

Digital television

Multimedia programming

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Introduction to MHP

DVB-J

DVB-HTML



- **Introduction to MHP**

DVB-J

DVB-HTML



Digital Television Why digital TV?

- Better image quality
 - More channels
 - Multiple audio channels
 - Subtitles
-
- The most important: applications
 - The whole new world of services



Digital Television Example services

- EPG



The screenshot displays a digital television interface. The top left shows a live broadcast of a Formula 1 race on the 'MTV3' channel, with a red Ferrari car on the track. A race leaderboard is visible, listing drivers like M. Schumacher, F. Alonso, and others. The top right features the 'Formula 1' logo and the text 'Ma HUHTIKUU 26, 10:12'. Below the logo are navigation buttons: 'OK Valitse', 'Ohjelmakuvaus', and 'Takaisin'. The bottom section shows an EPG menu for 'Urheilukanava' (Sports Channel) for 'TÄNÄÄN 26.04.' (Today 26.04.). The menu lists programs such as '09:00 Putti-mobiilipeli', '11:00 UrheiluChat', '17:00 Pelistudio (suora)', '18:00 ALS - Alekski Litovaara Snowboarding (u)', '18:30 NBA Action - makasiini', '19:00 NBA: 1. play off -kierros, Houston-L.A. Lakers, koripallo', and '20:55 Velkkauksen Kenon ja Mitalipellin numerot'. At the bottom, there are navigation icons for 'Päävalikko', 'Formula 1', 'Sivu ylös', and 'Sivu alas', along with the page indicator '1 / 2'.



- Super teletext



The screenshot shows a digital television interface for the MTV3 channel, labeled 'TEKSTIKANAVA'. The time is 18.02.12:02. The menu is organized into sections: UUTISET (News), URHEILU (Sports), and TV-OPAS (TV Guide). The 'UUTISET' section is highlighted with an orange border and contains three items: 'EU sijoittaa Irakiin 700 miljoonaa ensi vuonna', 'Korhola kokouksen riveihin', and 'Velkasovintoja odotettu vähemmän'. The 'URHEILU' section contains 'EK3: Loeb johdossa MM-Katalonlassa, Mäkinen sel..', 'THG-testejä myös MM-rugbyssa', and 'Paikallistunnelmaa Helsingissä'. The 'TV-OPAS' section contains 'Idols: Äänestys alkaa perjantaina', 'Hockey Night -sivut avattu', and 'Syksyn elokuvat digitaalisella MTV3+:lla'. On the left side, there are three program thumbnails: 'TV' (sailing), 'ECUSSA' (orange balls), and 'S-kanava TV' (blue background). At the bottom, there is a navigation bar with a channel number '100' and four colored buttons: 'SISÄLTÖ' (red), 'PALVELUT' (green), 'TV-OPAS' (orange), and 'VALINNAT' (blue).

MTV3 TEKSTIKANAVA 18.02.12:02

> UUTISET

- ▶ EU sijoittaa Irakiin 700 miljoonaa ensi vuonna
- ▶ Korhola kokouksen riveihin
- ▶ Velkasovintoja odotettu vähemmän

> URHEILU

- ▶ EK3: Loeb johdossa MM-Katalonlassa, Mäkinen sel..
- ▶ THG-testejä myös MM-rugbyssa
- ▶ Paikallistunnelmaa Helsingissä

> TV-OPAS

- ▶ Idols: Äänestys alkaa perjantaina
- ▶ Hockey Night -sivut avattu
- ▶ Syksyn elokuvat digitaalisella MTV3+:lla

