

Modelling and Accessing Context Information

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Advanced Context Functionality

- **Goal:** Enable context-awareness on a large scale
 - Move from vertical, single application solutions to larger scale, horizontal, multi-application solutions
 - Rapid deployment of innovative and horizontal services
- **Relevant building blocks:**
 - Standardized context representation
 - Context access interface that is expressive but allows efficient evaluation
 - Scalable and efficient mechanism for finding of sources for context information, e.g., location-based
 - Support for direct source-to-sink processing chain
 - Dynamic adaptation of context provisioning, e.g., for supporting mobility

Slide 2

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Detail some of the challenges addressed by advanced context components based on slide 4

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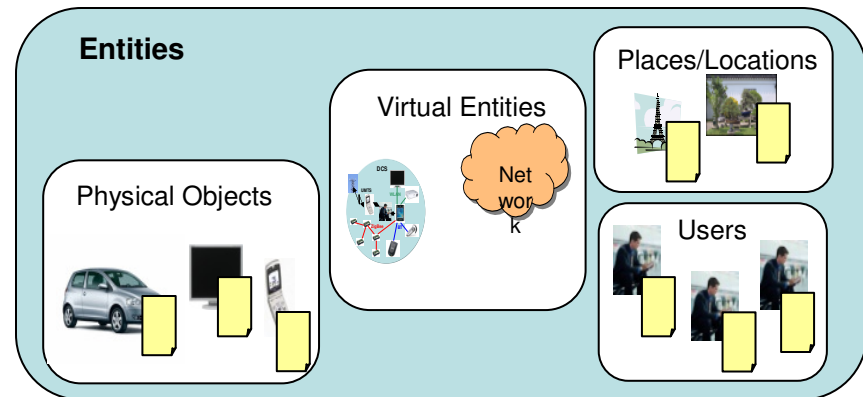
Context Modelling and Access (1)

- Top down view of context-aware applications: **high-level request specifying WHAT information is needed**
- Bottom up view: **Sensor providing data: 27 (value)**
- **Goal: efficient & scalable access to information**
 - **WHERE to find required information**
 - Knowledge how to get to high-level information
 - Efficient access to sources, e.g., index structures
 - **HOW to derive required context information**
 - Processing chain, contextualizing and deriving higher-level of information
 - **HOW to efficiently deliver context information to applications**

Context Modelling and Access (2)

- **Context Model**

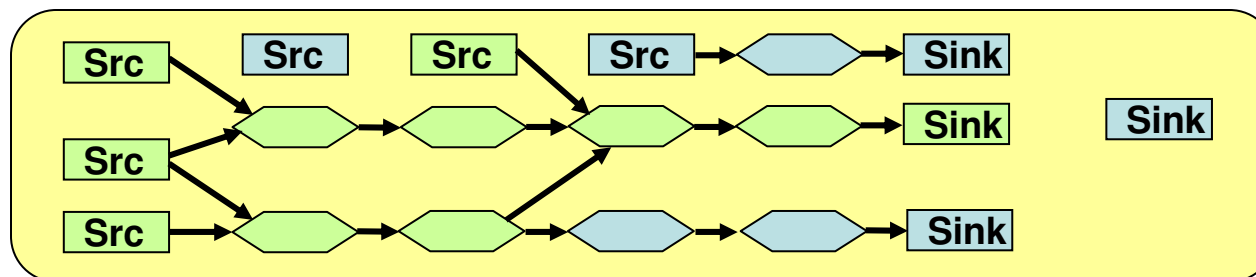
- **Entity/Attribute based “Meta Model”**
- **Real-World Spatial Entities**
 - user, devices, networks, ...
- **Virtual Entities**
 - services, profiles, policies
- **Meta information / quality aspects**



- **Real World Application Interface**

- Highly distributed information system
- General trade-off between expressiveness and efficiency/scalability
- Simple declarative language as an option

