DVB-MHP 기반
데이터방송 미들웨어 기술

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Table of Contents

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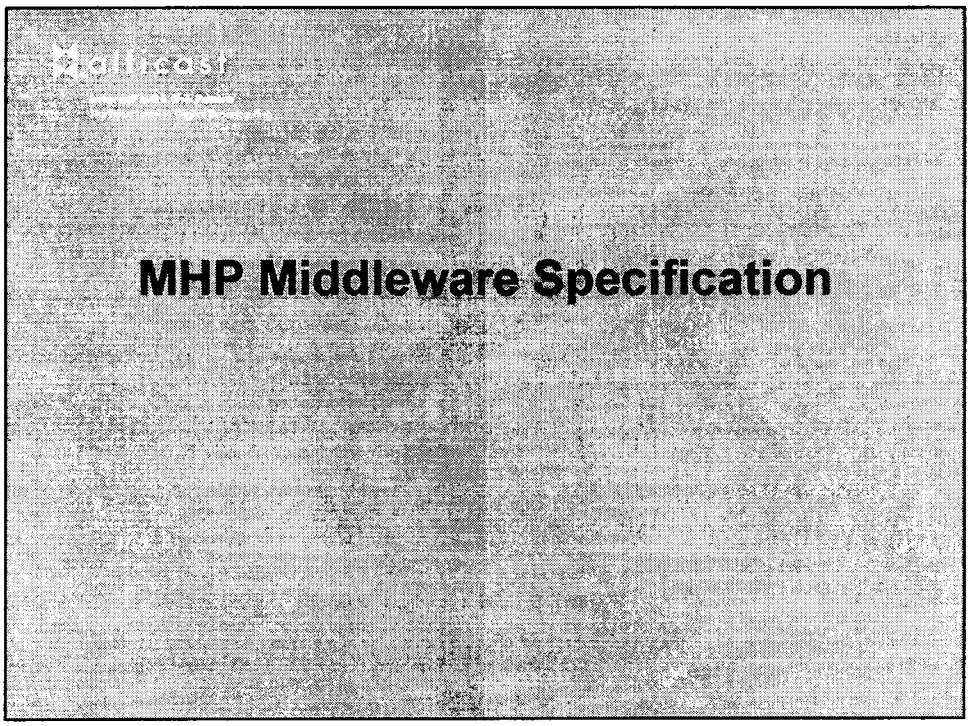
- **MHP Middleware Specification**
  - Architecture
  - Profiles
  - Platform
  - Application Lifecycle &Signaling
  - Security Framework
- **MHP Middleware Implementation: altiCaptor™**
  - Architecture
  - altiJVM
  - altiSTB Library



MHP Specification Overview

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- **MHP1.0 formally accepted by ETSI on July 2000**
  - Enhanced Broadcasting
  - Interactive Broadcasting
- **MHP1.1 formally accepted by ETSI on Nov 2001**
  - Internet Access
- **Based on DVB-Java**
- **Optional HTML / XML Support**
- **Existing (legacy) APIs to be handled as plug-ins**

MHP Architecture (1)

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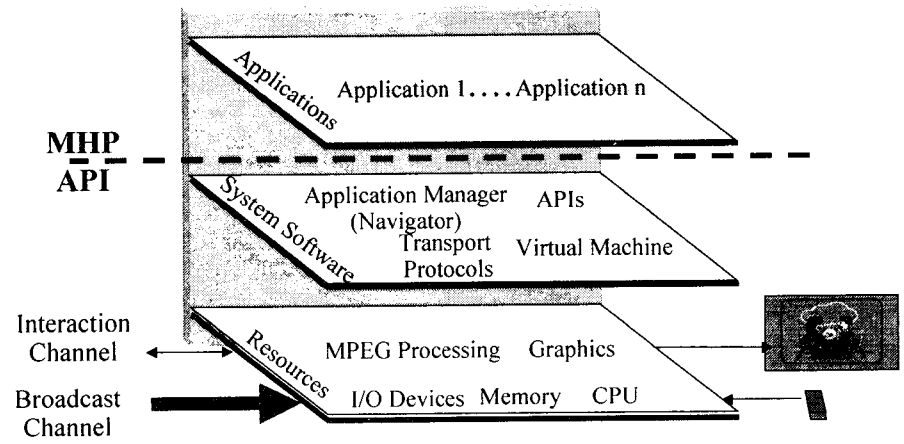

