The SmartRoom Infrastructure: Service Runtime Reliability

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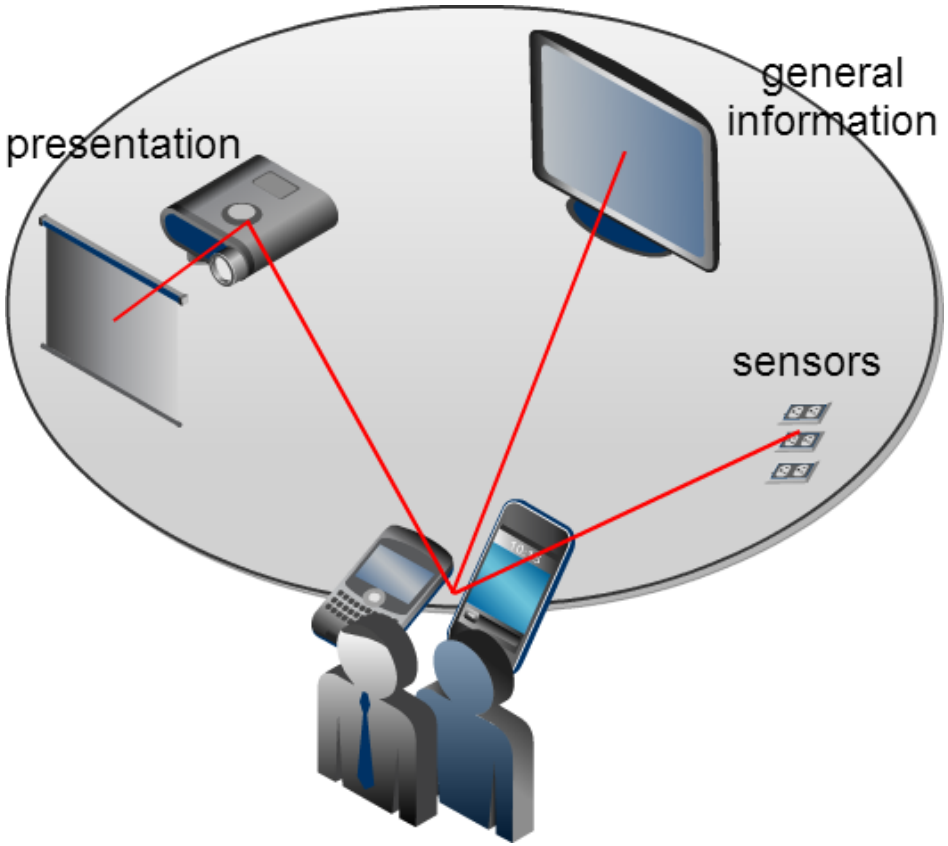
Smart Room at PetrSU

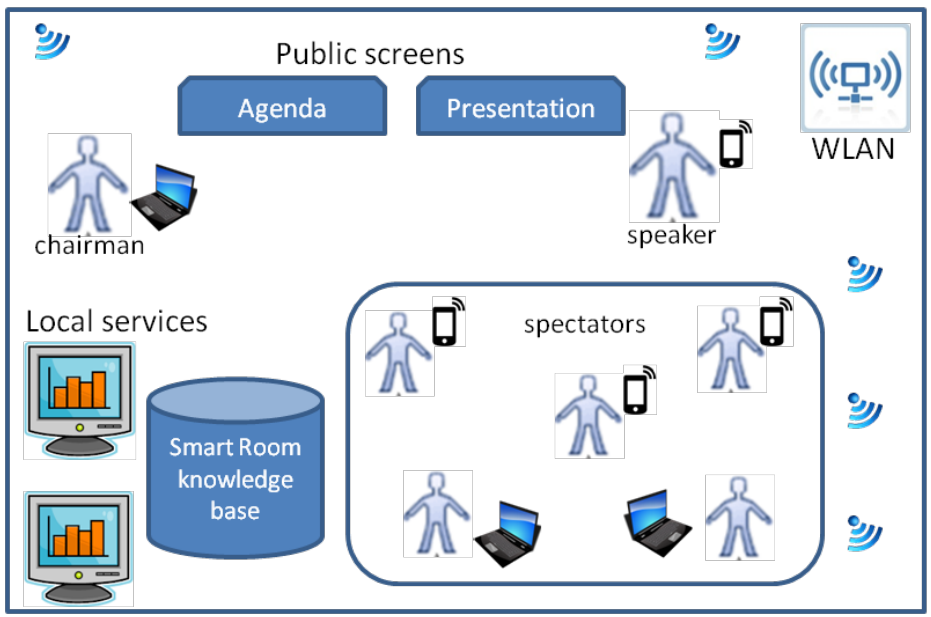
- holding conferences, meetings, and lectures
- personalized interaction with room participant
- participating using mobile devices

