Digital television

Multimedia programming

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Introduction to MHP

DVB-J

DVB-HTML

- **Introduction to MHP**

  DVB-J

  DVB-HTML

Why digital TV?

- Better image quality
- More channels
- Multiple audio channels
- Subtitles

- The most important: applications
- The whole new world of services

- EPG


FOSTERS
Formula1
mtv3
Ma HUHTIKUU 26, 10:12
OK Valitse
Ohjelmakuvaus
Takaisin
03 MTV3
Urheilukanava
TÄNÄÄN 26.04.
09:00 Putti-mobiilipeli
11:00 UrheiluChat
17:00 Pelistudio (suora)
18:00 ALS - Aleksi Litovaara Snowboarding (u)
18:30 NBA Action -makasiini
19:00 NBA: 1. play off -kierros, Houston-L.A. Lakers, koripallo
20:55 Veikkauksen Kenon ja Mitalipelin numerot
Päävalikko
Formula1
Sivu ylös
Sivu alas
1 / 2

Digital Television Example services

- Super teletext

- Enchanced broadcast

Digital Television Example services

- Game

Example services

- Banking

What is MHP?

- Multimedia Home Platform
- Defines a generic interface between interactive digital applications and the terminals on which those applications execute
- Alternatives: OpenTV, Canal Technologies MediaHighway.

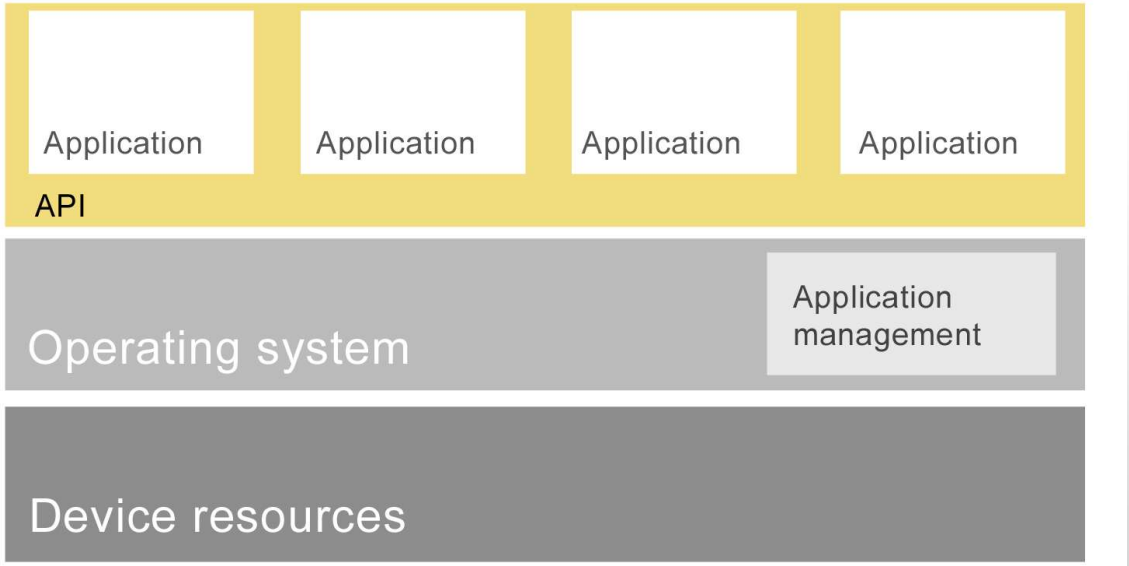
Digital Television Other standards

- NorDig
  - Scandinavian organization
  - Make the transition from analogue to digital television reception as simple as possible
  - Avoid and eliminate technical hindrances which might block viewers' access to the various programme companies' output
  - Make the transitional period with parallel analogue and digital transmissions as short as possible.
- F.U.N.
  - Free Universe Network
  - Germany
- For example both give suggestions to device manufacturers

