Technologies for Fixed Mobile Broadcast Convergence Services

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Outline

1. Trends of Japanese telecom market
2. Current Examples of FMC Services
3. Technologies toward Future FMBC Services

1. Trends of Japan's Fixed, Mobile and Broadcast services

1-1 Telco Business Environment in Japan
1-2 Broadband Penetration in Japan
1-3 Japan's Digital Terrestrial Broadcast

1-1 Telco Business Environment in Japan

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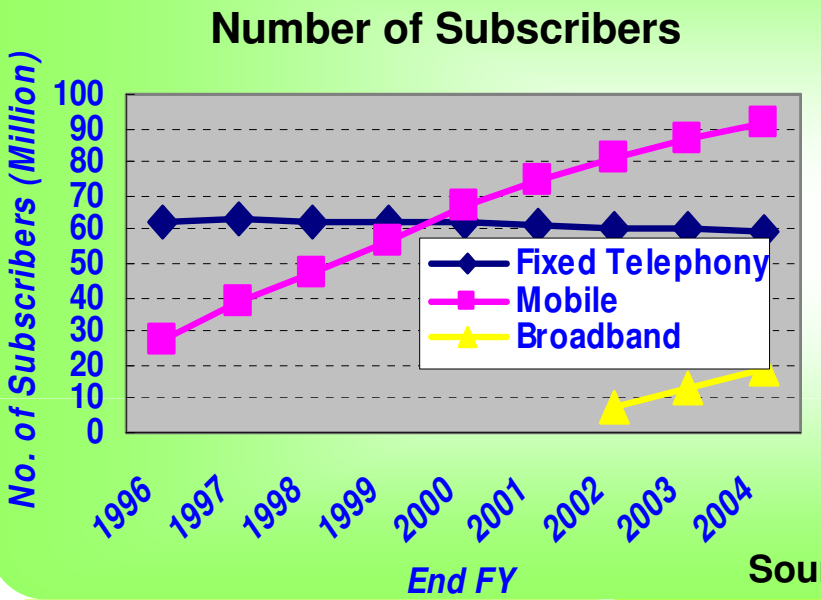
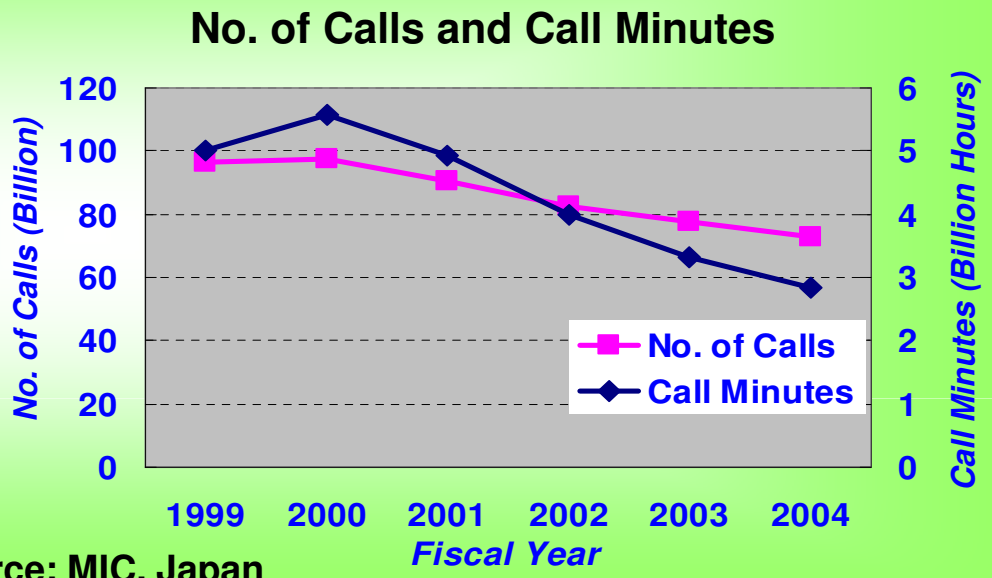
Shrink of Fixed Market and Saturation of Mobile Market





