Networked RFID Systems in Product Recovery Management

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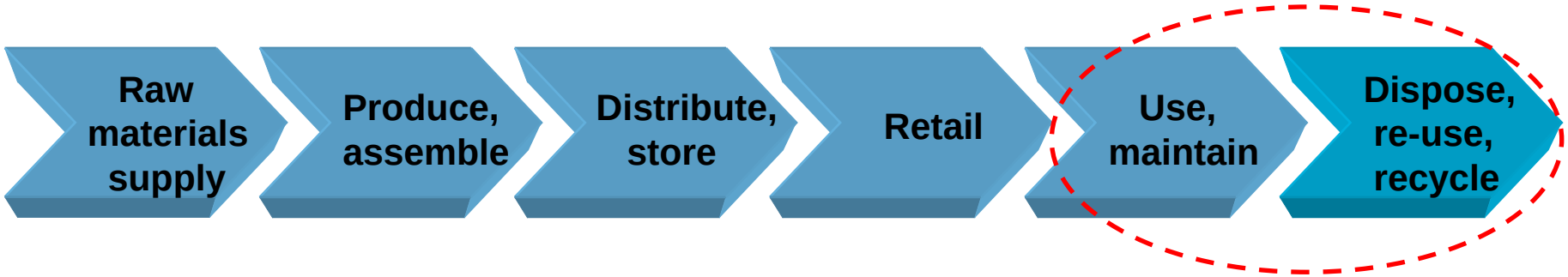
Presentation Overview

- Research Aim
- Product recovery decisions
  - Product dispositioning decision
  - Product remanufacturing inventory decision
- Linking product information to product recovery decisions
- Enhancing product information with “networked RFID”
- Improving product recovery decisions with enhanced product information
- Quantifying value of product information

Research Focus and Aim



- To examine and quantify the impact of ready availability of product information provided by networked RFID systems on product recovery decisions.

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Drivers for Product Recovery Management

Environmental

Government Regulations

– WEEE Directives

Other financial benefits…

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Product Recovery Decisions

- Product Dispositioning Decisions
  - Remanufacture
  - Reuse
  - Refurbish
  - Recycle
  - Disposal
- Remanufacturing inventory decisions
  - How much to procure from outside supplier

Research Questions

- What is the availability and requirements of product information for making product recovery decisions in product recovery industry?

- How can we provide the requisite information for better decision-making?

- How can we quantify the impact of ready availability of product information on product recovery decisions?

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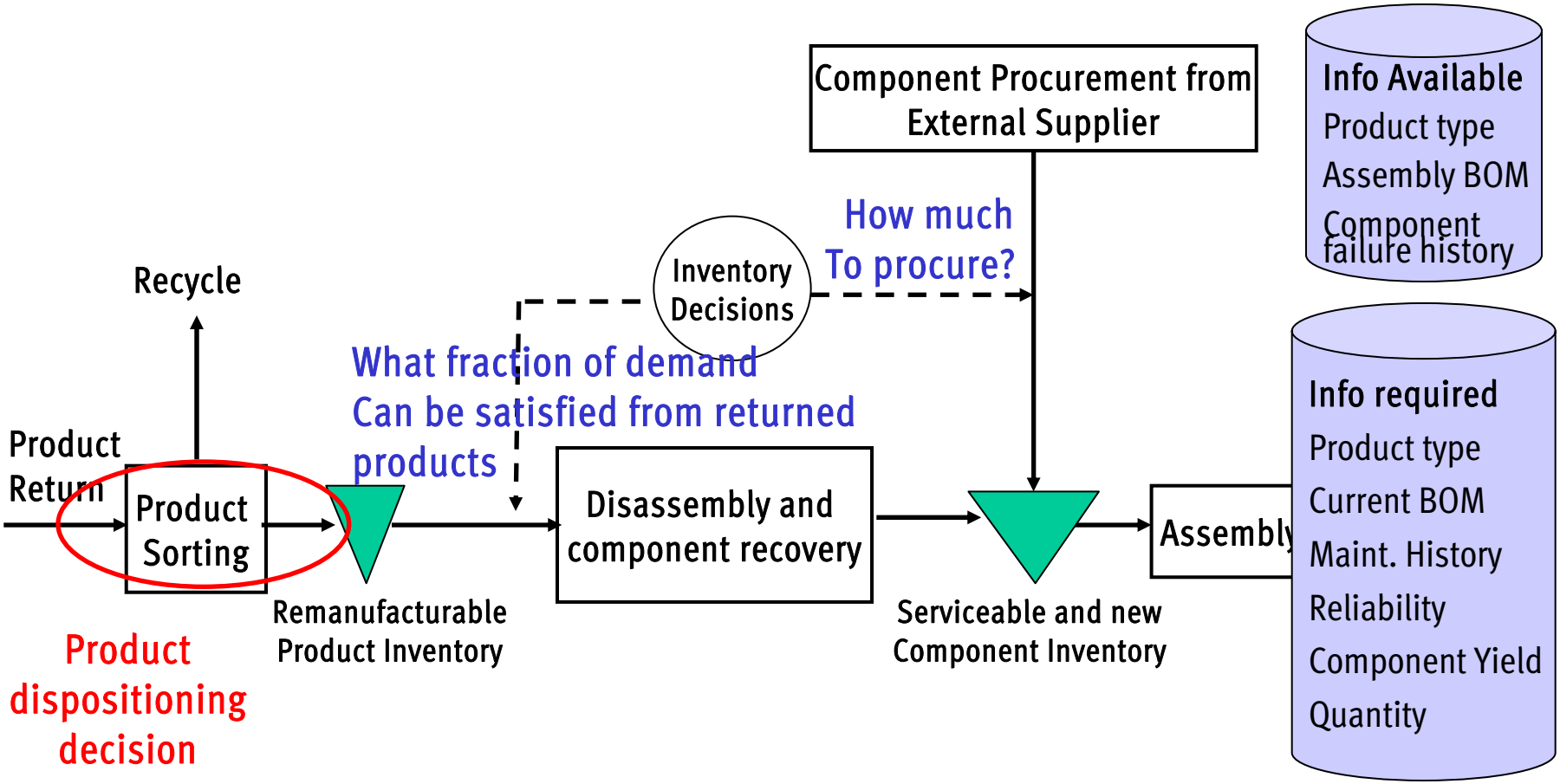
Case Study Exercise in Europe