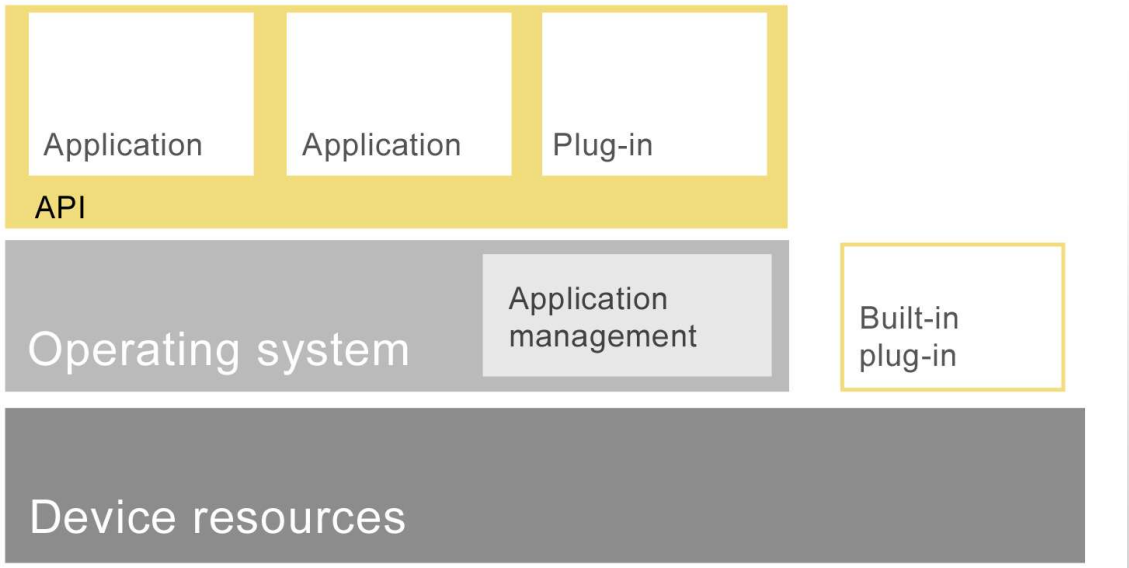
- Interactive vs. non-interactive
  - Feedback channel or not

- DVB-J
- DVB-HTML
- Built-in program guide:
  - ESG/EPG
  - Information about TV-programs
  - UI built into operating system

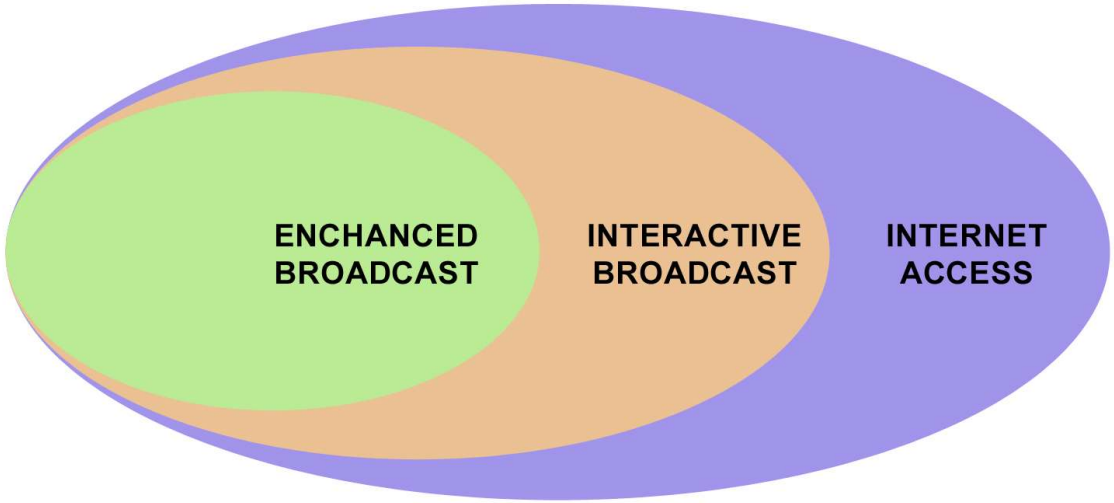
- MHP API
- Platform independent interface
- Hide actual system resources



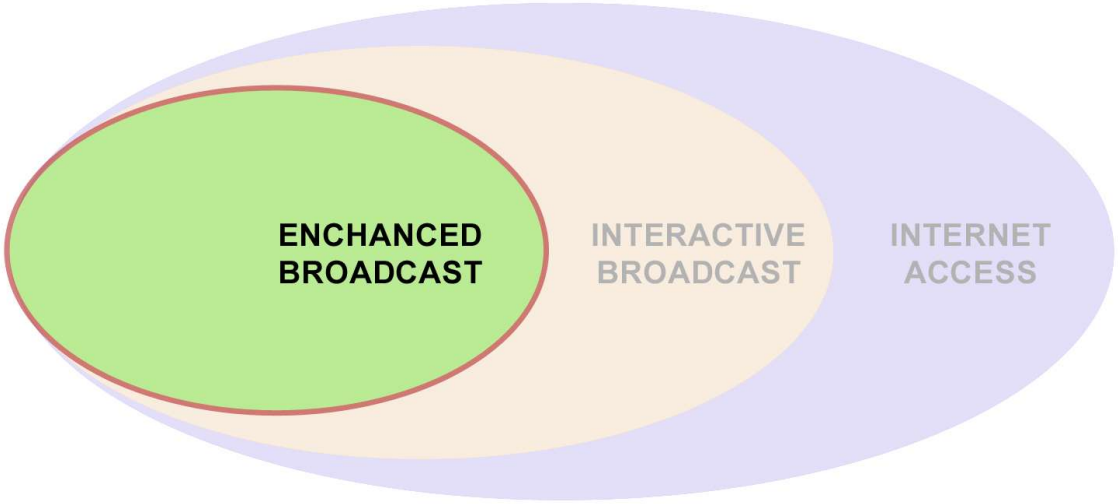
- Platform specific or application-like plugins



