

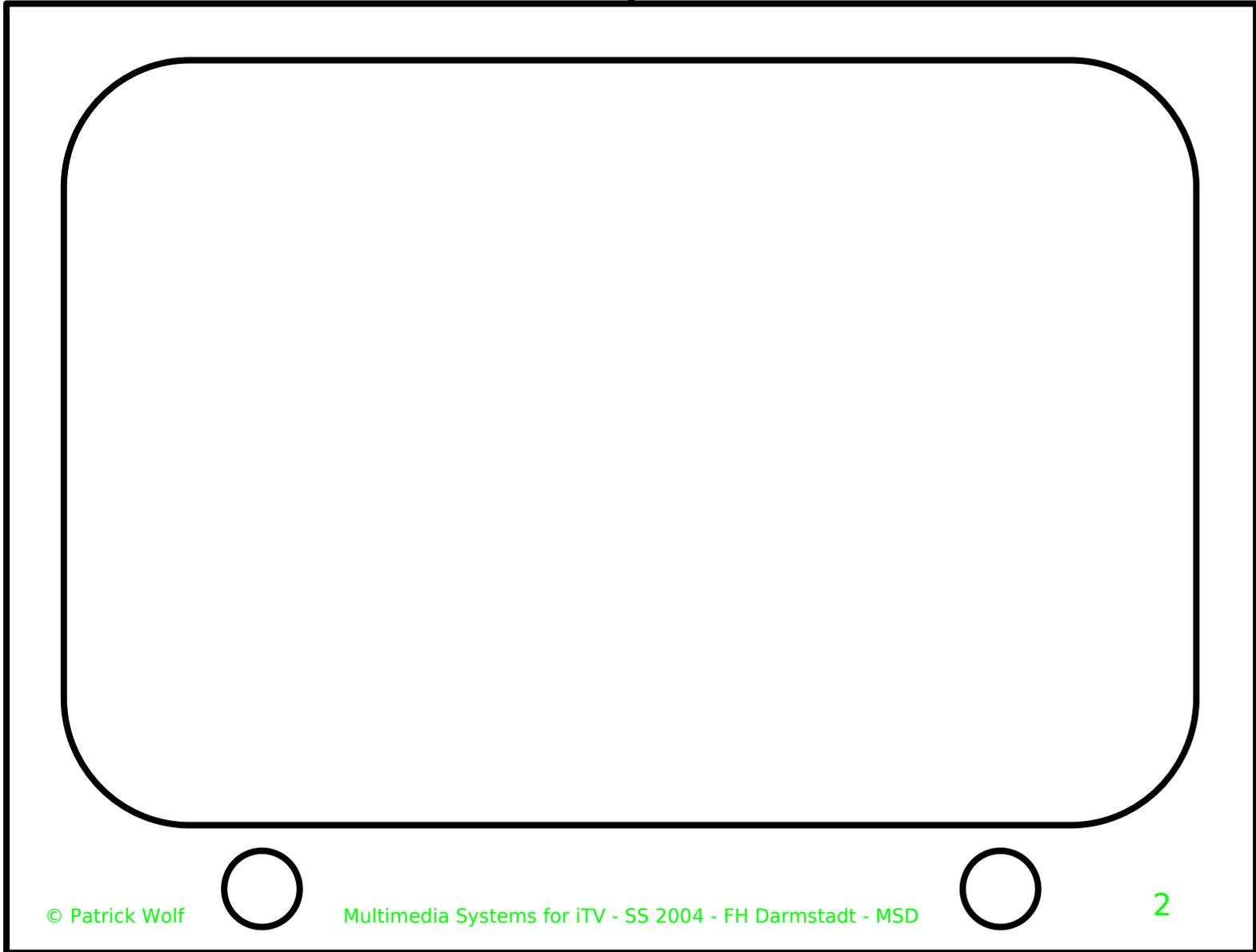
# **Middleware for interactive TV**

**How to overcome the  
antics of set-top-box  
manufactures**

 **Multimedia Systems for iTV** 

# Overview

- Middlewares
- MHP
- Questions



What is

middleware (I)

- Middlewares
- MHP
- Questions

**Middleware** is a **software layer** that **sites on top of** (or instead of) the **Operating System** (OS) on the Set-Top-Box

It allows a content developers to work without having to consider low-level issues for an STB

- Drivers, Operating System, etc.