Source: MIC, Japan

Adaptation to Change In Traffic Attribute

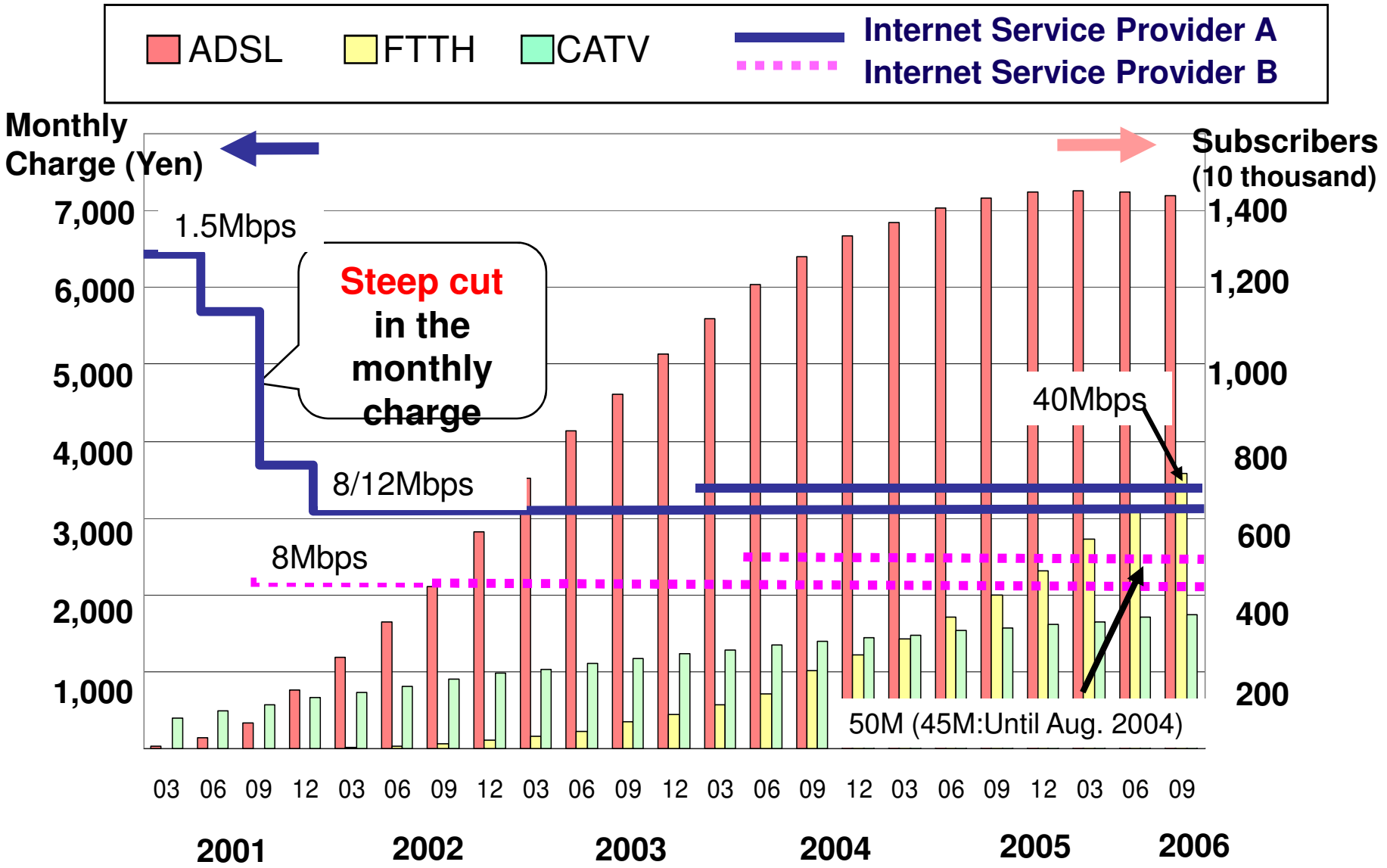
Cost Reduction

Creation of New Business Areas

Fixed Mobile Converged *Network*

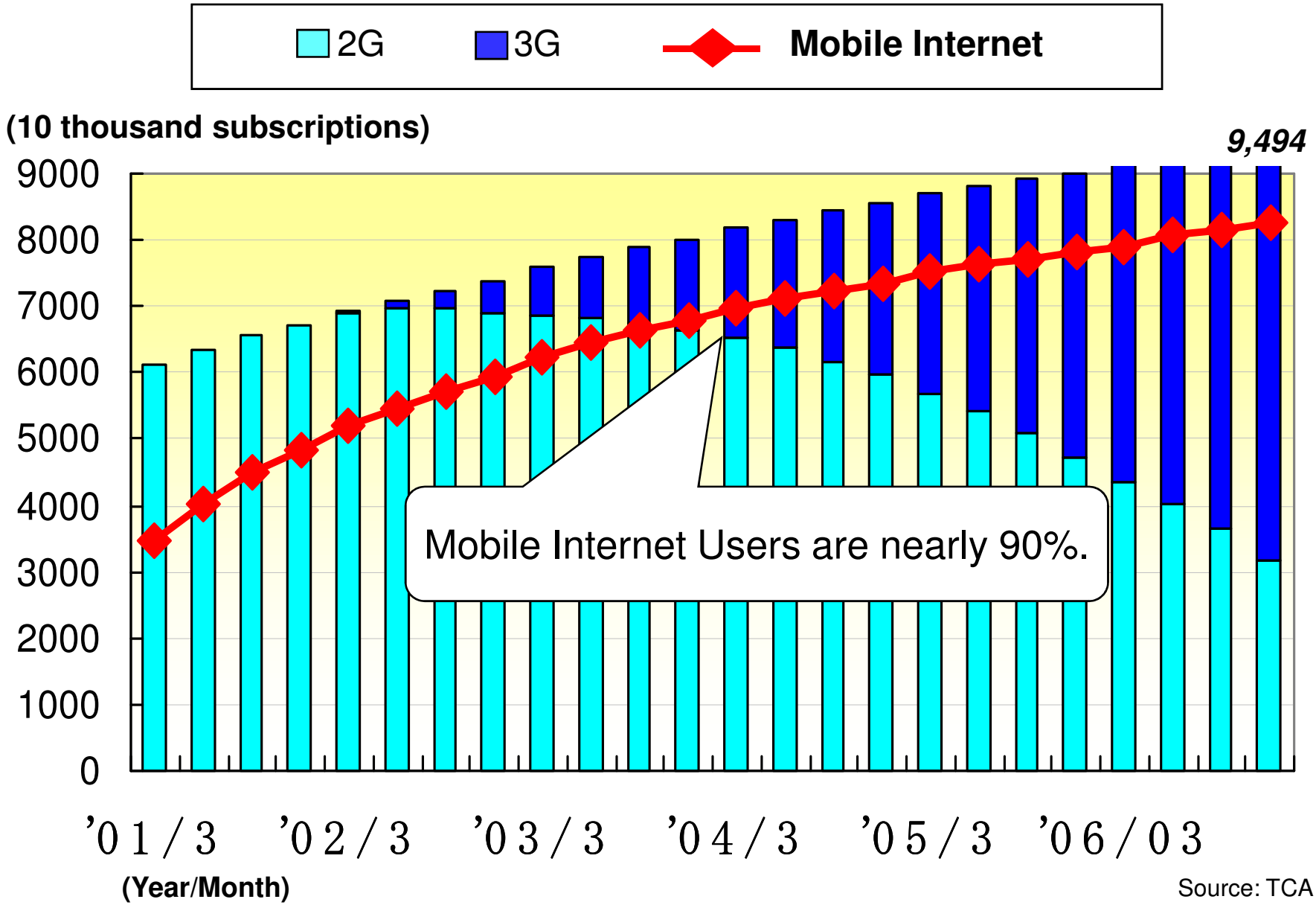
Fixed Mobile Converged *Services*

1-2 Broadband Penetration in Japan – (1)Fixed line



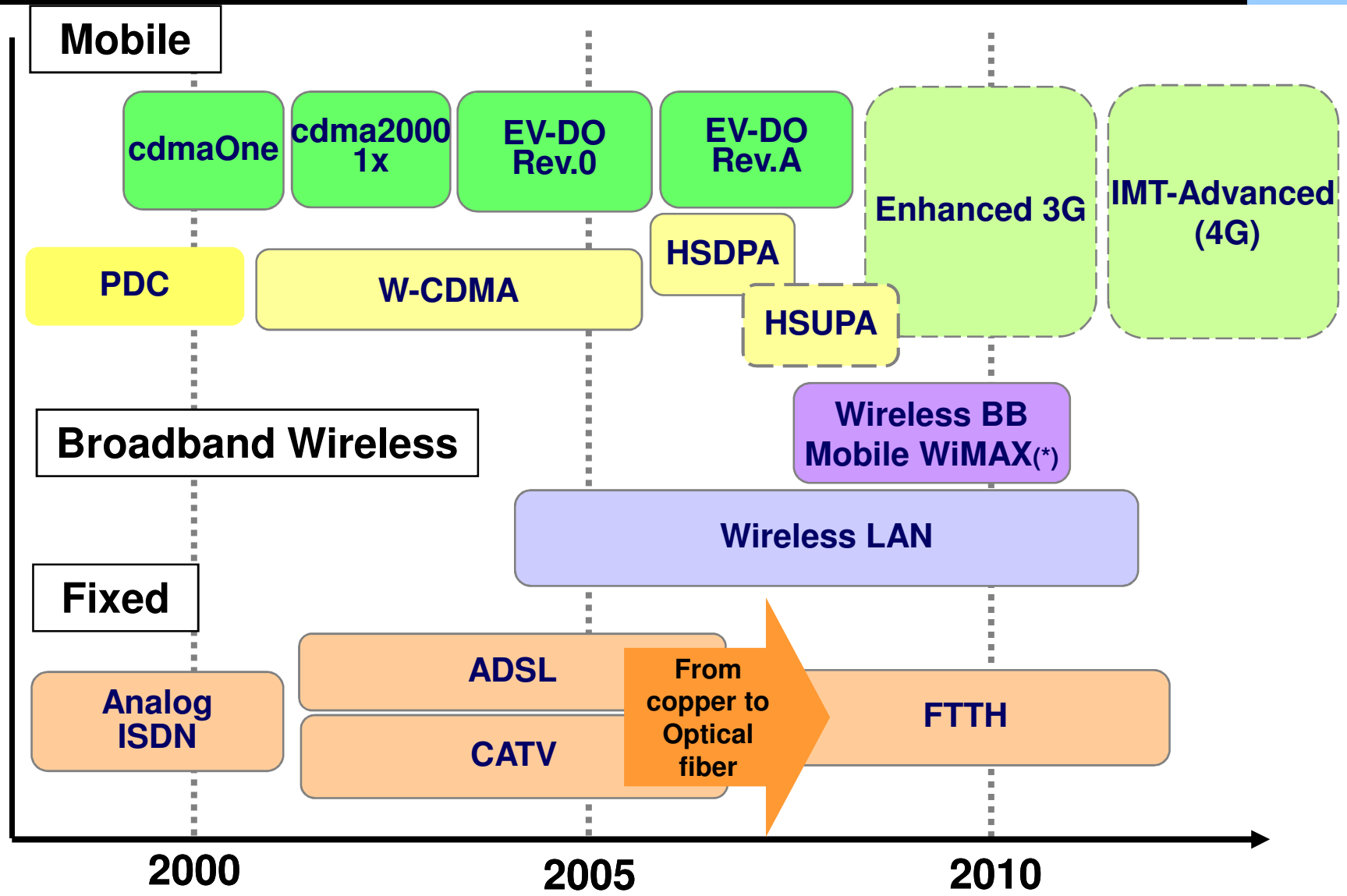
Source: MIC Press Release

1-2 Broadband Penetration in Japan – (2)Mobile



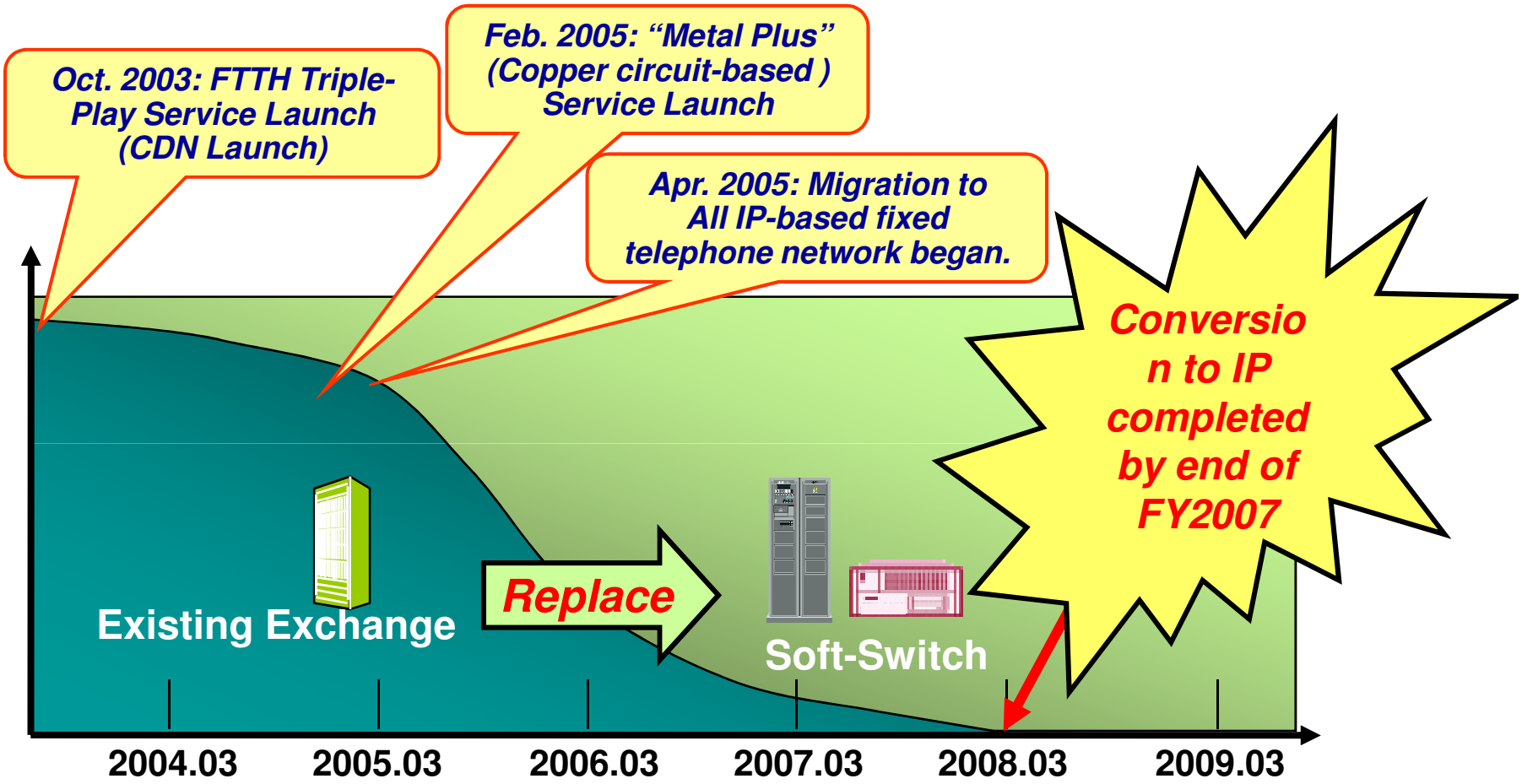
Source: TCA

Evolution of broadband in Japan



* IEEE802.16e : seamless connection when traveling at 120 km/h. Maximum speed is said to be around several tens of Mbps.