MHP Profiles

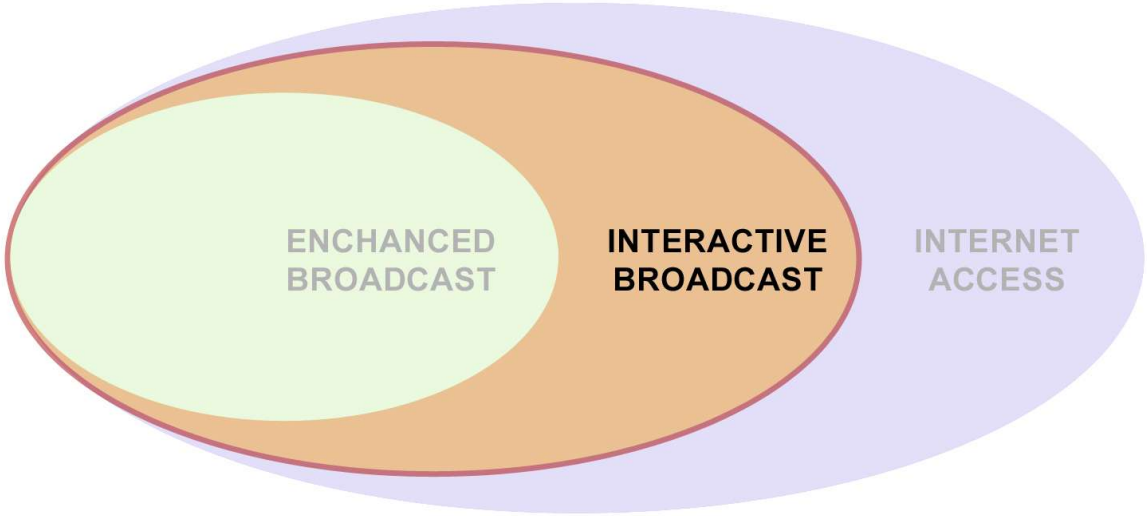


- Enhanced broadcast
- Interactive broadcast
- Internet access



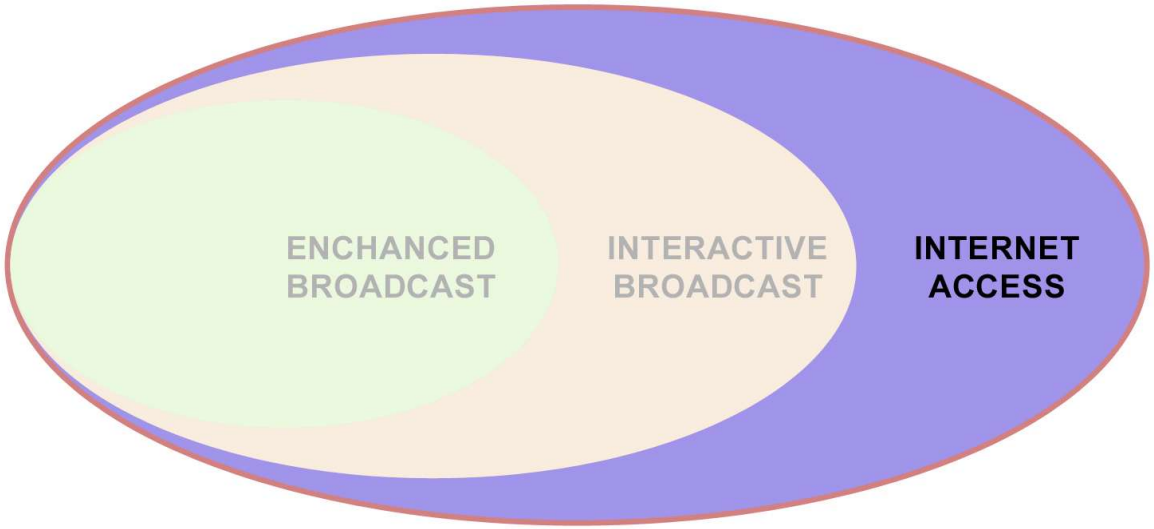
- Enhanced broadcast
  - The most limited profile
  - Video stream
  - Simple applications
    - digital teletext

MHP Profiles



- Interactive broadcast
  - Interaction
  - Feedback-channel

MHP Profiles



- Internet access
  - Full internet connection
  - Complicated services
  - All MHP boxes sold in Finland supports this profile (DigiTV Info)

- Devices
  - Set-top boxes
    - Scart connection
    - Like VCR
    - Prices starting from 50 €
  - Integrated TV sets
- Firmware can be updated from broadcast or manually

