
Networks as Media

- What's happening in Japan -

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Today's topic

The impact of the transition to digital information and content carried by “Media”, and NTT's activities to deal with the effects of this.

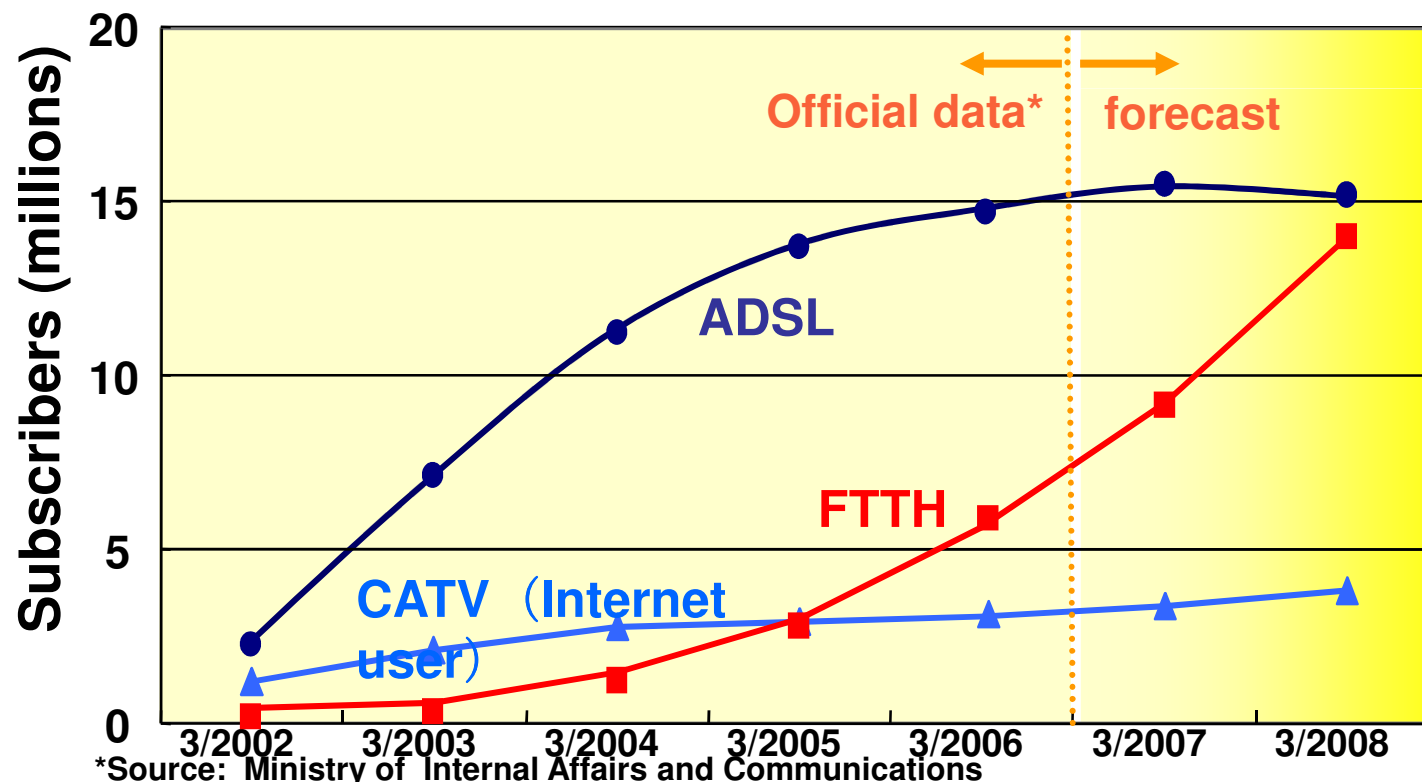
What is “Media”?

Definition of “Media” in this presentation

- “Means of conveying information from a few specified senders to a large number of unspecified receivers”

Dramatic increase of FTTH subscribers in Japan

- The transition from ADSL to FTTH is advancing in Japan. The number of FTTH subscribers will very soon exceed that of ADSL subscribers.
- NTT has begun building the next-generation network (NGN) to be ready for the age of 30 million FTTH users, and has been conducting an NGN field trial to provide technical confirmation in advance of full-scale introduction.



*Source: Ministry of Internal Affairs and Communications

Features of digital information and content

In the evolution of media, the transition to digital information and content has had a major impact on business.