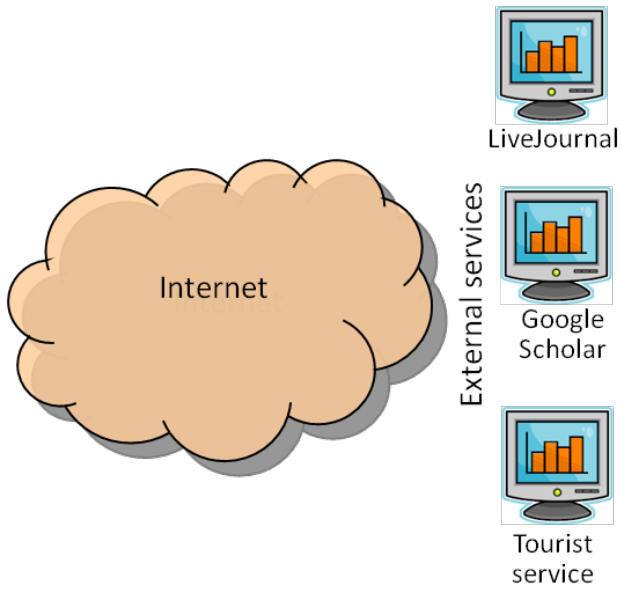


SmartRoom services

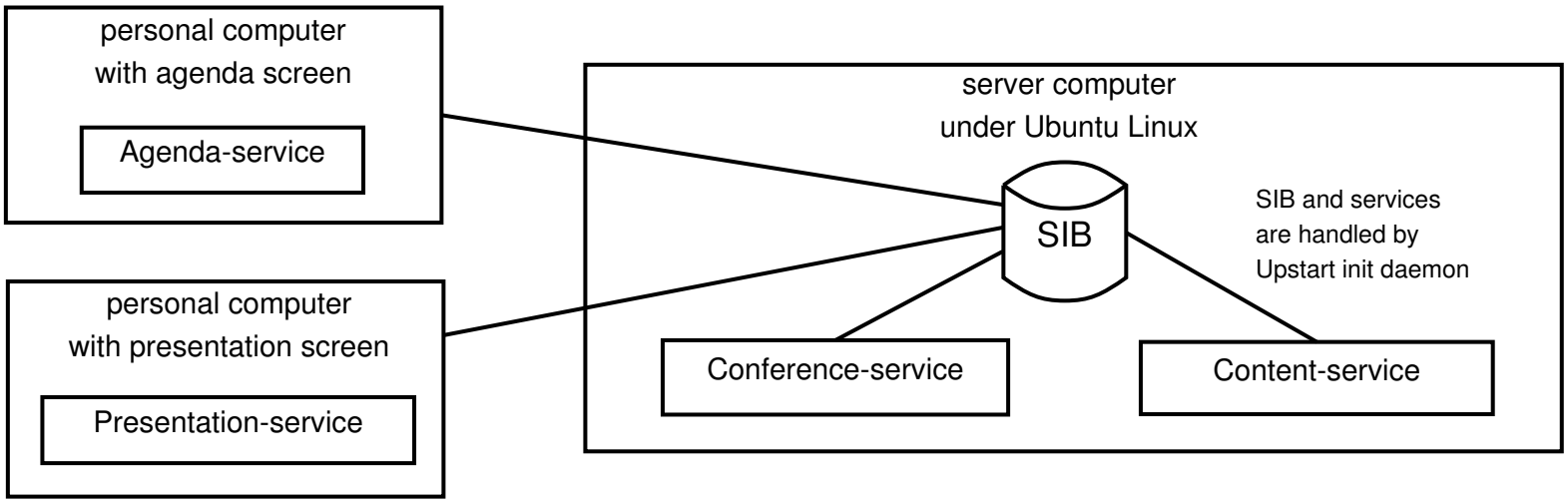
- conference services
- sensor services
- activity tracking services
- discussion services
- ...

SmartRoom is being deployed at PetrSU IT-park, 104 aud.



