Incorporating PC’s into AHA

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With thanks for discussions with

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AHA
(Adaptive Home Automation)

ABI
(Adaptive Building Intelligence)
The existing ABI system

- Structure Agent
- Distribution Agent
- Control Agent G74
- Control Agent G84
- Cluster
- Cluster
- LNS Server
- Bus Agent
- LNS
- LON bus
What is a JAS ABLE Agent?

• It is an ABLE (Agent Building and Learning Environment) agent that runs on a JAS (Java Agent Specification) platform that runs on a JVM (Java Virtual Machine) that runs on a computer running a native OS.

• The JAS platform provides infrastructure for
  – Messaging
  – Lifecycle control
  – Etc?
A cluster

Light

Presence

Blind

Light Switch

Blind Switch
Typical scenes at INI
This one is different
The new sensor effector

- PCs are already on a network
- They sense you exactly when you aren’t moving around the room
- They can act as presence detectors and as alternative light and blind control inputs
The existing ABI system

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The problems with using JAS ABLE Agents

• An agent can never System.exit(). If it does, it brings down the virtual machine and all other agents running on the same platform.
• An agent can’t use a GUI because it may have been started somewhere other than where it runs.
• An agent needs to run on a platform on a host with a static IP address and DNS entry.
• An agent can’t be stopped and restarted – only moved around.
• Because of all these factors, agents are a pain in the butt to use for client applications.
• All communication with an agent must be via another application.
How PCAgent fits in

Structure Agent

Distribution

Bus Agent

PCAgent

Mapper GUI

PC zzyzx

PC zala

LON bus

RMI

JAS

JAS

JAS

LNS

TCP

TCP
PC Client functions

• Lets you control your light and blind
  – These controls affect room learning just like switch presses

• Acts as alternative presence detector
PC Presence detector

- Spoofs the existing HTS occupancy sensor
- Uses native code to measure time since last keyboard or mouse activity
  - Windows: a system hook IdleTrac
  - Linux: X11 ScreenSaver extension
- Controller program does not need to be in foreground
PCController GUI

AHA Control

File Help

Connected

Light
Switch ON
Switch OFF

Height
Up
Down

Tilt
Open
Closed

Blind
Apply
PCClient properties dialog

The hostname of the server running the PCAgent.
(You shouldn't need to change this)

zaha.ini.unizh.ch

The port for the PCAgent.
(You shouldn't need to change this)

4000

Your location.
Be specific, e.g. 55G84
55G84 by hallway

OK Cancel Defaults

Show this dialog on startup
PC Client Mapper

- Uses RMI (Remote Method Invocation) calls to PCAgent to set the mappings from PCs to LON devices.
- PCAgent uses RMI to update the GUI
- These mappings are stored persistently as preferences of PCAgent
PC network consists of 3 applications

- Mapper GUI
- PCAgent
- PC Client

Connections:
- RMI
- JAS
- TCP
Software stats

• AHA total:
  – \{Methods=1410, Classes=166, Interfaces=9, Lines=18651\}

• PC software:
  – \{Methods=149, Classes=14, Interfaces=4, Lines=2580\}

The Java part of Ada was about 60k lines
Problems...
• Hi tobi,
• can you tell the students that are working on the intelligent room that the blinds in our office in the morning are going up every 5 min and every time I push the blinds to be shut, in about 2 min, the lights come on and the whole procedure repeats. It is getting annoying.
• sc
Mind Games

To beat the competition, video games are getting smarter

says Steve Rabin, editor of the book, *AI Game Programming Wisdom*:

“The hardest thing in game AI is just making sure that the game never looks dumb. You’d be better off having an AI that was just above average all the time, rather than one that was brilliant 98 percent of the time and stupid 2 percent of the time,” points out editor Rabin. Neural networks and genetic algorithms might seem to be useful. But when “something misbehaves with one of these technologies, it’s not easy to fix. You can’t exclude the one thing that’s broken without destroying all of the other beautiful things in there. It’s all or nothing, which is a very difficult situation when deadlines approach,” he concludes.
To run the PC client

http://www/~tobi/aha