- Creation of rich content
 - Anyone can create or process rich content, which uses multiple forms of information such as text, video and sound.
- Ease of information searching
 - Accumulated data can be searched for desired information.
- Ease of making copies
 - Data can be duplicated exactly, without quality degradation, and cheaply.
- Transmission without degradation
 - Data can be sent to a remote place without degradation.
- Efficient compression of information
 - The memory and network capacity required to handle content are smaller than those for an analog version of the same item of content.

Business impact of transition to digital content

Transition to digital information and content increases opportunities to expand video-related business.

1. Digital video content eliminates the distinction between telecommunication and broadcasting.
2. The emergence of posting-type video sharing sites is expanding the opportunities for video-based businesses.
3. Marketing using metadata and secondary use of content has begun.
4. Searching and navigation have begun to be business tools.
5. Everyday scenes will be turned into “content”.
6. Progress is being made in high-definition and super-reality video.
7. Video content can be selected and provided according to context.

1-1. Retransmission of digital terrestrial television programs

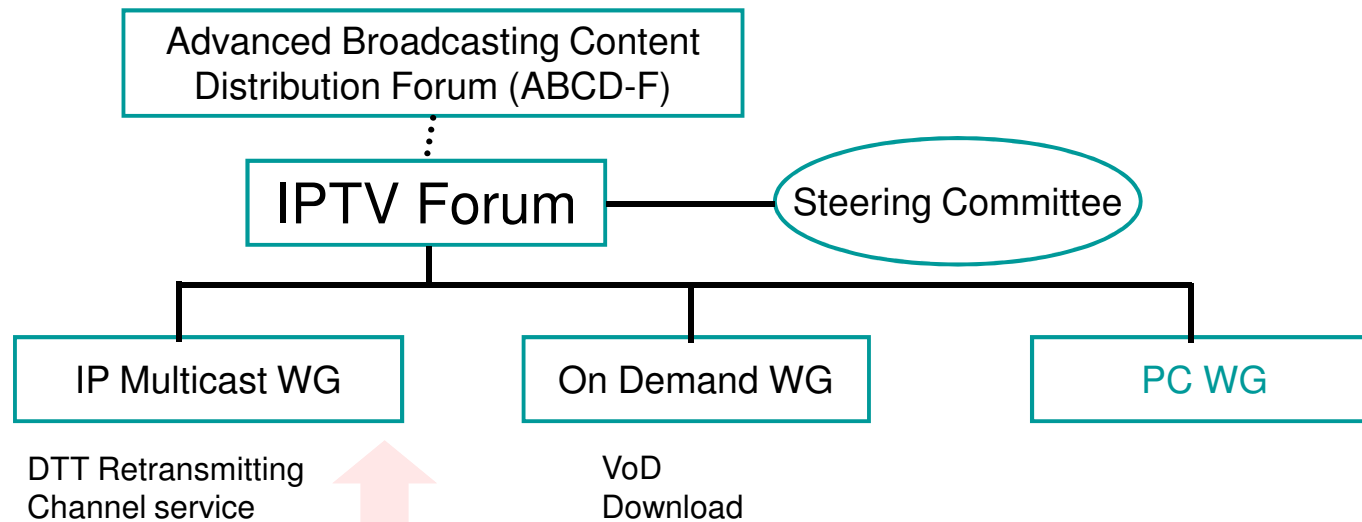
The IP network infrastructure is being put in place to enable multicasting of digital video content. Retransmission of Digital Terrestrial Television (DTT) programs is one of important services, but the complexity of handling copyright prevents the service from being commercialized in Japan.

- Until recently
 - The IP multicast was not classified as “broadcast”. It means an IP multicast provider had to get permission from all the performers in advance of multicasting according to the Japanese law. This complexity of handling copyright made it practically impossible to retransmit broadcasting programs.
- Recent development
 - In January 2007, the Copyright Law was revised so that the retransmission of broadcasting programs using IP multicast is treated in the same manner as CATV.
 - Now, digital terrestrial programs may be retransmitted using IP multicast with only the permission of the relevant broadcasting company.
 - A guideline for the technical aspects of this retransmission is being studied by an examining committee which consists of members from broadcasting companies.
- NTT’s activities
 - In the NGN trial, IP-based retransmission of Digital Terrestrial Television programs is being trialed along with VOD and Video Streaming services.
 - NTT will provide feedback from this trial to the examining committee to help it develop its guideline.

