

Virtual Shared Workspace for Smart Spaces and M3-based Case Study

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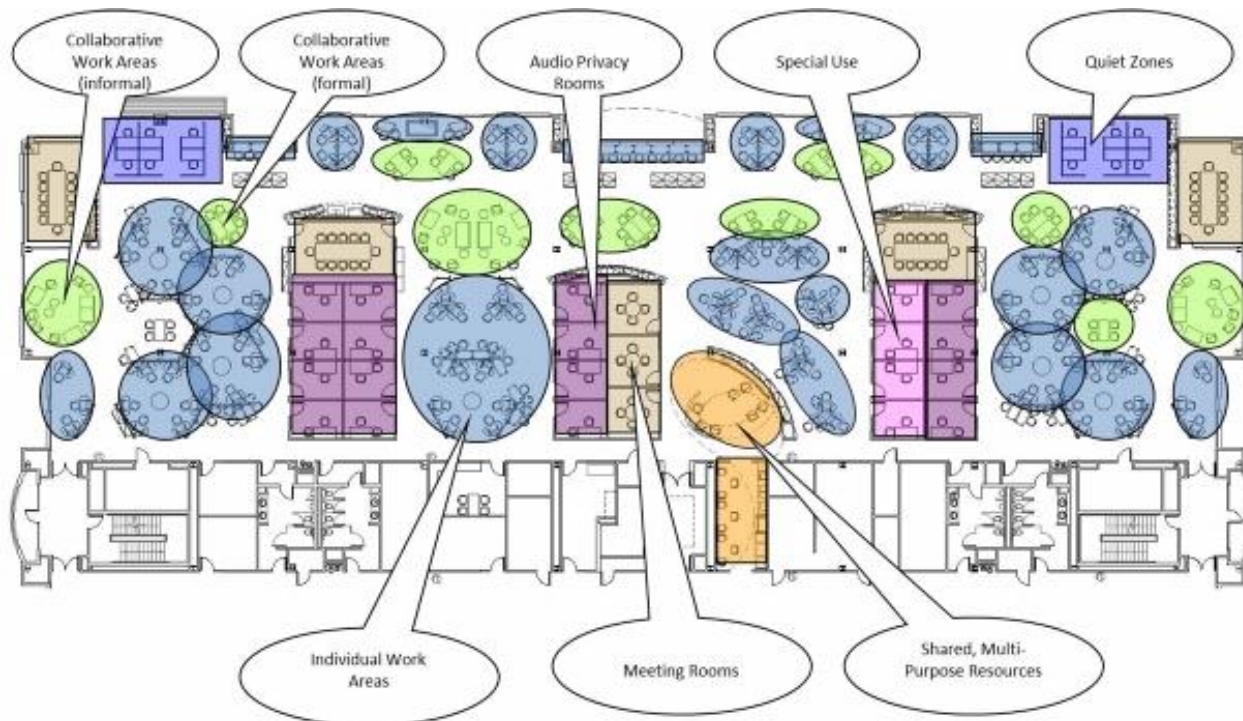
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Smart Spaces

- Smart spaces paradigm
 - Many predictions and comments on importance and perspectives;
 - The lack of practical development platforms.
- Internet of Things (IoT)
 - Opportunities and challenges for smart spaces deployment
- Example scenario – ***a virtual shared workspace*** supporting collaboration activity.
 - M3-based case study of the technology maturity (Smart-M3)
 - Advanced multi-domain services (SmartRoom + e-Tourism)