KDDI's initiative towards IP-based telephony network



■Replace all the circuit switches with Soft switches by March, 2008. => world's fastest migration

■Migrate NTT Local subscribers into KDDI direct subscription with "Metal-Plus" and "Hikari-one".

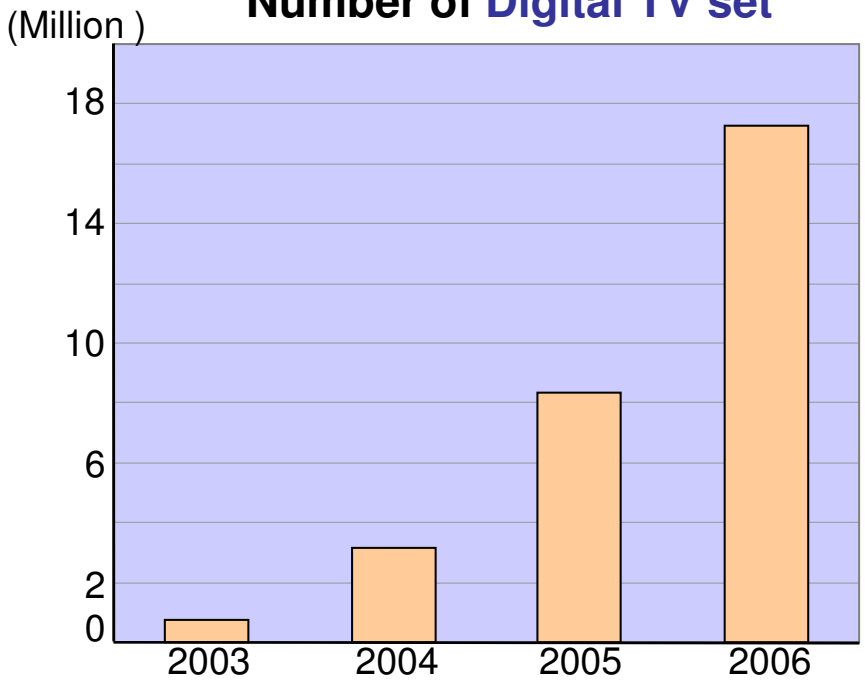
◆Metal-plus(Copper): 2.7 million subscribers
◆Hikari-one(FTTH): 0.3 million subscribers (2007.3)

1-3 Japan's Digital Terrestrial Broadcast

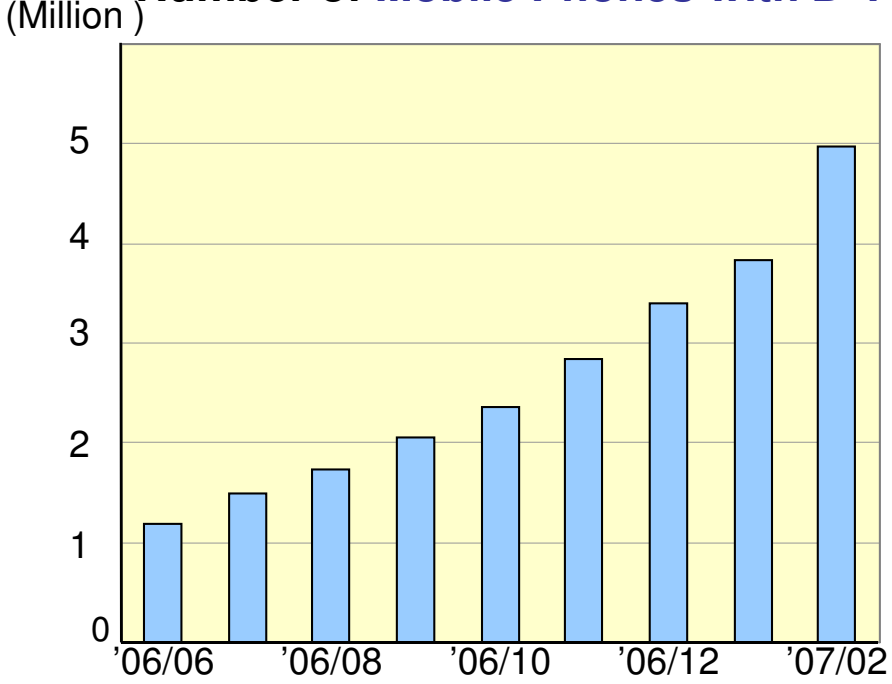
- **19 Million TV sets with a digital TV receiver('07-02).**
- **5 Million mobile phones with digital TV receiver within a year.**
  e.g. 7 out of 10 new models of au(KDDI) in '07-1Q.