1-2. IPTV Forum in Japan

With a view to ensuring the interoperability of IP broadcasting receivers and their unification among IPTV services, the IPTV Forum was established to study technical requirements for the receivers to be developed and to define operational rules.

- Status
 - IP Multicast Working Group: studies the technical method of DTT retransmission, and the channel service.
 - On-Demand Working Group: studies the technical specification for download and VoD services.



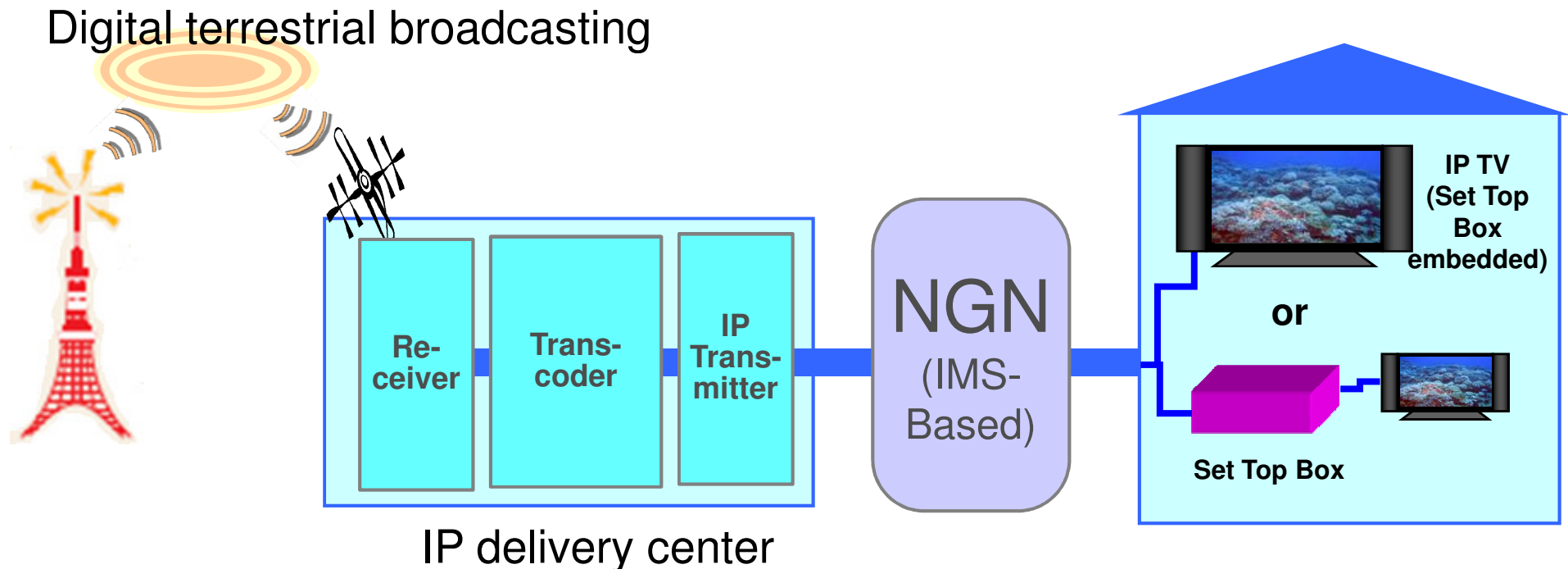
IPTV Forum members

Prof. Yasuda (leader)
Prof. Murai (chair)
NHK
NTV
TBS
CX
TX
TV Asahi
NTT
KDDI
SONY
Panasonic
Toshiba
Sharp
Hitachi
MIC (secretariat)

Experiment results from the NGN Trial are provided to the WGs as feedback.

1-3. Experiment for retransmission of Digital Terrestrial Television (DTT) over IP

- As one of the experiments of NTT's NGN Field Trial, Digital Terrestrial Television programs are retransmitted in real time using the NGN's multicast transmission capability.
- NTT provides the trial results as feedback to the IP Multicast WG, within the IPTV Forum, thus contributing to the development of technical specifications.