Virtual Shared Workspaces

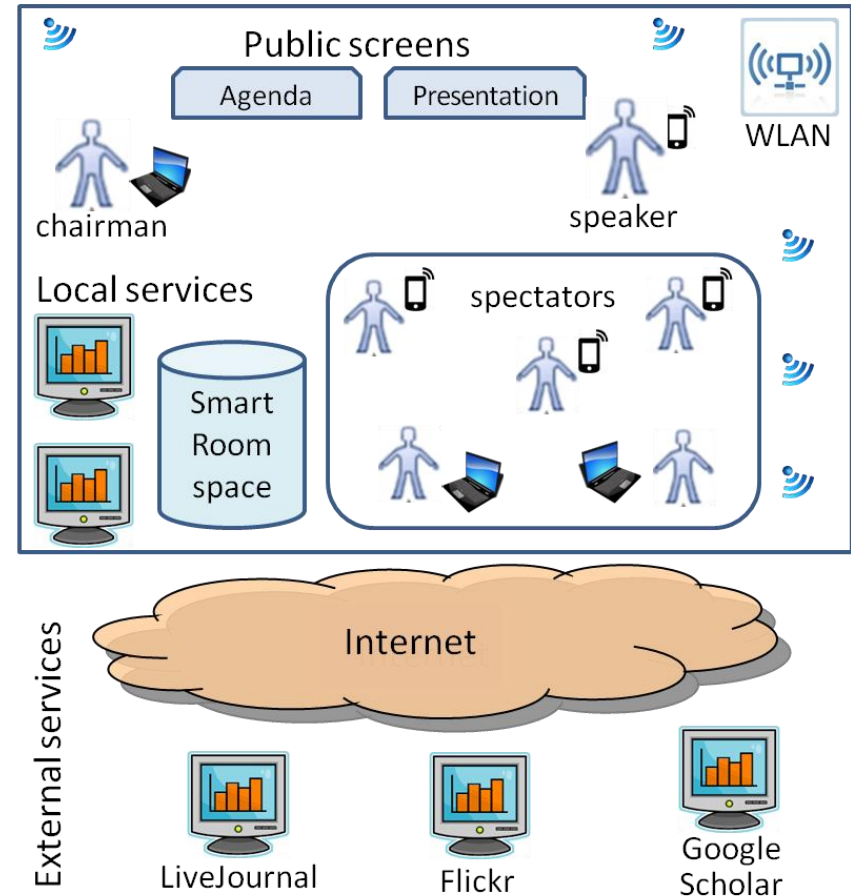
- People communicate, analyze & create knowledge, share findings.
- Smart assistance and “Be here” experience.
- IoT environment is localized in physical spatial-constrained area.
- Participants: locally present or remote, personal mobile devices.
- Computations: local with access to external (Internet) services.



