

SmartRoom System and its Use for Collaborative Work and e-Tourism

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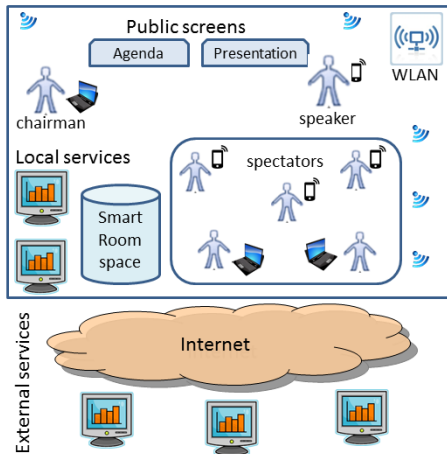
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SmartRoom: Assistance for Collaborative Work

- Holding collaborative activity (conference, meeting, social program, . . .)
- Deployed in room equipped with electronic devices:
 - ▶ Agenda: activity program
 - ▶ Presentation
 - ▶ Personal mobile devices

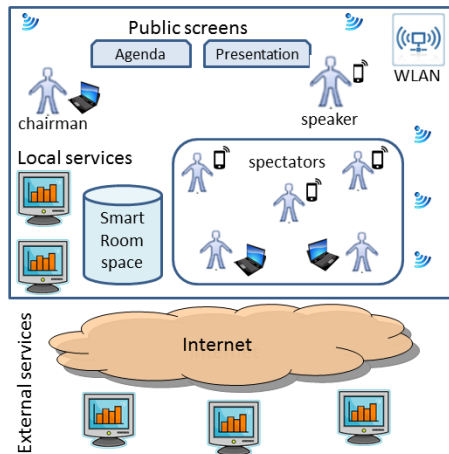
Software agents construct and deliver services in a shared smart space

- ▶ User services
- ▶ Infrastructure services
- ▶ External Internet services
- ▶ Personal mobile devices



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



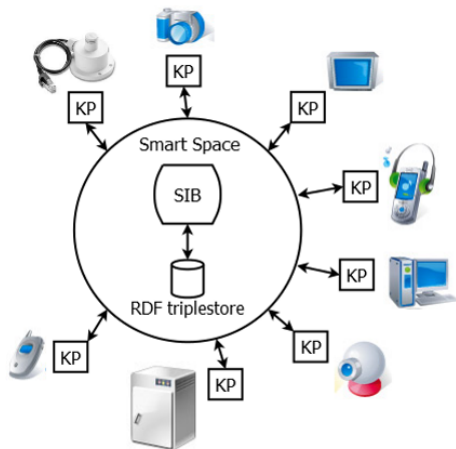
SmartRoom Scenarios

- Services for conference support
- Services for meetings support
- SmartRoom for e-Tourism:
 - ▶ Social Program Service
 - ▶ SmartRoom in a tour agency
- Presence Detections
- Discussion Service



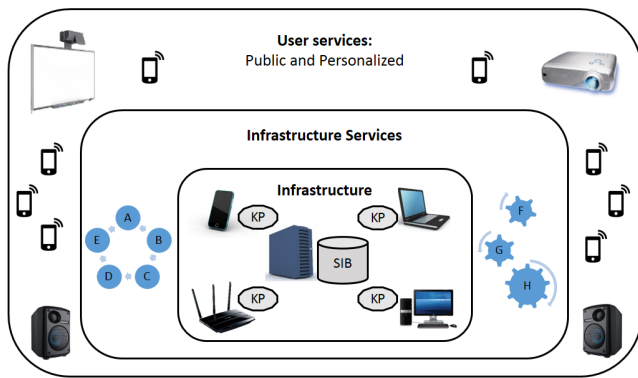
Smart-M3: space-agent approach

- 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
 - ▶ sparql query



Service Levels

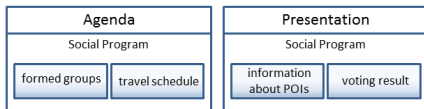
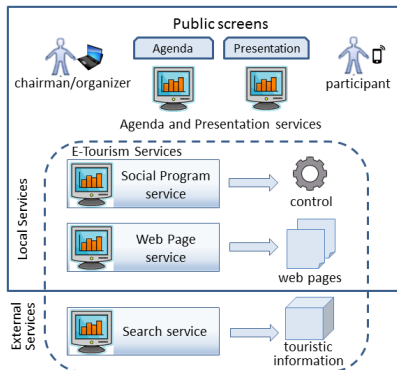
- **Infrastructure** — equipment, agents KP and SIB
- **Infrastructure services** — construction of user services
- **User services** — delivery of services to users