- Typical specifications
  - 32 MB Flash memory
  - ~150 MHz processor
  - Minimum color palette
  - Analog modem
  - Remote control, no keyboard
  - CA module
  - One tuner (C/T/S)

- In future
  - 32-bit color
  - Hard disk
  - Broadband
  - DVD-recorder
  - High definition

Remote controller

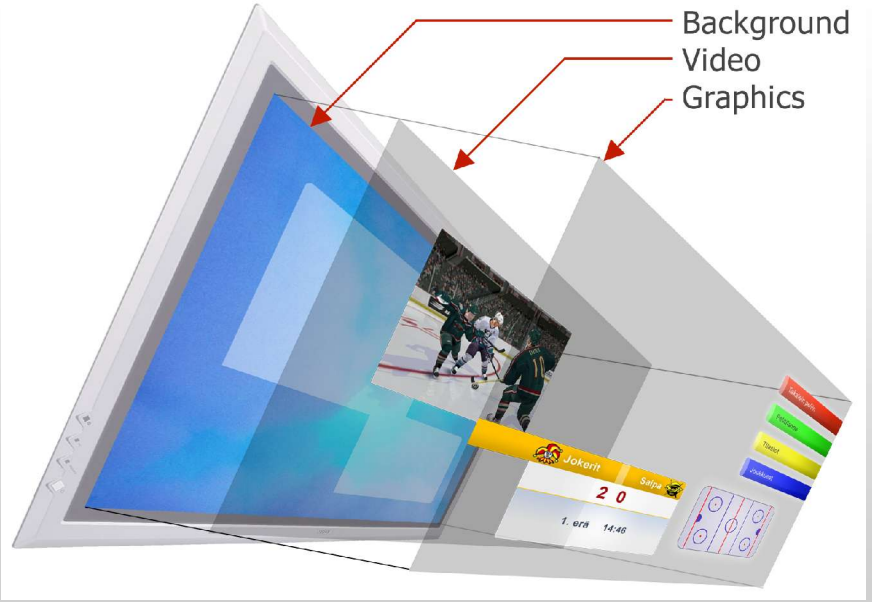
- MHP defines
  - Arrow keys
  - OK
  - TXT
  - Numbers 0-9
  - Color keys (in this order): red, green, yellow, blue
- There are also other keys, that are not required

Remote controller

- NorDig II suggests
  - Power ON / OFF
  - Programme UP / DOWN
  - Volume UP / DOWN
  - TV
  - Back

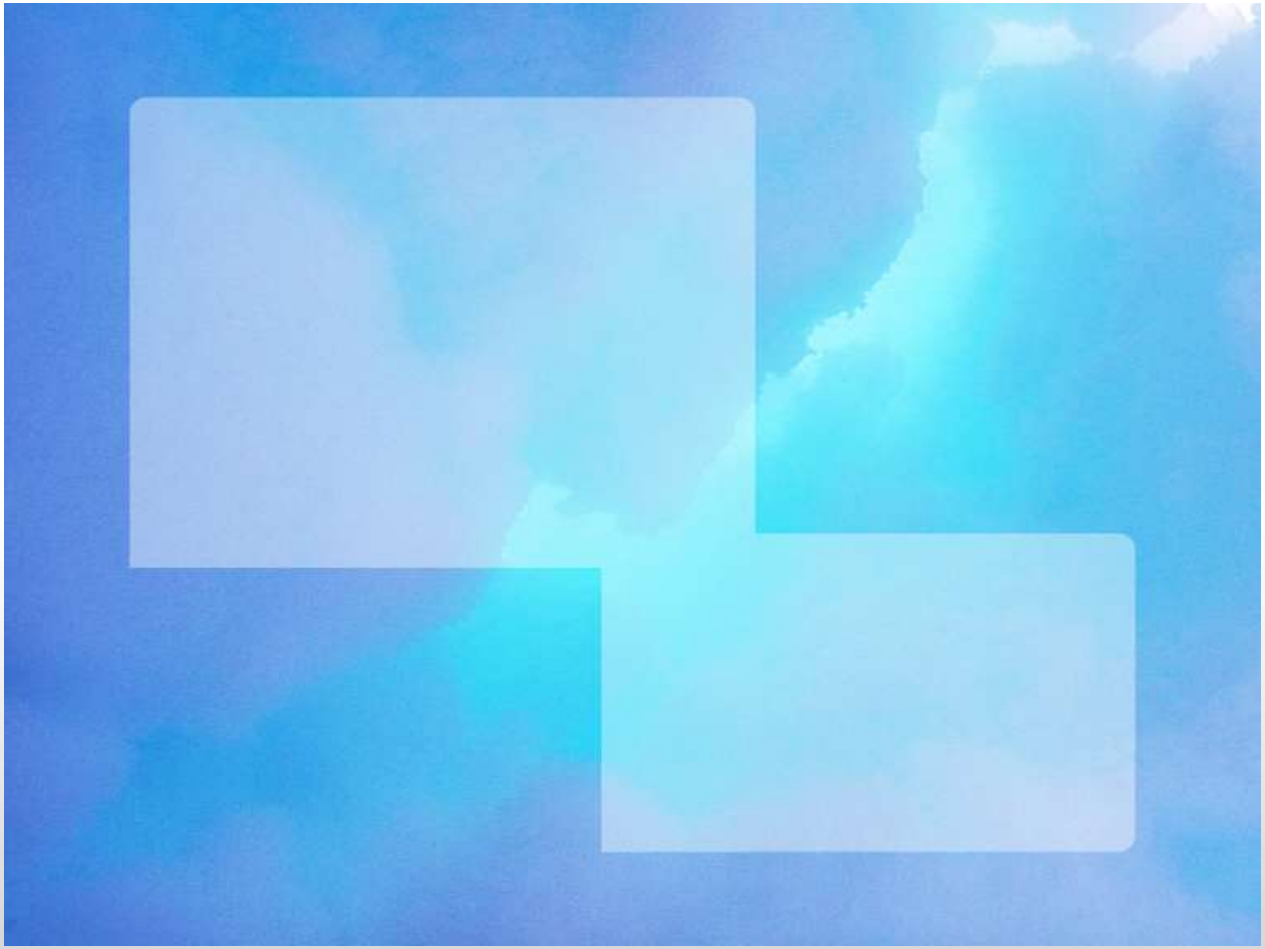
- Conditional Access Card
  - Defined in DVB-MHP version 1.0.1
  - Enables commercial channels, but pay-per-view-services are not supported.
- Smart Card
  - User authentication, transactions, paying via TV.
  - Defined in DVB-MHP version 1.1.