From CISCO report on Trends in IT (May 2012):
Flexible Collaborative Workspaces

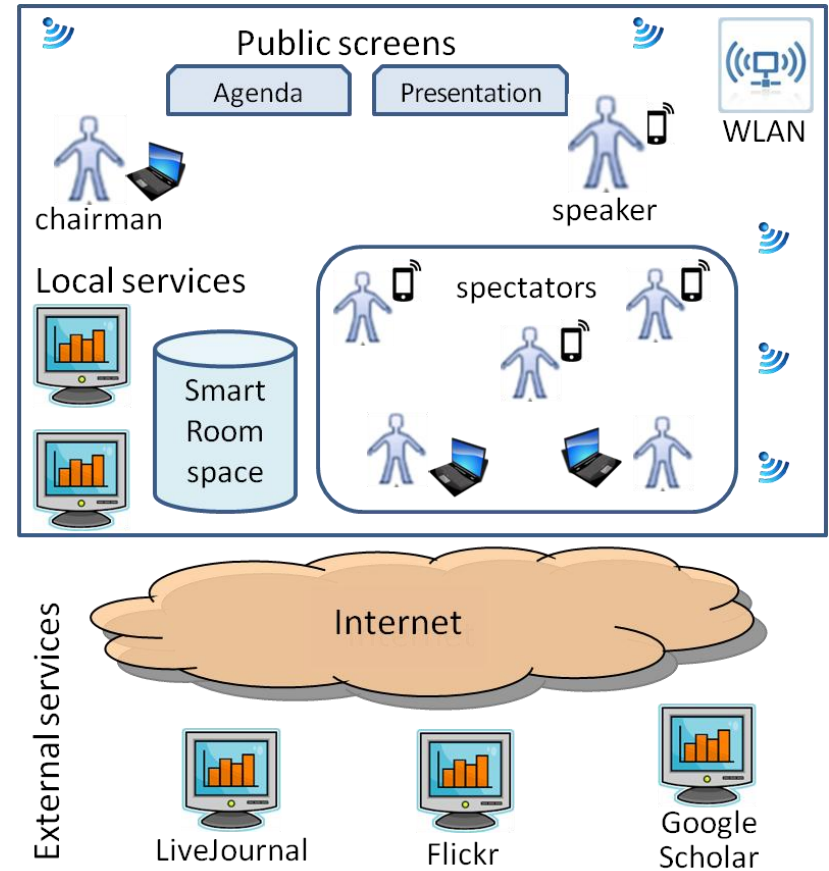
SmartRoom System

- Holding collaborative activity (conferences, meetings, ...)
- Deployed in room equipped with electronic devices to create a virtual workspace
 - Agenda: activity program
 - Presentation
 - Personal mobile devices
- Software agents construct and deliver services in a shared smart space
 - Local services
 - External services



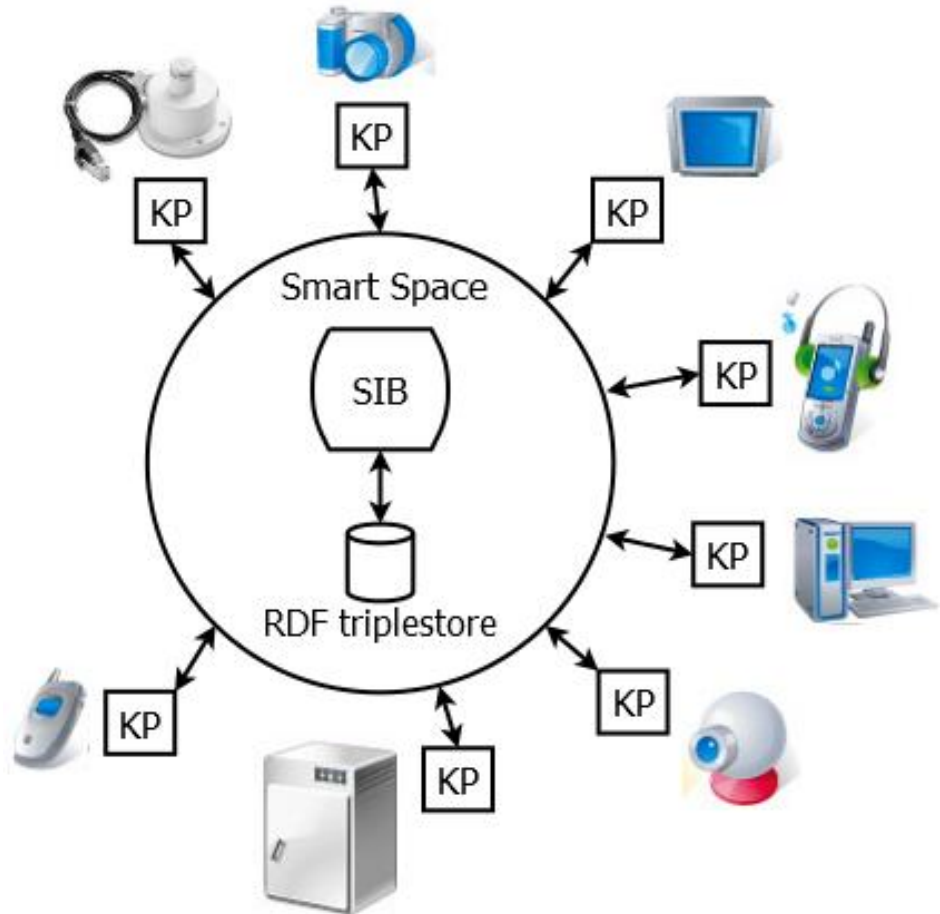
Devices in SmartRoom Environment

- WLAN equipment
- Media projectors, interactive boards, loudspeaker (with attached computers)
- Local and server computers
- Video and audio capture devices
- Physical data sensors
- Network activity sensors
- Personal mobile devices