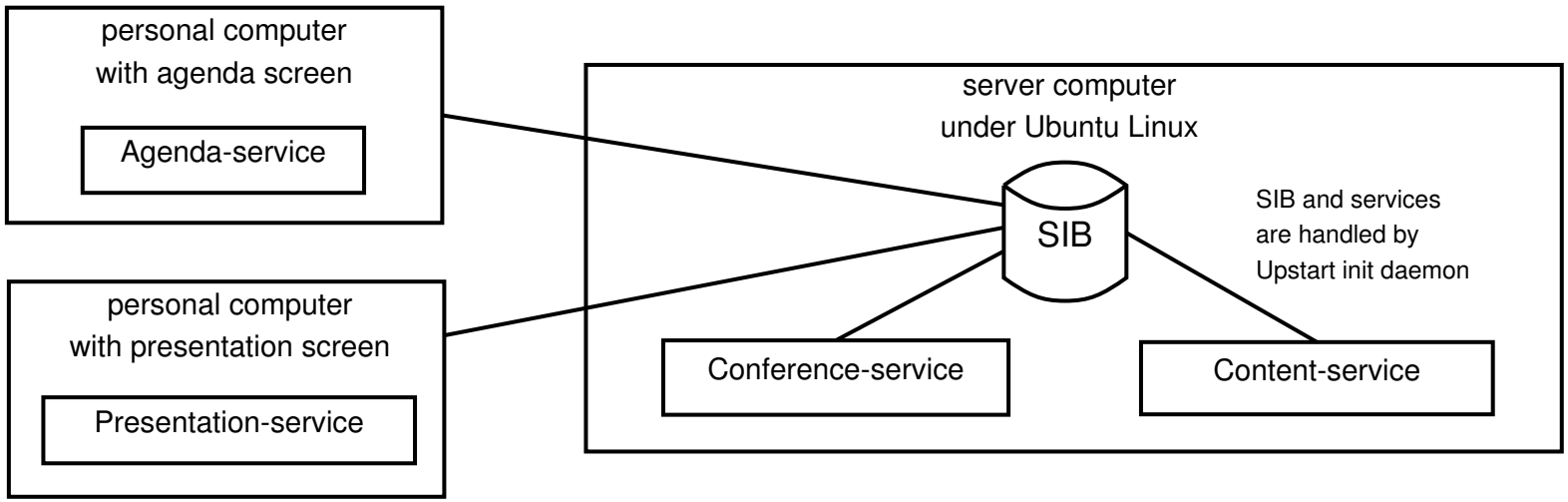


SmartRoom infrastructure



- SIB is deployed either locally or on a remote machine
- Conference-service: conference runtime management
- Presentation-service: slide show of current speaker
- Agenda-service: visual activity agenda
- Future: Meeting-service, Lecture-service, ...

Infrastructure KP deployment options



1. the same server computer with the SIB
2. dedicated computers to attach specific devices
3. additional server computers (non-SIB)

infrastructure also includes KPs for the system administration

Services reliability

- Infrastructure element failure: crash of Smart-M3 processes or SmartRoom services
- Subscription query: it is not guaranteed that the application receives every subscription notification

Possible solutions:

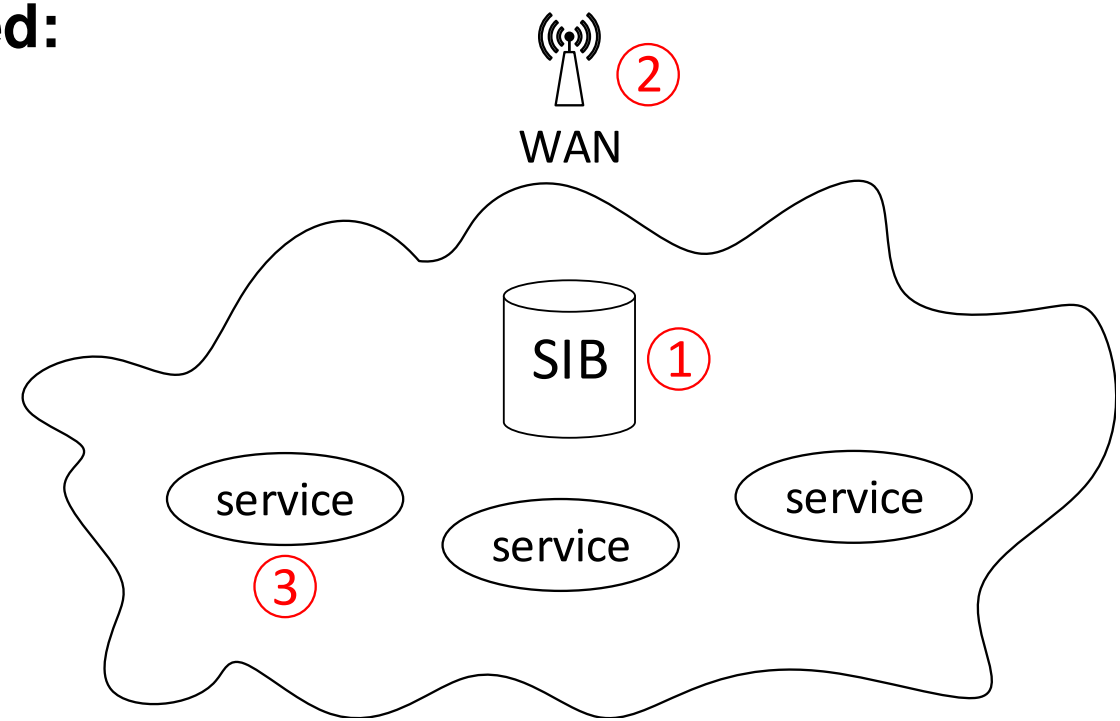
- Subscription application-level control: KP performs additional timer-based checks for the service subscription
- Restart/Reconnection: A service restores its runtime and connection with the smart space
- Infrastructure: online services and content management