**Plan:**

This makes it easier to write complex applications

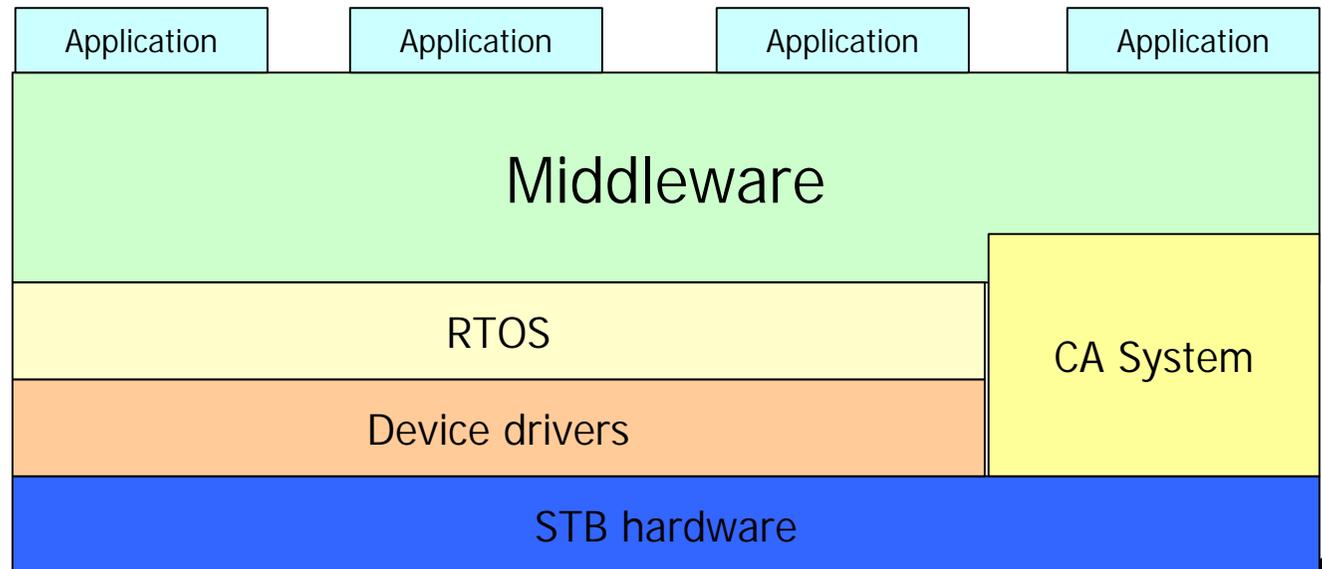
What is

middleware (II)?

- Middlewares
- MHP
- Questions

**Middleware runs between the device drivers/OS and the application**

**Literally 'in the middle' of the software stack**



**Advantages of**

**middleware**

- ❑ Middlewares
- MHP
- Questions

**Makes it easier to write complex applications**

**Allows portability across hardware and operating systems**

- ❑ Applications will run on any platform the middleware has been ported to
- ❑ The application developer doesn't need to consider the OS/hardware in every STB the application will run on

**Makes it easier for third parties to write applications**

- ❑ Only need to learn about a few middleware platforms
- ❑ More abstraction makes learning easier

# Types of

# middleware

- ❑ Middlewares
- MHP
- Questions

## Proprietary middleware

- ❑ Designed by a single company
- ❑ Licensed to STB manufacturers
- ❑ Most common in pay TV
  - ★ e.g. OpenTV

## Open middleware

- ❑ Standardised by an industry body
- ❑ Can be implemented by anyone
- ❑ Licensing fee is usually small
- ❑ More commonly used in free TV
  - ★ e.g. MHEG in UK terrestrial market
  - ★ (of course) MHP

## Closed middleware

## examples

- ❑ Middlewares
- MHP
- Questions

### OpenTV Core (OpenTV)

- ❑ the “Microsoft of iTV” middleware
- ❑ 70% market share (as of 2000, tendency ↓)

### MediaHighway (Canal+)

### Microsoft TV (Microsoft)

### Liberate

### PowerTV

### NDS Core (NDS)

### Liberty

# Open middleware

# examples

- ❑ Middlewares
- MHP
- Questions

## MHEG

- ❑ Standardised by ISO
- ❑ Used in the old UK terrestrial system
- ❑ DAVIC (MHEG+Java)

## MHP

- ❑ DVB Open middleware standard
- ❑ Broad industry support

## OpenCable

- ❑ Open standard for US cable market
- ❑ Based on MHP

# Middleware

# features

- Middlewares
- MHP
- Questions

All middleware have same basic features

**Hide** the hardware/OS layer from an application and **provides a set of commonly used functions**

- Abstracts over complex hardware and software functions
- Provides a more natural environment for developers
- Allows the use of pre-built components (graphics support, browser)
- Offers better software tools