MHP Architecture (2)

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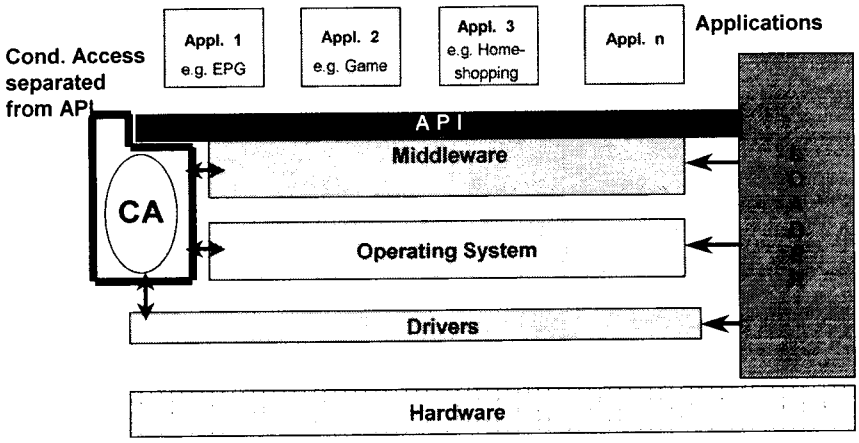
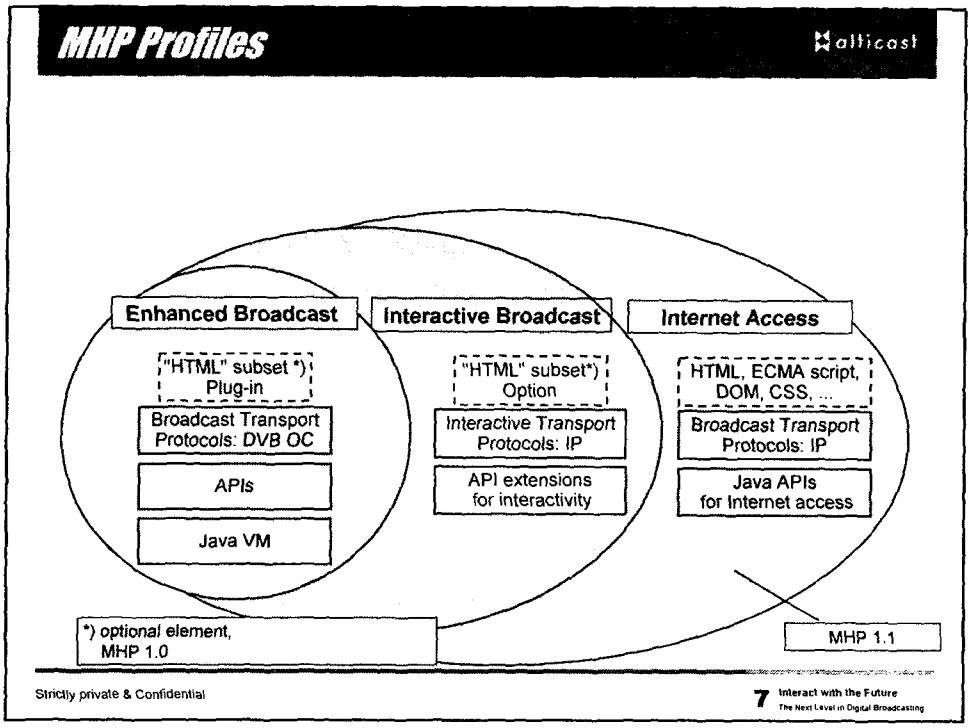
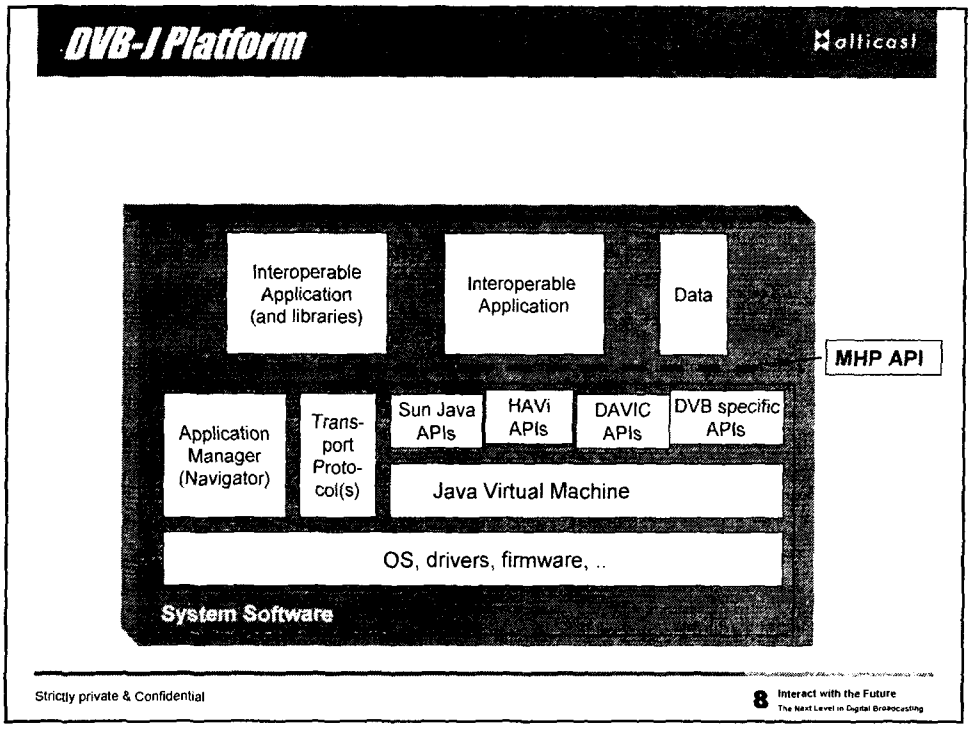



