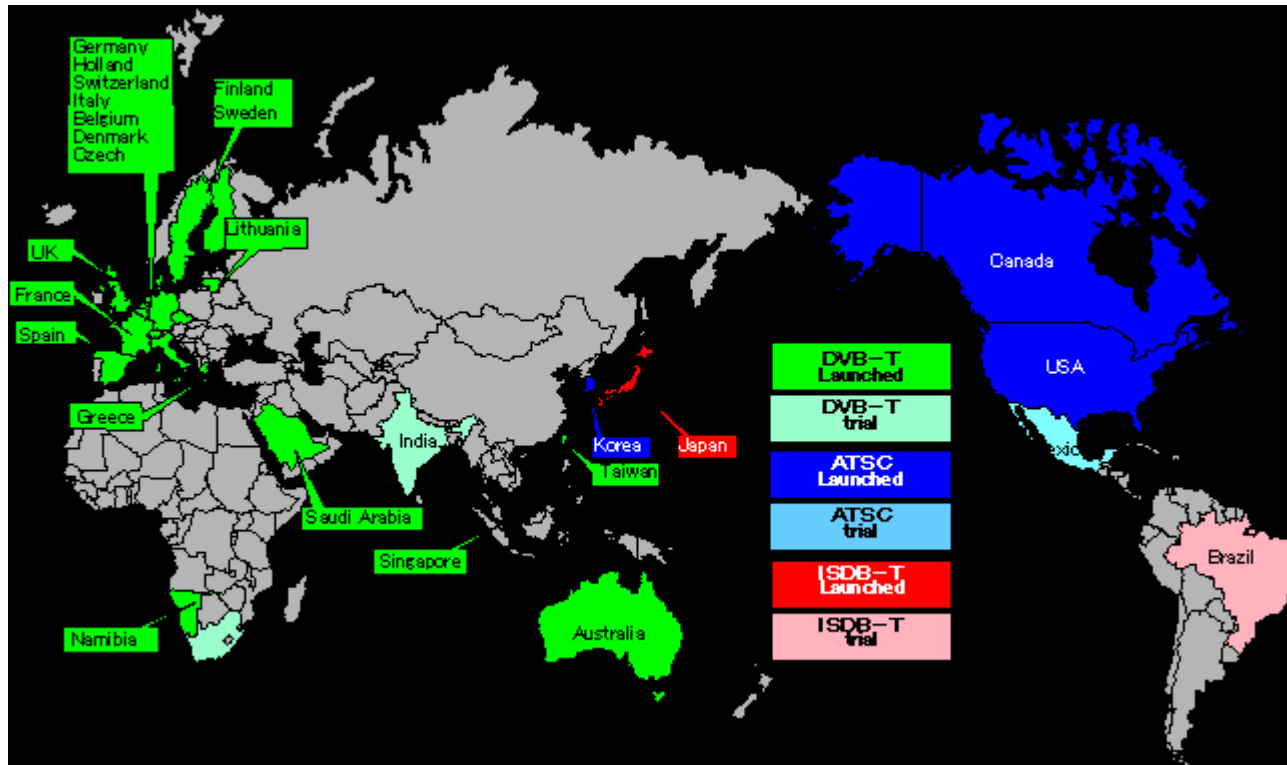
ISDB-T: Japan and Brasil

(Source: Digital Broadcasting Experts Group)

Digital Broadcast in Japan

Integrated Services Digital Broadcast		
Satellite	Cable	Terrestrial

Defined by ARIB (Association of Radio Industries and Businesses)

▶ Integrated Services Digitial Broadcast (ISDB)
- Link-layer independent digital broadcast approach
- MPEG-based codecs and transport mechanisms for digital TV
- Data broadcasting
- HDTV-support
- Conditional Access
- Different modulations for different networks (satellite, cable, terrestrial)

▶ ISDB-S
- Started in 1996

▶ ISDB-C
- Started in 1996

▶ ISDB-T
- Started in 2003 (after frequency allocation)
- Terrestrial TV broadcast fundamental in Japan
- Basis for Mobile-TV

# ISDB-T: Digital Terrestrial TV

▶ Features

- HDTV, multi-channel SDTV
- Multimedia and interactive services
- Mobile reception
- Robustness against multipath and propagation fading
- Single-Frequency-Network enabled