- **Context Processing**

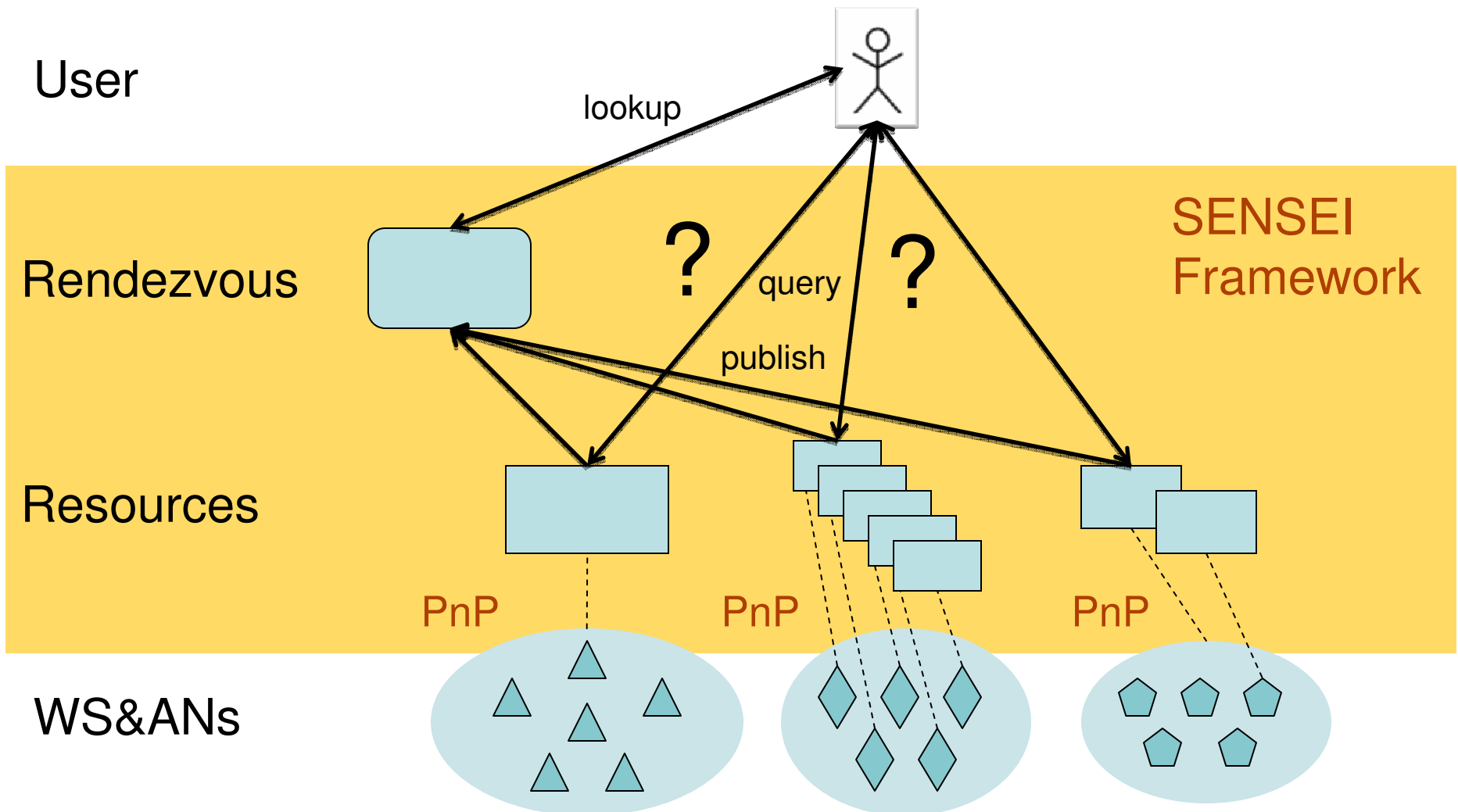


Thank you for the attention!

Questions?

