



## Shuji Hirakawa

Audio, Video and Multimedia Standards  
for Fully Networked Cars

Geneva, 5-7 March 2008



## Audio, Video and Multimedia Standards for Fully Networked Cars

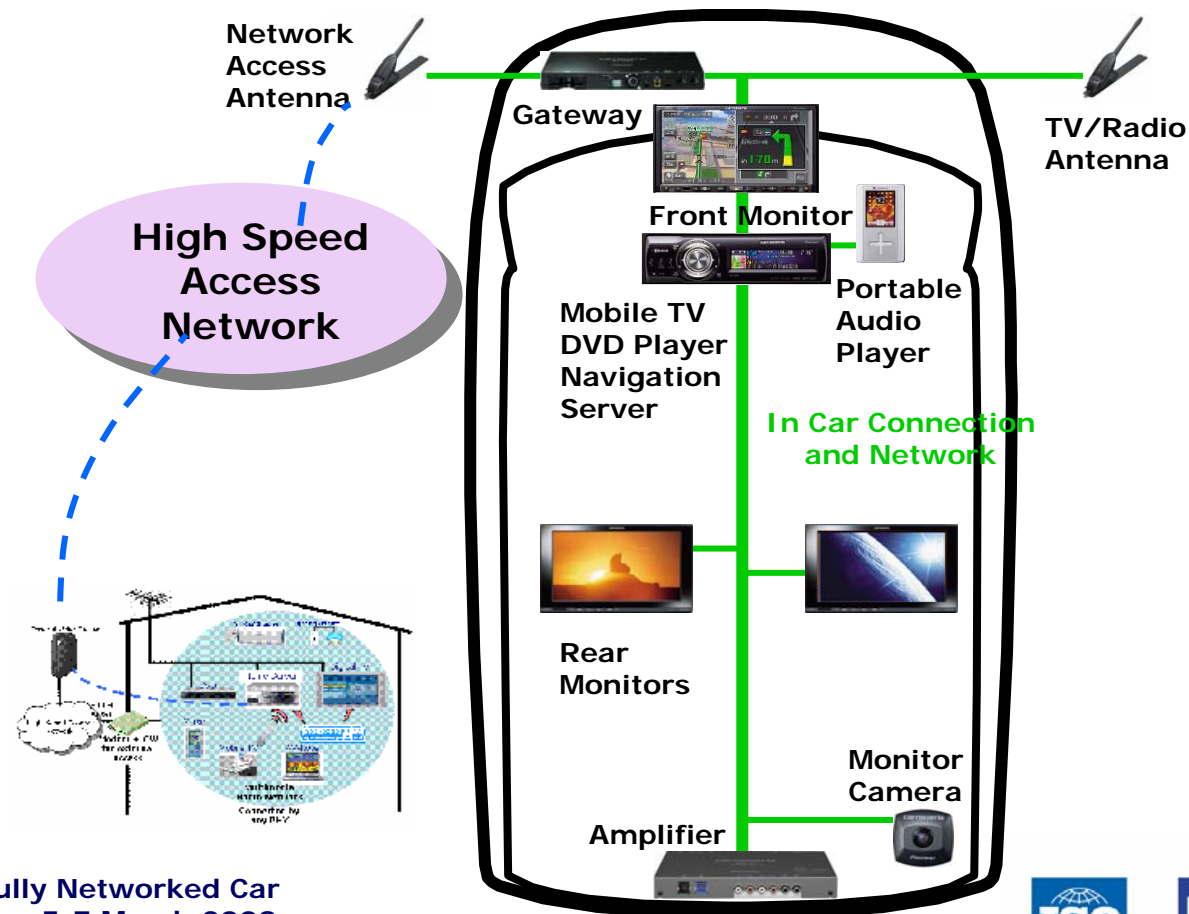
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- IEC TC 100 Activity in end-user network
  - IEC/TC 100 has Technical Area 9
  - Presentation of Last Year from IEC/TC 100
- AV Content mobility between home and vehicle
  - Standards for end-user network
  - DLNA Interoperability Framework
- Examining from analogue era to networked environment
  - Recalling Analogue Media Era
  - Recent media environment in the home
  - Recent media environment in vehicles
- Digital Broadcasting Systems
  - ITU-R Recommendations and IEC Standards for digital broadcasting
  - Recommendation ITU-R BT.1833 for mobile systems
- Content delivery using flash memory card
  - Carrying content between home, mobile and vehicle
  - Multiuse of content within the home and vehicles