- 12 companies located across Europe
  - 3 computer refurbishers
  - 3 photocopier remanufacturers
  - 1 phone refurbishers
  - 3 computer dismantlers
  - 2 white goods recyclers

OEM owned Photocopier Remanufacturing



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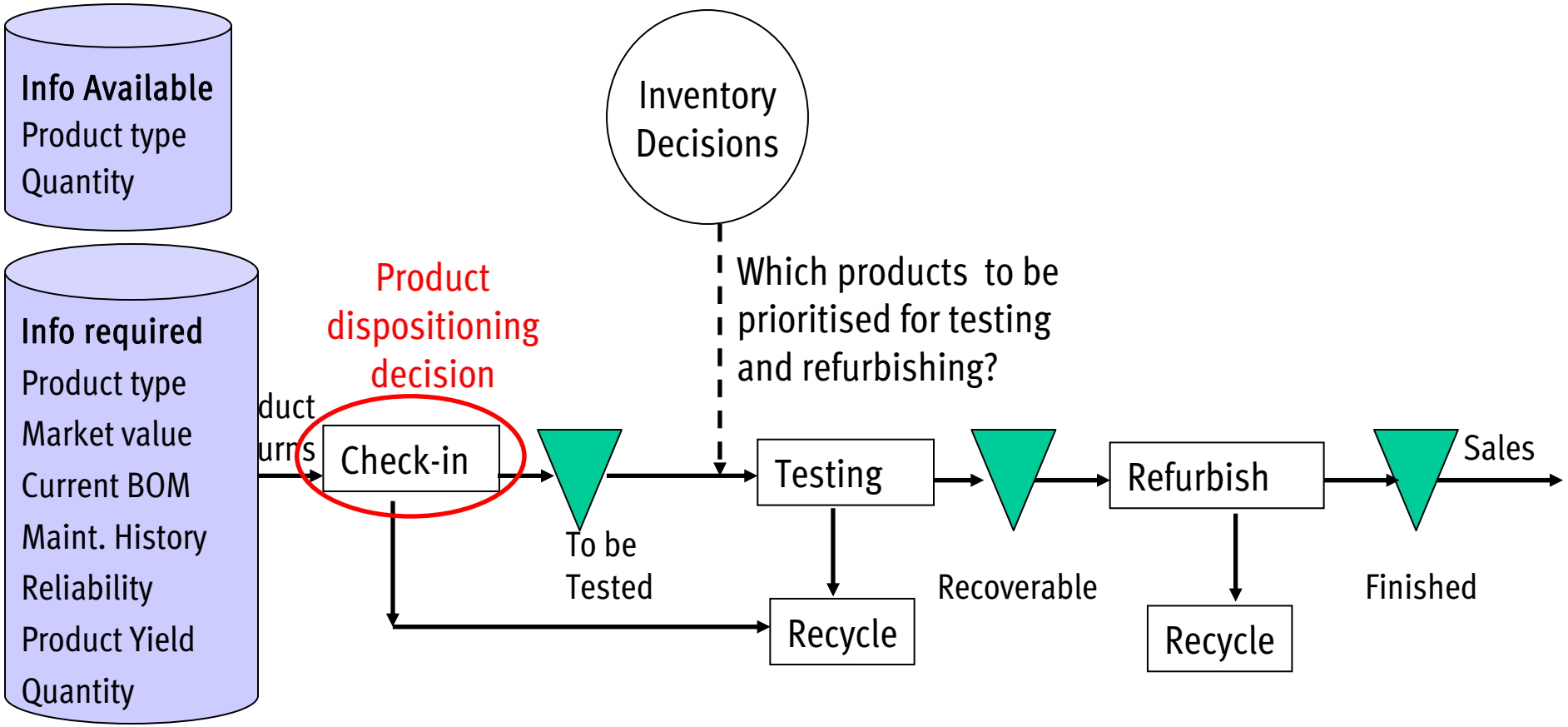
Third party owned computer refurbishing



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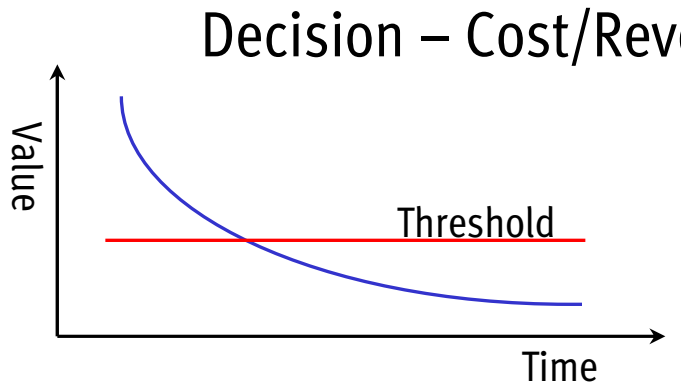
Product Information Requirements Vs availability

	Information availability	
Information Required	Pre-sorting	Grading
Material content	×	depending on access to design data
Original specification	✓	✓
Later modifications	×	✓
Reliability	×	depending on access to design data
Age	×	depending on access to sales & maintenance data
Current condition	×	✓
Usage	×	×
Maintenance	×	depending on the availability & accuracy of maintenance logs

Requirements of Information Quality for Making Product recovery Decisions

- Uniqueness
  - to enable individual information trails for each unique object throughout its lifecycle and across the whole supply chain.

Requirements of Information Quality for Making Product recovery Decisions



- Timeliness
  - to ensure that information is readily available for decision-making and execution process with minimal need for manual inspection or testing.

