



**Hasso
Plattner
Institut**

IT Systems Engineering | Universität Potsdam

Seminar

Real-World Application in RFID Aided Supply Chains

Organisatorisches, Einführung in die Thematik und
Vorstellung der Projektseminarthemen

Agenda

- **Organisatorisches**
 - Rahmenbedingungen
 - Ziele des Projektseminars
 - Inhalte des Projektseminar
 - Auswahlprozess für die Projektseminarthemen
- Einführung in die Thematik

Organisatorisches

Rahmenbedingungen

- Verantwortlich: Dr. Alexander Zeier
- Tutoren: Martin Lorenz, Matthieu Schapranow, Jürgen Müller
- Ort: Villa, 2.16, Hasso Plattner High-Tech Park
- Zeit: Mittwochs, 11h00-12h30 (s.t.)
- 4 Semesterwochenstunden
- 6 benotete Leistungspunkte
- Einschreibefrist 27. April 2011

Organisatorisches

Ziele des Projektseminars

- Gesamtüberblick über das Themengebiet erlangen und das eigene Projektthema einordnen können
- eigenständiges Einarbeiten in einer Themenstellung
- spezielles Wissen im Projektthema gewinnen
- Projekterfahrung sammeln
- Präsentationstechniken aneignen
- Grundlagen des wissenschaftlichen Arbeitens erlernen

Organisatorisches

Inhalte des Projektseminars

- Vorstellung des Themengebietes "RFID in SCM"
- Einführung in wissenschaftliches Arbeiten
- Präsentationen der Projektgruppen zu projektrelevanten Themen

Leistungserfassung

- Projektergebnisse 30%
- Projektbericht / - dokumentation 30%
- Zwischen- und Endpräsentation 30% (10% / 20%)
- Wissenschaftliches Arbeiten und persönliches Engagement 10%

Besonderheit: ca. 60min Treffen pro Woche mit Betreuer

Organisatorisches

Auswahlprozess für die Seminarthemen

- verschiedene Themenvorschläge
 - Einschreibefrist: 27. April 2011
1. Für Projektseminarthemen bewerben
 - * Prioritätenliste abgeben
 - * Im Seminar oder per Mail an Martin
 - * Inhalt: drei priorisierte Wünsche
 - * Deadline: 21. April 2011, 16h
 2. Zuordnung von Projektteams zu Projektseminarthemen (21. April 2011)
 3. Bestätigung des zugeordneten Projektes (Deadline: 22. April 2011, 16h)

Soviel zum Organisatorischen!

Fragen?

Nun zur Einführung in die Thematik...

RFID



Basic RFID Tag (Passive Tag)

Power

- Passive tags are powered by the energy sent from radio waves to the tag from the reader.

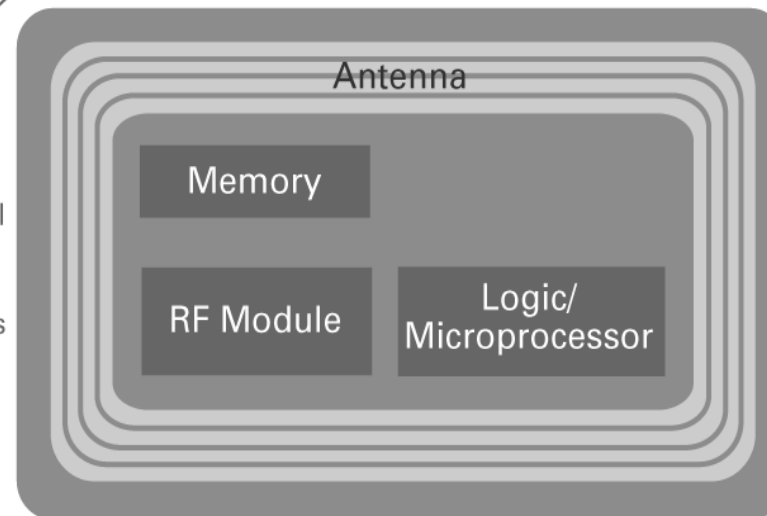


Antenna

- When the antenna receives radio waves in the right frequency, the tag uses the energy to wake up and respond by sending information to the reader.

Memory

- Passive RFID tags have small amounts of memory, usually only a few bytes, to store an ID number. Some passive tags have read/write memory.



Logic/Microprocessor

- The logic on the tag responds to instructions sent to the reader about what information to send back or how to manage collisions.

RF Module

- The Radio Frequency Module makes sense of the signal sent through the antenna and uses the antenna to send information back to the reader.

Smarter RFID Tag (Active Sensor Tag)

Antenna

- Antennas on active tags may be able to send and receive from greater ranges on many different frequencies.

