

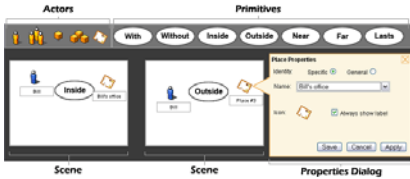
Scenic/PEEX: Extracting Probabilistic RFID Events

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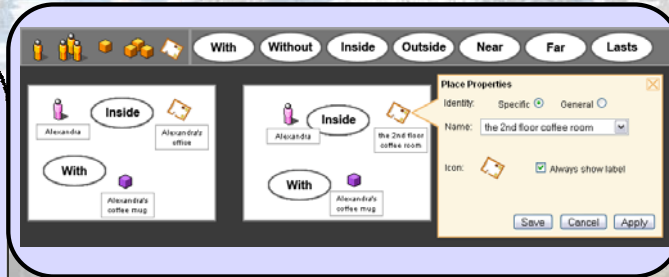
Affiliates 2007

Scenic

- End-user tool for specifying RFID events
- Visual language supports common events
 - Three basic constructs:
 - 1) Scenes: Depict point events in sequence
 - 2) Actors: People, places, and things
 - 3) Primitives: basic types of events



- Web-based GUI:
 - Drag & drop, context menus, dialog boxes
 - DHTML with ~500K custom JavaScript
 - AJAX connection to PEEEX via Servlet
- Automated translation from Scenic to PEEEX
 - Auxiliary tables to represent primitives



```
FORALL Sightings S1, Sightings S2, Sightings S3,
      Sightings S4, AntInside A1, AntInside A2
```

```
WHERE SEQ(AND(S1, S2), AND(S3, S4)) AND
S1.ant = A1.ant AND
S3.ant = A2.ant AND
A1.room = 'Alex's office' AND
A2.room = '2nd floor coffee room' AND
S2.ant = S1.ant AND
S4.ant = S3.ant AND
S1.tag = 'Alex's person tag' AND
S2.tag = 'Alex's mug' AND
S3.tag = S1.tag AND
S4.tag = S2.tag AND
abs(S1.time - S2.time) < (10 * 1000000) AND
abs(S3.time - S4.time) < (10 * 1000000)
```

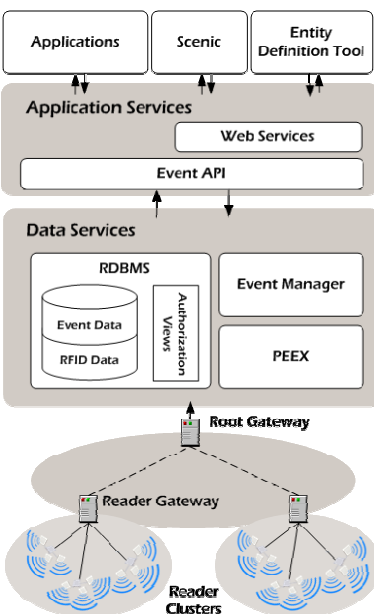
```
CREATE EVENT AlexGetsCoffee E
SET      E.room_descr = H2.room_descr
```

PEEX

(Probabilistic Event EXtractor)

- Applications define and extract high-level, meaningful events
- PEEEX extracts these probabilistic events from stored RFID data
- Uses a declarative SQL-like query language (PeexL) extended with a simple sequence operator
- Copes with noise, errors, and inherent ambiguity in two ways:
 - 1) Confidences tables: capture the historical probability that different combinations of tag reads correspond to an event.
 - 2) Partial events: inferred events based on only a subset of all tag readings in the specification.
- Allows applications/users to choose their desired trade-off between detection rate and precision.

System Architecture



tag	ant	time
Alex's mug tag	49	2007-10-29 14:13:36
Alex's mug tag	49	2007-10-29 14:13:36
Alex's person tag	49	2007-10-29 14:13:36
Alex's person tag	49	2007-10-29 14:13:36
Alex's mug tag	49	2007-10-29 14:13:35

room	time
2nd floor coffee room	2007-10-29 14:13:39
2nd floor coffee room	2007-10-29 16:01:57
2nd floor coffee room	2007-10-29 18:25:20

[illegible]

Digital Diary Application

- Tracks user's events over time
- Displays events in a Google calendar
- Users can review:
 - How they have spent their time
 - Where time was spent
 - With whom
 - What was done (eventually)
- Calendar labels allow separation of events (e.g. "Work Related", "Fun Stuff")