▶ Implementation

- Orthogonal Frequency Division Multiplex (OFDM)
- Time interleaving
- Band Segmented Transmission (BST) of OFDM
  - Frequency band of one channel (6 Mhz) divided into thirteen segments
  - Partial reception is possible
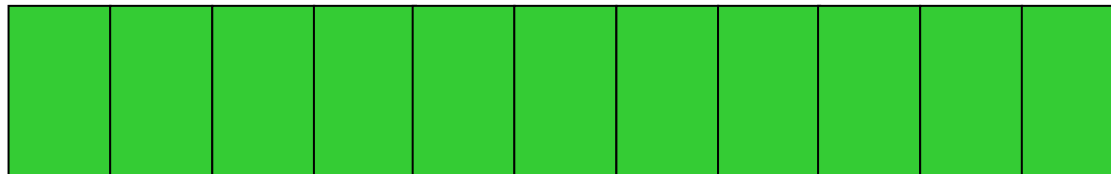 - TV stations can configure use of segments for different TV services
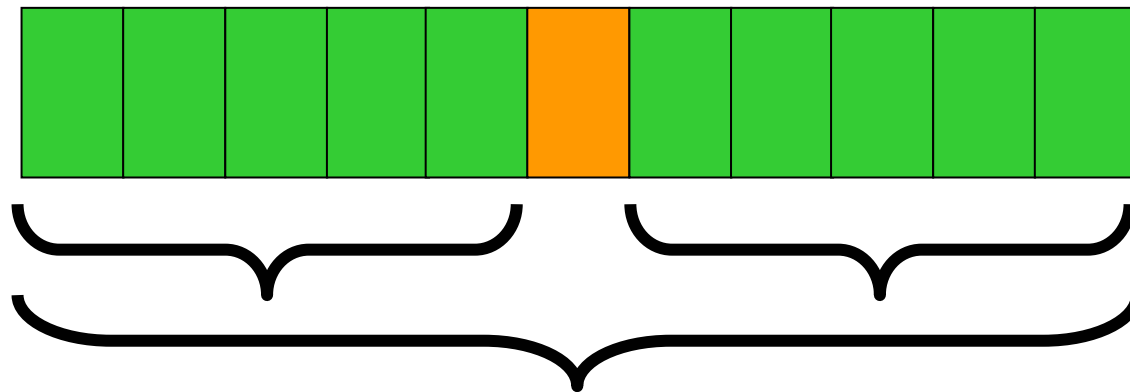
Segmented OFDM