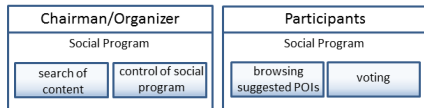
SmartRoom Services

Level	Services	Function
User services	<ul style="list-style-type: none">- Agenda service- Presentation service- Social program service	Visualization of different information (e.g. slides, agenda)
Infrastructure services	<ul style="list-style-type: none">- Conference service- Presentation service- Content service- Web page service- Presence service- Social program service- Search service- User activity service- Microphone service	Creation of user services by inserting and updating of necessary information in smart space
External Web services	<ul style="list-style-type: none">- Google scholar service- Panoramio service	Providing information from various Internet services (e.g. photos, citation index)

Social program for activity participants: Scenarios



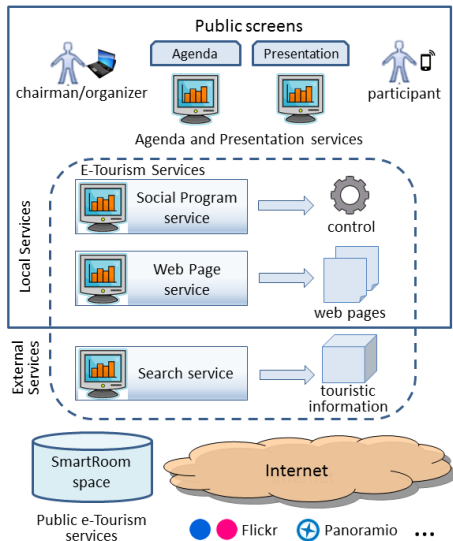
Screens of SmartRoom's components for Social Program



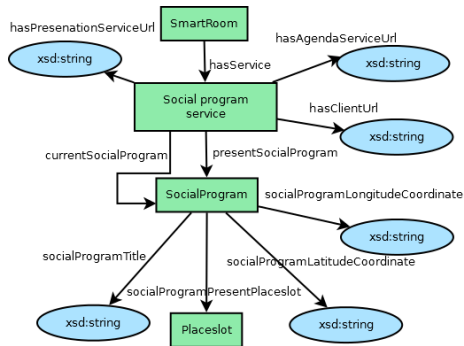
~> Social program: groups, timetable, transfer, ...

Social program for activity participants: Approach

- Enhancing primary SmartRoom services with additional information: Agenda and Presentation
- Use of touristic data sources from the Internet: Flickr, Panoramio, ...
- Focus on SmartRoom users: collaborative work combined with conference activity

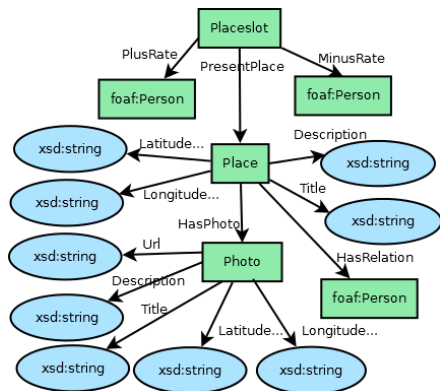


Social Program Ontology Model: Service Description



- *Social Program service individual* stores URLs for Client, Agenda and Presentation service
- Each program is in *Social Program individual*
- *Placeslot individual* is for connection with POIs individual
- Coordinate properties are for automated search

Social Program Ontology Model: Point of Interest

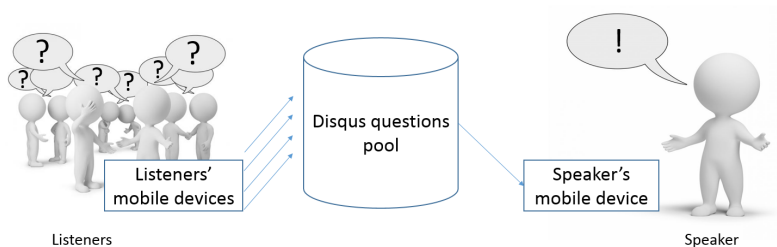


- For each participants is known voting result on POIs
- Participants can have semantic relations with POIs (e.g., the architect of the building was from certain country)
- Every POI has many *Photo* with appropriate properties
- POI individual can be used cooperatively with other SmartRoom services

Discussion service

- Allows conference participants leave their commentaries of different kinds to the current speaker.
- Minimizes listeners' participation in creating discussion branches by using available Smart-M3 tools.