- o IEC/TC 100 considers that vehicular network is a part of end-user networks.
  - TC 100/TA 9 title: Audio, video and multimedia applications for end-user network
  - Scope of TA 9: To develop International Standards for the requirements, functions and protocols of audio, video and multimedia applications for end-user networks, as well as specifications addressing the total system connected in the network for this purpose. --- End-user networks include all personal networks, e.g., home networks, vehicular networks and other networks controlled by an individual for audio, video and multimedia applications.
- o Last year, TC 100 depicted the similarity between home-network and vehicular-network.

# Presentation of last year from IEC/TC 100

- o The title was 'The seamless home network to the car system.'
- o Presented by Mr. Jun-ichi Yoshio who has many roles in IEC/TC 100.

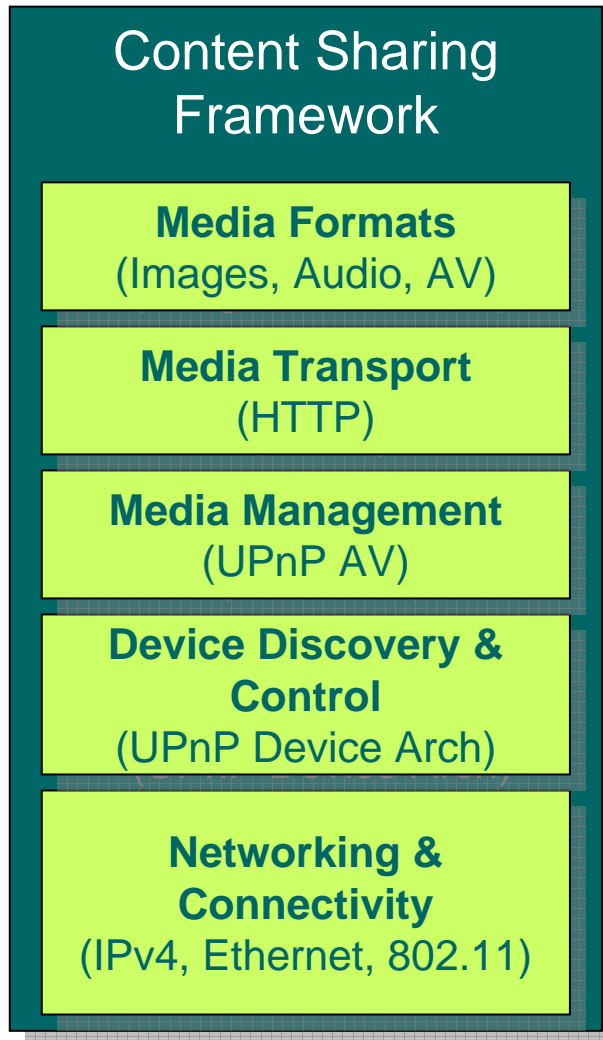


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- o Trend:
  1. Analogue to Digital
    - Plastic Disc/Cassette → CD
    - VHS → DVD
  2. Package to Network Download
- o Physical media needs its specific media player that has been implemented in the box.
- o However, network system has various combination between media servers and media players.
  - **IEC 62481 (published in Aug. 2007)**, Digital living network alliance (**DLNA**) specification, provides architecture, protocols and media formats for home networked device interoperability guidelines.