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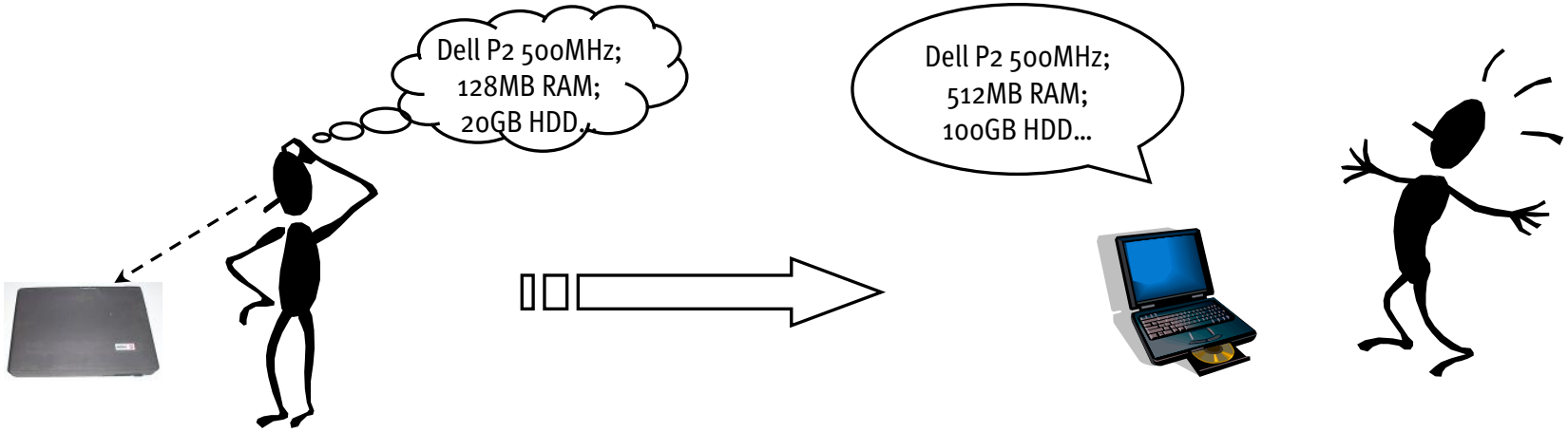
Requirements of Information Quality for Making Product recovery Decisions



- Completeness
  - to ensure that all relevant information is available for optimal decisions.
- Accuracy
  - to reduce or eliminate inaccurate representations of current and historical product information.

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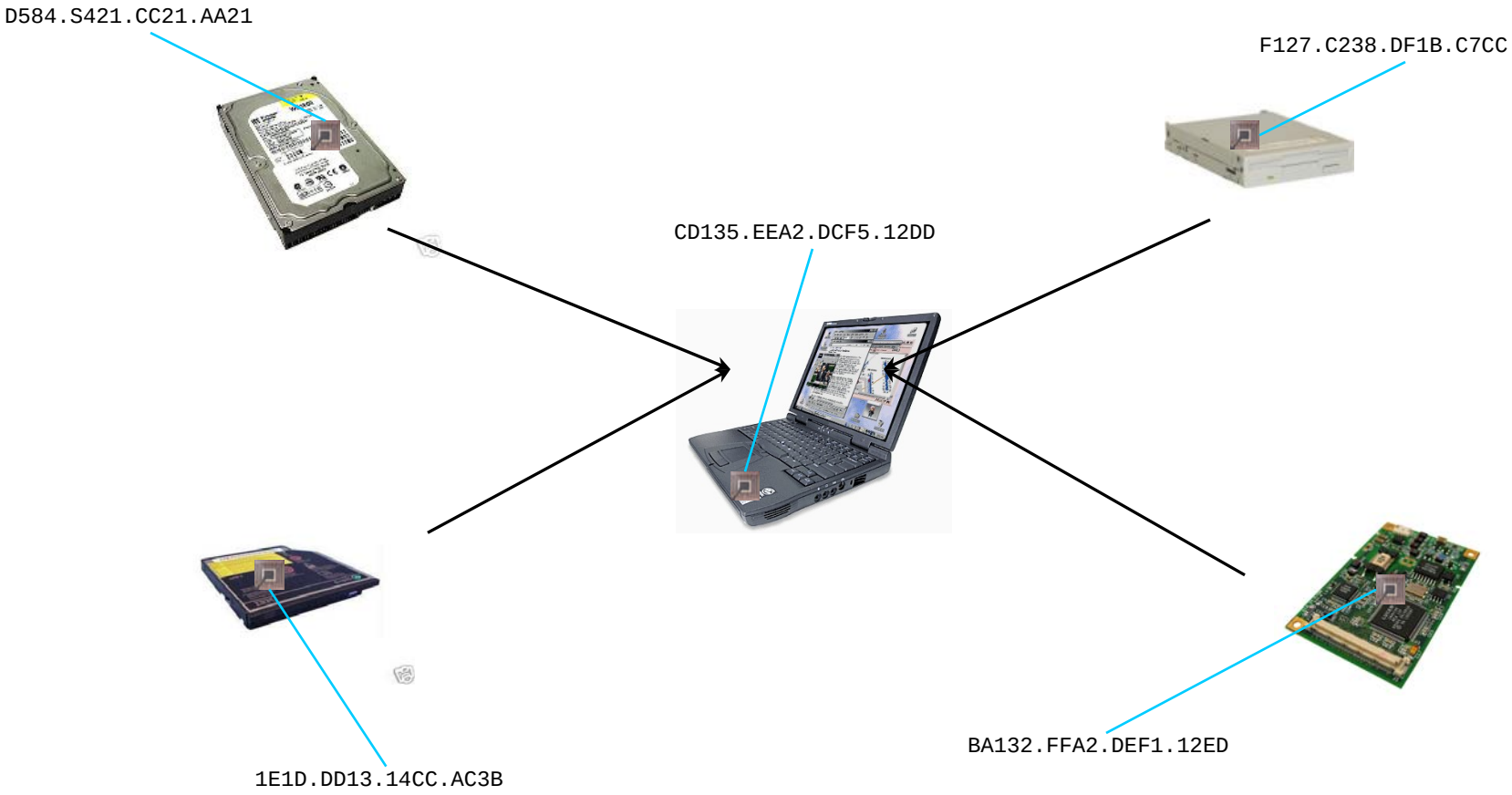
A Networked RFID Approach