TV

ECUSSA

S-kanava TV

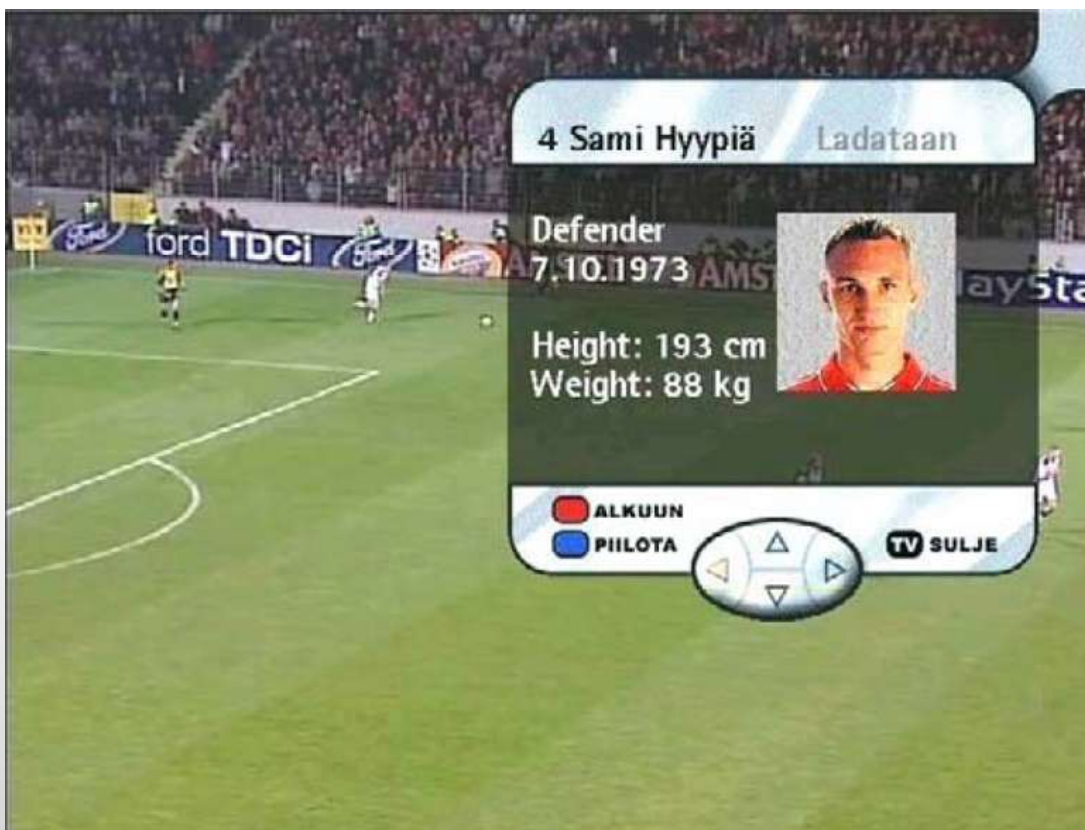
100

SISÄLTÖ PALVELUT TV-OPAS VALINNAT



Digital Television Example services

- Enhanced broadcast



Digital Television Example services

- Game



- Banking



- Ohje tähän näkymään
- Lopeta palvelun käyttö

Tällä hetkellä valittu tili: 500001-12345678

Valitse palvelu:

- 1 Laskun maksu
- 2 Tilitapahtumat
- 3 Tilin vaihto

① 1 - 3 numeropainikkeilla valitset palvelun



- 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

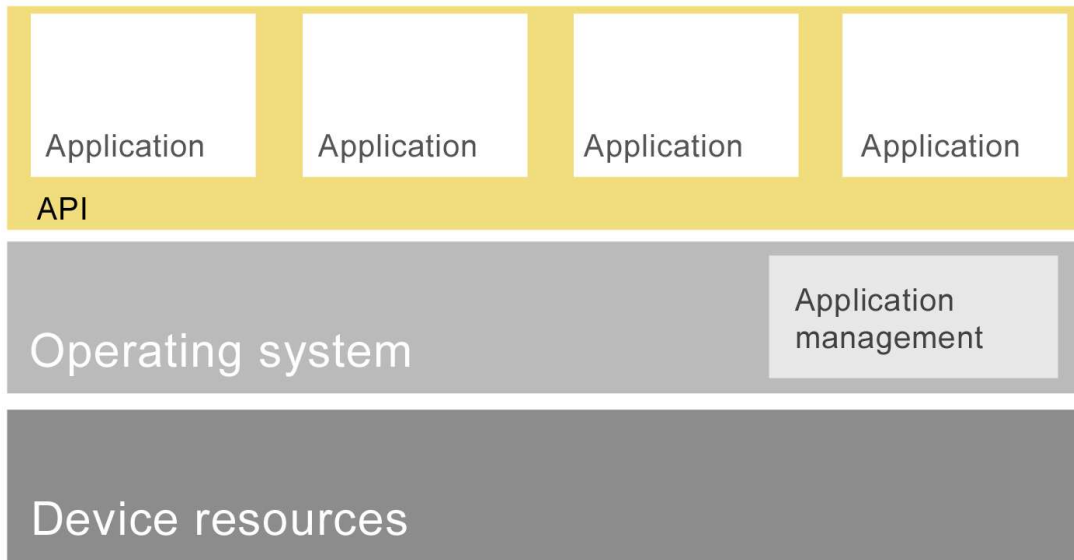
- NorDig
 - Scandinavian organization
 - Make the transition from analogue to digital television reception as simple as possible
 - Avoid and eliminate technical hindrances which might block viewers' access to the various programme companies' output
 - Make the transitional period with parallel analogue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