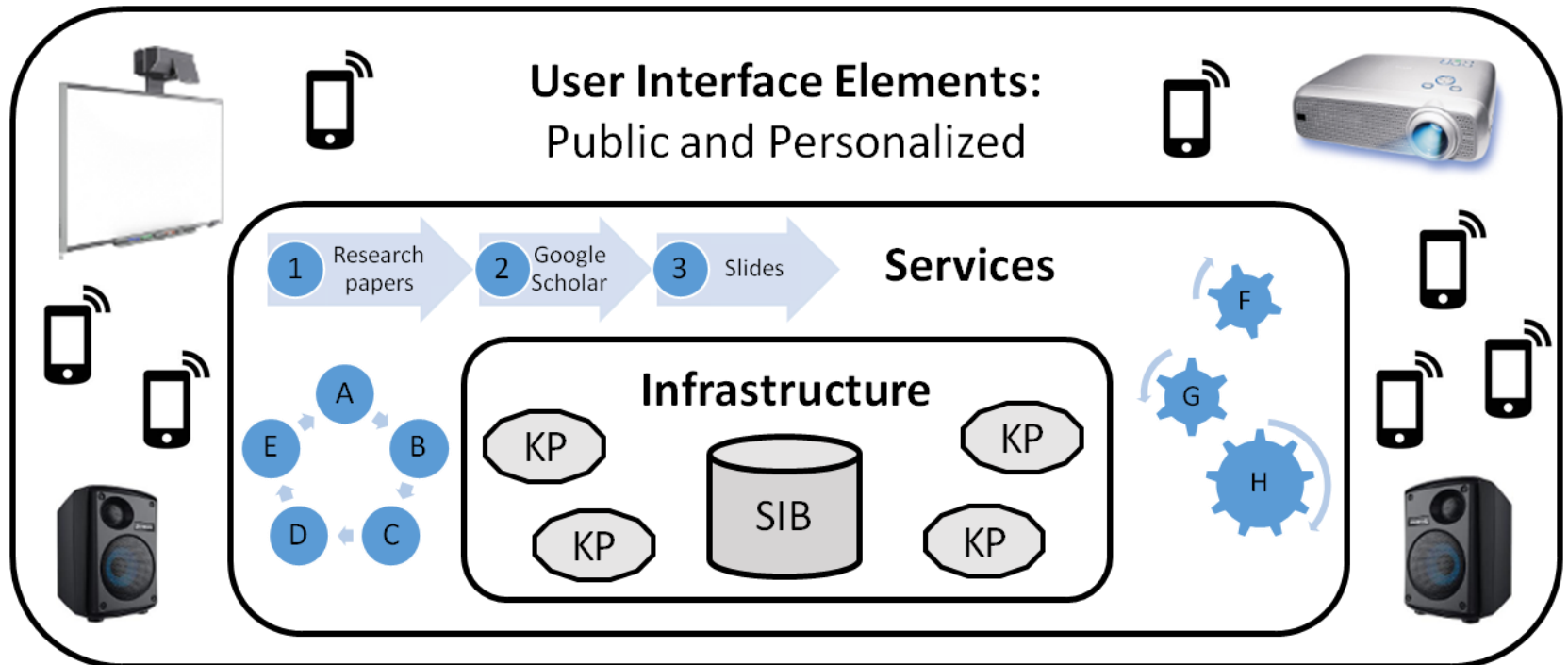
Smart-M3: space-agent approach

- Semantic information broker (SIB) maintain smart space content in RDF triples
- Application: knowledge processors (KPs) running on various devices
- Agent KPs share ad-hoc knowledge
 - join, leave
 - insert, update, remove
 - (un)subscribe



Services Construction

- SmartRoom infrastructure: Infrastructural KPs
- Responsibility: Service construction and delivery
- Service: interaction of one or more infrastructural KPs



Services example

Conference-service Meeting-service	Activity control
Presentation-service Agenda-service	Information visualization
Content-service	Keeping/providing multimedia content
Other local services	Providing specific pieces of information and assistance for spectators

Types of Services

Informational

- Providing multimedia content for users
- Visualization of ongoing processes in the room
- Information sources: activity program, presentations, audio from participants, video from cameras, etc.