- ❑ Middlewares
- MHP
- Questions

## Middleware for iTV offers

- ❑ **An application model**

  - ★ includes usually distribution

- ❑ **MPEG decoder/demux access**

- ❑ **Graphics display**

  - ★ Access to multiple video planes

  - ★ Access to graphics/video integration features

- ❑ Middlewares
- MHP
- Questions

- ❑ **Service information access**
- ❑ **User input (via RC or keyboard)**
  - ★ Supports a standard input model and key codes
- ❑ **Access to the return channel (TCP/IP)**
  - ★ Modem or Broadband
- ❑ **Memory management**

**Services**

**middleware offers**

- Middlewares
- MHP
- Questions

## **Software development environment**

- Usually C/C++ or Java
- Sometimes other languages
  - ★ Possibly proprietary scripting languages
- HTML may be supported

## **More complex features**

- Internationalisation
- Web browsing & internet access

**Problems with**

**closed middleware**

- ❑ Middlewares
- MHP
- Questions

**Too many different vendors:**

- ❑ Different markets use different middleware
- ❑ Content must be developed repeatedly for different customers
- ❑ Content can't be re-sold

**Licensing costs are quite high**

- ❑ ~US\$10 per box for OpenTV, for example
- ❑ This increases STB costs

Problems with

open middleware

- ❑ Middlewares
- MHP
- Questions

**No one knows yet if using open middleware pays off, but many companies support it**

- ❑ Including some proprietary middleware vendors
- ❑ See it as a chance to **grow the overall market**

**open middleware**

**wish-list**

- ❑ Middlewares
- MHP
- Questions

**It would allow the entire industry to change its business model:**

- ❑ Sell STBs through outlets
- ❑ Allow customers more choice
  - ★ Move from one operator to another without replacing your STB
  - ★ Add more features to an STB, e.g. PVR, games console, broadband gateway

**Requires full compatibility!**

**MHP**

**abstract**

Middlewares

MHP

Questions

**MHP** is an **open** standard for **interactive digital television**

- Defined by the DVB consortium**
- An extension to existing open standards
  - ★ DVB, MPEG, JavaTV (JMF)
- “An enabling technology for compelling interactive content”

Middlewares

MHP

Questions

## Three layers:

- resources** - MPEG processing, I/O devices, CPU, memory and a graphics system
- system software** - uses the available resources in order to provide an abstract view of the platform to the applications
- applications** - MHP implementations include an application manager ("navigator") to control the MHP and the applications running on it.

# What Is MHP?

Middlewares

MHP

Questions

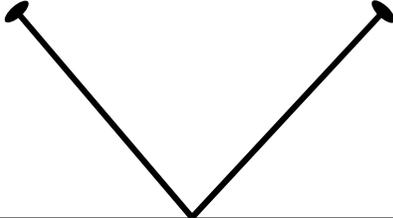
## **MHP is:**

- A platform definition
- A set of Java APIs
- A set of HTML document type definitions
- A set of compatibility tests

## **It is also:**

- Compatible with DVB-based solutions
- Freely available (specification available on the web)

# MHP Adoption



Middleware

MHP

Questions

**MHP has been adopted in many countries**

- Germany, Finland, Singapore, Korea, Australia and others
- Included in the US OpenCable standard

**Many other broadcasters & content developers working with MHP**

Middleware

MHP

Questions

## Applications are built in Java or HTML

- Most current products use Java only
- Plug-in mechanism similar to web browsers means current content may be re-used

**Transported in a DVB transport stream or IP connection**

**Described to the platform using additional service information**

**What can**

**an application do?**

Middleware

MHP

Questions

## **Almost anything!**

- Many standard Java APIs are available
- Extensions for TV-specific functionality
- APIs for return channel access
- APIs for application control and communication

**HTML application support for latest internet standards**

**XHTML, CSS 2.0, ECMAScript**

**Incremental**

**Investment**

- Middlewares
- MHP
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## **MHP services and receivers can be deployed incrementally**

- 'Big bang' deployment is not necessary
- Forward and backward compatible with non-MHP DVB services and receivers

## **Most existing DTV head-end equipment can be re-used**

- Including existing CA systems

**MHP**

**Links**

Middlewares

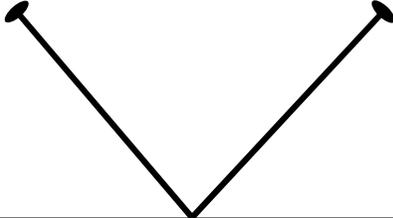
MHP

Questions

### **Some MHP resources:**

- <http://www.mhp.org>
- <http://www.mhp-interactive.org>
- <http://www.mhp-forum.de/>
- <http://www.irt.de/IRT/mhp/mhp.htm>
- <http://www.mhp4free.de/>

# Questions?



Middleware

MHP

Questions

## **You first:**

I am awaiting your questions

## **Now me:**

What did we learn today?

## **Credits:**

Thanks to Steven Morris for slides

## **What's coming up?**

MHP

★ My first Xlet