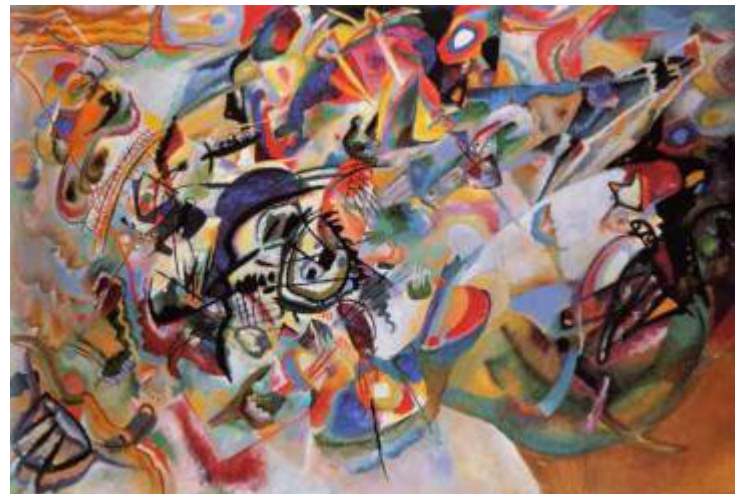# Software Infrastructure for Home Computing

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Outline

- Home Computing Software Infrastructure
- Overview of Our Home Computing Systems
- Middleware for Home Automation
- Middleware for User Interface Management
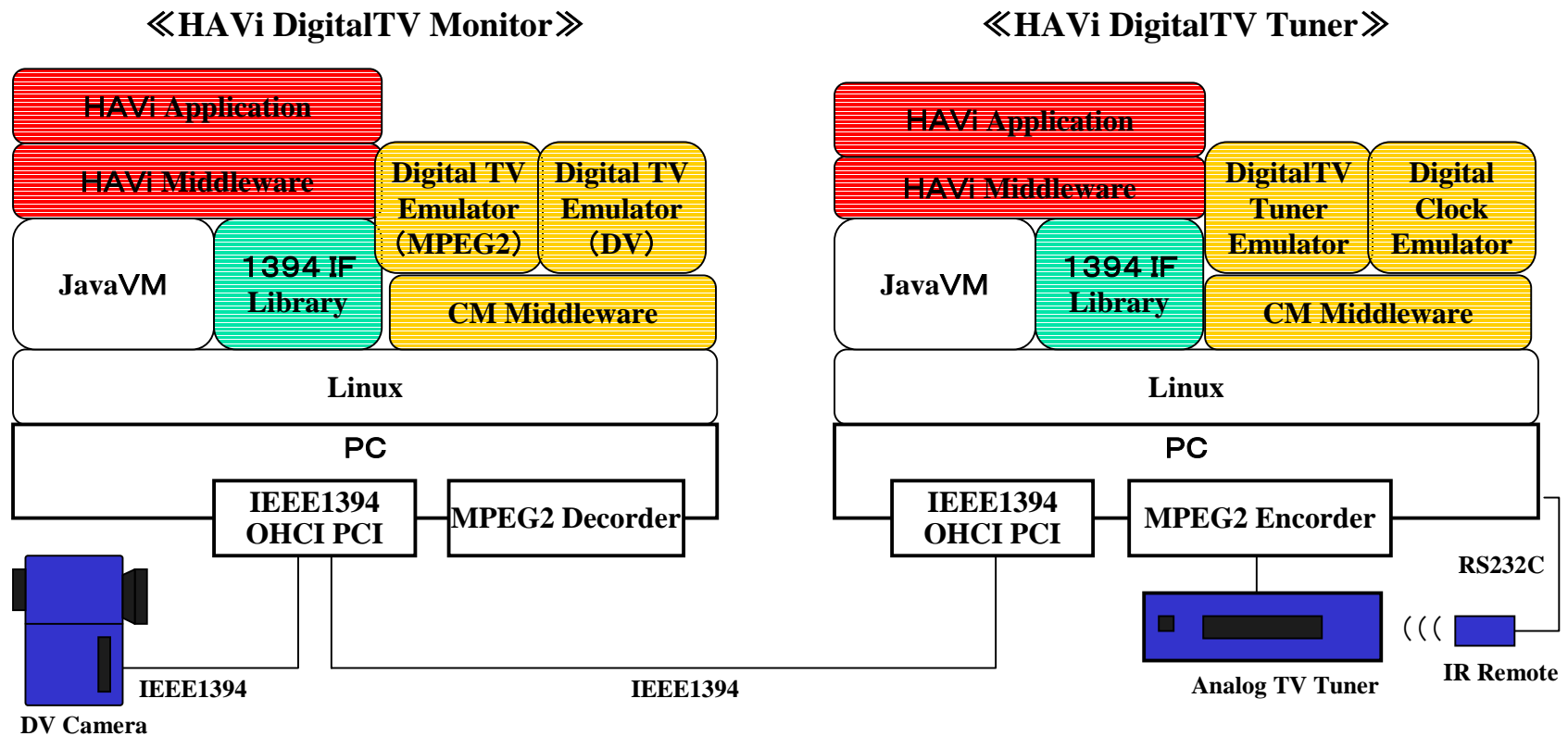- Experiences
- Future Direction