- 32-bit colors
  - MHP minimum palette (140+48 colors)
- Alpha channel
  - 0%, 30%, 100% required by MHP
  - If other values not supported, values are rounded to these.
- 3 layers:
  - background
  - video
  - graphics
- Java drawing primitives

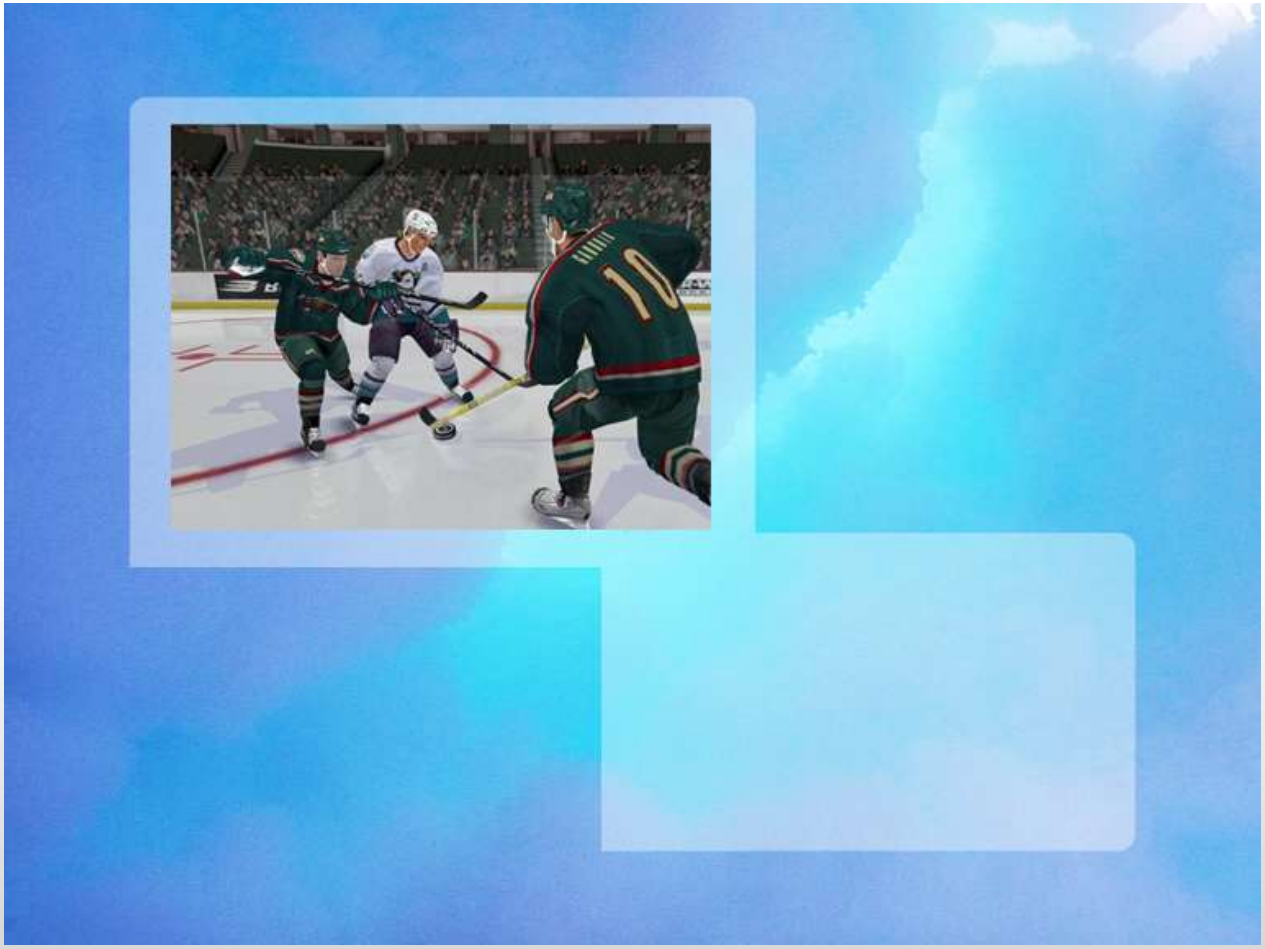


- Image formats
  - JPEG, GIF, PNG, MPEG I-Frame