- **FMBC "Standby" >> FMBC "Ready to Go"**

Number of Digital TV set



Number of Mobile Phones with D-TV



2. Current Example of FMC Services

2-1 FMC in KDDI Services
2-2 KDDI's Mobile - Broadcast Convergence
2-3 Broadcaster's TV-Mobile Convergence

2-1 FMC in KDDI services

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Level 1: Combined Account, Integrated Billing and Discount, e.g. KDDIまとめて請求 KDDIから届く請求書をひとつにまとめられます。

Level 2: Integrated Service Platform across Fixed & Mobile,

e.g. *(1)Music download & playback in between PC and mobile phones, "LISMO!"*

(2) Personal data storage,"au My Page"

(3) Blog system for PC and mobile phones "DUOBLOG"

LISMO!

DUOBLOG

Level 3: Services for Ubiquity

e.g. Remote control for Home Appliance connect to WAN

“au My Page”- Personal Data Storage Service

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“au My Page”

Data Storage

Important photos, mail
= store up to 100MB

Share photos with friends
= Easy access to photo album

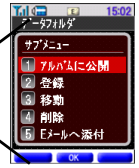
Won’t lose Address data
= Back up in a server

Store access records

Easy access to frequently used contents

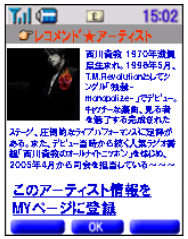
Content recommendation
=Analyze from user records, preference

Upload personal contents



Networked Storage

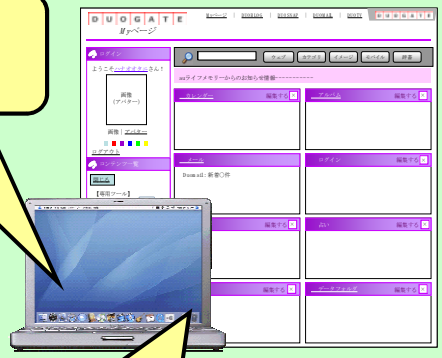
Access log



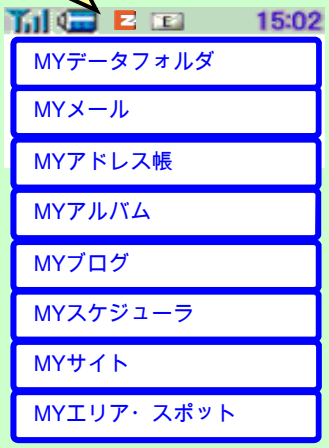
Use daily access records to recommend best suitable contents

FMC （ PC site, Mobile site ）

Browsing



Browse e-mail, web site



2-2 KDDI's Mobile - Broadcast Convergence

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Flat Rate Charging Environment

Music	Game	Movie	Book
Full Download	Video Game Quality	Trailer Download	Full Download
CHAKU-UTA Full ™	BREW$_R$ Download	High-definition QVGA	Dedicated Viewer
(CHAKU-UTA$_R$) catchy part	Mini game (Java)	Short size Low-definition	Web/Mail only

Convergence with Broadcast

Mobile TV

Service-in on Apr.1, 2006

Immediate and real time download of the content taking advantage of the broadcast

FM Radio

Service-in on Dec., 2003

BCMCS
-Telco's Broadcasting Example of 3G mobile -

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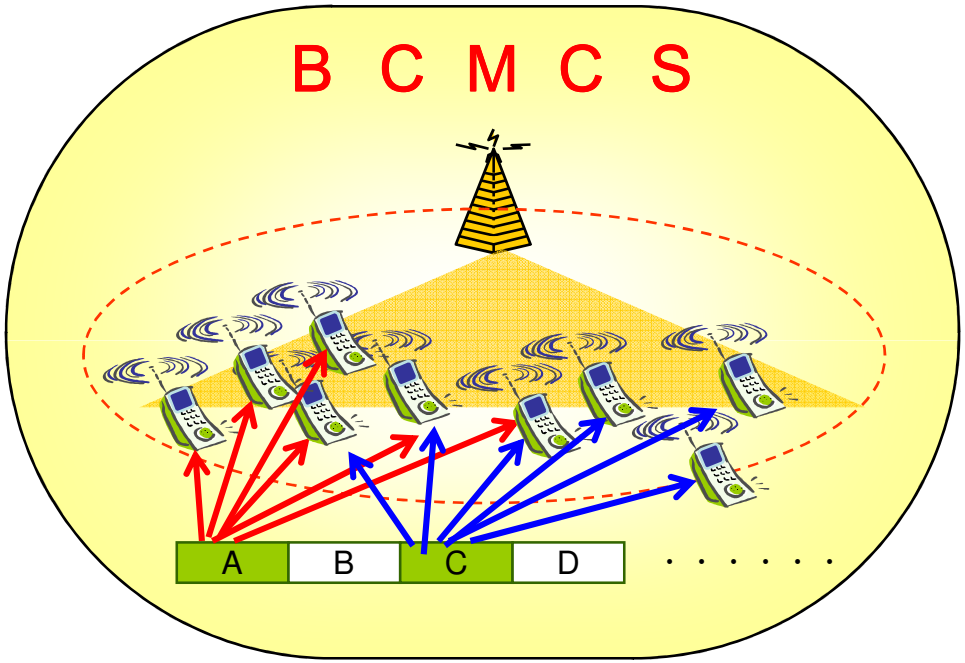
BroadCast MultiCast Service



Shared use of single channel

⇒Multi-channel Mass Distribution

Lower cost than uni-cast distribution

EZ News Flash

EZニュースフラッシュ

- Hourly news updates
- Automatic distribution

FREE OF CHARGE!

ニュース　待受画面 (注1)　天気

EZ Channel Plus

EZチャンネルプラス

- Daily/weekly video clip distribution
- *\315(2EUR)/mo for full service*

2-3 Broadcaster's TV - Mobile Conversion

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Synchronous to TV program

Data cast on the current TV program → useful to know detail of what users see now.