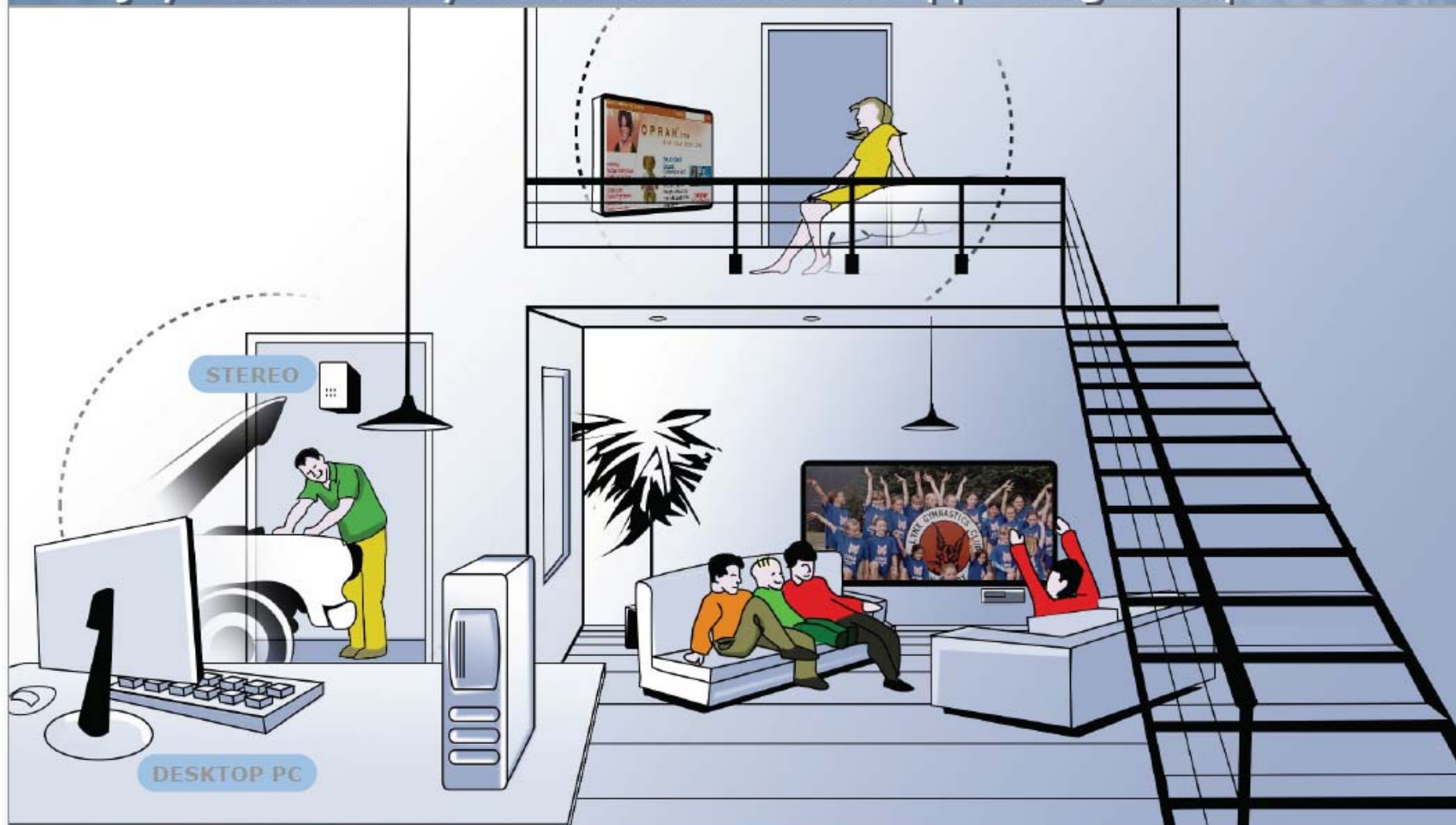
- o IEC 62481 has two parts:
  1. IEC 62481-1 Ed.1: **DLNA** Home networked device interoperability guidelines - Part 1: Architecture and Protocols
  2. IEC 62481-2 Ed.1: **DLNA** Home networked device interoperability guidelines - Part 2: Media Formats
- o In order to harmonize home and vehicular networked device interoperability, a set of media formats plays the key role.
- o **Content Protection** is additional key technology in network downloading environment.



