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
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)
Middleware for Home Automation (2)

Linux

JavaChips

Windows
Middleware for User Interface Management(1)
Middleware for User Interface Management (2)
Experiences

■ HAVi is too heavy to use 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