(1)TBS : Data cast detail info. of actress's jewels while in popular TV drama → About twice as many access to their website via mobile internet as ordinary access

(2) NTV : Simul-data cast of coupons and recipes while in TV

Asynchronous to TV program

Users may miss favorite programs → data cast related info on the TV program throughout a day

(1)TV Tokyo : Data cast on stock info, weather, and news

(2) Fuji TV : Data cast on game results(Asynch) and detailed info of athletes while TV game program(Synch)

3. Examples of R & D for FMBC services

R&D examples toward FMBC

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(1)Convergence in network layer
3-1 Seamless Handover Technology

(2)Convergence in session layer
3-2 FMC Service Migration Technology
3-3 W-DLNA

(3)Solution for problems in FMBC
3-4 Traffic control for communication-broadcasting integrated services
3-5 Ubiquitous Authentication Mechanism

(4)Convergence in application layer
3-6 Intelligent Content Transcoding

3-1 Seamless Handover Technology(1)

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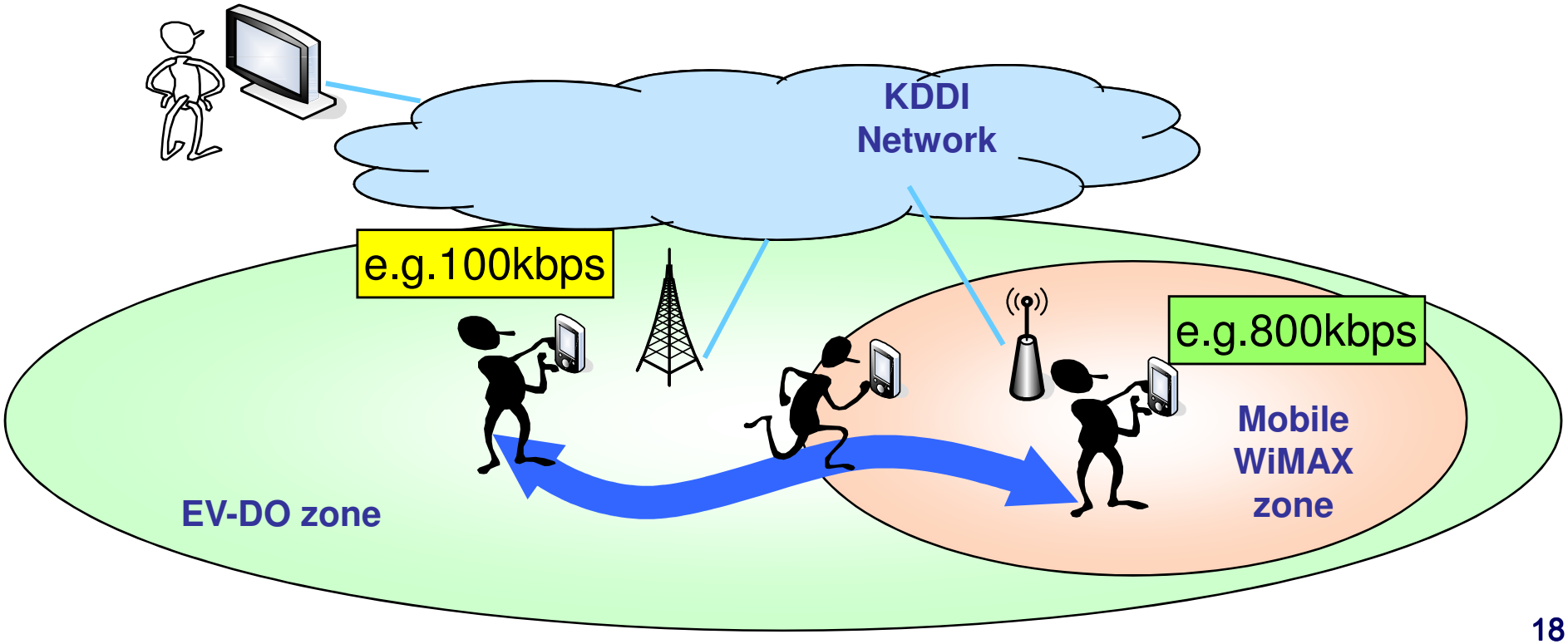
- Handover latencies and throughputs between heterogeneous networks
  →Usually different → Difficult to realize seamless real-time applications

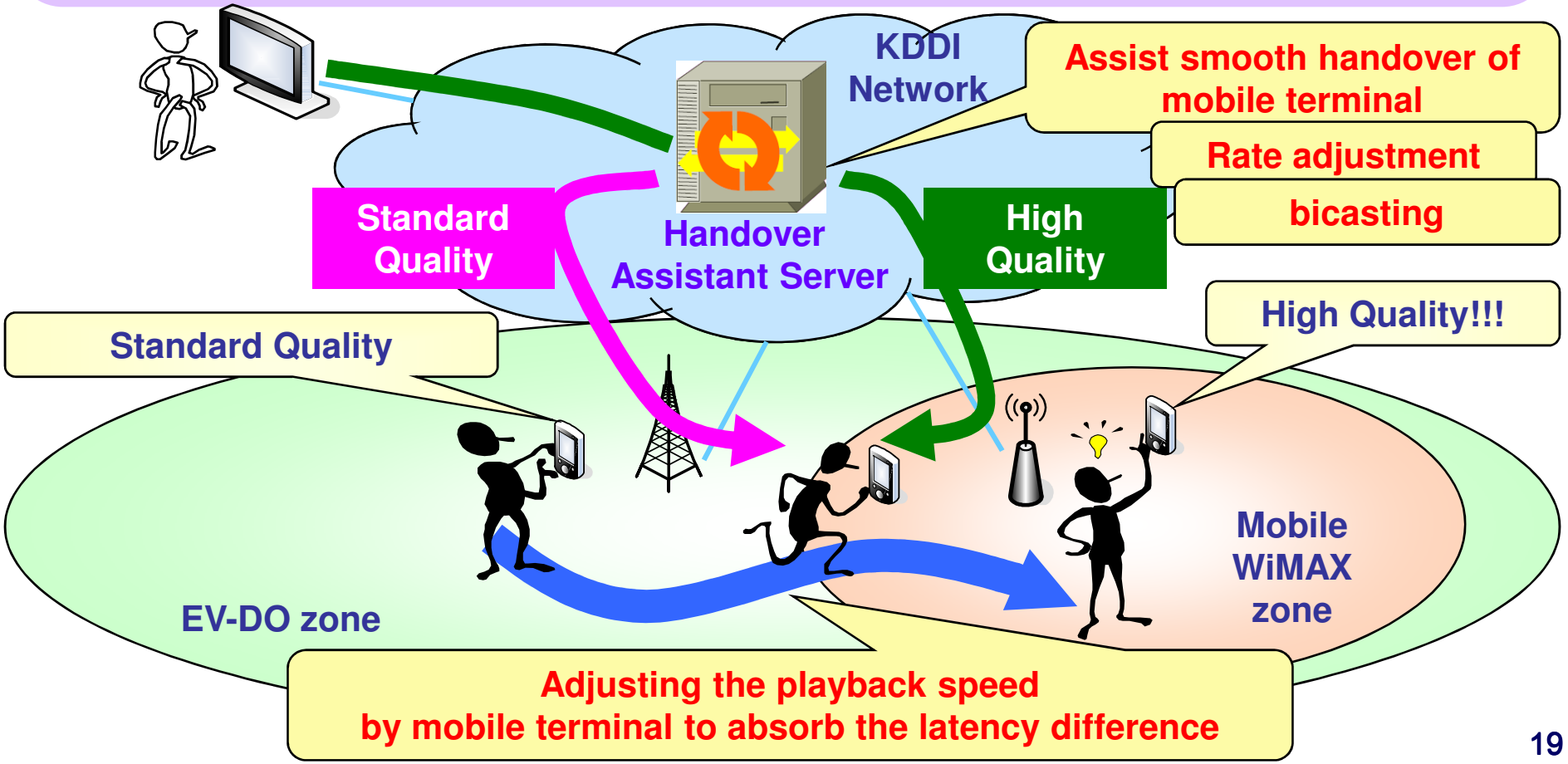
- Need an adjustment of service quality, such as bit rate and frame rate, to make full use of available network.



3-1 Seamless Handover Technology(2)

✓A Handover Assistance Server sets the rate of two wireless systems using the SIP protocol, then bi-casts images to them in the respective service quality.

✓ A mobile node adjusts the latency difference between two bi-cast flows, and switches over the system on receiving the same time stamp.