- One resident font
  - Tiresias Screenfont
- Scaled video
- Combined web graphic and TV artist skills needed!

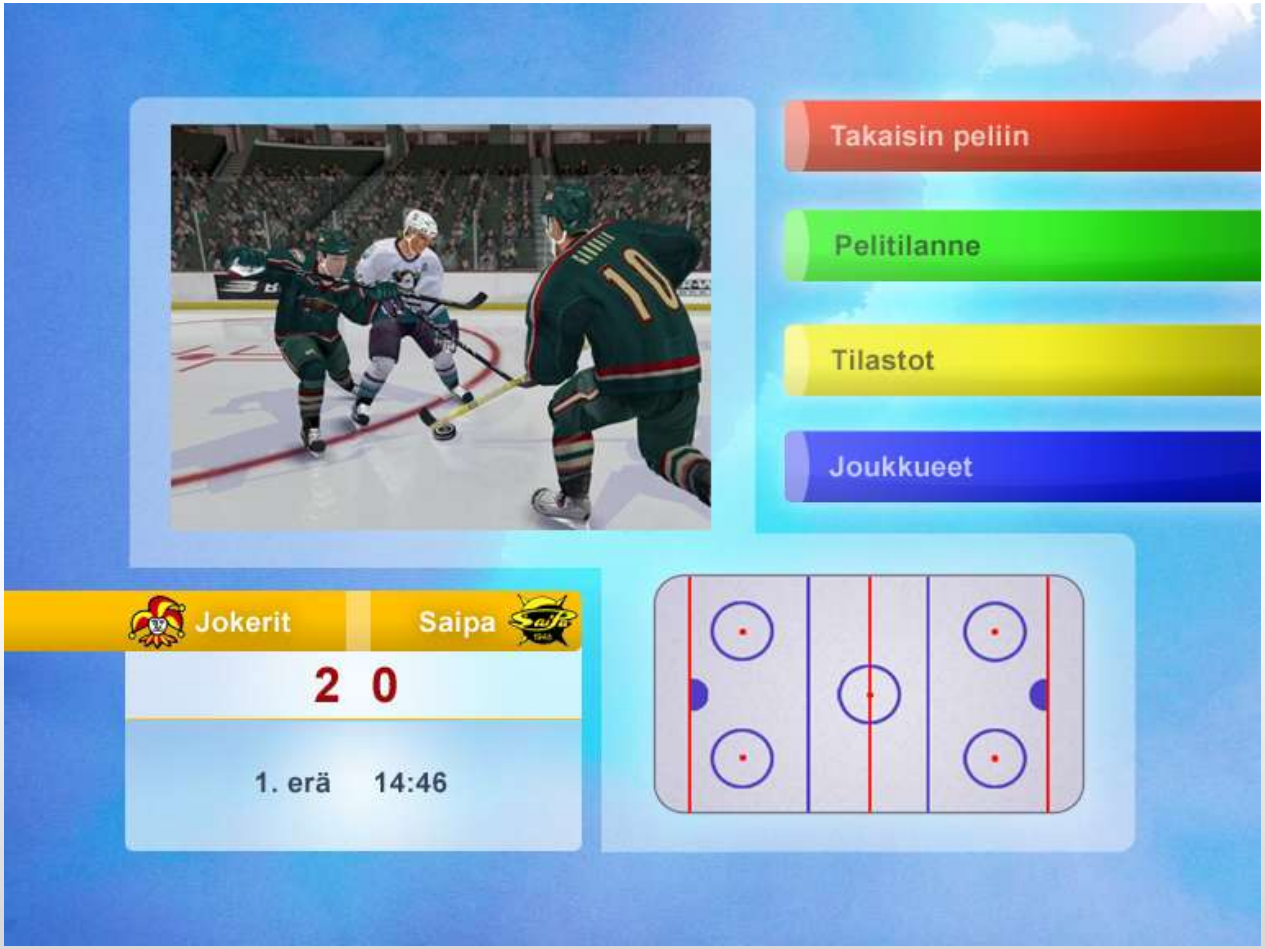
MHP layers: Background



MHP layers: Video



MHP layers: Graphics



MHP layers: background

- Only one still image
- MPEG I-Frame bitmap
- Always full-screen
- Opacity cannot be set