One ISDB-T channel

6 Mhz
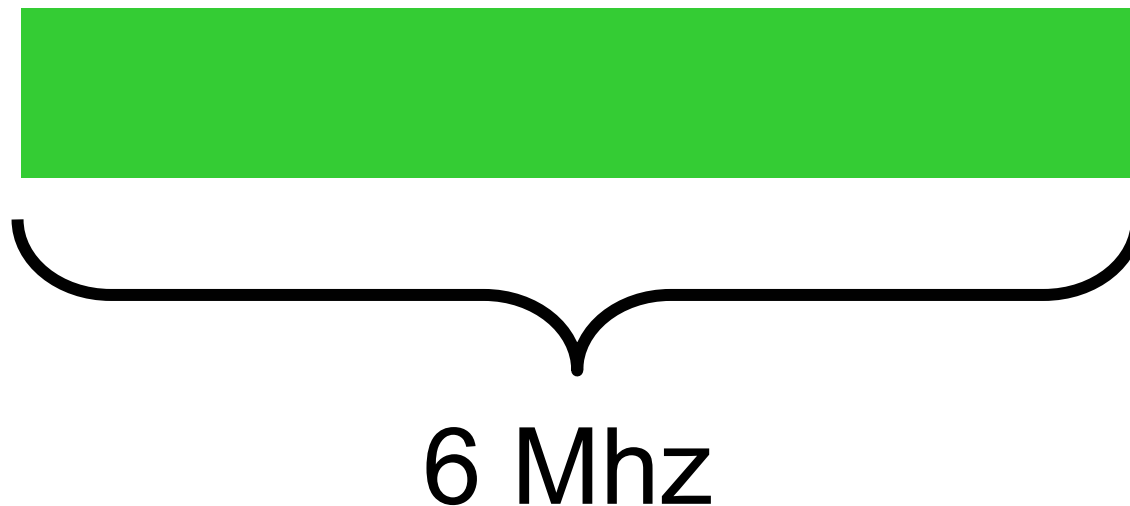
Segmented OFDM

13 segments

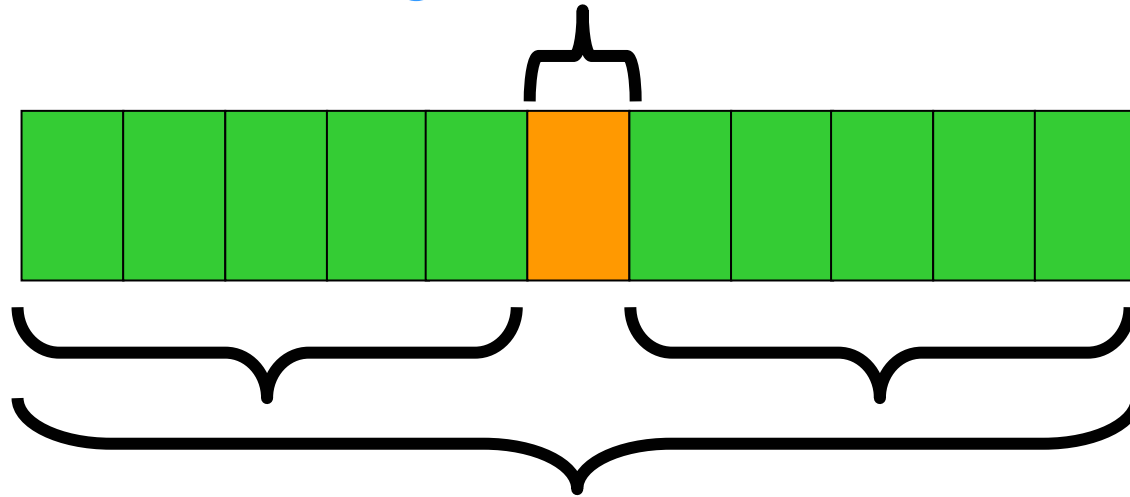# Segmented OFDM

13 segments

12 segments for either 1xHDTV or 3xSDTV

Segmented OFDM

One segment for Mobile TV

12 segments for either 1xHDTV or 3xSDTV

1SEG Technical Overview

▶ H.264 video
- Maximum video resolution: 320x240 pixels, 15fps
- Maximum video bitrate: approx. 180 – 256 Kbit/s

▶ AAC audio (LC profile)
- Approx. 32 – 64 Kbit/s

▶ Encapsulated in MPEG-2 transport stream

▶ Data broadcasting
- EPGs and other supplementary information
- Broadcast Markup Language (BML)
- Approx. 20 – 80 Kbit/s

▶ Transport
- OFDM, QPSK
- 1/2 FEC, 1/8 guard ratio
- Robust reception at higher speeds:
  up to 400 km/h

| Seg. 13 | Seg. 11 | Seg. 09 | Seg. 07 | Seg. 05 | Seg. 03 | Seg. 01 | Seg. 02 | Seg. 04 | Seg. 06 | Seg. 08 | Seg. 10 | Seg. 12 |

1SEG coverage
in Tokyo area
as of 2006-12

Source: http://www.d-pa.org

Data Services

- All broadcasters are providing data broadcasting now
  - Program related information
  - Anytime news
  - Weather information
  - Sports results etc.

- Broadcast Markup Language (BML)
  - XHTML, CSS, ECMAScript, broadcast-specific extensions
  - Web-content (XHTML)
  - Linking to external web content
  - Asynchronous notifications

- Enabling interactive broadcasting
  - Video + data
  - Backchannel for responses
  - BML data can received over broadcast or over Internet (e.g., over 3G link)

```
<?xml version="1.0" encoding="Shift_JIS"?>
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http://www.arib.or.jp/B24/DTD/bml_12_0.dtd>
<?bml bml-version="12.0"?>
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<link href="Sample-Common.css" />
</head>
<body>
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 height:40px; left0px; top0px;" />
<p class="marquee" style="left:0px; top:40px; />
ワンセグ放送サービス BMLサンプル！！
</P>

<p class="linkl" style="top:60px" >
<a href="about.bml">·News and Sports</a>
</p>
<p class="linkl" style="top:80 " >
<a href="about.bml">·Weather  News</a>
</p>
<p class="linkl" style="top:100 " >
<a href="about.bml">·About 1 SEG</a>
</p>

<P style="width:240px; height:60px;
 left:0px; top:120px; font-size:small" >
Copyright SILENT RHINO JAPAN <br />
All Rights Reserved, 2006
</P>
 </div>
</body>
</html>
```

BMLソース

表示例

1SEG-Devices (1)

KDDI Sanyo W33SA

KDDI Hitachi W41A

1SEG-Devices (2)