Restart/Reconnection

- Restart: application is shut down and launched again
- Reconnection: application is still running but connection to SIB is re-established

Problems when it is needed:

- SIB failure
  - data are saved (Virtuoso)
  - data are lost
- WiFi access point failure
- particular service failure



Online Services

- main goal: increase reliability of service provision
- operate permanently and continuously on server computers
- provide the service in 24/7 mode
- Upstart event-based init daemon handles the services
  - automatic respawning: whatever happens with the service, it will be relaunched again
  - services chaining: one service is automatically launched when another service is started

$$\text{redsibd} \rightarrow \text{sib-tcp} \rightarrow \text{Smart Room initialization} \rightarrow \text{conference-service} \rightarrow \text{other services}$$

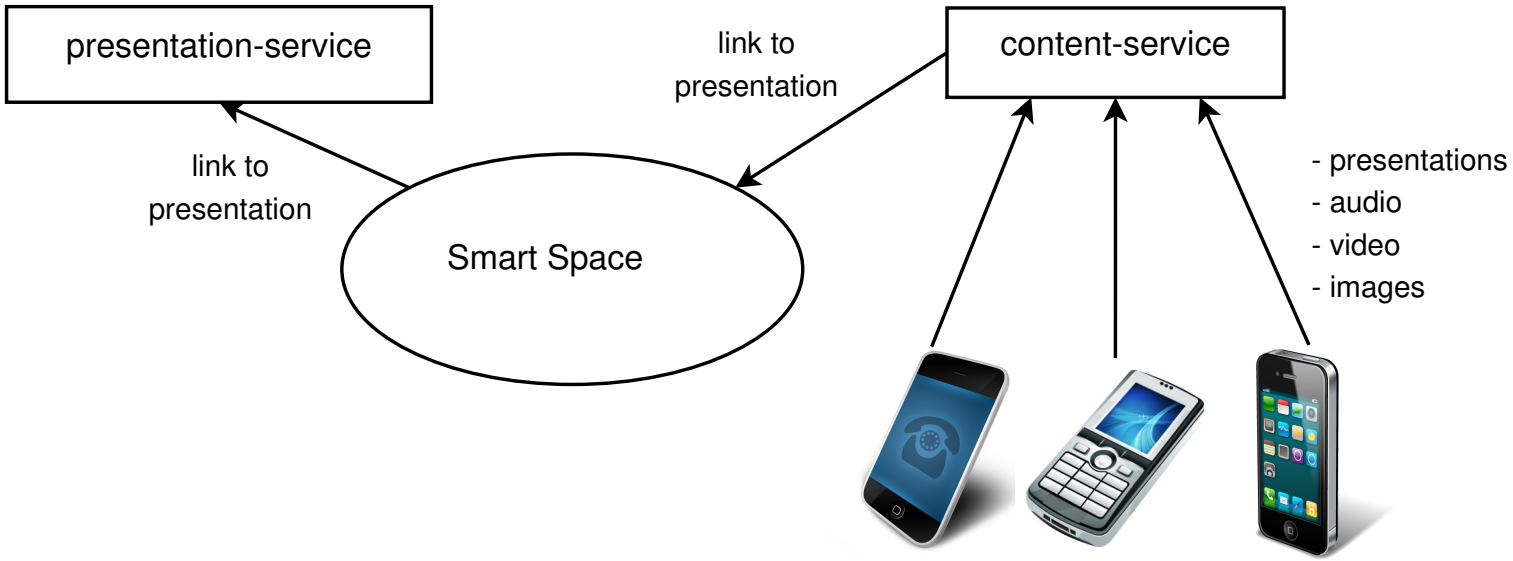
Online Services example

redsibd	start on startup
sib-tcp	start on started redsibd stop on stopping redsibd
conference-service	start on started sib-tcp stop on stopping sib-tcp
...	...

```
start on started sib-tcp
stop on stopping sib-tcp

env SERVICE=/usr/local/bin/conference-service

respawn
exec $SERVICE

post-start script
    python /usr/local/bin/register.py
end script
```