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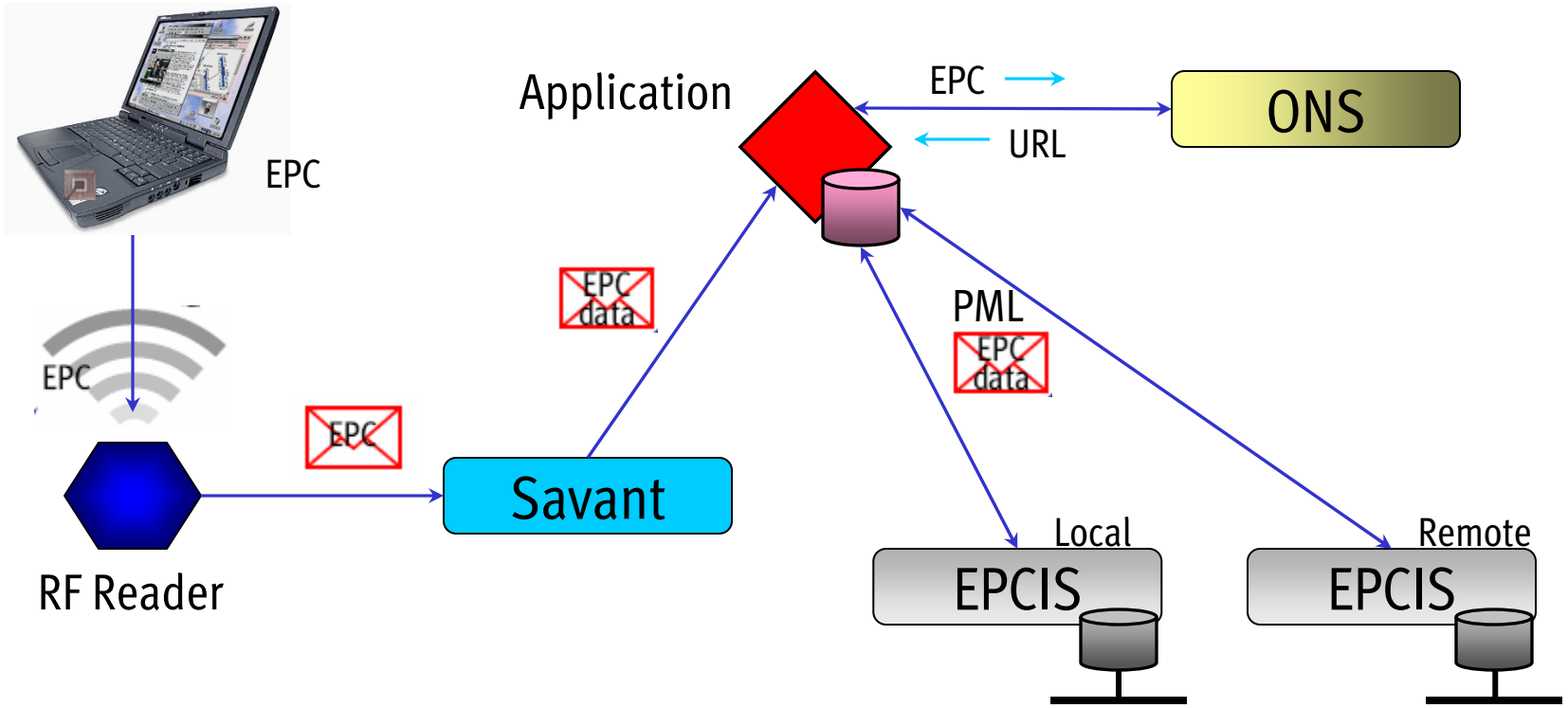
EPC™ Network Technology Building Blocks



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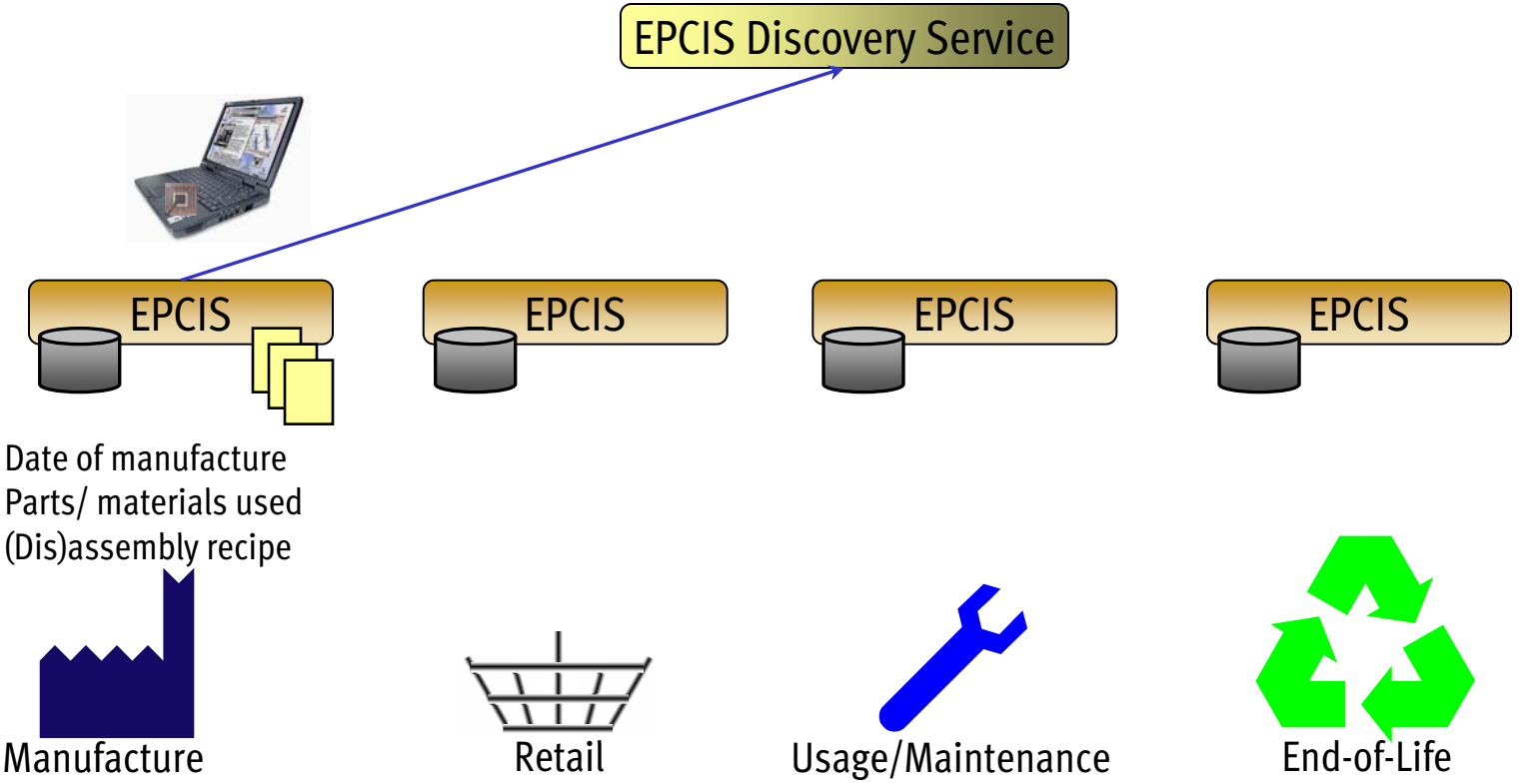
Information Quality <-> EPC Network