2-1. Posting-type video sharing

- The posting-type video sharing services have begun to be used for business purposes, particularly for promotion of products and sharing of content among creators.
- The number of video content items has increased rapidly with the result that problems arise due to the posting of unauthorized content.
 - Current status
 - 10 million people in Japan access YouTube in the U.S.
 - A P2P-delivery-based video sharing service, “Joost”, was launched by the originator of Skype.
 - Content holders and broadcasting companies have emerged who seek coexistence through strategic alliances, especially by providing advertising video clips for promotional purposes.
 - There are many incidents of content being posted without the permission of copyrights owners.
 - Copyright management organizations in Japan requested YouTube to take measures to prevent unauthorized items of content from being posted. (Dec. 2006)
 - NTT’s activities

Developing technologies to facilitate the posting and viewing of content, and to regulate items of content that are in violation of public orders and decency.

 - In August 2006, NTT started an experimental video sharing service called “ClipLife”.
 - NTT developed technology to automatically identify items of content which are reposted after once being determined to be unauthorized. This allows the efficient handling of unauthorized items of content.
 - NTT is evaluating a mechanism to promote the reuse of content by enabling posting parties to select the terms and conditions of creative commons licenses.

2-2. Example of R&D on video sharing: Video sharing site called “ClipLife”

- Using a video-sharing site, “ClipLife”, NTT is experimenting with safe and secure video communication which takes account of copyright infringement and violation of public orders and standards of decency.
- Already some companies are interested in business based on ClipLife on account of its reliability in ensuring safety and security.



Enterprises and communities actively using video posting and sharing

- Infomercial
 - Improve corporate or brand image indirectly by video content that gives their messages, such as “We support women at work!”
- Gateway to success for creators
 - Promotion of creators’ works ,such as animation and short movies.
- Collaboration
 - Supporting creators to create, edit advertising videos, by sharing library videos and providing communication tools.

3-1. Generating and using metadata

- Marketing using metadata and secondary use of content has begun through the use of “metadata” attached to video content.
- If metadata can be created and attached economically, and if video content can be searched for by using “metadata” easily, there will be opportunities for new businesses.
- Current status in Japan
 - Content holders and surrounding businesses, such as retailers, have begun to seek business opportunities by using metadata.
 - With a view to promoting the use of metadata for video content, standardization bodies are specifying standard formats.
 - In digital terrestrial television broadcast, program information is contained as metadata.
- NTT’s activities
 - Developing technology to create metadata from video or audio content using voice recognition and language processing, and attach them to the content.
 - As part of an IPTV service by an NTT Group company, Plala 4TH Media, an efficient content management is provided using a metadata system developed by NTT Laboratories.

3-2. Example of R&D on generating and using metadata : Metadata Generation System

NTT is developing a system that automatically generates metadata such as title, summary, and key words that are extracted from voice or subtitles.

Video content

Automatically create video indices

Automatically detect major changes in a video

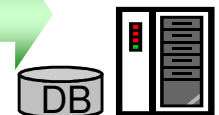
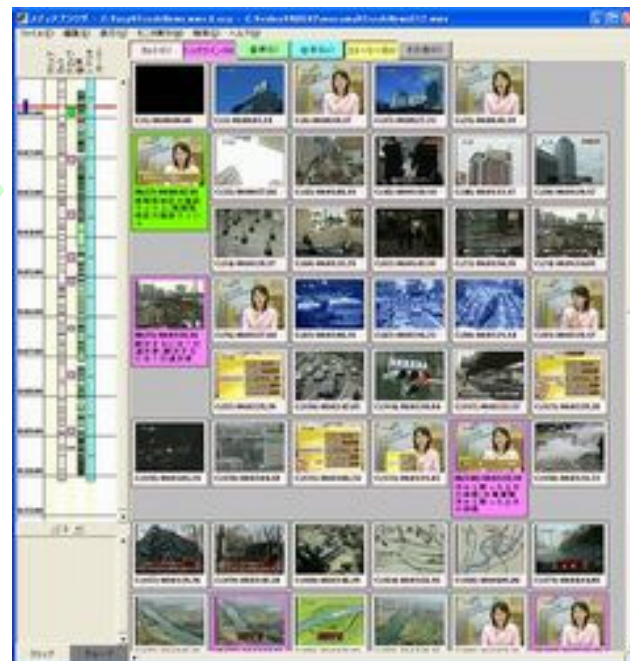
- A change in the scene (cut)
- Scene with written characters (subtitle)
- Movement of the camera
- Music
- Human voice