- Complete set of components to deliver user experience for sharing content
- How media content is encoded and identified for interoperability
- How media content is transferred
- How media content is identified, managed, and distributed
- How devices discover and control each other
- How devices physically connect together and communicate

# Use Case Scenario #1

## Enjoy Content Anywhere with a DMS Supporting Multiple DMPs





### Recalling Analogue Media Era

- o In Home
  1. AM and FM band radio and analogue tape recording
    - Audio cassette system was dominant for recording
  2. Analogue TV broadcasting service was/is received by CRT television receivers
    - Record and replay using Video Cassette
- o Outside Home
  - Portable audio cassette players
- o In Vehicle
  1. Audio: AM and FM Radio like home
    - Audio cassette for recorded media
  2. Analogue TV on car-navigation display

### Recent media environment in the home

#### o Audio:

1. HDD (hard disk drive) is a main audio media server device in the home.
2. A portable audio player are synchronized using a media server
3. All personally owned CDs may be stored in a HDD media server.
4. Audio content may be downloaded from a remote audio server through the Internet
5. A mobile phone set becomes an audio media player
  - A high capacity **flash memory card, more than a DVD disc**, is capable to store large amount of audio content

#### o Video:

- Optical Discs, such as DVD, are major video content distribution media

#### o Portable TV receiver:

- Many mobile phone sets have digital TV receiving capability for, such as, 1-seg of ISDB-T, S/T-DMB and DVB-H

### Recent media environment in vehicles

- o Many Vehicles have a multi-channel stereo audio system
  1. Vehicular AV system may have a CD/DVD player for audio and/or video play-back
  2. Some highly valued vehicles have a HDD that may capture all played-back content in the system
  3. Some vehicles have digital broadcast receiver for audio and/or TV.
- o Some vehicles have a medium size display in centre console:
  1. For analogue TV viewing
  2. For digital TV viewing
  3. For DVD playing back

### Recent media environment in vehicles (Cont.)

- o Ways of content delivery to vehicles
  1. From Digital Broadcasting (Terrestrial or Satellite)
  2. Package media like optical disc such as CD and DVD
  3. Within **flash memory cards** such as SD card
  4. Via access networks to buffer memory in the vehicle
  5. Via mobile audio devices such as MP3 player
  6. Via **mobile devices with Bluetooth connection** and flash memory card such as mobile phone set.

## ITU-R Recommendations and IEC Standards for digital broadcasting

- ITU-R developed Recommendations for broadcasting systems and IEC did International Standards of receivers
- The following table shows an example of digital broadcasting system Recommendations and their receivers' International Standards