- Uniqueness
  - Enable unique product identification ---> EPC
- Completeness
  - Ensure availability of relevant product info ---> EPCIS/ONS/XML
- Timeliness
  - Ensure "ready" availability of product info ---> RFID/Filtering
- Accuracy
  - Reduce/eliminate errors in info management ---> RFID/XML

Networked RFID for Product Lifecycle Information Management



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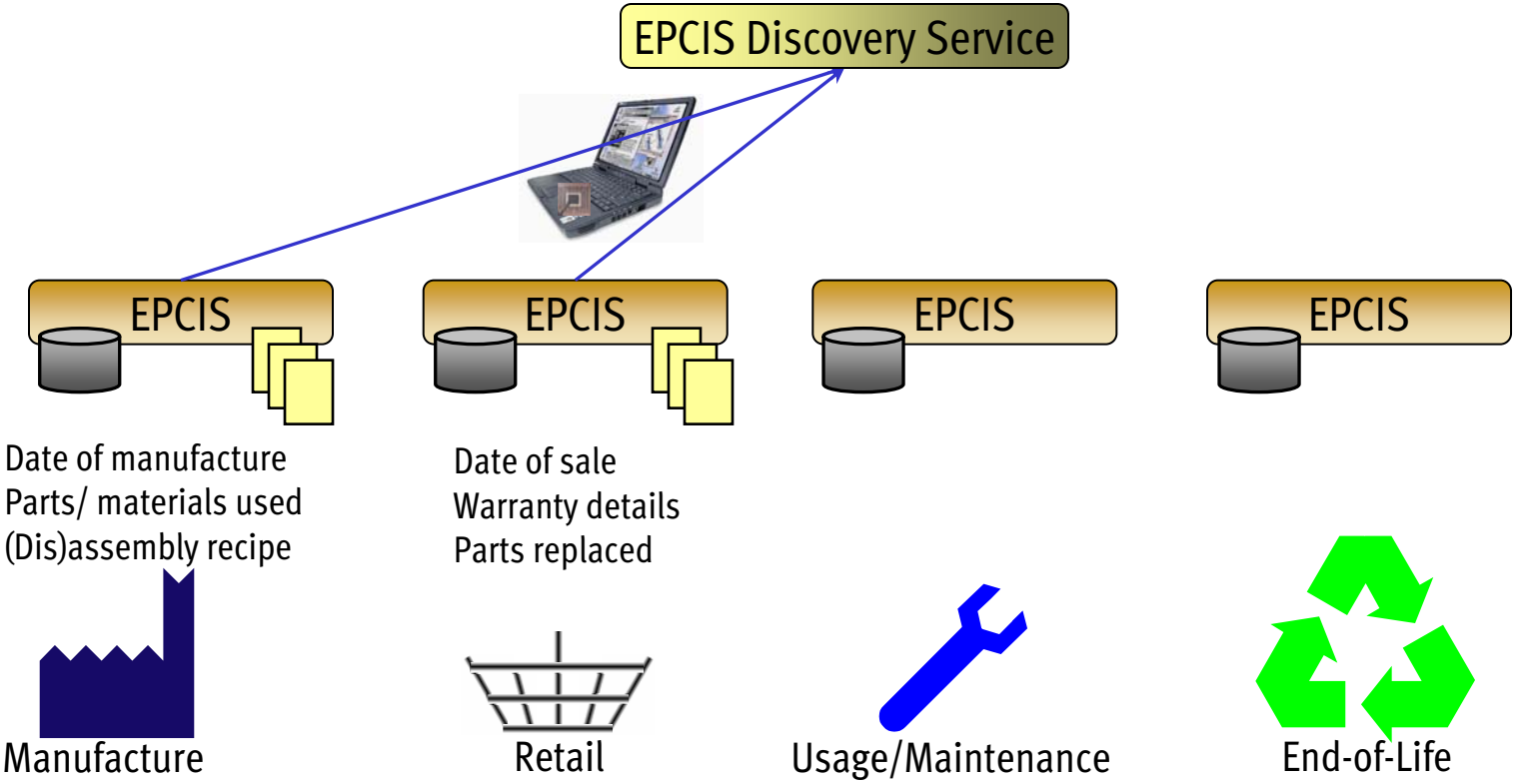
Networked RFID for Product Lifecycle Information Management