KDDI Sony Ericsson W44S

**Nintendo DS
with 1SEG receiver**

Sanyo NV-HD830DT **Vodafone Sharp 905SH**

1SEG-Devices (3)

Sharp Papyrus PW-TC920 Dictionary

1SEG phones at KDDI Designing Studio

1SEG-Devices (4)

Panasonic FOMA P903iTV

Typical 1SEG Phone Features

▸ EPG management

▸ TV and additional data information from data broadcast

▸ Follow links from BML to arbitrary web resources (over 3G network)

▸ Content recording (on SD memory cards)

▸ DRM and copy protection mechanisms

- 1SEG transmission unencrypted

- Manufacturers and mobile phone companies chose to implement copy protection mechanisms

▸ 1SEG content

- Currently limited to simulcast (national regulation until end of 2008)

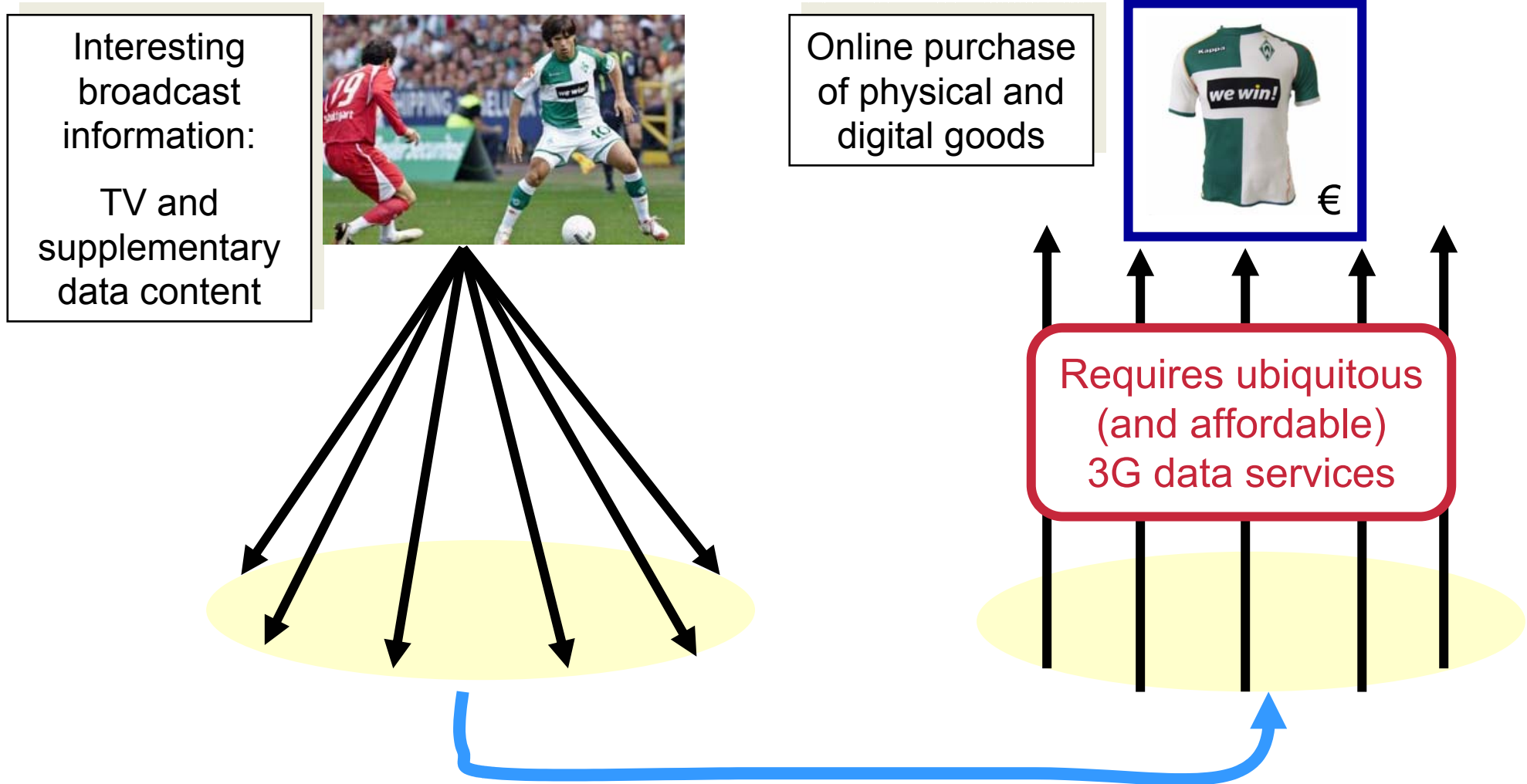
Source: DiBEG Japan

From Technology to Business

▶ Business models for Mobile TV not obvious

- Mobile operators provide Mobile TV handsets (with substantial subsidizing) but cannot charge for TV service
  - Public, free to air broadcast service
  - Difficult to estimate value of interactive services
- Extremely competitive mobile communications market
- Mobile TV for mobile phones is viewed as a differentiating phone feature