3-2 FMC Service Migration System(1)

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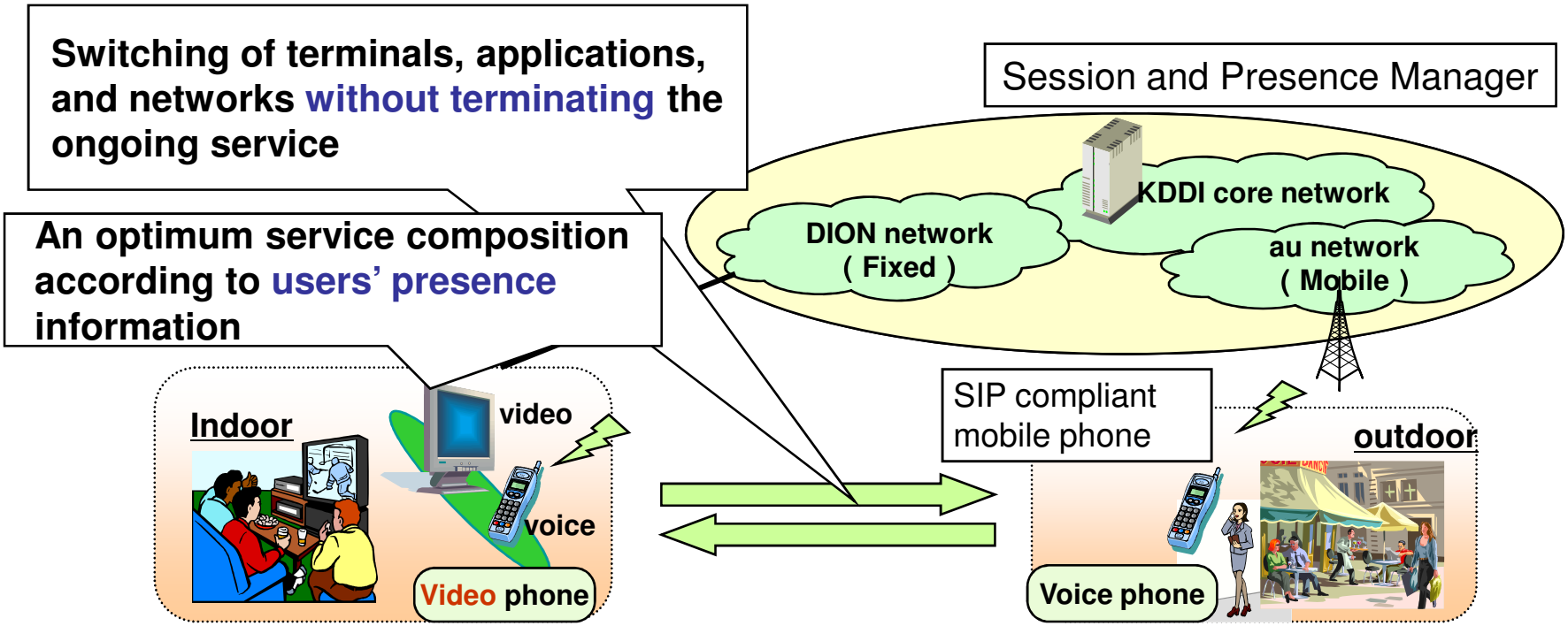
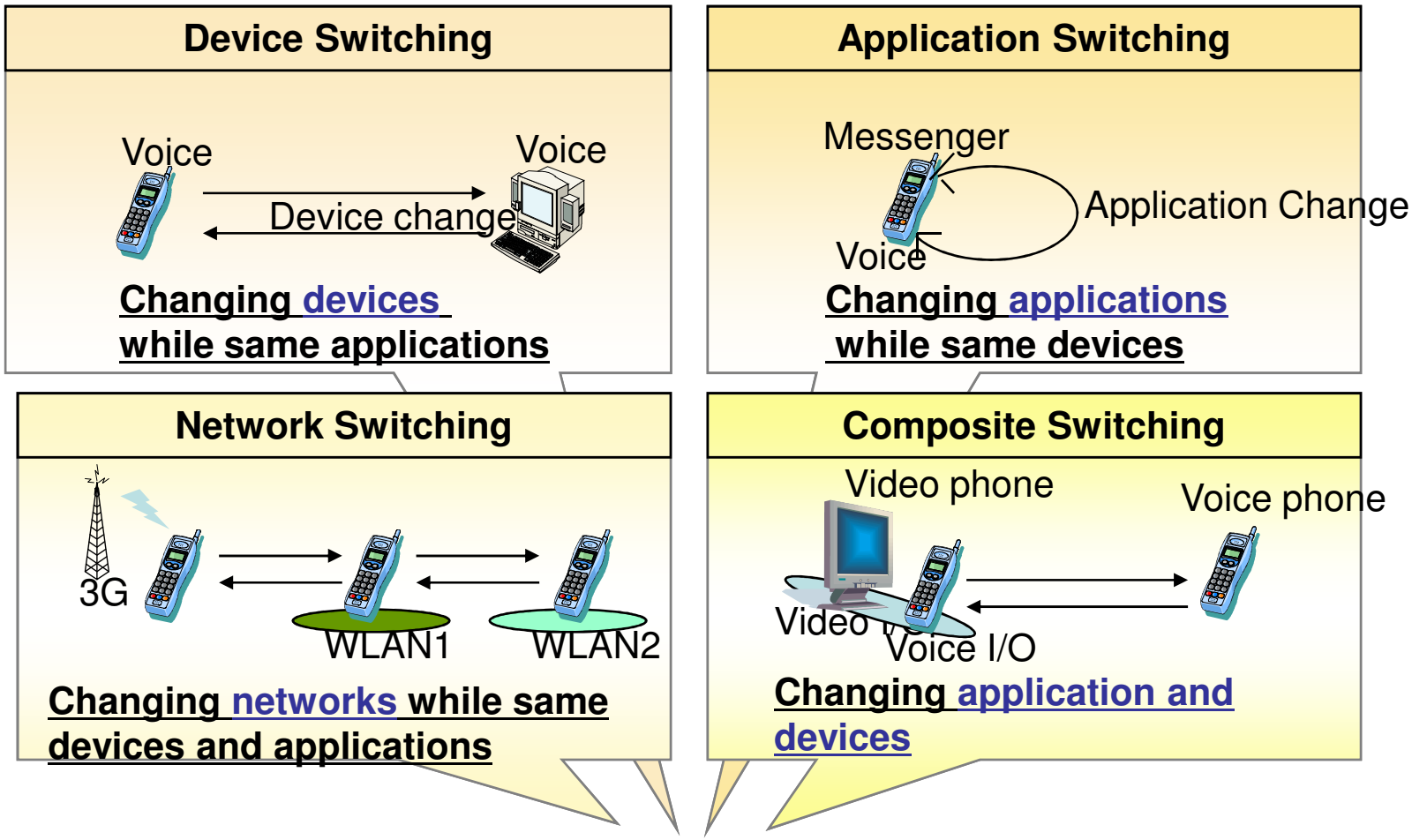
◆**Overview**

Method to provide optimum service on FMC (Fixed Mobile Convergence) environment.

- Semi-automatically adapt to available communication resources.
- Terminals, applications, and networks can be flexibly switched in a unified fashion without terminating the ongoing session.
- The protocol can be easily developed on various terminals due to the introduction of SIP.