Backup Slides

SENSEI Architecture



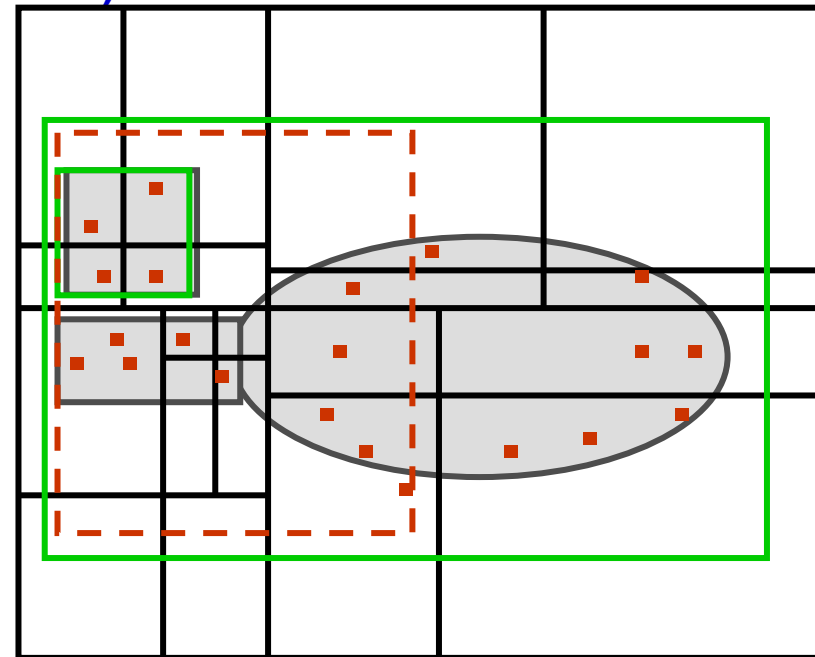
Efficient Access: Scopes & Indexes

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- Index based on entity/attribute combination, e.g., hash table

smoke sensor1/smoke sensor/sensesSmokeLevel	http://smokesensor1
smoke sensor2/smoke sensor/sensesSmokeLevel	http://smokesensor2
smoke sensor1234/smoke sensor/sensesSmokeLevel	http://personalsmokesensor12
room123/room/hasSmokeLevel	http://smokesensor1
room 234/room/hasSmokeLevel	http://processor5
user1234/hasGPSLocation	http://locationsensor1234
user1234/user/hasSmokeSensor	http://user2smokesensor
...	

- Location/type index, e.g., based on quad tree (shown in visualization, blue)

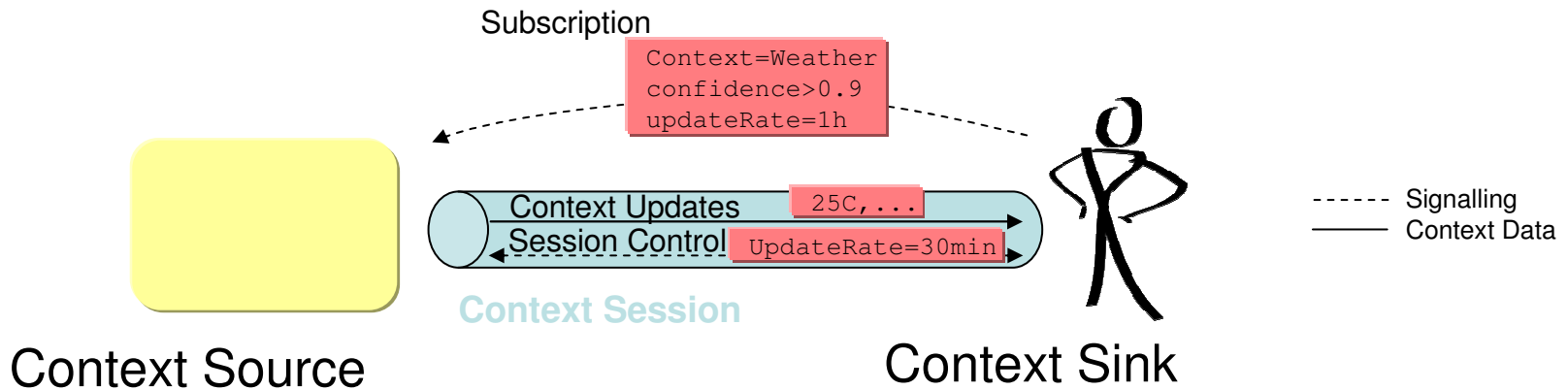


- stationary smoke sensor
- location system
- - - request area: to find results, check only in overlapping parts of quad tree