MHP Profiles
Enhanced Broadcast
Interactive Broadcast
Internet Access
"HTML" subset *)
Plug-in
Broadcast Transport
Protocols: DVB OC
APIs
Java VM
"HTML" subset*)
Option
Interactive Transport
Protocols: IP
API extensions
for interactivity
HTML, ECMA script,
DOM, CSS, ...
Broadcast Transport
Protocols: IP
Java APIs
for Internet access
*) optional element,
MHP 1.0
MHP 1.1
Strictly private & Confidential
7
Interact with the Future
The Next Level in Digital Broadcasting


DVB-J Platform
Interoperable
Application
(and libraries)
Interoperable
Application
Data
MHP API
Application
Manager
(Navigator)
Trans-
port
Proto-
col(s)
Sun Java
APIs
HAVi
APIs
DAVIC
APIs
DVB specific
APIs
Java Virtual Machine
OS, drivers, firmware, ..
System Software
Strictly private & Confidential
8
Interact with the Future
The Next Level in Digital Broadcasting

Lifecycle DVB-J Application Signalling

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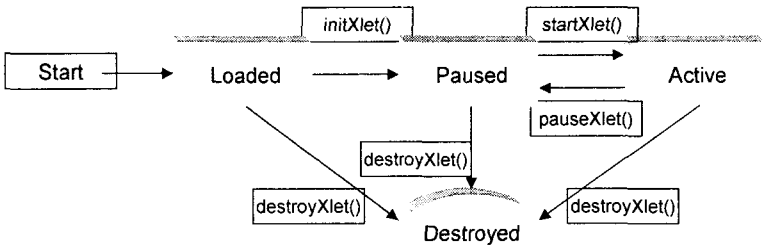