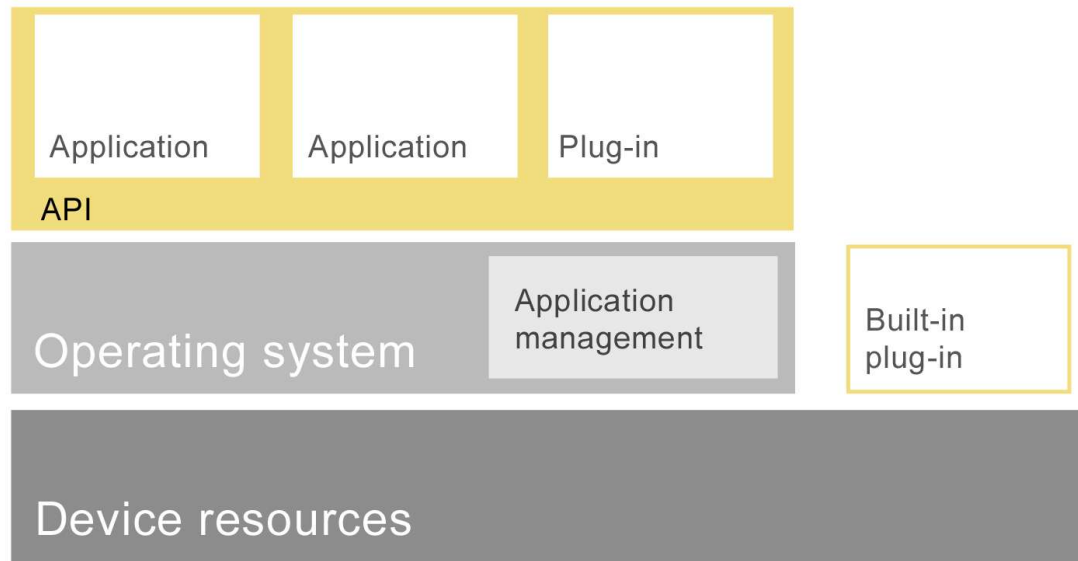
- Interactive vs. non-interactive
 - Feedback channel or not
- DVB-J
- DVB-HTML
- Built-in program guide:
 - ESG/EPG
 - Information about TV-programs
 - UI built into operating system