Scalability and Adaptivity: Context Sessions



Basic Idea: Separate signaling from context exchange

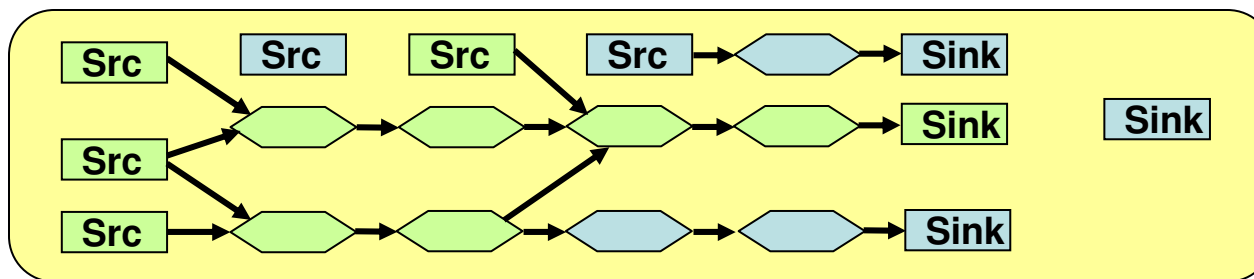


→ Enables transparent reconfiguration of context sources

Context Session: Communication Channel between context sink and context source

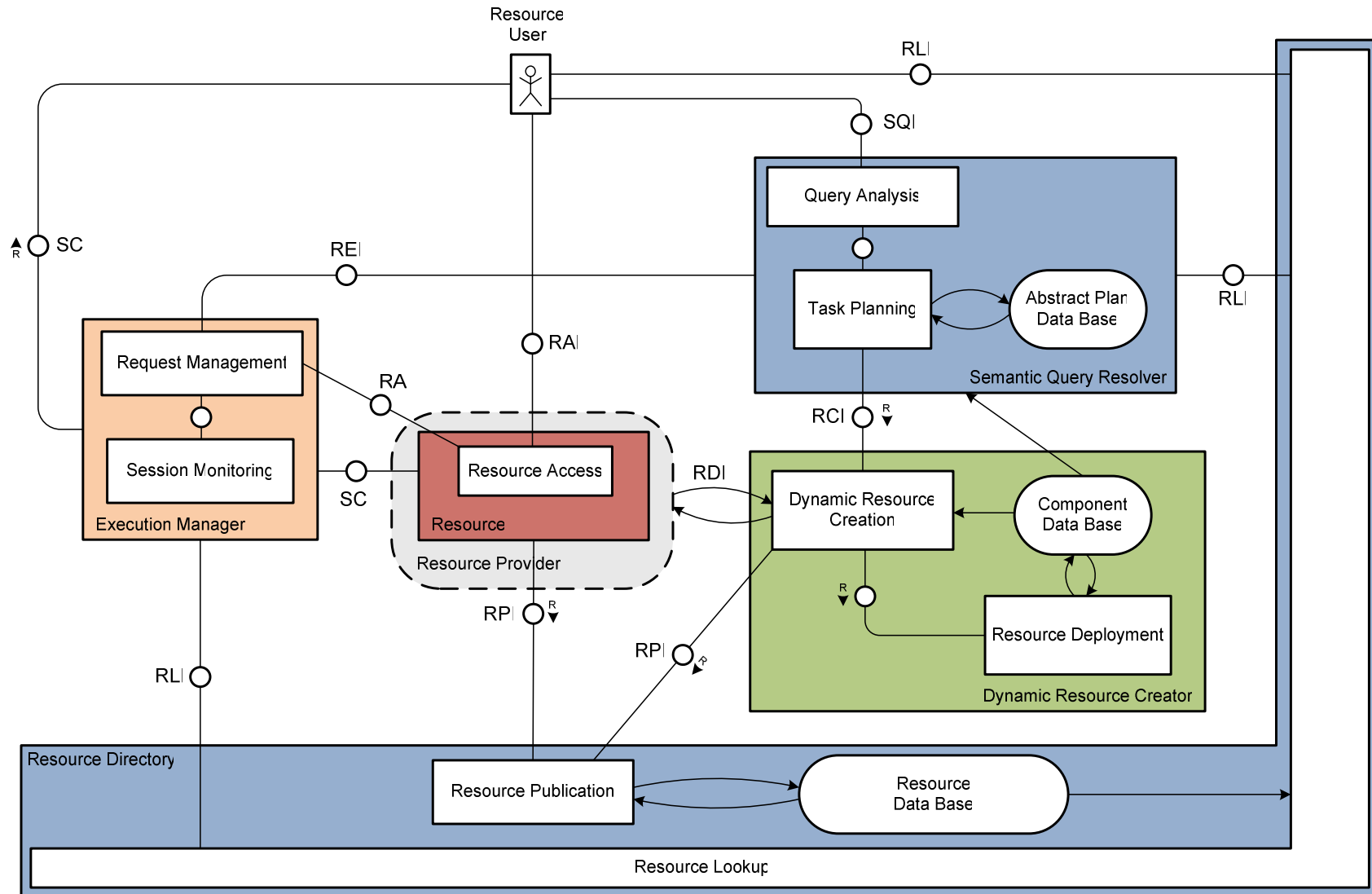
In analogy to a media session

Flexible control and efficient management of context delivery networks



Detailed Architecture

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Slide 10

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Replace picture

Introduce advanced components

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