Control

- Changing data representation of activity processes
- Control of ongoing activity
- Delegating the control on presentation to the next speaker

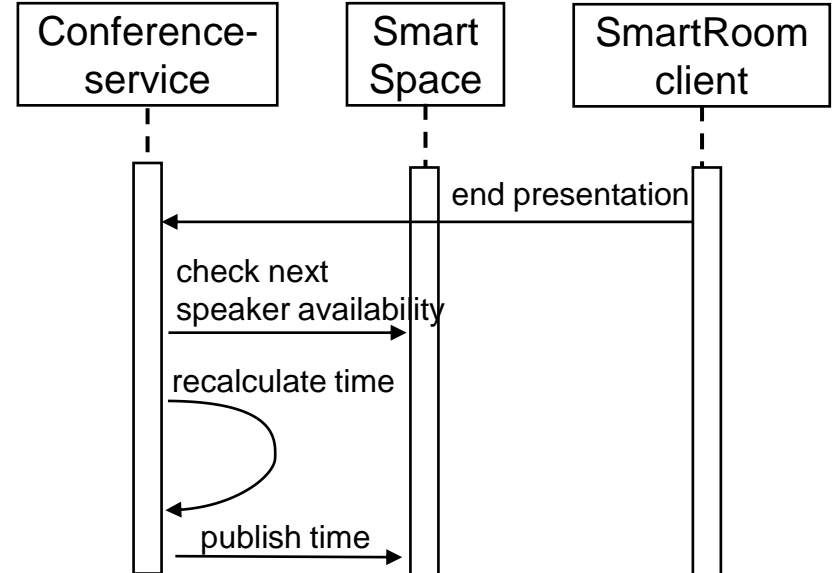
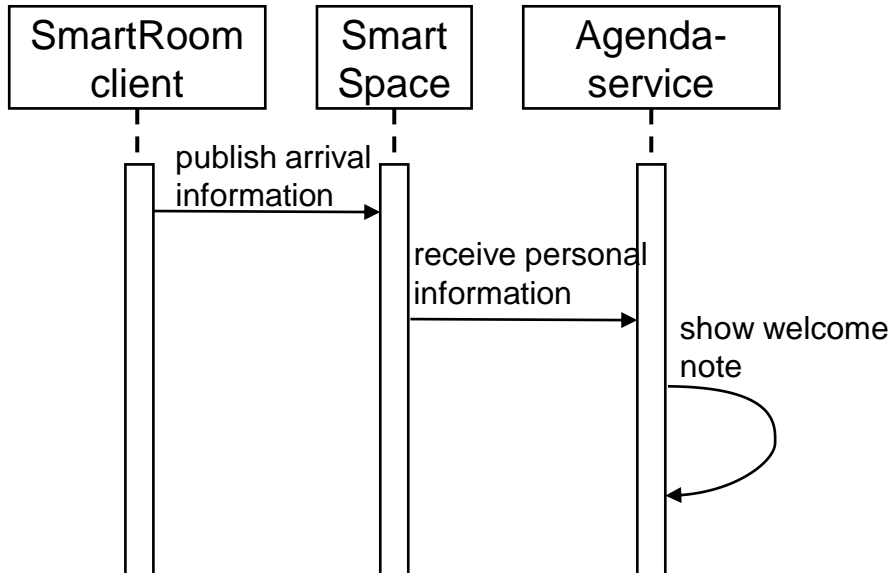
Services Algorithms