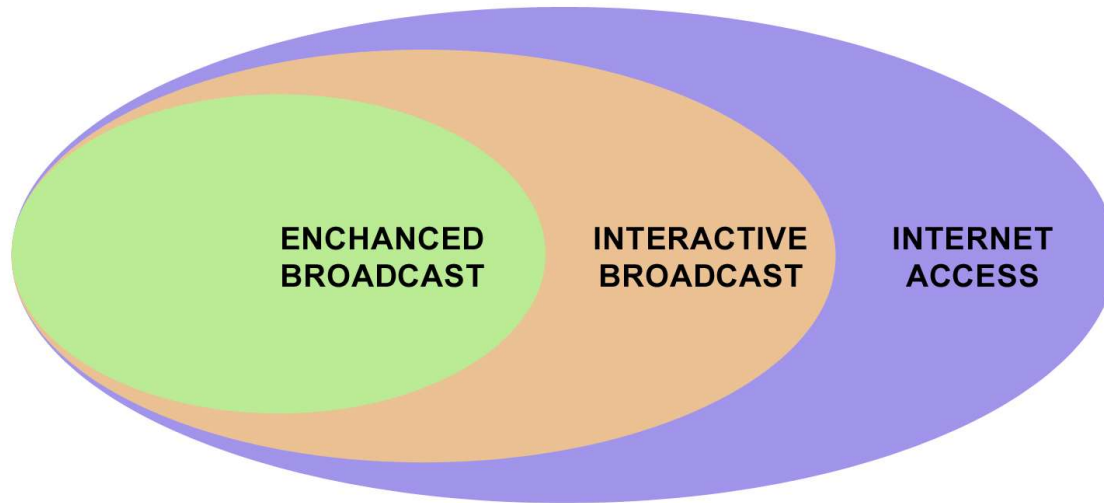


- MHP API
- Platform independent interface
- Hide actual system resources



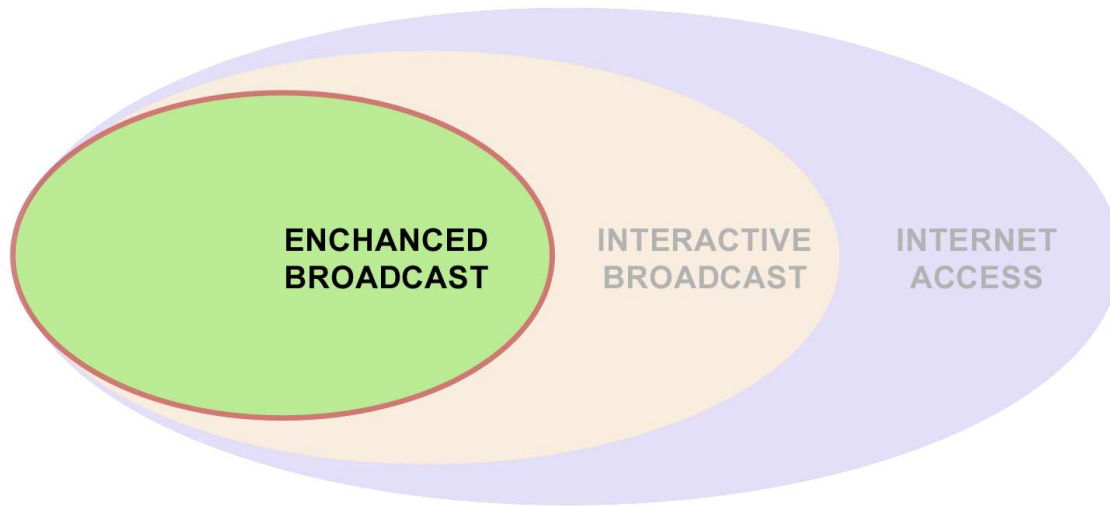
- Platform specific or application-like plugins





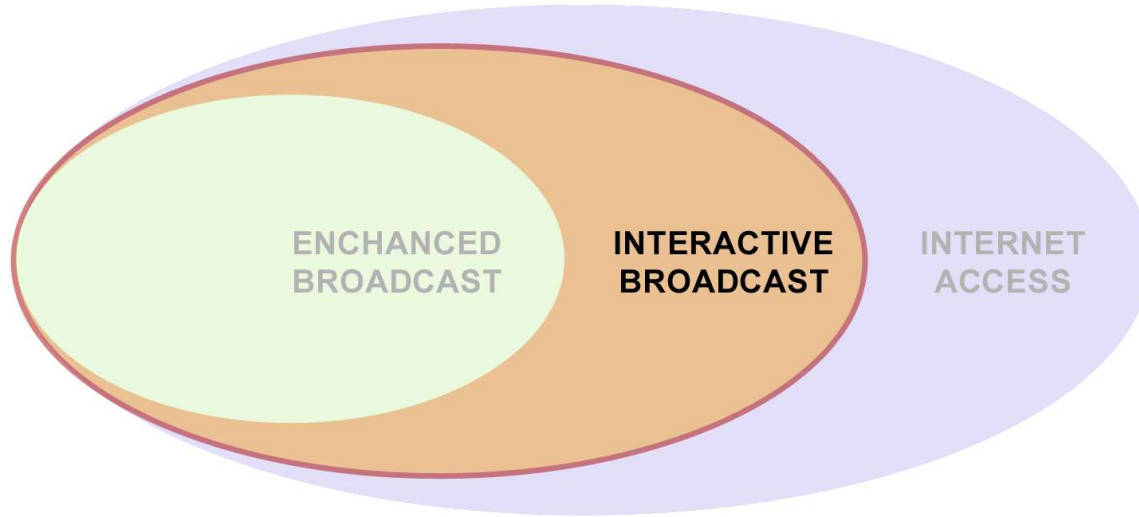
- Enhanced broadcast
- Interactive broadcast
- Internet access