- **Application Signalling**
  - Extension to DVB-SI
  - Dedicated tables (AIT, VST)

Security Framework

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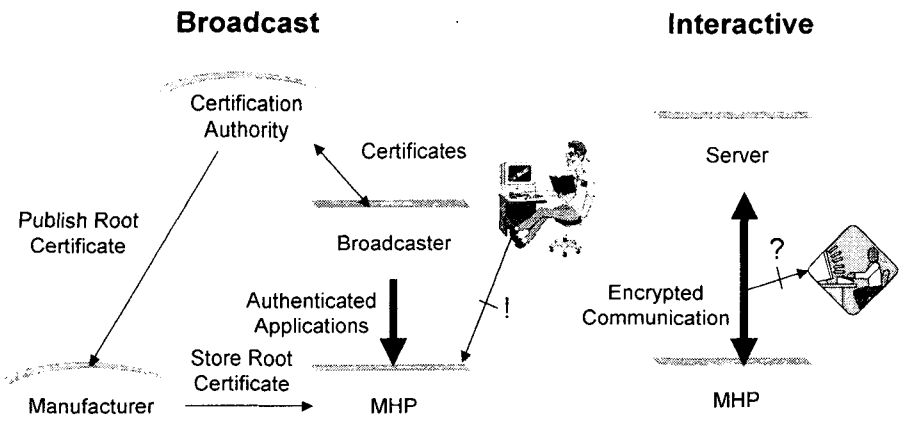

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An MHP Middleware Implementation: altiCaptor™

AltiCaptor Architecture

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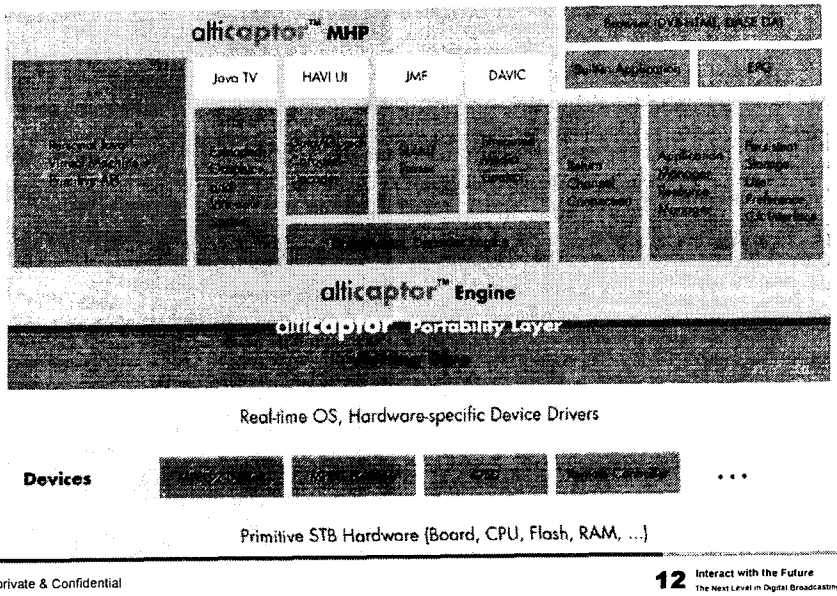

AltiCaptor Overview

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Set-Top Box Middleware

- **AltiJVM – Java Virtual Machine**
- **AltiSTB Library**
- **AltiMHP Library**
  - Core MHP compliant library

AltiJVM

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Java Virtual Machine
Designed for Set-Top Box

Specification

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- **Alti®JVM Standards based on:**
  - Personal Java Specification 1.2a
  - Sun Reference Implementation 3.1
- **Supports MHP / DASE**

Performance Enhancements

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- **Hot-spots Reengineered for Superior Performance**
  - Interpreter
    - Instruction reordering for DTV characteristics
  - Memory management
    - Garbage collection
    - Fragmentation handling
  - Threads
  - Class loader
  - Synchronization
    - Eliminate unnecessary locks
    - Make critical regions tight
  - Minimized number of Java Native Interface (JNI) calls