Home Computing Software Infrastructure

- **Future home computing applications need to support**
  - context-awareness.
  - accessing various Web services.
  - composing multiple home appliances.
  - Flexible user interface.
  - → It is important to provide high level abstraction for building home computing applications easily.

Overview of Our Home Computing Software Infrastructure

- **Middleware for home automation**
  - Provide high level abstraction
  - → We have implemented HAVi-based middleware.

- **Middleware for user interface management**
  - Provide flexible user interface management
  - → We have implemented user interface management middleware supporting various interaction devices.
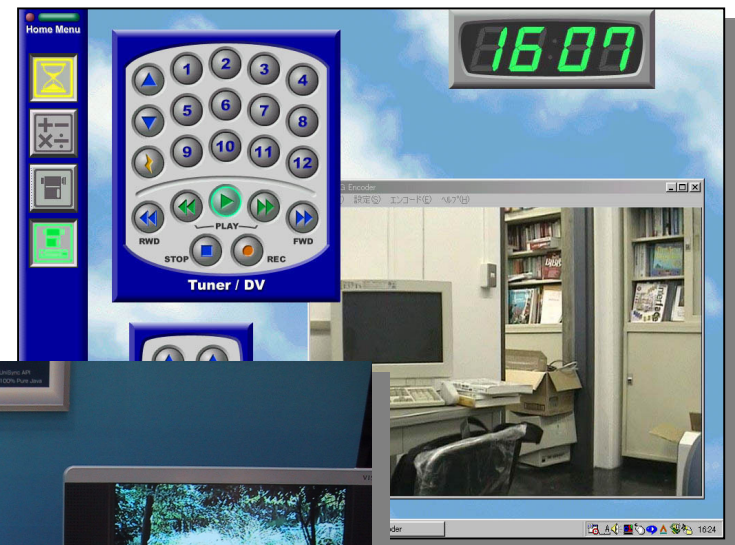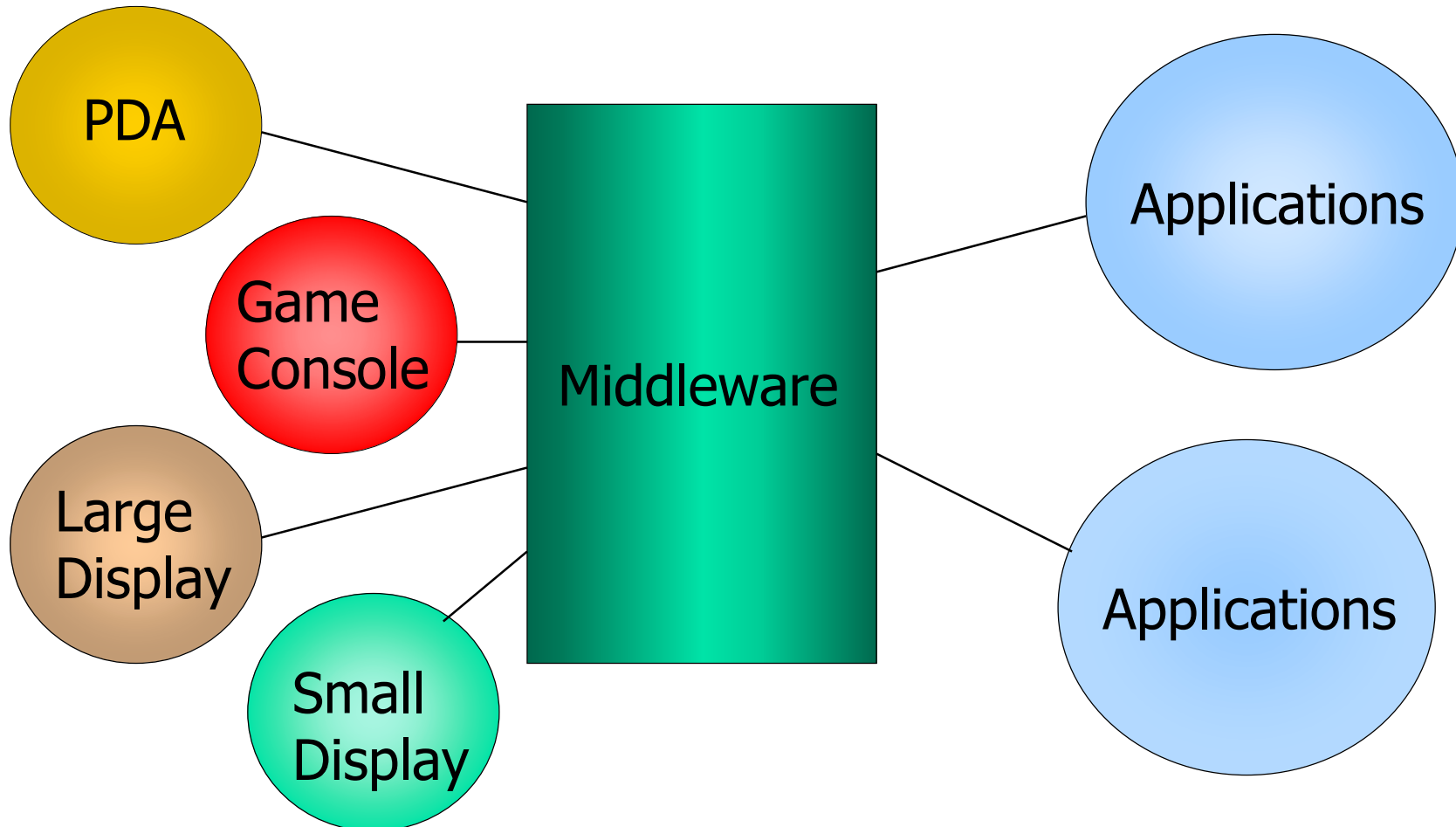
Middleware for Home Automation (1)

≪HAVi DigitalTV Monitor≫

≪HAVi DigitalTV Tuner≫

Middleware for Home Automation (2)
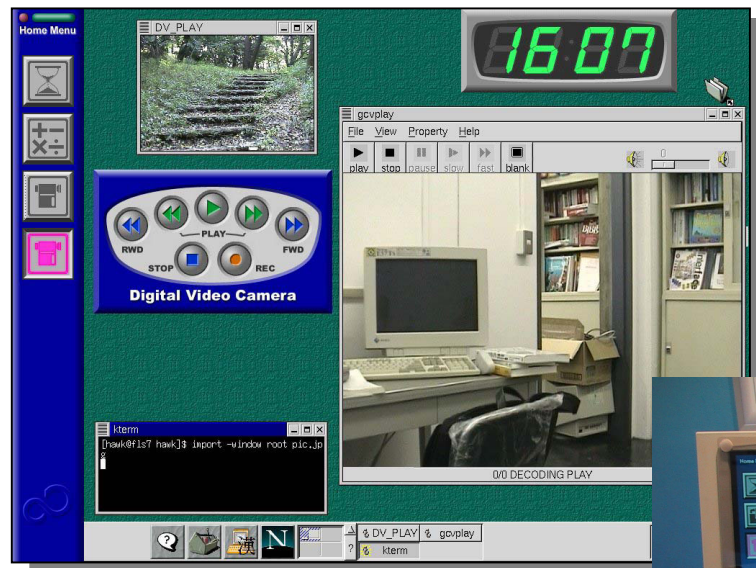
Linux