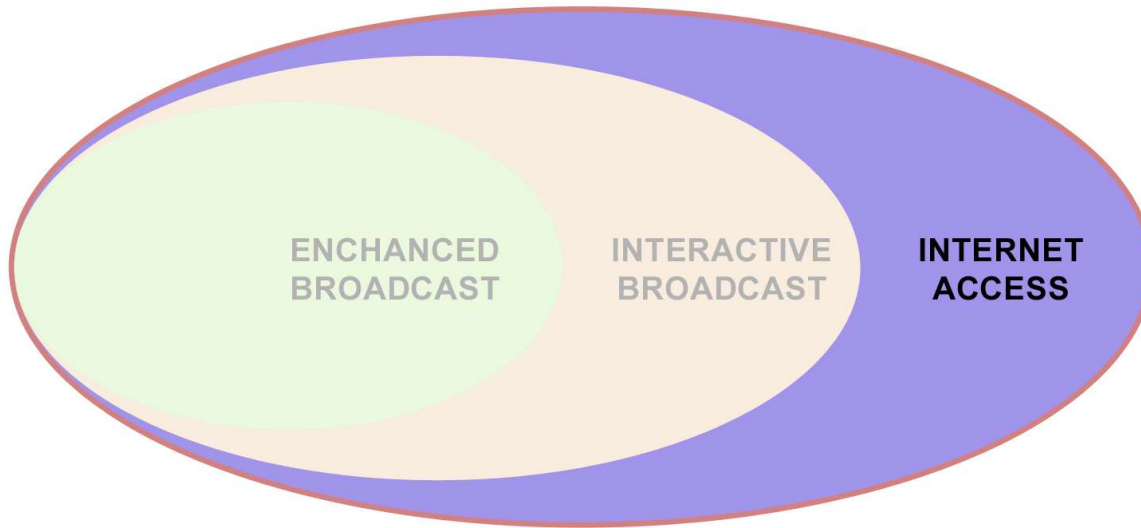
- **Enhanced broadcast**
 - The most limited profile
 - Video stream
 - Simple applications
 - digital teletext





- **Interactive broadcast**
 - Interaction
 - Feedback-channel





- **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



Digital Television 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



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

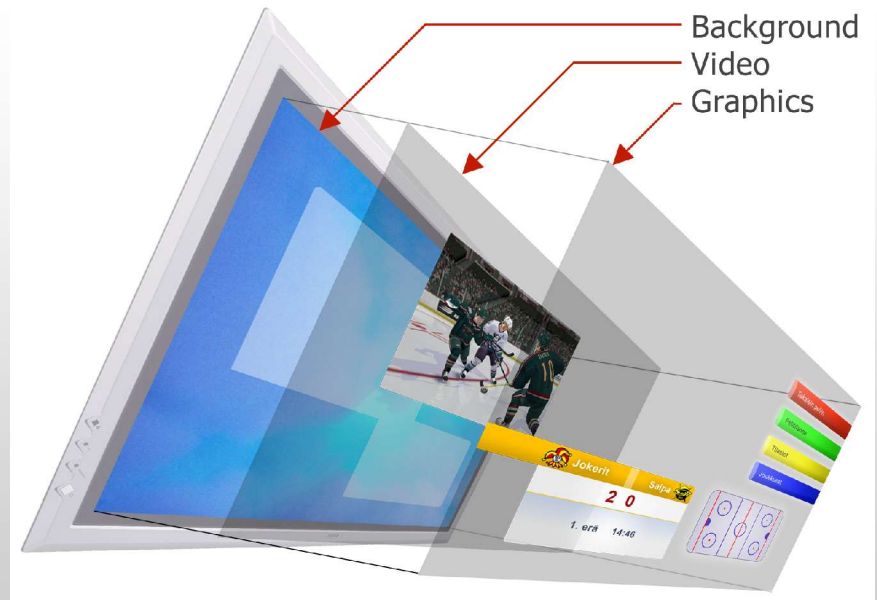


- **Conditional Access Card**
 - Defined in DVB-MHP version 1.0.1
 - Enables commercial channels, but pay-per-view-services are not supported.
- **Smart Card**
 - User authentication, transactions, paying via TV.
 - Defined in DVB-MHP version 1.1.