▶ Operators currently building alliances with content providers

- KDDI and TV Asahi
- DoCoMo and Fuji TV, Nippon Television
- Goal: validate new services by integrating Mobile TV and interactive wireless communication
  - Introduction of new commercial services
  - Integration of Mobile TV with existing services
  - Measure user behavior (peak times, session duration etc.)

Leveraging Integration of Broadcast and Interactive Communications

Interesting broadcast information:

TV and supplementary data content

Online purchase of physical and digital goods

€

Requires ubiquitous (and affordable) 3G data services

Case Study: Advertisement-based Services

▶ EZ TV "Song Search"
  - Allowing search of broadcasted BGM song titles
  - Purchase and download songs with Chaku Uta Full service

▶ EZ Navi Walk
  - Initiate navigation from 1SEG data broadcasts
  - Guiding users to spots introduced on TV programs
  - Leveraging regional scope of 1SEG distribution system
  - Product placement, advertisements

▶ Chukyo TV and Yumenomachi develop 1SEG-based food ordering system
  - Food ads over 1SEG TV channel
  - Ordering information over data channel (link to website)

Other 1SEG Services

▶ Nippon TV and NTT DoCoMo have built a system to distribute and store video-embedded e-coupons and e-cards
  - Compatible with Toruca, DoCoMo's existing e-coupon service for Osaifu Keitai FeliCa handsets
  - Under consideration: location-dependent, user-group-specific coupons

▶ NHK (Japan's public broadcaster) has launched an earthquake and tsunami alerting service over 1SEG data broadcasting
  - Alerts broadcasted over data channel
  - *Interactive button* on handsets can be used to request detailed alert information
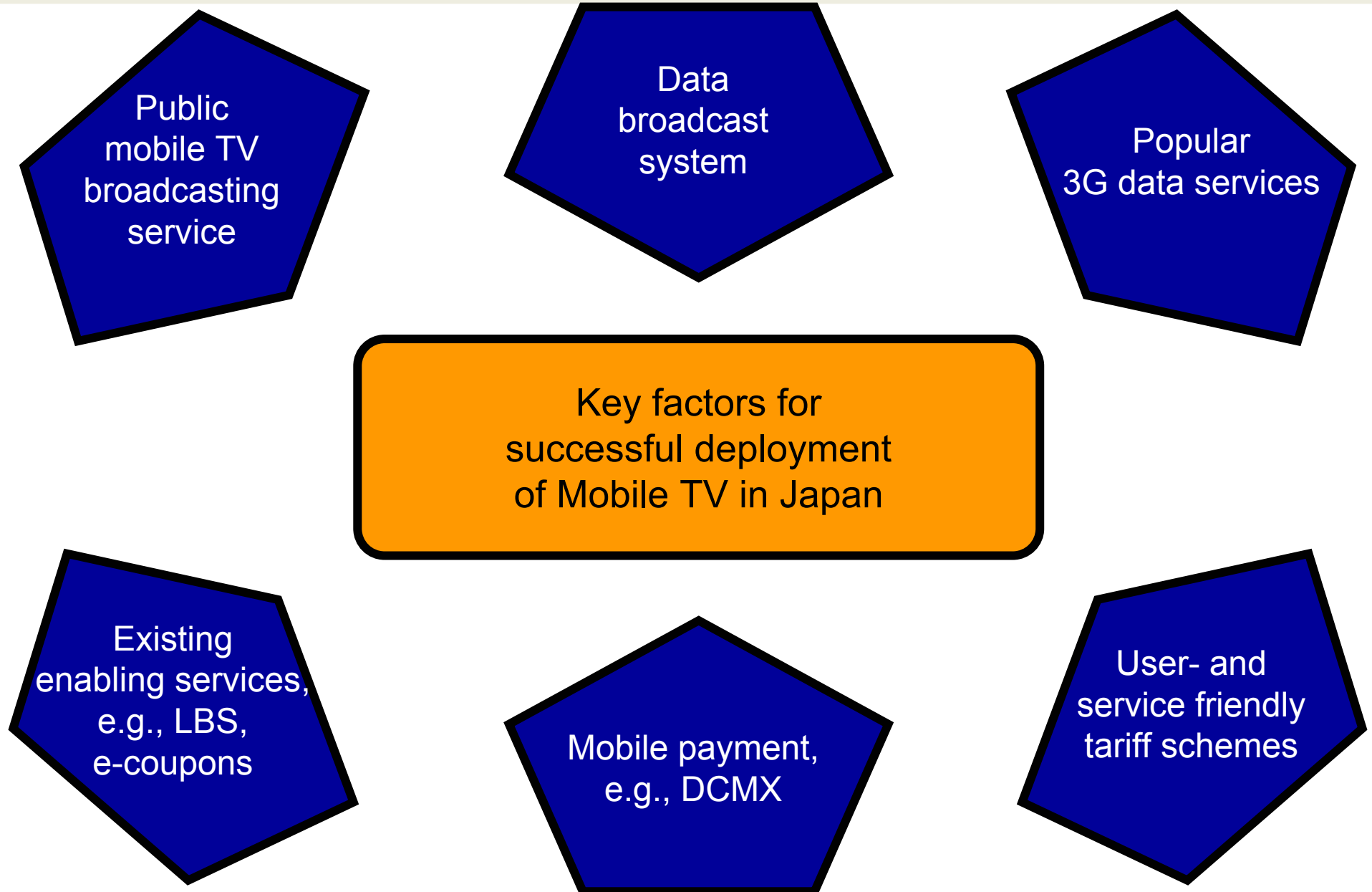
Future Services/Applications