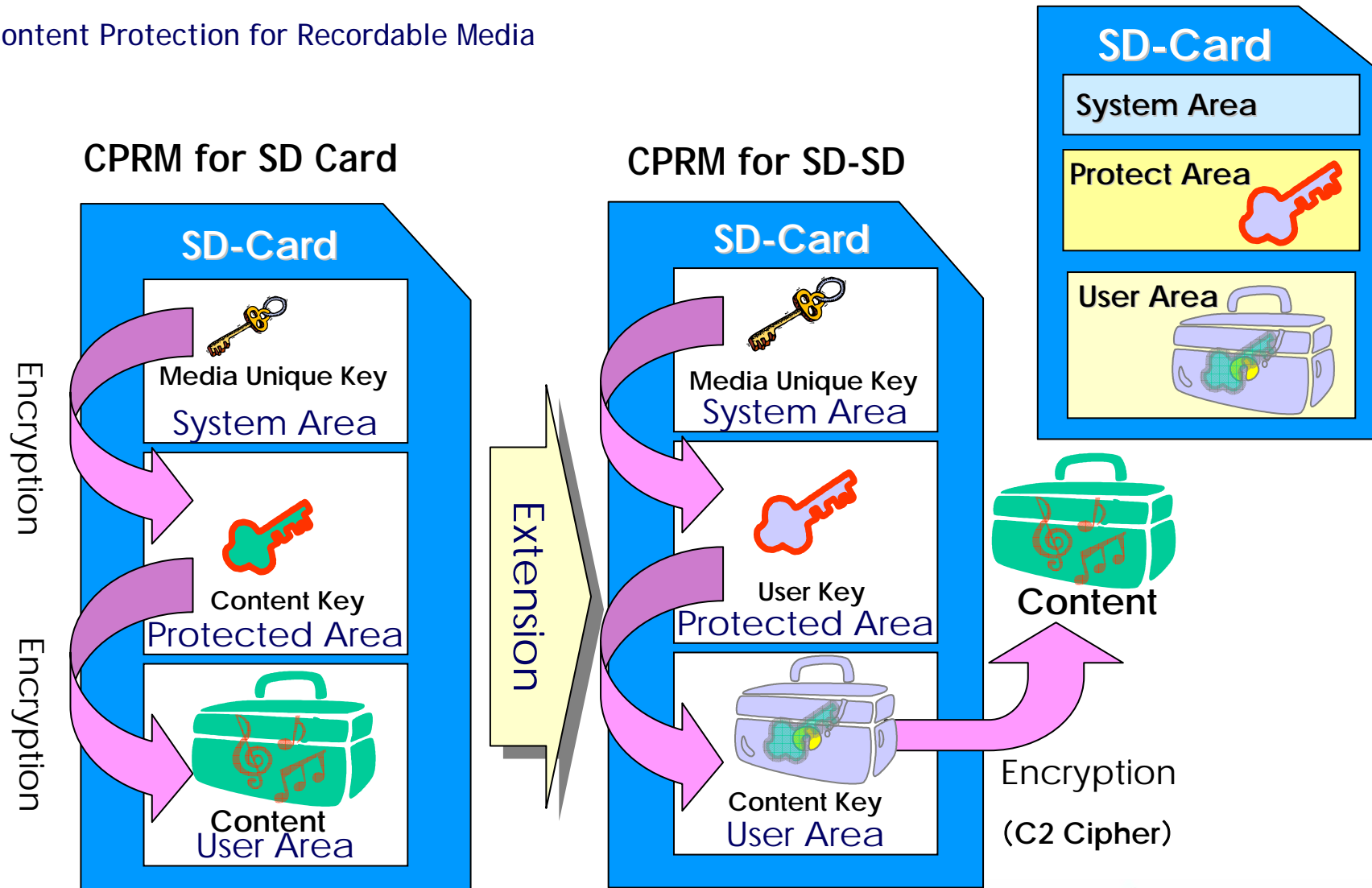
		<i>Satellite for fixed reception</i>	Terrestrial	Mobile (One-Seg./DVB-H)
ISDB	ITU-R	<i>BO.1516 System D</i>	BT.1306 System C	BT.1833 Multimedia System C
	IEC	<i>IEC 62360</i>	IEC 62360	To be included in IEC 62360
DVB	ITU-R	<i>BO.1516 System A</i>	BT.1306 System B	BT.1833 Multimedia System H
	IEC	<i>IEC 62028</i>	IEC 62216-1 IEC 62028	IEC 62002-1, 2 IEC 62455 for IPDC

- o ITU-R WP 6M developed this Recommendation titled 'Broadcasting of multimedia and data applications for mobile reception by handheld receivers' under Question ITU-R 45/6
- o Multimedia System "C" (ISDB-T) and Multimedia System "F" (ISDB-T<sub>SB</sub>)
- o Multimedia System "E" (MBCO in Japan and S-DMB in South Korea)
- o Multimedia System "A" (T-DMB)
- o Multimedia System "H" (DVB-H)
- o Multimedia System "M" (Forward Link Only (FLO))

- o ISO TC 204/WG 10 developed a series of Technical Specifications based on TPEG- binary, that includes additional specification to modify multimedia digital system.
- o ITU-R WP 6M started Category A liaison between ISO/TC 204 and its WG 10 regarding digital multimedia broadcasting system in 2000.
- o Under the liaison mechanism, ISO/TC 204/WG 10 developed tpeg-ML series deliverables based on XML content description.
- o 'tpeg-ML' mechanism can be applied to all digital multimedia systems based on XML.