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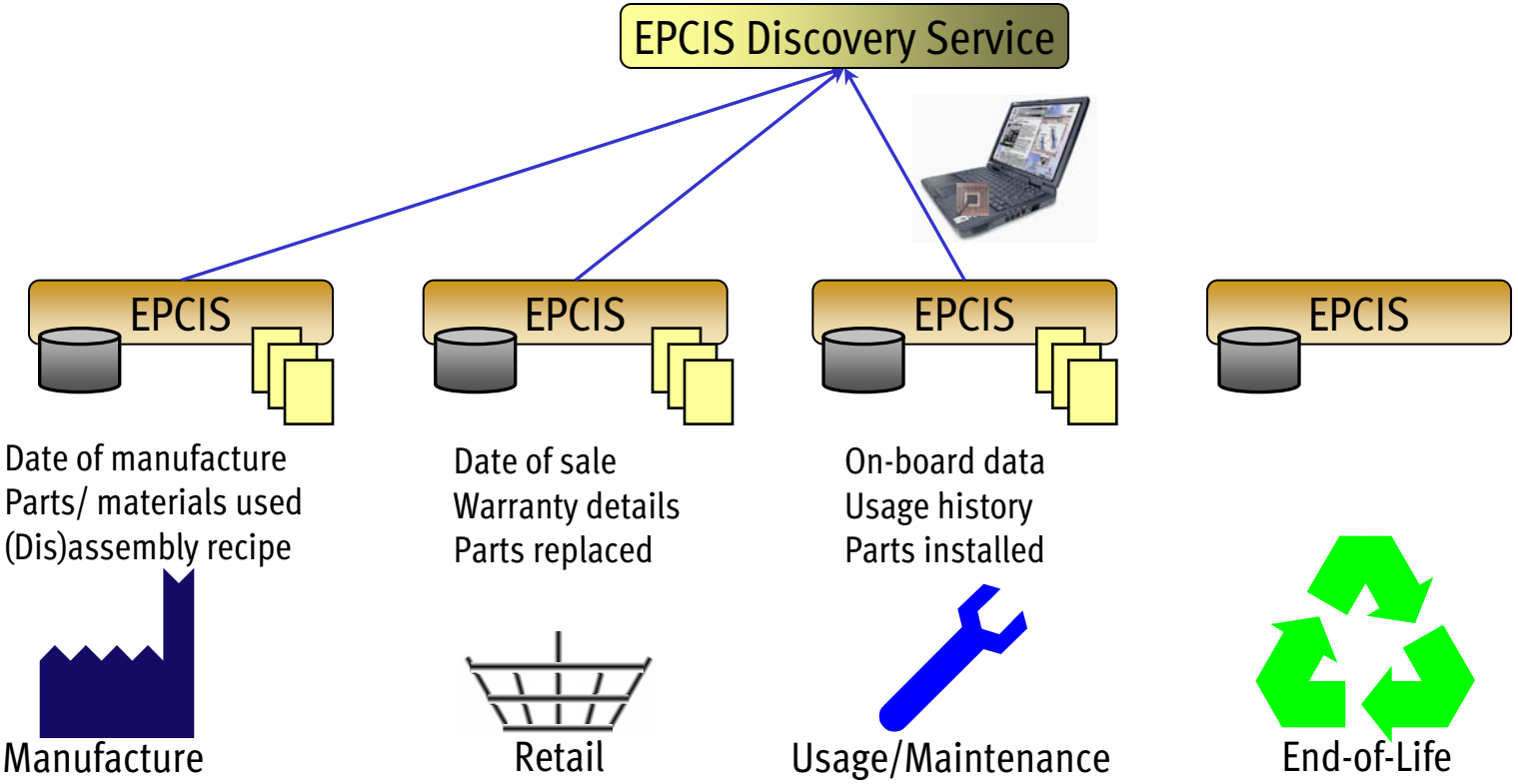

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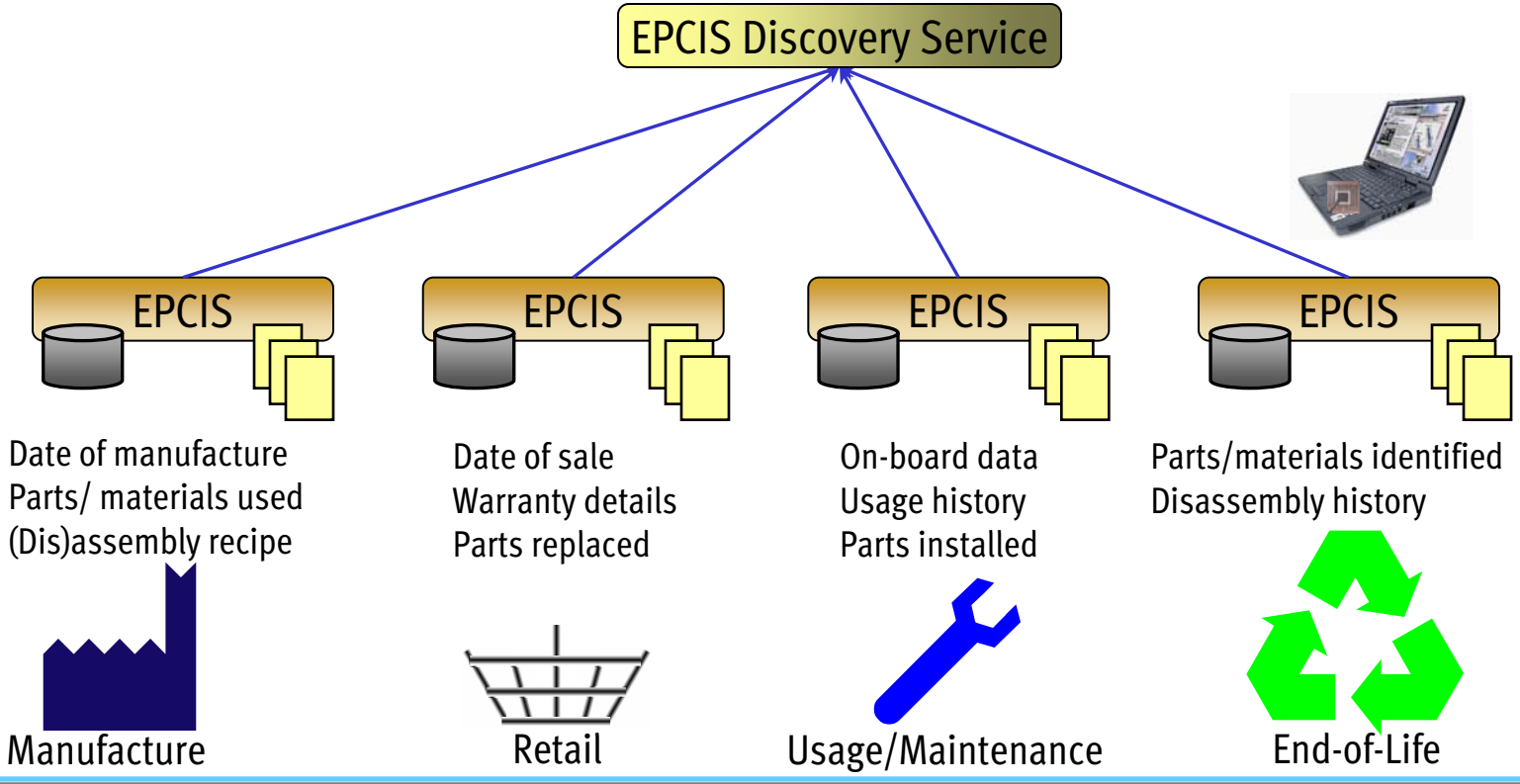