Automatically create title and key words

Automatically create text data from video content

- Characters in the subtitle
- Voice recognition

Use of metadata for efficient management of content

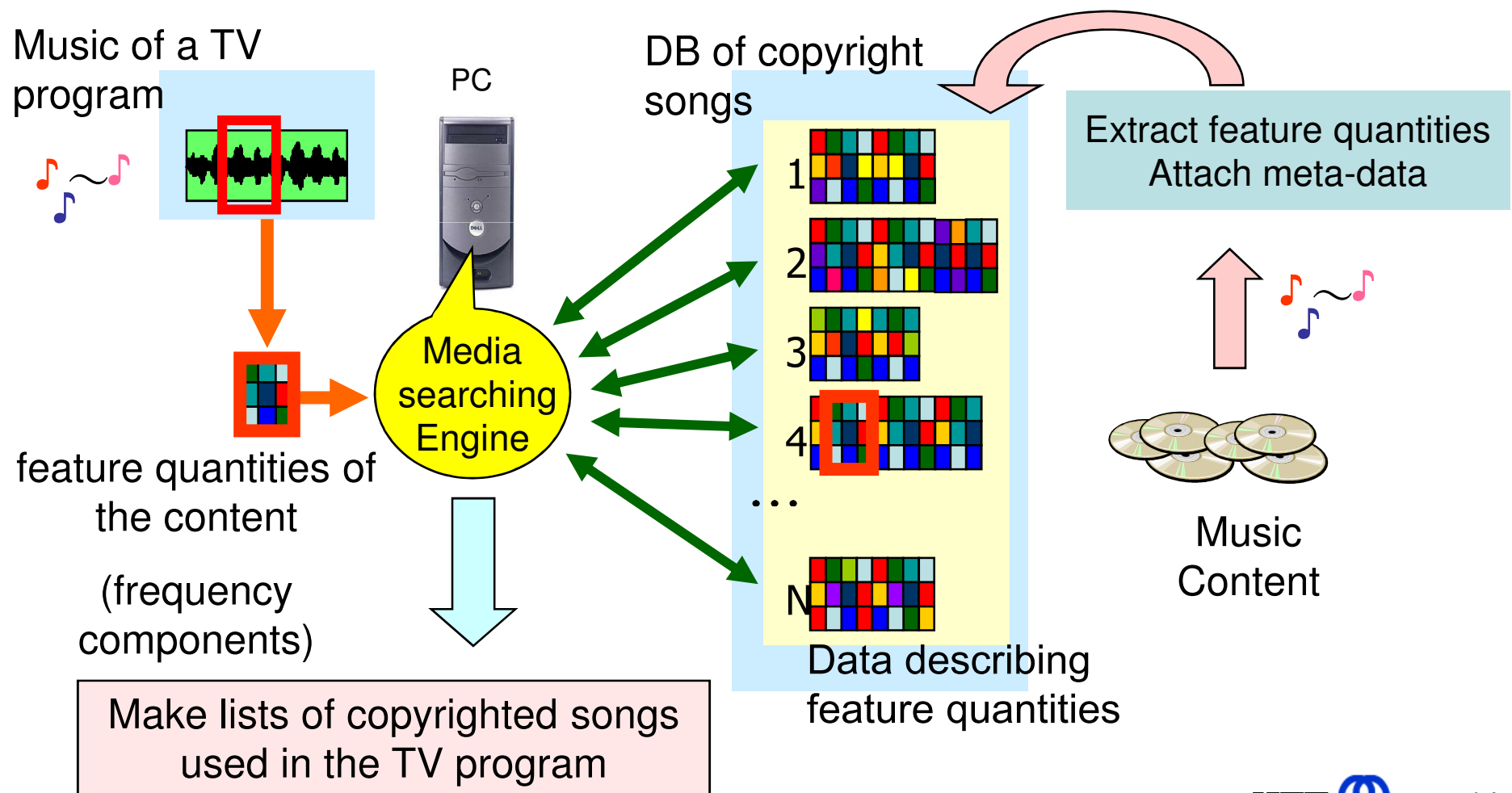


4-1. Video searching and navigation

- Searching for desired content quickly and providing a digest of the content so found for users may form a promising business.
- Although a large volume of video content has begun to be available on the network, searching for desired video data is more difficult than that for text data.
- Current status in Japan
 - Video searching is mainly based on key words attached by the content provider to each item of content.
- NTT's activities
 - NTT is developing Robust Media Searching technology that searches for desired music or video using the sound or video data themselves.
 - It is also developing technology for supporting summary-based navigation by generating a digest of video data automatically.