Content Management

- Smart space is a semantic hub: relating multi-source information without duplicating all the data in the smart space
- Content-service stores and shares information among others
- Every service or client can upload some data (video, audio, etc.)
- Content-service saves data and provides download links

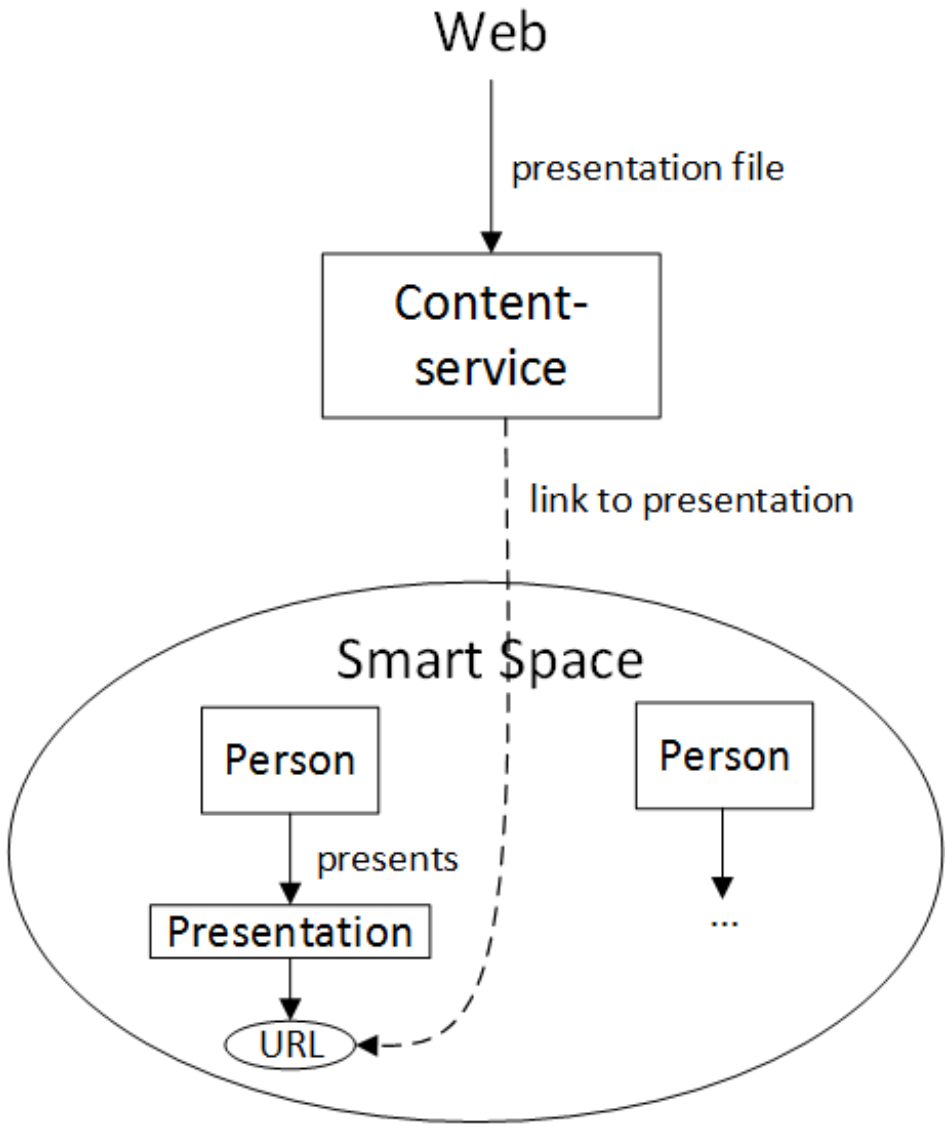


Smart Room participants

Content-service links

- direct links
  - global — on external resources
  - local — on resources stored by the service

  Problem: dynamic changing of content-service IP for local links
- relative links — relative path to resources stored on content-service
  Content-service IP is stored and updated in service space



Conclusion

- Mechanisms for service reliability
  - Service delivery: subscription control, reconnection
  - Infrastructure: online services, content management
- Basic online services controlled by Upstart init daemon: SIB processes, Conference-service
- Content-service is still in development stage
- Open source code: `http://sourceforge.net/projects/smartroom`
- Welcome to our demo on 13.11.2013

Thank you for attention!