Design and Implementation of A Secure Prototype for EPCglobal Network Services

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Agenda

EPCglobal Network Services

Design of Secure Prototype for EPCglobal Network Services

Implementation of Secure Prototype for EPCglobal Network Service

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EPCglobal Network

EPC ONS → EPC DS

EPC IS → ALE → RFID Sub-system

Data Exchange

Physical Exchange

EPC Data Exchange Standards

EPC Infrastructure Standards for Data Capture

EPC Physical Object Exchange Standards
EPCglobal Network Services

- EPC Information Services (EPC IS)
- EPC Discovery Services (EPC DS)
- EPC Object Naming Service (EPC ONS)
EPCglobal Network Services

- EPC Information Services (EPC IS)
- EPC Discovery Services (EPC DS)
- EPC Object Naming Service (EPC ONS)
- Directory look-up based EPC-DS
- Aggregating EPC-DS
Directory Look-up based EPC-DS

1. Send event information to EPC-IS servers

2. EPC-IS sends notification information to EPC-DS as object is seen

3. User queries EPC-DS to find the addresses of related EPC-ISes

4. User queries the EPC-ISes whose addresses are returned to obtain event information

Products with RFID pass through supply chain
Aggregating EPC-DS

1. Send event information to EPC-IS servers
2. EPC-IS sends notification information to EPC-DS as object is seen
3. User queries EPC-DS to find event information
4. EPC-DS queries the EPC-ISes to obtain event information
5. EPC-DS returns the aggregated event to the user

Products with RFID pass through supply chain
Secure Prototype for EPCglobal Network Services
Goals

- EPC-DS

- Access Control

- Automatic Data and policy publishing

Facilitating global information sharing among supply chain partners

Security mechanism

Reducing the cost of managing and maintaining supply chain partners’ data and authorization policies
Architecture

Authentication Server

Secure EPCDS

Secure EPCIS

Data Exchange

Secure EPCIS

Secure EPCIS
Functionalities of Secure EPC-IS

Secure EPCIS

Data Management
- Data storage
- Data capture
- Data query
- Data publish

Authorization
- Policy storage
- Policy publish
- Policy management
- Access enforcement
Architecture of Secure EPC-IS
Functionalities of Secure EPC-DS

- Data Management:
  - Data storage
  - Data publish
  - Data query

- Authorization:
  - Policy storage
  - Policy management
  - Access enforcement
Architecture of Secure EPC-DS
Implementation

- Implement EPC-DS system following our design
- Extend EPC-IS system (Fosstrack) to Secure EPC-IS system
- Support attribute-based access control (CODASPY 2012)
DSIOT (Discovery Service for Internet of Things)

- User Register
- Data Publish
- Policy Management
- Data Query
DSIOT Web Application

End Users

DSIOT Application

Register  Data Publish  Policy Management  Query

Authentication Server

Secure EPCDS

Data Exchange

Secure EPCIS

Secure EPCIS
## Basic Search

![Basic Search](image)

- **Search Field:** `urn:epc:id:ssgt:0057000.678930.5004`
- **Options:** Search, Detailed Search

## Query Results

<table>
<thead>
<tr>
<th>EPC</th>
<th>Event Time</th>
<th>Biz Step</th>
<th>Disposition</th>
<th>EPC Parent</th>
<th>Aggregation Action</th>
<th>URL</th>
</tr>
</thead>
</table>
Conclusions

- Introduce EPCglobal Network Services
- Design secure prototype For EPCglobal Network Services
- Implement DSIOT web application
THANK YOU!