



Theseos

Data Traceability Query Engine

Intelligent Information Systems
IBM Almaden Research Center

Description of Technology

- Theseos is a query engine that:
 - Allows enterprises to create traceability networks in which they can selectively share various data about uniquely identifiable objects.
 - Facilitates numerous traceability applications, including supply chain management, pedigree generation, targeted recalls, and asset management.
 - Enables real-time querying of distributed data across multiple enterprises to trace the location and movement of individually tagged items.
 - Preserves the sovereignty of each enterprise in the network by enforcing fine grained data disclosure policies over each data source.

Opportunities

- An increasing number of items are uniquely tagged, using RFID, 2D bar codes, TREC for containers, and other methods.
- There are efforts to standardize tag formats and reader protocols to facilitate electronic tracing of items.
- Traceability laws are emerging in many countries and industries.
 - Japan Beef Traceability Law
 - EU fish products traceability requirements
 - US drug pedigree requirements
- Supply chain management greatly enhanced by traceability.
 - Risk mitigation, real-time alert generation
 - Improve overall efficiency of operations

Solution

Query Processing

- Querying of traceability data across different enterprises.
 - Links with various enterprise data (PO notices, shipping manifests, custom records, RFID readings, etc).
 - Handles containment relationships (items get packed into larger boxes and vice versa).

HDB Policy Enforcement

- Allows each enterprise to specify data disclosure policies that are automatically enforced.
 - Uses Hippocratic Database (HDB) technology.

Value Proposition

▪ Information On Demand

- Execute queries on-the-fly over the repositories where data was originally collected.
- Does not require each organization to publish its data to central location.

▪ Ease of Integration

- API is modeled after public standards, such as EPCGlobal, to support different traceability applications.
- No need to set up data warehouses to host data from different parties; all data remains where it was originally collected.
- Easily configurable to handle data schema heterogeneity across different entities.

▪ Multi-Level Traceability

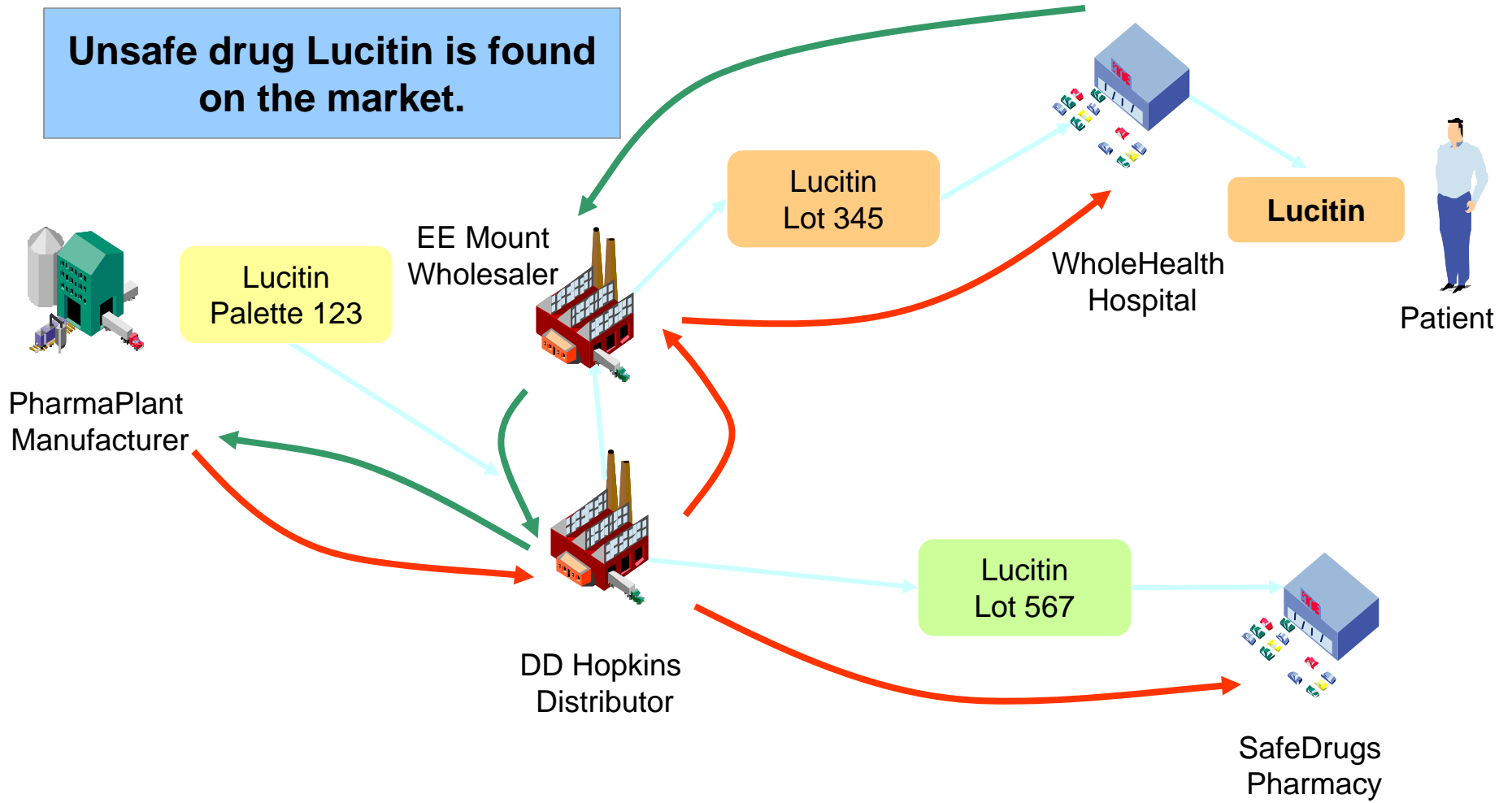
- Designed to handle multiple-level object containment relationships (e.g., bills of materials) that span many different organizations.