Windows

JavaChips

Middleware for User Interface Management(1)

Middleware for User Interface Management(2)

Motion Detector

A

B

Control Panel

PDA

LaserDisc
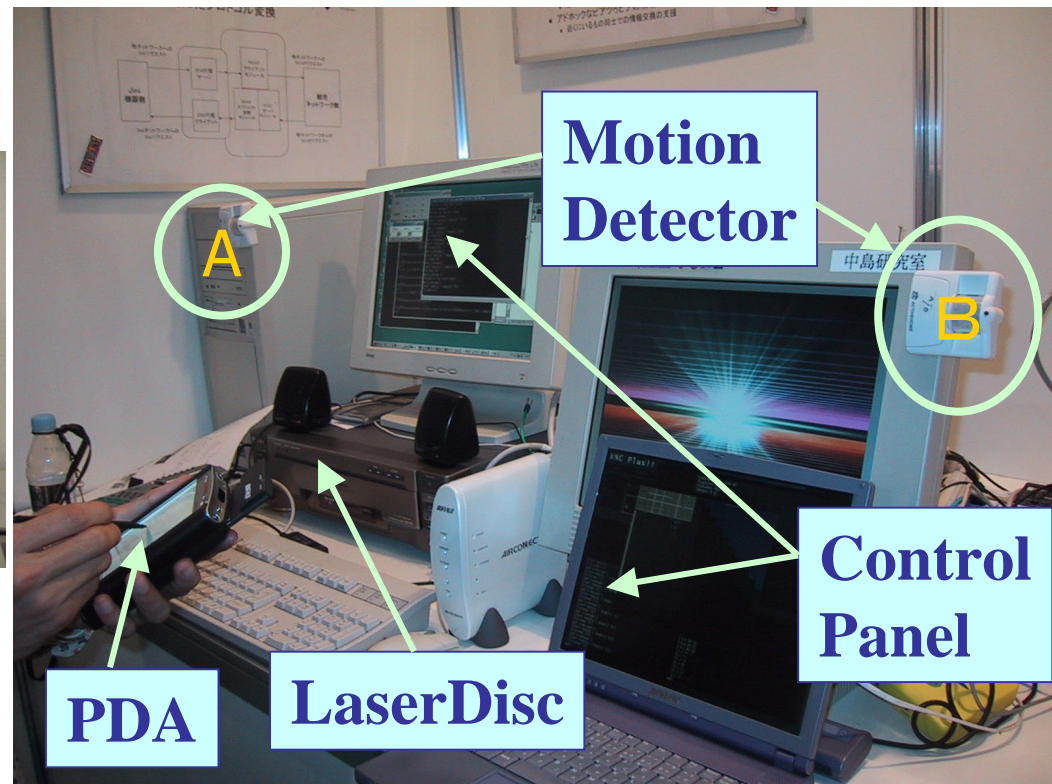
Experiences

- HAVi is too heavy to used for embedded devices.
    - We are working on more light-weighted Web-based middleware
        - The middleware will be able to add context-awareness to existing UPnP or Web based home appliances.
- Commodity software is useful to build portable embedded software.
    - Embedded Linux and Java is very effective.
    - But, we need a more flexible framework.
        - We are working on flexible customizable implementation of the above middleware.

Future Direction

- **Software design for Ubiquitous Computing**
  - Component framework
  - Physical programming
  - Collaboration based extensible framework
  - Meta interface

- **Middleware for integrating information from various sensors**
  - Context-aware Personal devices/Cellular phone
  - Context-aware Furniture