- MPEG-video from TV-stream
- Video is scalable
  - Full screen, 1/4, 1/16
  - Other if device supports
- Some devices supports multiple simultaneous video streams, but this is not required by MHP-standard

Layers: graphics

- Graphic layer
- Application graphics

- Poor sharpness
- Bright colors saturate
- Interlaced
  - Image consist of two separate set of horizonal lines
- Many aspect ratios (4/3, 14/9, 16/9)
  - Pixels are not squares
- Overscan
  - Edges are cut out
- Resolution is small (PAL 720x576)
- Flickering, 50 Hz

- Environment
  - Viewing distance
  - Lighting
  - Attention level
  - Social aspects

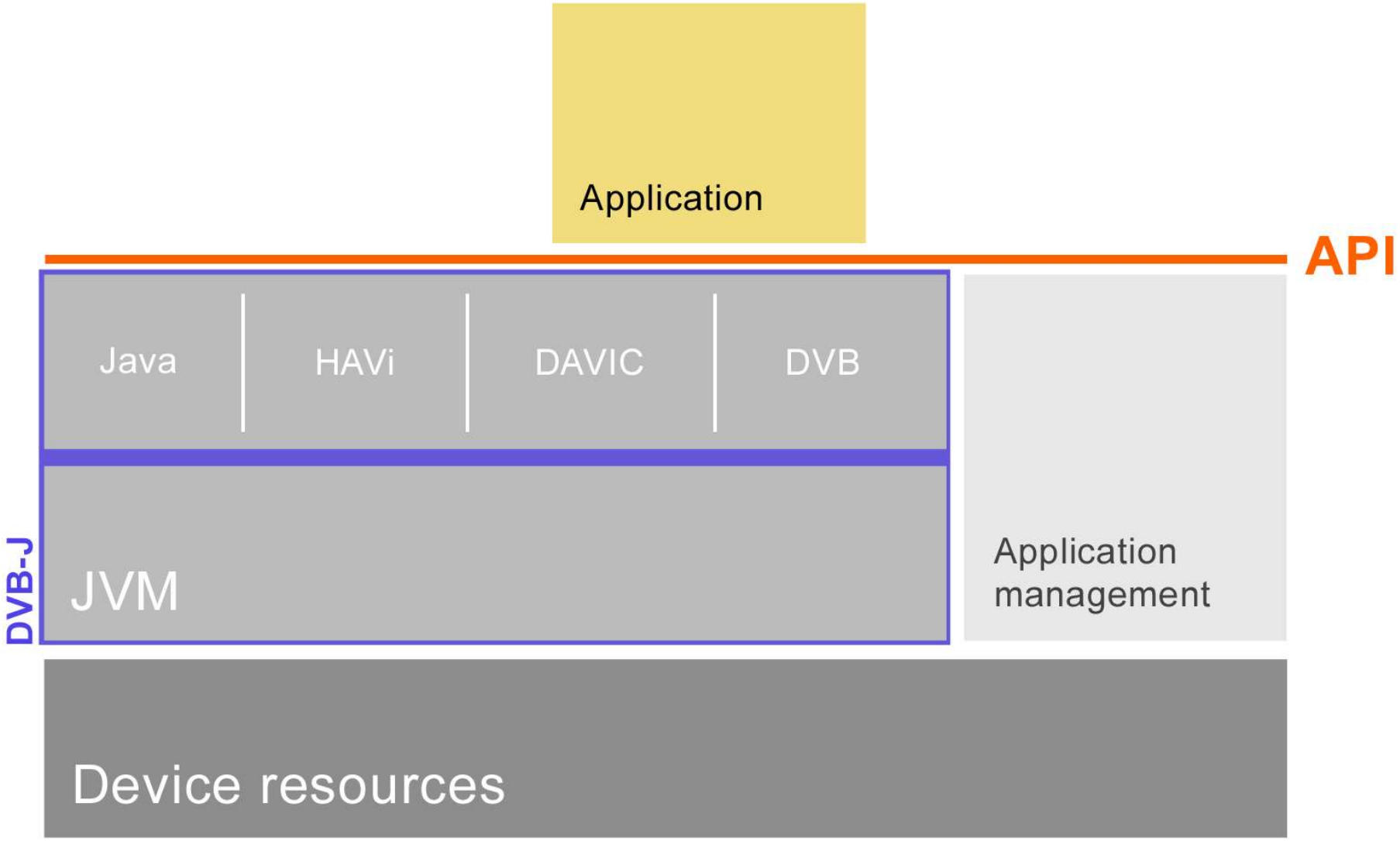
Introduction to MHP

- **DVB-J**

DVB-HTML

Digital Television DVB-J

- Special Java platform for digital television
- JVM is part of OS
- A few interfaces