▪ Data Sovereignty

- Intercepts incoming queries at each organization and dynamically rewrites them in accordance with data disclosure policies installed at each repository.
- Instead of publishing a “general public” view, database owners can control disclosure with policies based on query initiator, purpose, and recipient of query results.

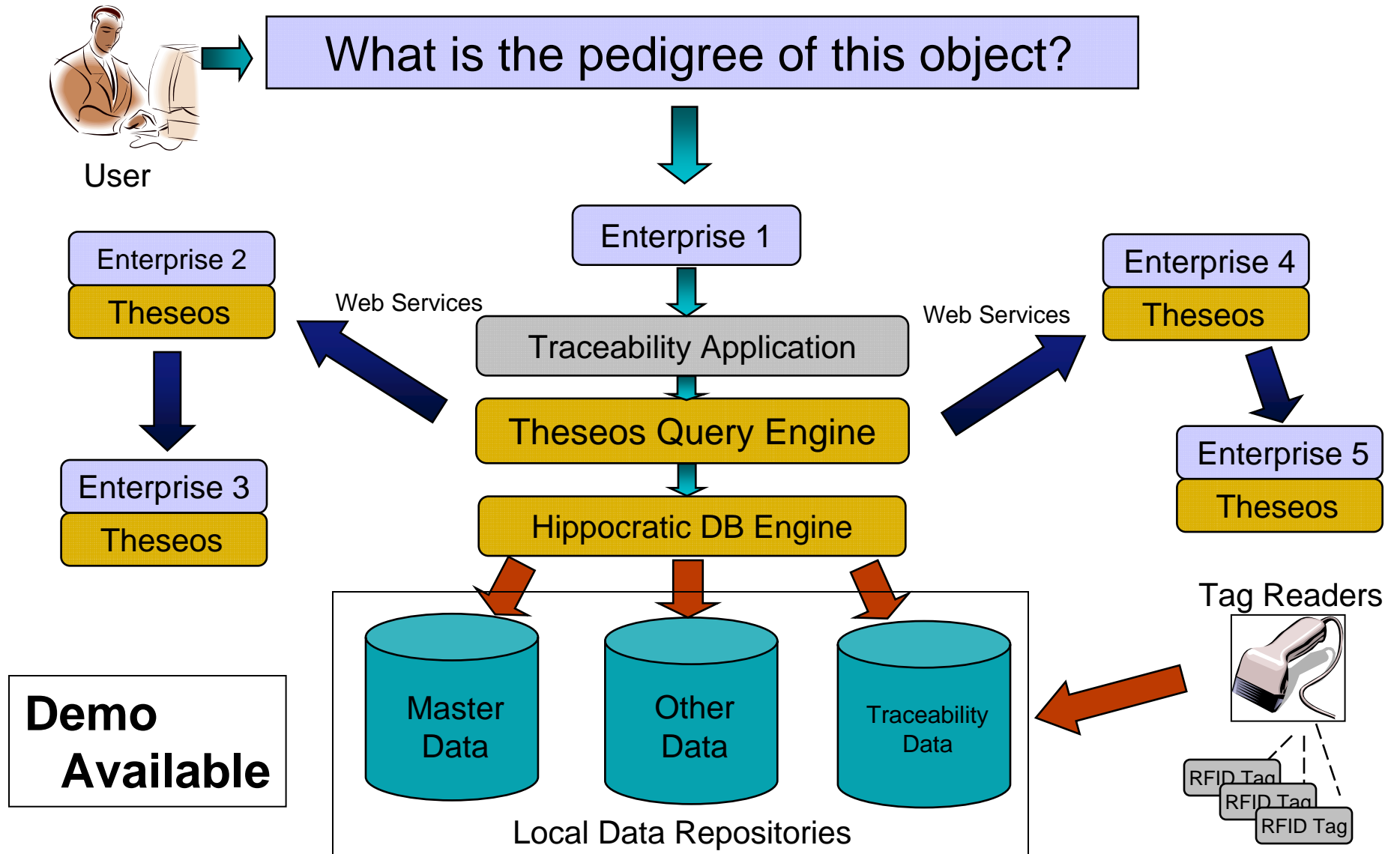
Traceability Query Example

Unsafe drug Lucitin is found on the market.



Adopted from IBM Academy

Reference Architecture





THE END

<http://www.almaden.ibm.com/software/projects/iis/rfid/>