Result: Improving the level of holding events by automating certain elements of interaction between its participants.



Presence Detection: Scenarios

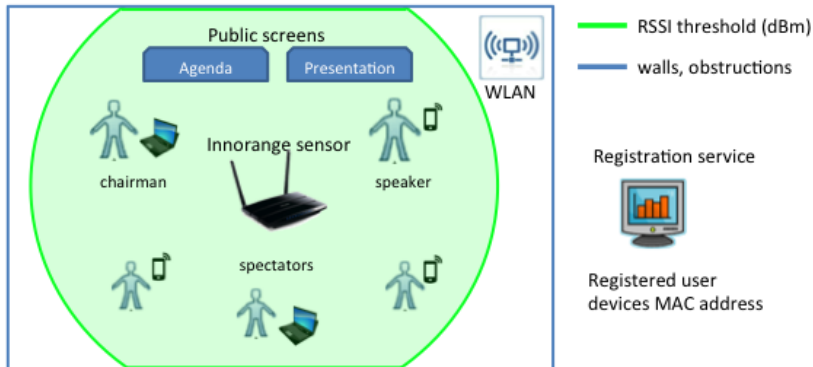
- SmartRoom services can be extended by utilization of runtime information on user presence in the room: physical and virtual
- This information is associated with network activity
- Each scenarios group supports a set of services:

Scenarios group	Description	Examples of services
S_1 (before)	user arrival to the room before starting the main activity	<ul style="list-style-type: none">– personalized welcome service– runtime initialization service
S_2 (during)	user joins and leaves during the main activity	<ul style="list-style-type: none">– runtime status for agenda service– planning speeches service
S_3 (after)	activity statistics	<ul style="list-style-type: none">– activity analysis service

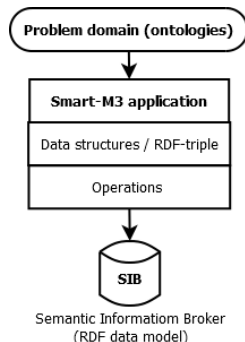
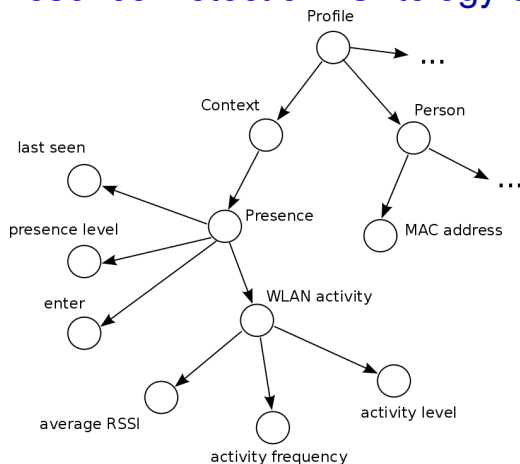
Presence Detection: Technology

- End-users have personal computers and mobile devices
- Radio Detection using Received Signal Strength Indication
- Innorange Footfall Technology
- Correspondence of users and MAC – registration service

room area

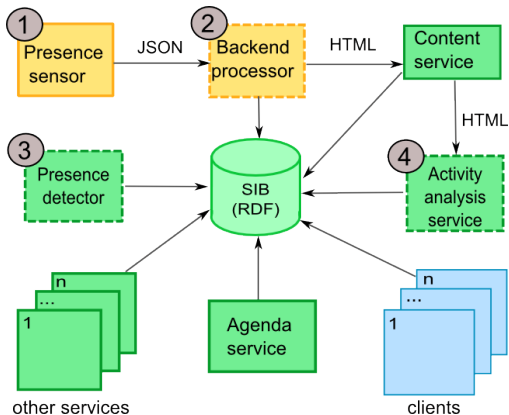


Presence Detection: Ontology of User Presence



- Ontology of user presence is part of the SmartRoom ontology
- User presence is based on the context of the user profile
- All relationships here are of type “has”

Presence Detection: Architecture of Smart-M3



- 1** The presence sensor sends its measurements: MAC, RSSI and timestamp
- 2** Backend processor is HTTP endpoint to processing presence data from sensor
- 3** Presence detector KP detects presence information change
- 4** Activity analysis service processes of accumulated data from content service

Conclusion

- Current issues:
 - ▶ Service-oriented systems in smart spaces
 - ▶ Composition and configuration many services
 - ▶ Multimodal user interface on public screens
- SmartRoom system: publicly available for deployment
<http://sourceforge.net/projects/smartroom/>

Thank you for attention

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