▶ KDDI and TV Asahi collaboration
  - Connecting services for mobile phones and broadcast TV
  - TV Asahi providing content and merchandising offers
  - KDDI providing mobile & fixed network, 3G services, e-business platforms

▶ New promotion strategies: advertising through TV media and datacasting

▶ TV shopping and on-line shopping
  by connecting merchandise offerings to TV content

▶ Linking on-line content to TV Asahi programs

▶ Connecting TV Asahi 1SEG to KDDI EZweb services

▶ Multimedia Broadcasting Planning LLC (MMBP)
  - NTT DoCoMo founded partnership with Fuji TV, Nippon Broadcasting System, Sky Perfect Communications, Itochu
  - Mission: research new ISDB-T-based multimedia services & dedicated content for Mobile TV

Regulatory requirement for simulcast ends after 2008

1SEG: First Experiences

10,000,000 1SEG handsets sold as of 2007-09

▶ Real user base still unclear

▶ Peak time is 19:00 to 20:00 (KDDI)

▶ Video quality is considered satisfactory

▶ Mobile reception in local trains can be difficult

▶ Battery duration for Mobile TV today approximately 3 – 4 hours

Public mobile TV broadcasting service

Data broadcast system

Popular 3G data services

Key factors for successful deployment of Mobile TV in Japan

Existing enabling services, e.g., LBS, e-coupons

Mobile payment, e.g., DCMX

User- and service friendly tariff schemes

Challenges

▶ Attractive content
  - Dedicated programs for 1SEG not yet available
  - Regulatory issues

▶ Power Consumption
  - 3 – 4 hours continuous watching time
  - Higher energy density required

▶ Technology lifetime
  - MediaFLO is being considered by operators as an alternative technology
  - Trials by KDDI and DoCoMo
  - However, ISDB-T and 1SEG enjoy strong government support

▶ Finally: business models
  - How to make money with Mobile TV
  - Acceptance of advertising unclear
  - Network designed with broadcast in mind
  - Still, mobile operators required to develop interesting services
  - Favored approach so far: couple Mobile TV to 3G network-based services

Conclusions

▶ Introduction of 1SEG broadcasting service significant breakthrough for introduction of Mobile TV — **world's most successful commercial Mobile TV deployment** to date

▶ Technology development and network extension supported by national political bodies: **well-defined architecture, fast network extension** → less fragmented market

▶ 1SEG as **public, free to air broadcasting service** is key to fast adoption by users

▶ **Inclusion of data broadcasting** mechanisms right from the beginning

▶ Business models for operators and content providers not completely defined

▶ But **vital, ubiquitous 3G infrastructure and complementary commercial services** allow for promising integration of broadcast and interactive, and commercial services

▶ **Collaborations between operators, broadcasters and content providers** currently being extended

Danke!

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