4-2. Example of R&D on video searching: Robust Media Search technology

- NTT is developing high-speed media searching technology by matching the feature quantities, such as the frequency components in characteristic areas of audio, still images and videos.



5-1. Turning everyday scenes into content

- The widespread use of digital video camcorders, together with the lowering of transmission cost, will allow “everyday scenes” on the street to be turned into content that can be viewed by anyone.
- If “everyday scenes” are used for business opportunities, privacy protection and the detection of specific events in such content need be put in place.
 - Current status in Japan
 - There are cases where videos or still images of streets and entertainment facilities can be viewed by anyone to check how crowded they are, but a mechanism to protect privacy is needed.
 - Video extraction technology is required so that the interesting part of videos or still pictures become viewable only when certain specific events take place.
 - NTT’s activities
 - Developing technology that selectively blurs images of moving objects (humans, cars, etc.).
 - Developing technology that detects and displays abnormal states (i.e., somehow different from the normal state) in a video.

5-2. Example of R&D on turning everyday scenes into content: Technologies to protect video privacy, and to detect an abnormal state

- The detection of moving objects using real-time video processing has made possible video processing to blur persons and cars for the protection of privacy. This processing can operate stably even when the objects stop moving temporarily or when the camera is moved.
- The technology to automatically learn the similarity of scenes in a large volume of video data allows the extraction of abnormal scenes, that is, scenes with movements different from those witnessed in the normal state.

Privacy protection technology



Normal video







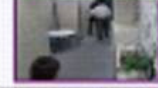
Video with privacy protected

Abnormal state detection technology

シーケンス映像	時刻
	09:01:35
	09:04:54
	09:06:27
	09:10:40
	09:12:22

Chronological sequence



シーケンス映像	時刻
	01:34:12
	21:37:32
	08:01:21
	19:24:14
	16:10:20

Sequence of the degree of abnormality

6-1. Progress in ultra-high-definition and ultra-reality videos

■ The expansion of network capacity can lead to business opportunities in providing ultra-definition and ultra-reality videos.

- Current status in Japan
 - The movie and broadcasting industries are experimenting with the transmission of video with even greater definition than HDTV (High Definition TV).
 - NHK (Nippon Hoso Kyokai, Japanese public broadcasting organization) is developing Ultra High-Definition TV, which has a resolution 16 times greater than HDTV.
- NTT's activities
 - Developing high-compression coding to use limited transmission resources effectively for ultra-definition and ultra-realistic communications, and a variety of interfaces that provide a sense of high reality.
 - NTT is seeking to deliver ultra-high-definition video, far exceeding the quality of HDTV, by High-compression and high-functionality coding technology.

6-2. Example of R&D on ultra-definition video: high-compression, high-functionality coding

- NTT has developed the world's first single-chip MPEG-2 HDTV CODEC LSI and H.264 real-time CODEC LSI for the transmission of professional-quality video materials.

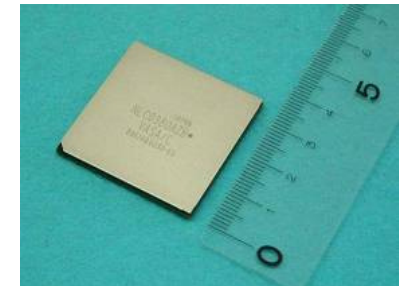
NTT Electronics Corp. sells MPEG-2 HDTV encoders /decoders that use the MPEG-2 HDTV CODEC LSIs.

(http://www.nel-world.com/products/video/products/codec_system_solutions/h5100/index.html)

Records of applications of the chips

The chip is used by major TV program producing companies, and major broadcasting stations in the world.

MPEG-2 HDTV CODEC LSI



NTT developed the world's first H.264 real-time CODEC LSI which is applicable to professionals. A system adopting this chip will be put on sale by NTT Electronics in the 4rd quarter of this year.