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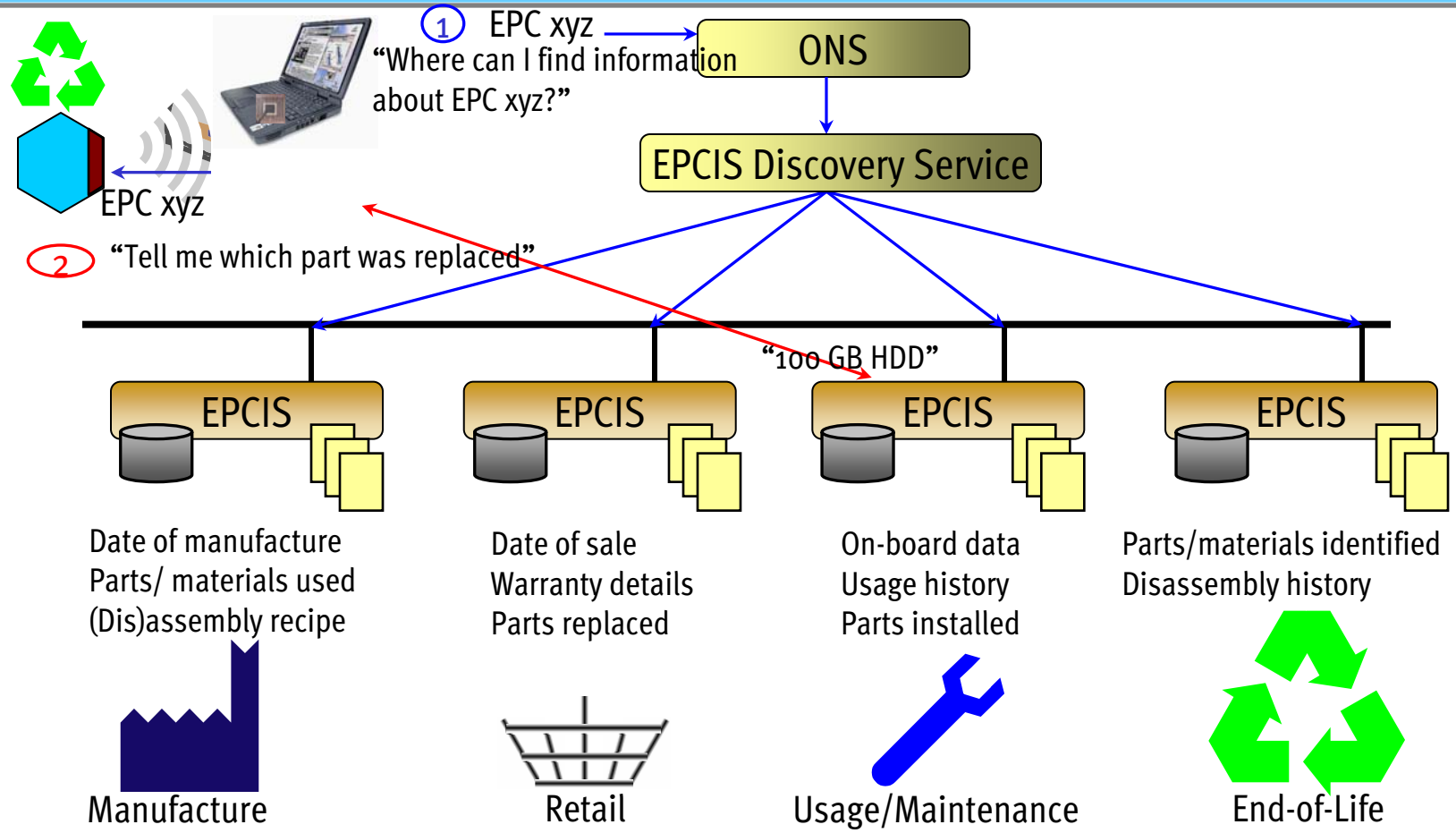