Informational

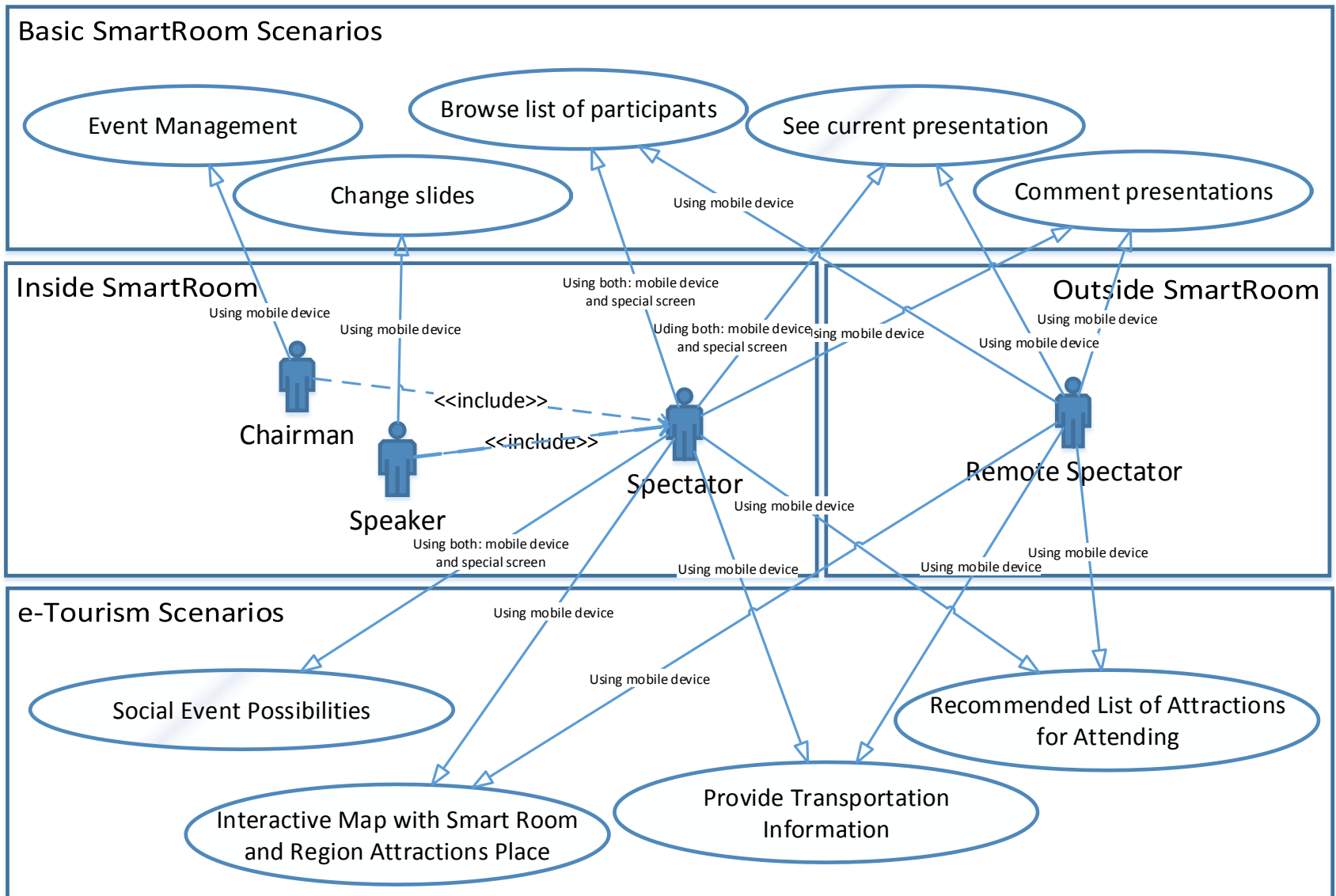
1. event-based activation
2. information selection
3. target UI devices
4. service delivery