# Content delivery using flash memory card

CPRM: Content Protection for Recordable Media



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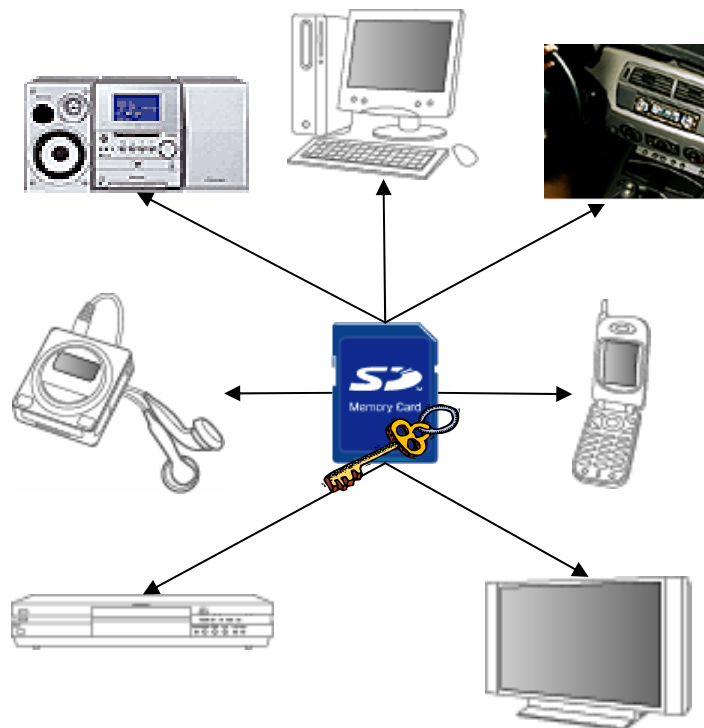
# Carrying content between home, mobile and vehicle



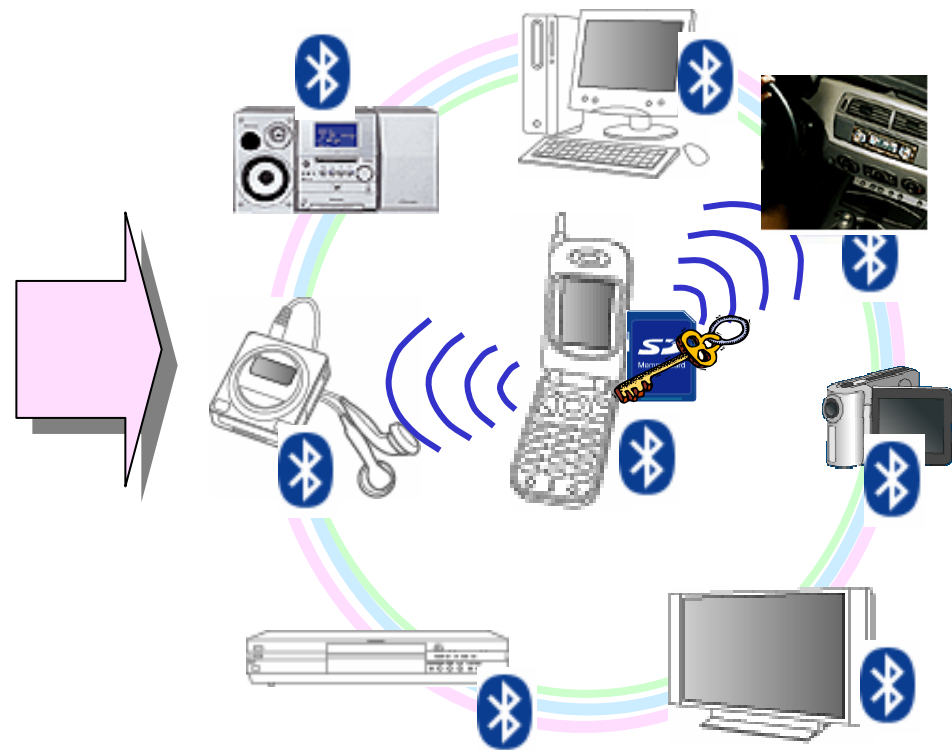
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SD Card plays like a golden key



SD Card with Bluetooth controls all equipment



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- o IEC/TC 100 is contributing:
  - Part of TC 100/TA 9 scope: End-user networks include all personal networks, e.g., home networks, vehicular networks and other networks controlled by an individual for audio, video and multimedia applications.
  - DLNA (IEC 62481-1 and -2) provides architecture, protocols and media formats for home networked device interoperability.
- o Trend:
  - Analogue to Digital
    - Plastic Disc/Cassette → CD
    - VHS → DVD
  - Package to Network Download
- o Discussed the ways of content delivery to vehicles
  - Within **flash memory cards** such as SD card
  - Via **mobile devices with Bluetooth connection** and flash memory card such as mobile phone set.
  - **SD Card with Bluetooth** controls all equipment

# Thank you for your attention

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