Digital Television MHP Graphics

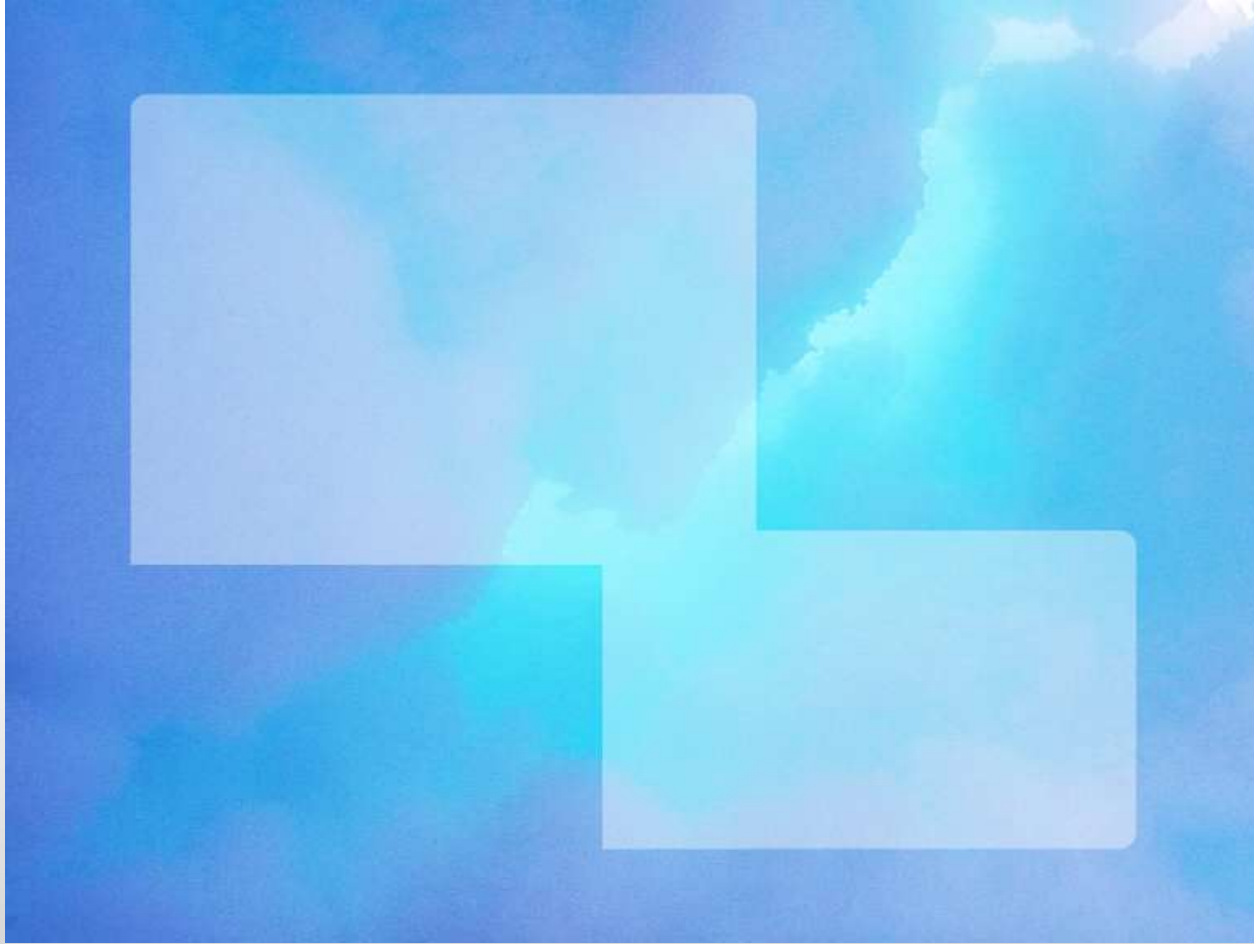
- 32-bit colors
 - MHP minimum palette (140+48 colors)
- Alpha channel
 - 0%, 30%, 100% required by MHP
 - If other values not supported, values are rounded to these.
- 3 layers:
 - background
 - video
 - graphics
- Java drawing primitives



