

SmartRFLib - An RFID-Supported Library System

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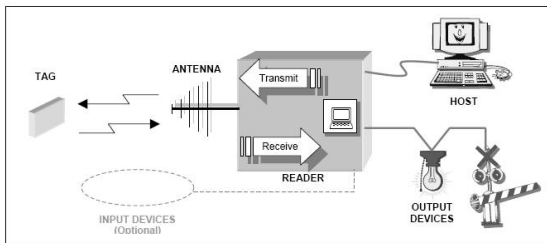
Project Goals

- to automate a library with the help of the **RFID (Radio Frequency Identification) technology**
 - RFID vs. Barcode Technology: line of sight and range
- to run higher-level **event detection** queries on RFID data streams
- to visualize important events and alerts in real time on **SecondLife**



RFID Hardware Components

- An RFID system is composed of readers, antennas, tags, and a host computing device
 - Readers: transmitter, receiver, microprocessor
 - Antennas: transmitter, receiver
 - Tags: identification and other information



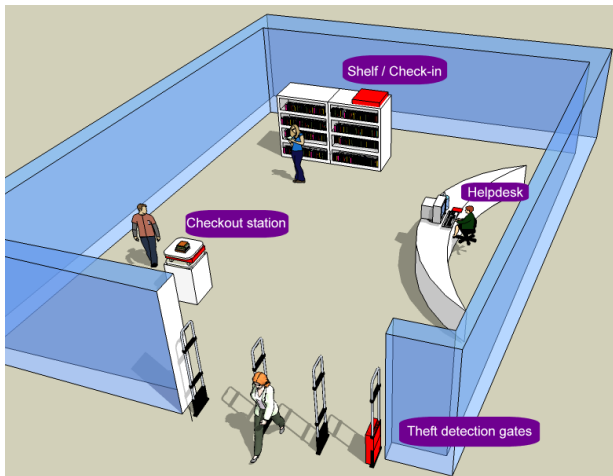
Second Life

- SL is a virtual 3D world created by its users
- SL is not a game
- SL has its own economy and currency (Linden Dollars)
- ETH Zurich owns an island on SL
- Our library is located on the ETH Zurich Island

<http://www.secondlife.com>

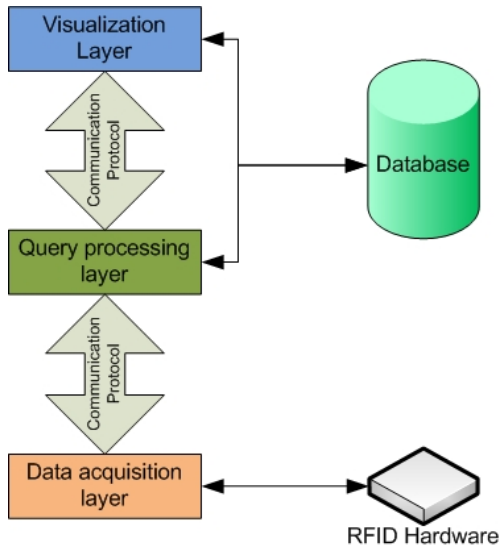


Library Setup

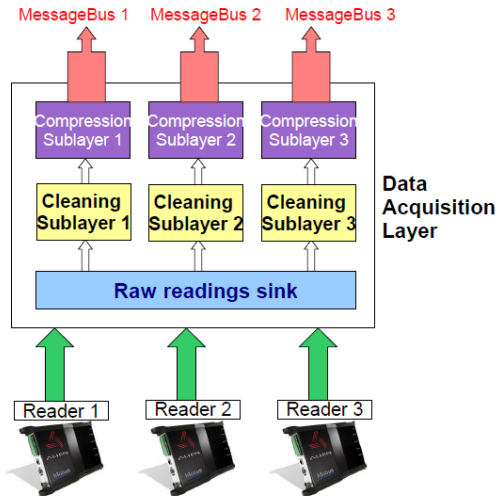


- We analyze the data that the RFID readers collect from tagged books and library users in order to detect and respond to important situations.
- We have several types of events defined in our library:
 - Book check-in
 - Book checkout
 - Illegal checkout
 - Reference books
 - Too many books
 - **Book theft**

SmartRFLib System Architecture



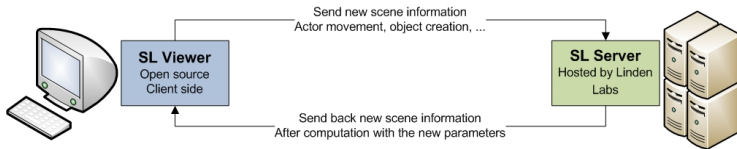
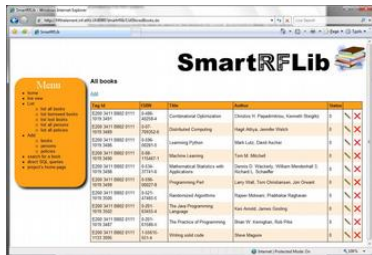
Data Acquisition Layer



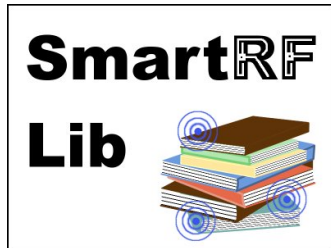
- This layer takes in the cleaned and compressed RFID data streams and runs a set of pre-defined event queries on them.
- Event definition for book theft:

```
NAME book_theft
PATTERN SEQ(Book+ b[ ]) ON 3
MATCH INCREMENTAL
WHERE notBorrowed(b[i])
ACTION alarm_theft(b), notifyTheft(b)
RETURN True
```

Visualization Layer



Demo



http://www.dbis.ethz.ch/education/ws0708/inf Syst_lab/rfid