Size Minimization

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- **Java Byte Code Reduction**
  - Alticast leading technology
  - 25% reduction on original byte code
  - Traditional compression techniques (e.g. zip and jar) compatible

High Portability

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- **Extra Low CPU Dependency**
  - Easily ported to various OS and Hardware
- **Highly Modularized File System**
  - File access easily configured for
    - Carousel File
    - Flash/ROM
    - RAM

High Portability

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- **Improved Native Memory Management**
  - Memory management layer/library encapsulated
  - Adaptable to sophisticate RTOS configuration
- **Full Implementation of Basic Java Native Interface (JNI) Methods**
  - JNI used as a sole interface between VM core and libraries
  - VM core and library do not have to be changed when the other changes during the porting process

Lightweight Graphics

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- **Systematic Integration with Device-level Graphics**
  - Drawing operations
  - Image handling
  - Color handling
  - Double buffering
- **Portable Built-in Window System**
  - No integration with native window system

Minimal Memory Requirements

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- **Static Memory**
  - Merely 2MB are needed (Core binary + zipped class file + class native binary)
- **Dynamic Memory**
  - Small in size, though depends on applications
  - Standard requirements:
    - Java (Stack, Heap) 3MB + Native (Stack, Heap) 2MB + Carousel Cache 2MB

Customization

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- **Subsets of Personal Java package and classes under the MHP/DASE specification**
  - Java classes not used by MHP/DASE are removed
  - Customized for digital set-top boxes
    - event binding, file access, networking, graphics, etc.

AltiSTB Library

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A Full Functionality Implementation for Interactive Digital Set-Top Box

Architecture

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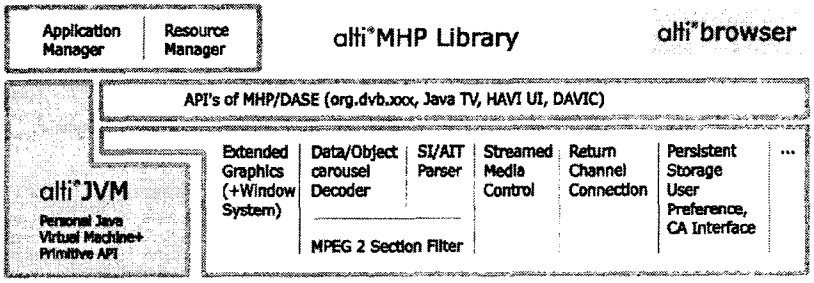

JavaTV API Implementation

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- **Extends TV Functionalities and Controls**
  - Streamed media control
  - Service information
  - Service selection
  - Broadcast data access
  - Application lifecycle control

HAVi Level 2 User Interface

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- **Standard UI of MHP/DASE**
- **TV-friendly User Interface Components**
  - Easy-to-use Widget Set
  - Various mattes implemented for sophisticated alpha composition
- **Configurable Terminal Presentation Settings**
  - Video, graphics devices automatically fits for the contents author's intention

Data / Object Carousel

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- **Features**
  - Supports task-balancing
  - Includes efficient cache in/out selection
- **Facilitates prompt responses to user or broadcasting requests**

High Portability

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- **Porting Kit**
  - Primitive and natural set of native functions are defined in the porting layer
  - Test kit for the native function implementations included
- **AltiSTB Library Built on the Porting Layer**
  - No modification needed for specific hardware

Performance

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- **Optimized Performance**
  - Speed and accuracy of the native functions ensured
  - Periods and priorities of the thread/task are fine tuned for optimal system response time

MHP API Implementation

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- **MHP 1.0.1**
  - Approved by European Telecommunications Standards Institute (ETSI)
  - Broadcasting Profile Supported
    - Enhanced Broadcasting
    - Interactive Broadcasting
- **MHP 1.1**
  - To Be Released Soon

Thank You

www.alticast.co.kr

For questions, mail to
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