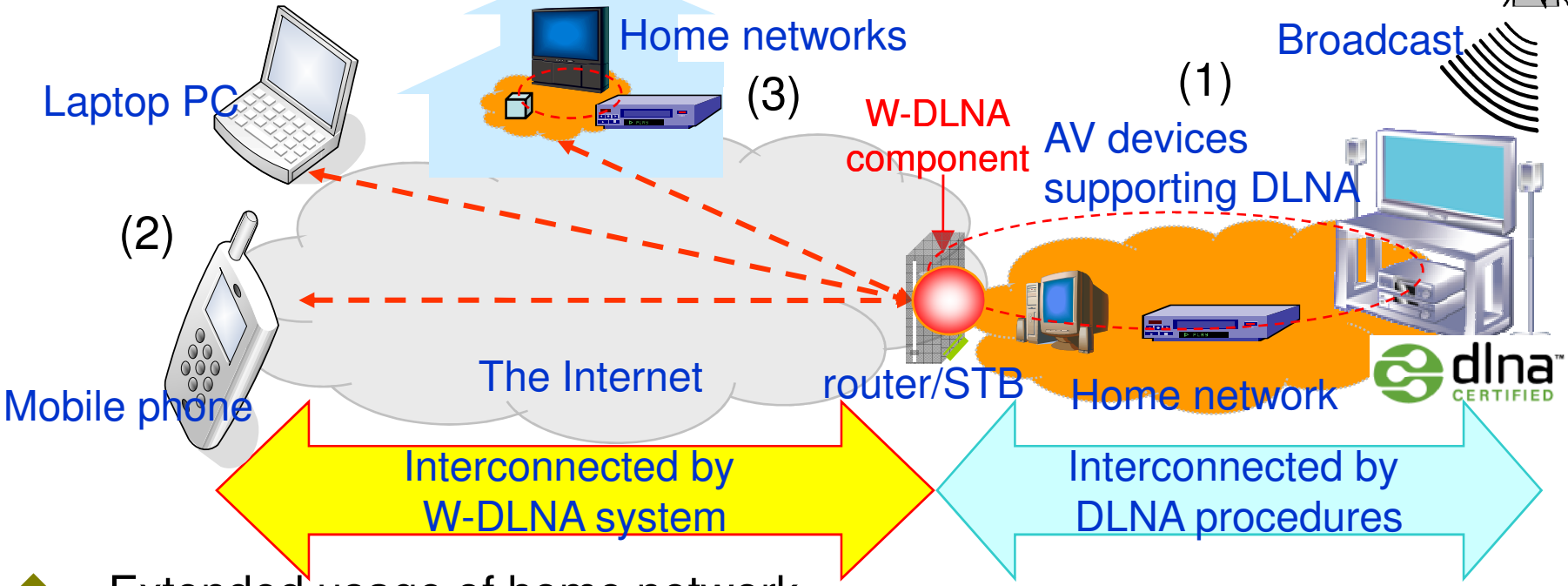
3-2 FMC Service Migration System(2)
-Classification of Resource Switching-



We have developed a unified switching mechanism using SIP to support the all types

3-3 W-DLNA (Wide area – DLNA) (1)

- A proprietary extension framework of DLNA technology.
- DLNA-compliant audio-visual equipments can be used via W-DLNA on a remote PC and/or a cellular phone, and from the AV equipment in a home network of another user.

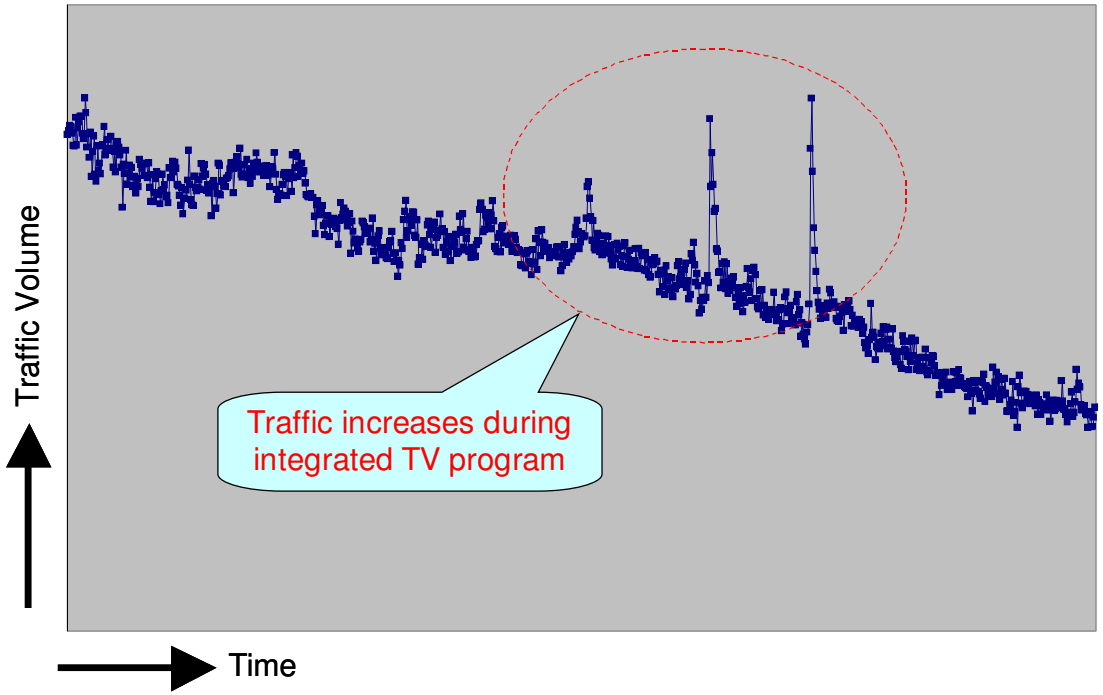


- Extended usage of home network
  - Use of video contents at home (original function of DLNA)
  - Use of video contents from outside via a PC or a cellular phone
  - Share video contents with friends, who specify the user's contents by a cellular phone and stream the contents via internet

3-4Traffic control for communication-broadcasting integrated services(1) -Example of Commercial Network Traffic-

- Traffic data of cellular phone network during communication -broadcasting integrated TV program in Japan
- Viewers respond to live non-Digital TV program and send data using ordinary cellular phones

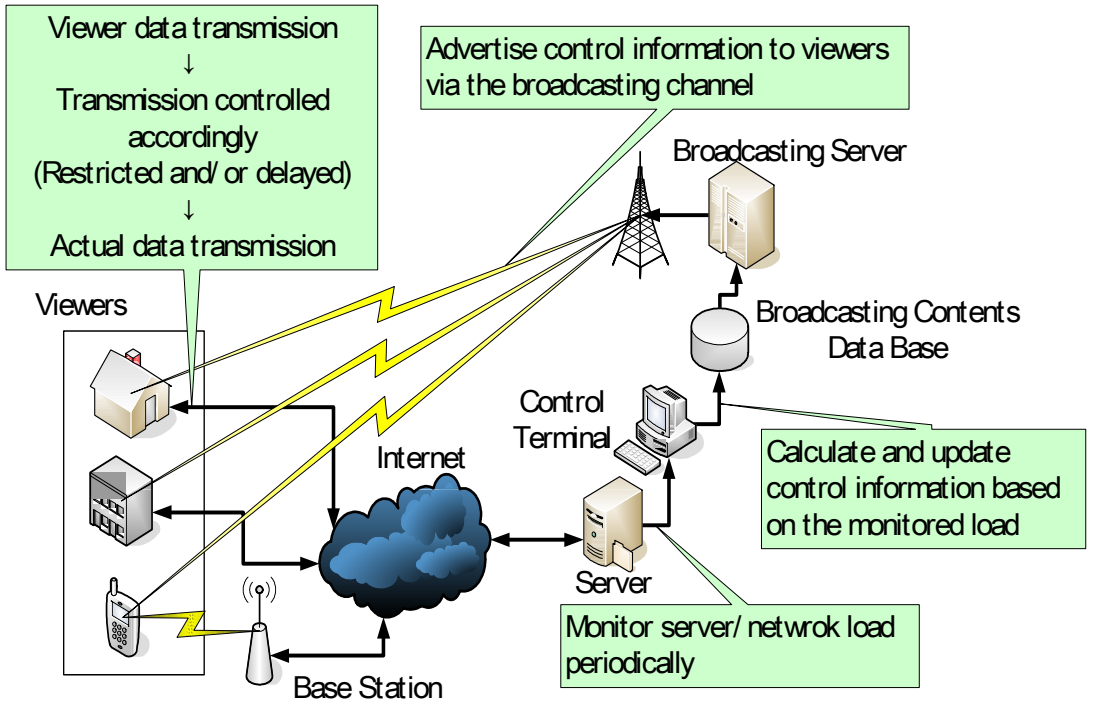
⇒ Even now, network traffic increases in conjunction with TV contents



What will happen when DTV mobile reception capability equipped terminals are widely deployed ??