Application
API
Java
HAVi
DAVIC
DVB
JVM
DVB-J
Application management
Device resources

- Java
  - Basic interfaces
    - lang, util, beans...
  - Graphical libraries
    - AWT, JMF
  - Service interfaces
    - JavaTV

Java
Havi
DAVIC
DVB

- HAVi
  - Home Audio Video Interoperability
  - Display and user interface libraries

Java
Havi
DAVIC
DVB

- DAVIC
  - Digital Audio Visual Council
  - Payment interfaces
  - Infrastructure interfaces
  - Tuning interfaces

- DVB
  - Digital Video Broadcasting
  - Extensions and limitations to Java-interfaces
  - Data access interfaces
  - I/O-device interfaces
  - Security interfaces
  - Other interfaces

Java
Havi
DAVIC
DVB

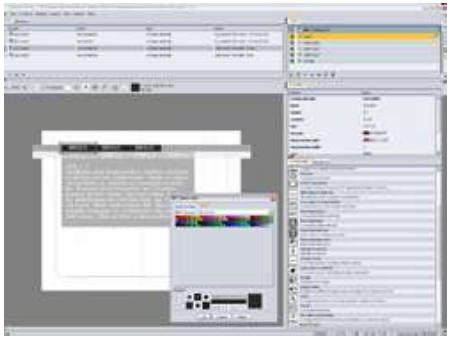
- Core interface
- Graphic User Interface is based on Java AWT (Abstract Windowing Toolkit) -toolkit
- MHP-standard lists Java.awt-classes that is supported
- AWT- library is cut down for unused features in digital television

Digital Television DVB-J org.dvb.ui

- Extended graphics interface (org.dvb.ui)
- Functionality is added to AWT by DVB-organization's *org.dvb.ui and org.dvb.event* – classes
- Extensions is fixed to match television environment
- Improvements
  - DVBBufferedImage, Image buffer memory
  - DVBColor, colors transparency using with Alfa-channel
  - DVBGraphics , graphics level transparency using with Alfa-channel
  - DVBTextLayoutManager, Text layout inside container
  - FontFactory, possibility for loaded fonts

DVB-J Tools and environments

- OpenMHP
  - MHP compliant implementation of classes required by MHP specification
  - Open source
  - Made in Turku, Finland
- XleTView
- Cardinal
  - Commercial environment



- Demonstration

Introduction to MHP

DVB-J

- **DVB-HTML**

Digital Television DVB-HTML

- Digital Video Broadcasting – HyperText Markup Language
- HTML-like environment for television
- Technologies
  - xml, xhtml, css, dom, ECMAScript
- Pages or ”screens” are received from media carusel
  - Same way of thinking as in normal teletext service.

Modern version of Teletext services

- DVB-HTML services are very often called as supertext-tv services.
- It will replace the normal teletext services.
- New services possible but already launched applications are the same as in normal teletext but with pictures
  - Perhaps ’cause the feedback channel is not yet implemented in on the market products

- DVB-HTML includes forms and links as a way to browse within service
- Forms makes it possible to build up somehow interactive content.
  - Need to remember that actual content for pages is received from media carusel.

DVB-HTML as a markup language

- Very close to normal html and xhtml/xml services.
- W3C has made very versatile standardisation
  - Includes many features that are not currently implemented to real products
  - DVB-MHP project describes the minimum level which has to be followed.
- Makes it possible to publish content easily from other content management systems etc.
- Code sample

Example of DVB-HTML page

```
<?xml version="1.0" encoding="ISO-8859-1"?><!DOCTYPE html SYSTEM
"supertext.dtd">
<html>
        <head>
                <title>SM-Liiga</title>
                <link rel="stylesheet" href="styles1Column.css"/>
        </head>
        <body>
                <div class="title">
                <span style="width: 200;">Tilastot
                </span>
                </div>

                <div class="main">
                <br><span class="lihavointi"></span><br><br>
                <table>
                <tr>
                        <td>SARJATAULUKKO</td>
                        <td ></td>
                </tr>
                <tr>
                        <td  bgcolor="#cccccc"></td>
                </tr>
.....
```

- Tools
  - Sofia Backstage
  - Cardinal
  - MHDL 2.0 (Canal+)
  - Ortikon Interactive

- Few example services
  - News
  - Extra information about tv-series or events
  - Traffic jam information, bus timetables
  - Subject specific portals
  - Payment services
    - Order new services or products via television. (requires feedback channel)

- Demonstration

- SM-Liiga Ice Hockey information service.
  - Service for extrainformation of statistics and newest gameresults and player profiles.

Digital Television