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



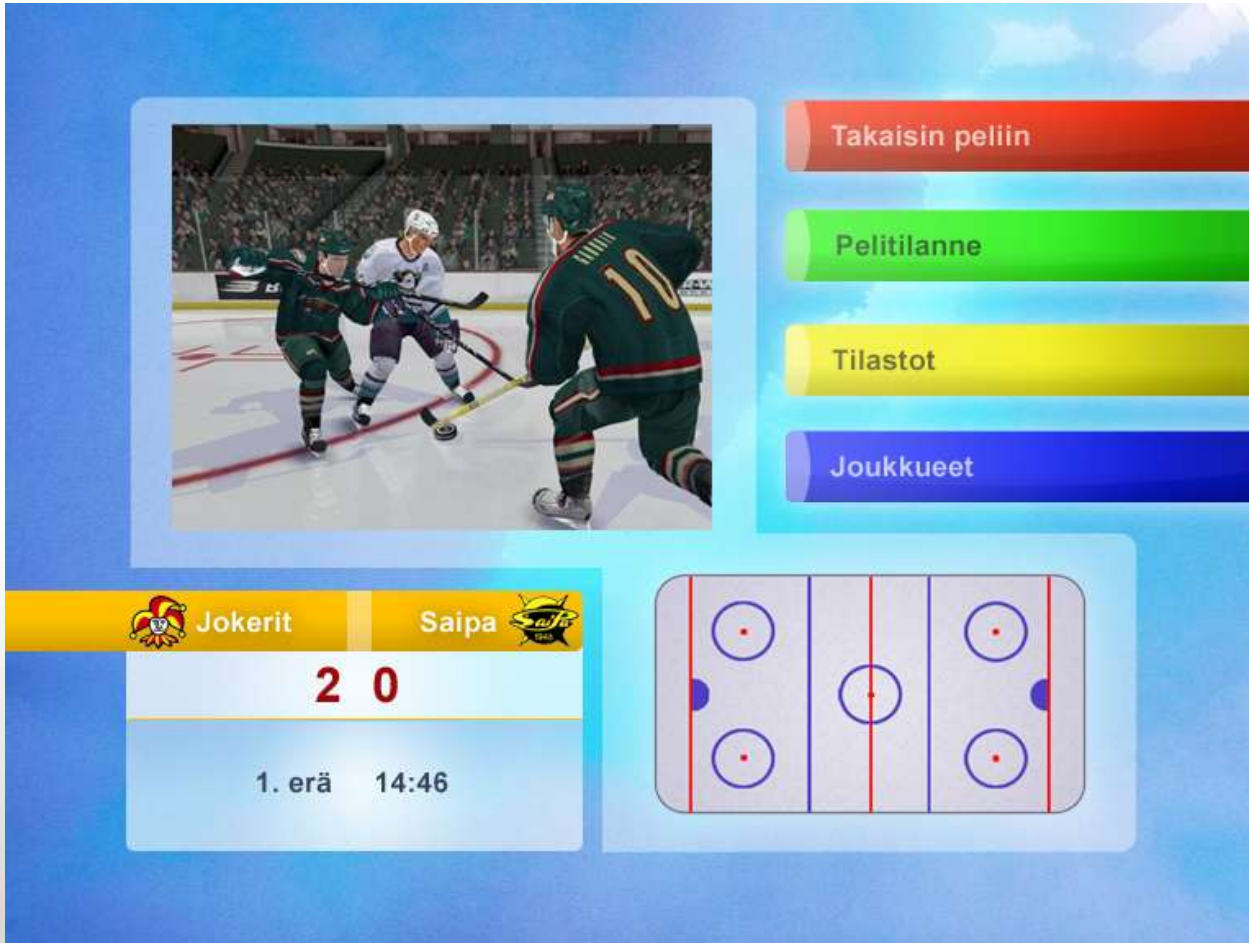
Digital Television MHP layers: Background



Digital Television MHP layers: Video



Digital Television MHP layers: Graphics



The image displays a digital television interface for an ice hockey game. It features a central video window showing players on the ice, a vertical menu on the right with four options, a scoreboard at the bottom left, and an ice rink diagram at the bottom right.

Takaisin peliin
Pelitalanne
Tilastot
Joukkueet

Jokerit **Saipa**
2 0
1. erä 14:46

The interface is set against a blue background with a light blue sky and clouds. The video window shows three players in action on an ice rink. The scoreboard shows a 2-0 lead for Jokerit. The rink diagram shows the current positions of the players on the ice.



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

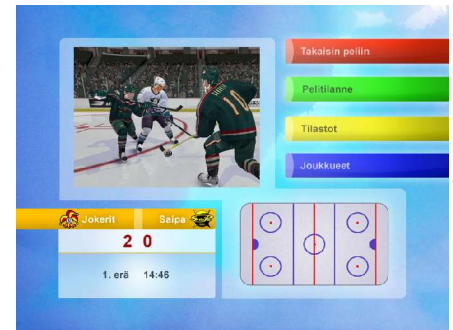


- MPEG-video from TV-stream
- Video is scalable
 - Full screen, 1/4, 1/16
 - Other if device supports
- Some devices supports multiple simultaneous video streams, but this is not required by MHP-standard



Digital Television Layers: graphics

- Graphic layer
- Application graphics



Digital Television TV as multimedia platform

- Poor sharpness
- Bright colors saturate
- Interlaced
 - Image consist of two separate set of horizontal 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**