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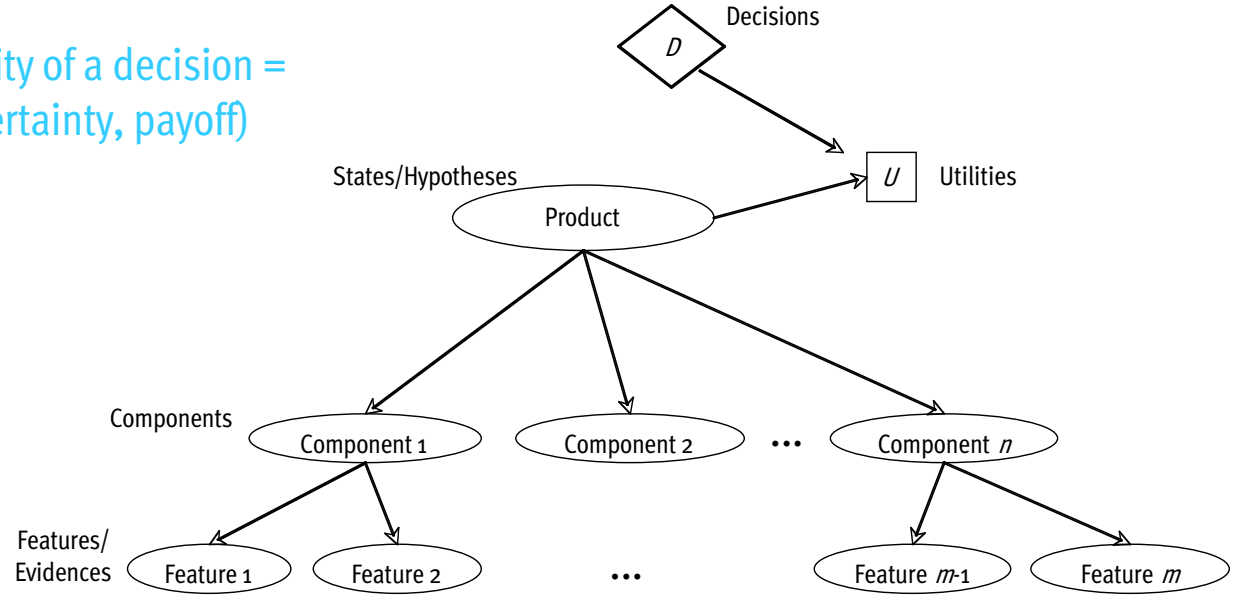
How to Quantify Value of Product Information

Mathematical Models are under development to quantify the impact of ready availability of product Information on Product recovery Decisions.

Example: A Bayesian product dispositioning decision model

Utility of a decision = *f*(certainty, payoff)



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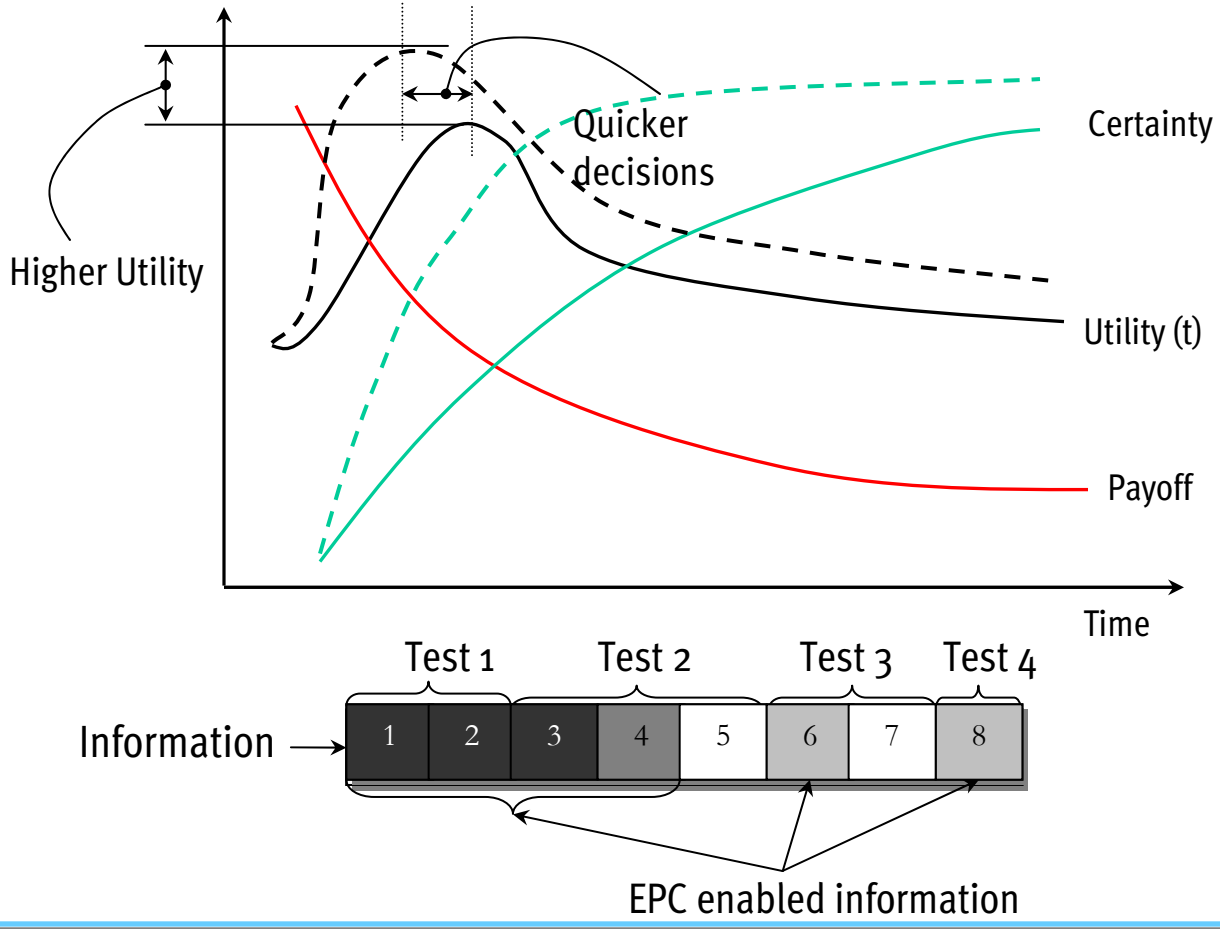
EPC ENHANCED PRODUCT RECOVERY DECISIONS



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CONCLUSIONS

Networked RFID based Approach has potential to bring:

- Decision improvements
  - Better estimation of residual life and value
  - Better estimation of recyclable material content
  - Rich information leads to better decisions
- Process improvements
  - Quick and possibly automated identification & sorting
  - Error reduction

Thank You

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