3-4 Traffic control for communication-broadcasting integrated services(2) -Combined Congestion Control Method -

- Adaptively restricts and/or delays transmission of massive and intensive traffic



- Main points
  - Control information is advertised to viewers by the broadcasting channel
    - Scalable control of vast number of viewers
  - Adaptive control of traffic depending on the server/network load
    - Appropriate control applied depending on load
  - Control applied at viewer terminals that is the source of traffic
    - Distributed control of vast number of viewers
  - Implemented at the application level
    - No modifications to the OS, protocol, hardware etc.

3-5 Ubiquitous Authentication Mechanism(1)

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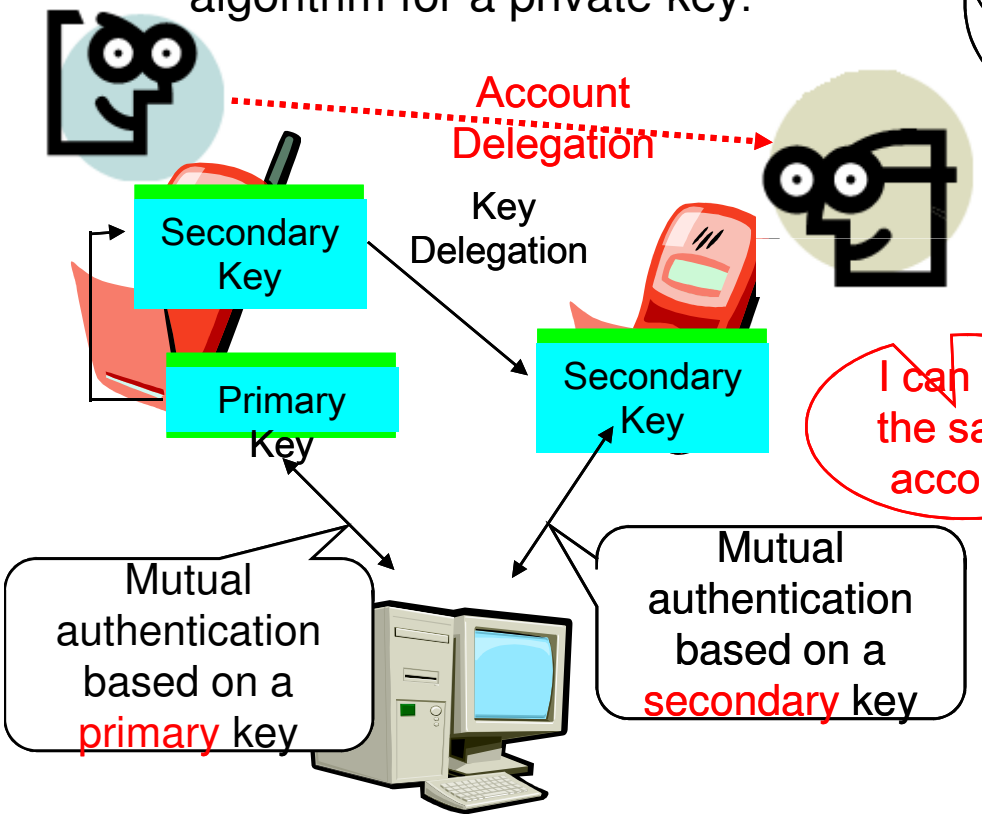
◆ Overview

secure and user-friendly authentication architecture based on hierarchical delegation algorithm for a private key.



Example: Group Account Service

◆ Motivation

- Users want to use the same account on several terminals.
- Users want to share their accounts simply and securely.

Efficient and Flexible

Delegation-based Authentication

◆ Characteristics

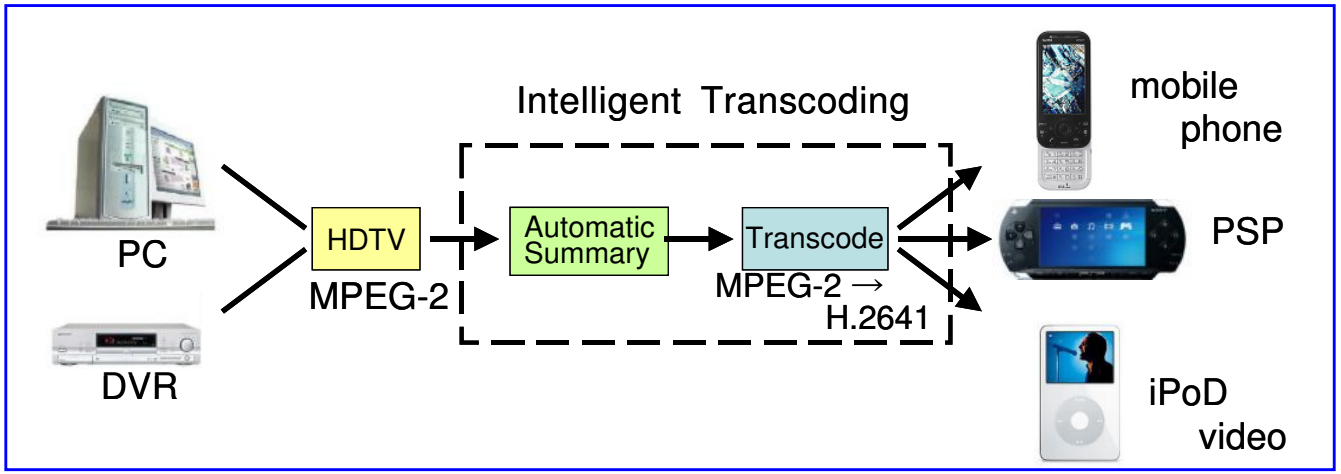
- Fast and Lightweight (200ms on Brev
- Delegation without any servers
- No additional hardware
- Simple operation

◆ Example Application

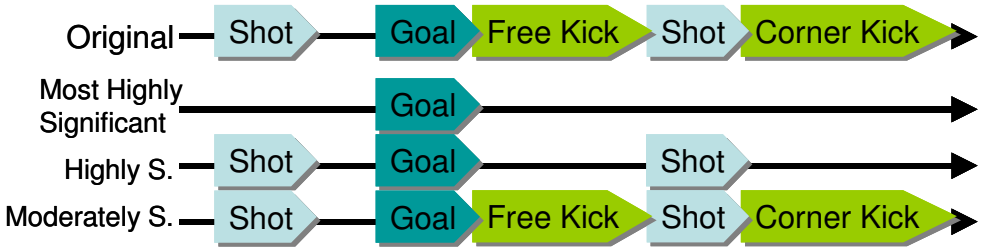
- Transferable User Account
- Group or Family Account
- Digital Right Management
- And many others…

3-6 Intelligent Content Transcoding

- A variety of portable devices : Now capable of video playback
- Transcoding of master contents : Very useful to realize efficient one-source multiple use.
- Content summarization :Important for quick access to must-to-see events in order to save time and storage space.



Summary(Outline)



Sport Highlights

Conclusions

- Trends of Japan's FMBC
- R&D activities toward FMBC in the near future

- Much faster than expected
  - Transition from ADSL to FTTH
  - Transition from Analogue SDTV to Digital HDTV
  - Growth of Mobile TV users including automobiles

- Need to accelerate FMBC solutions
  - From network layer to application layer
  - Users won't pay attention/purchase unless there is "a surprise" or "a new experience". They are already fed up with various functions they have not used.