H.264 real-time CODEC LSI

7-1. Delivery of videos that are appropriate for the context

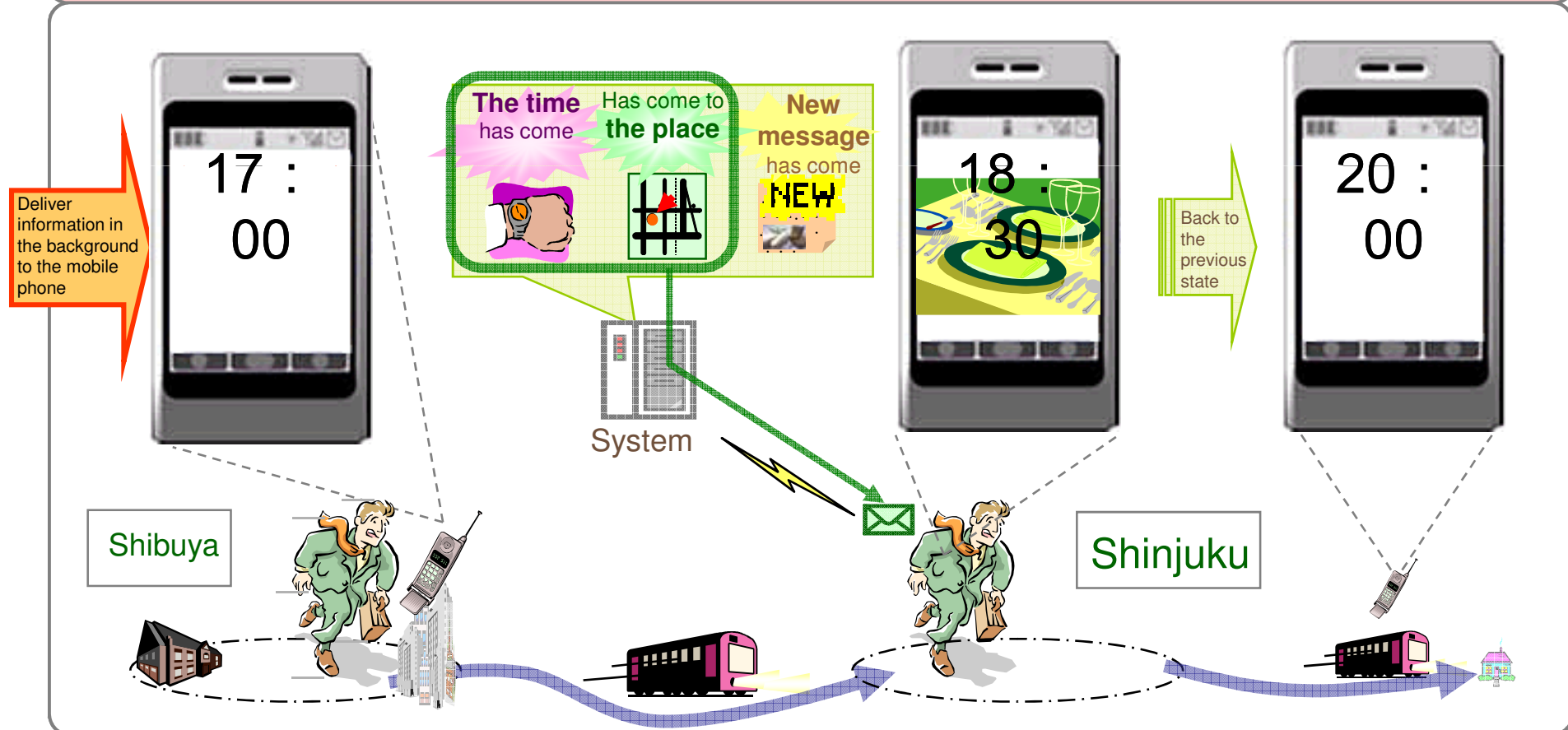
■ The delivery of video content according to the user's context such as location, time or his/her preference will become a promising business.

- Current status in Japan
 - Since April 2007 it has been required in principle that 3G mobile phones are equipped with GPS capability, and as a result there are business opportunities for information delivery linked with GPS.
 - Since digital maps have become available economically, a business of providing navigation linked with maps has emerged.
- NTT's activity
 - Developing technology to deliver content that is appropriate for the location of the mobile phone.
(ex. Restaurants, hospitals, hotels, etc.)

7-2. Example of R&D on providing content appropriate for the context: System for delivering information while the mobile phone is on standby

- NTT delivers information about shops near the user to a mobile phone on standby, stimulated by his/her location. The information can be images, messages or maps of the shops.

Example: deliver information about recommended restaurants near the Shinjuku area from 6 p.m, which the user has registered. (this information is deleted when the user leaves the Shinjuku area.)



Networks as Media

The NTT Group will collaborate with partners in different industries to seek to create new business opportunities using the networks.