Control

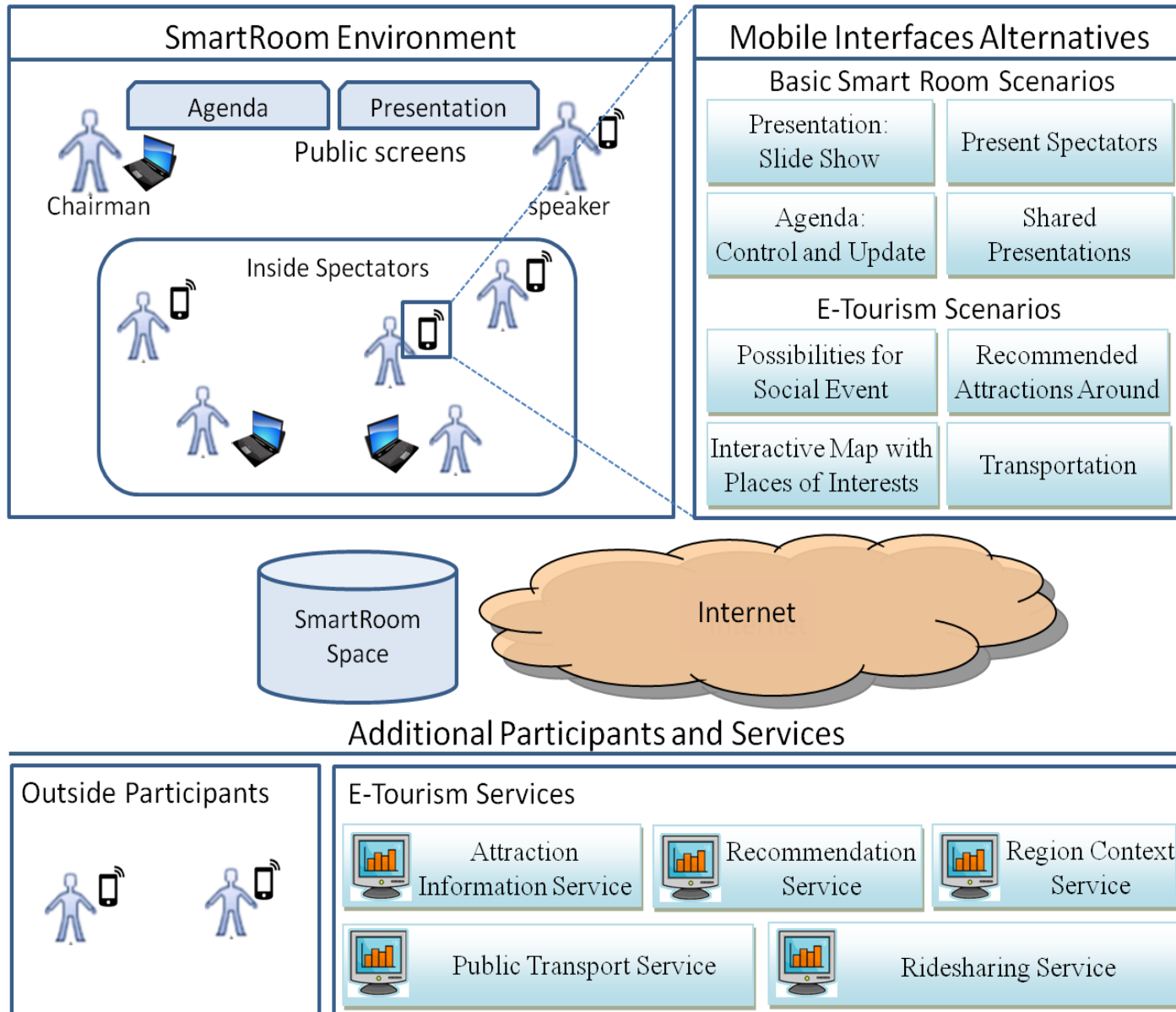
1. event-based activation
2. information selection
3. formulation of control action
4. service delivery