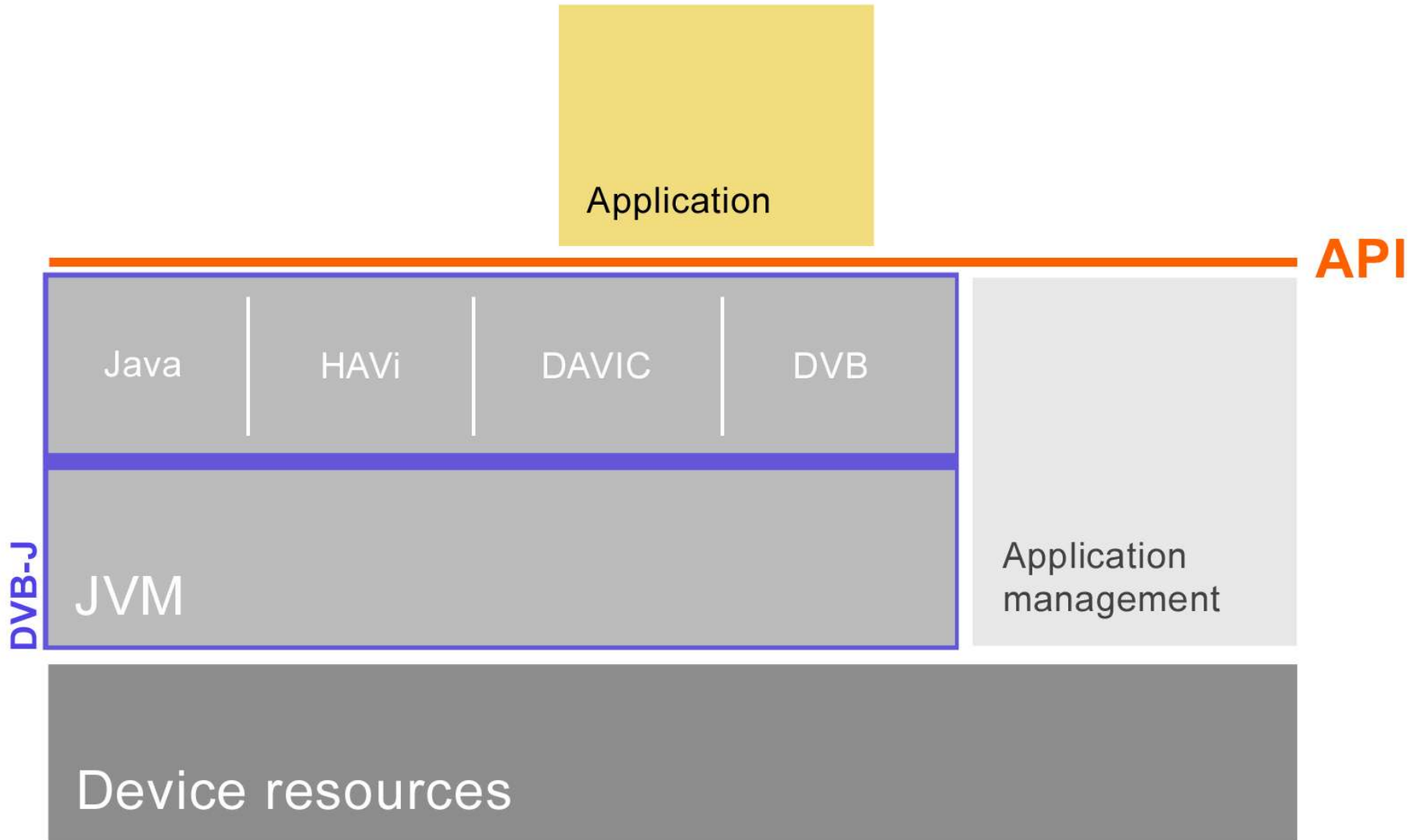
DVB-HTML



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



Digital Television DVB-J



- **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

Java

Havi

DAVIC

DVB



- 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



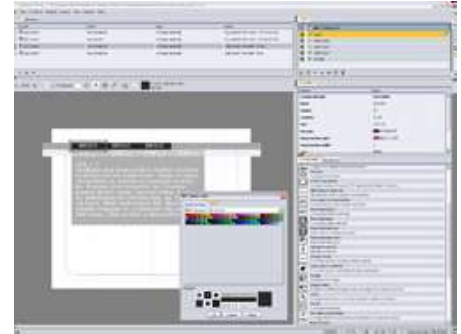
- Core interface
- Graphic User Interface is based on Java AWT (Abstract Windowing Toolkit) -toolkit
- MHP-standard lists Java.awt-classes that is supported
- AWT- library is cut down for unused features in digital television



- 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



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



Digital Television 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 carousel.



Digital Television 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



Digital Television 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">`
- `Tilastot`
- ``
- `</div>`
- `<div class="main">`
- `

`
- `<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