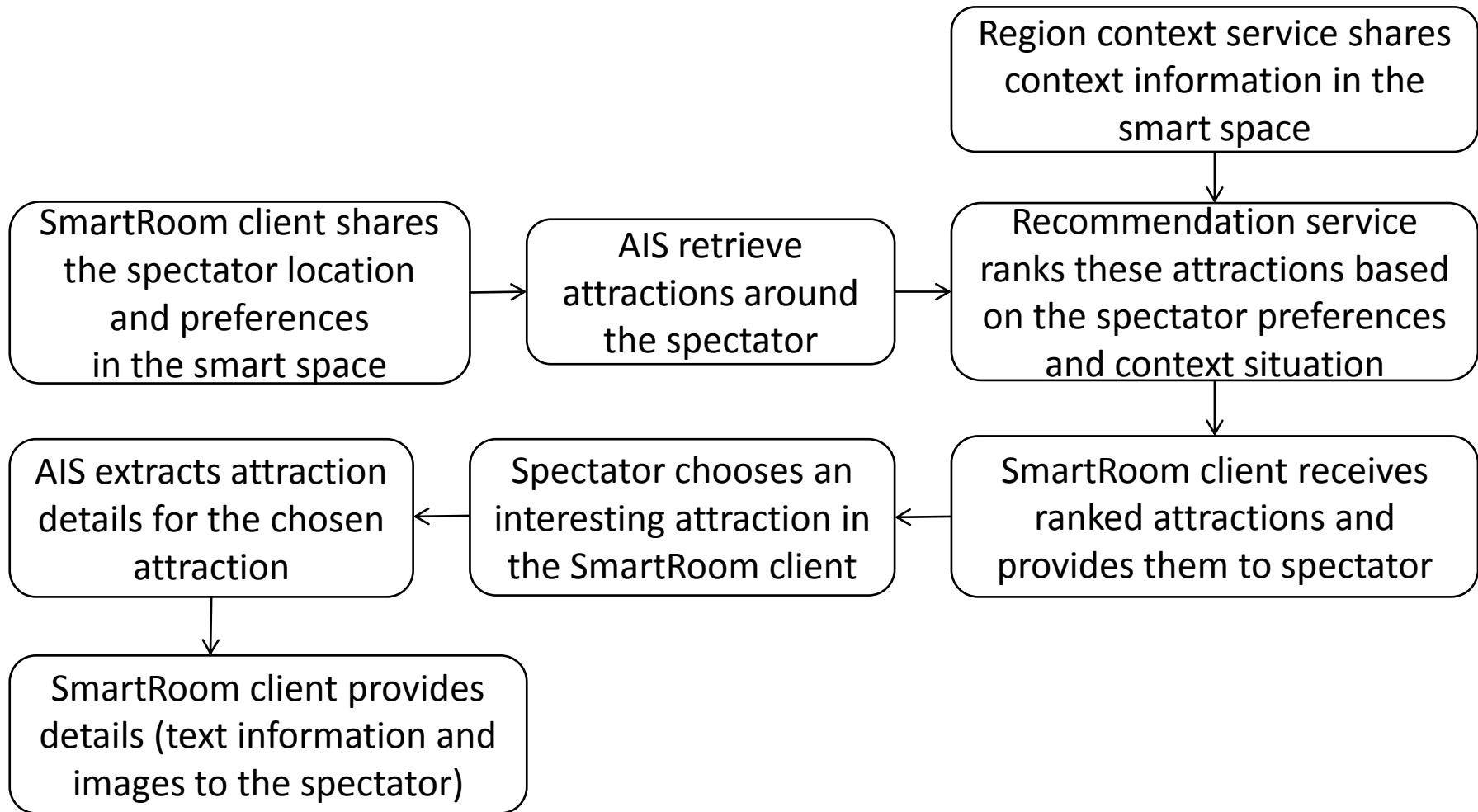
e-Tourism Scenarios in SmartRoom



e-Tourism in SmartRoom: Architecture



Example Scenario of Retrieving Attractions for Spectator



Conclusion

- Example for smart spaces based solutions: virtual shared workspace environment.
- SmartRoom system: publicly available for deployment.
<http://sourceforge.net/projects/smartroom/>
SmartRoom clients:
<http://play.google.com/store/apps/details?id=petsu.smartroom.android.srclient&hl=en>
<http://www.windowsphone.com/en-us/store/app/smart-room/77aa6b83-d040-4839-8226-92eaa9bde01>
- Idea and architecture of e-Tourism services integration in SmartRoom.
TAIS:
<https://play.google.com/store/apps/details?id=ru.nw.spiiras.tais>

Thank you for attention!
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