Memory

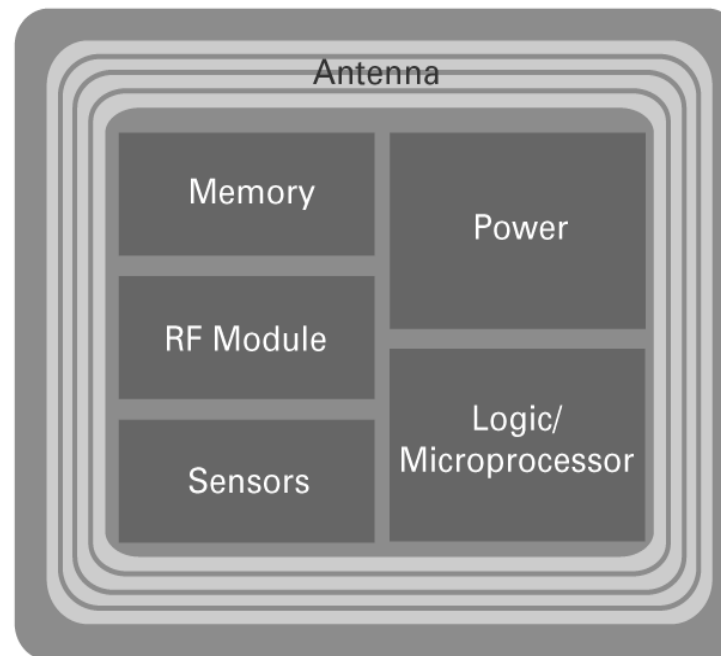
- Active RFID tags may have substantial amounts of memory to record data from sensors or data transmitted to the tag about the history of the tagged item.

RF Module

- The Radio Frequency Module of active tags may be able to receive and transmit on several frequencies.

Sensors

- Sensors enable active tags to gather more information about such quantities as pressure, temperature and vibration that may be related to the tagged item and its environment.



Power

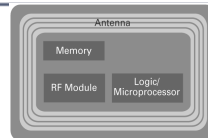
- Active RFID tags may have their own power source, a battery attached to the device or an external power source.

Logic/Microprocessor

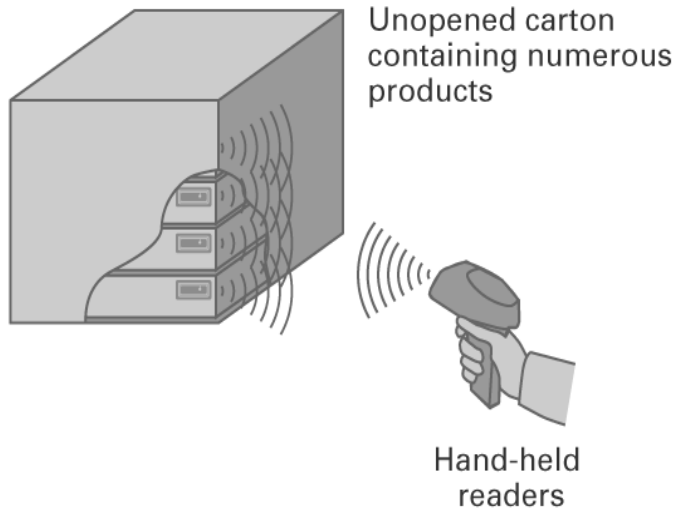
- Processing capability of active tags allows filtering of information collected by sensors, advanced collision management mechanisms, and a set of complex commands. This level of processing power allows the tag to act as an intelligent device and only report meaningful events. Some active tags have RFID readers in them.

Bar Codes Versus RFID Tags

RFID



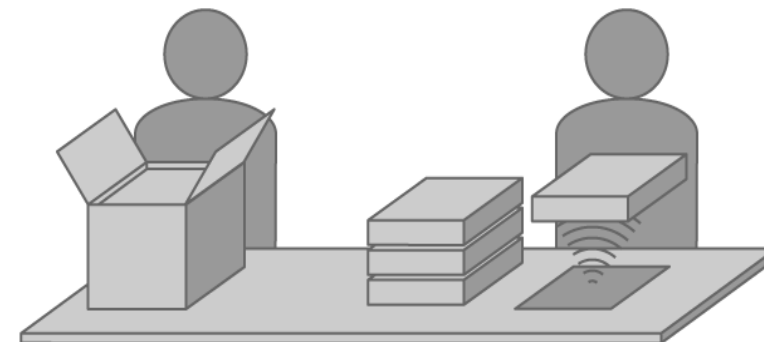
- No line of sight required
- Highly accurate
- Information captured in seconds
- RFID tags contain more information



Bar Codes



- Line of sight required
- Margin of error
- Time consuming
- Cost/labor intensive



1. Open carton and remove contents

2. Scan individual items

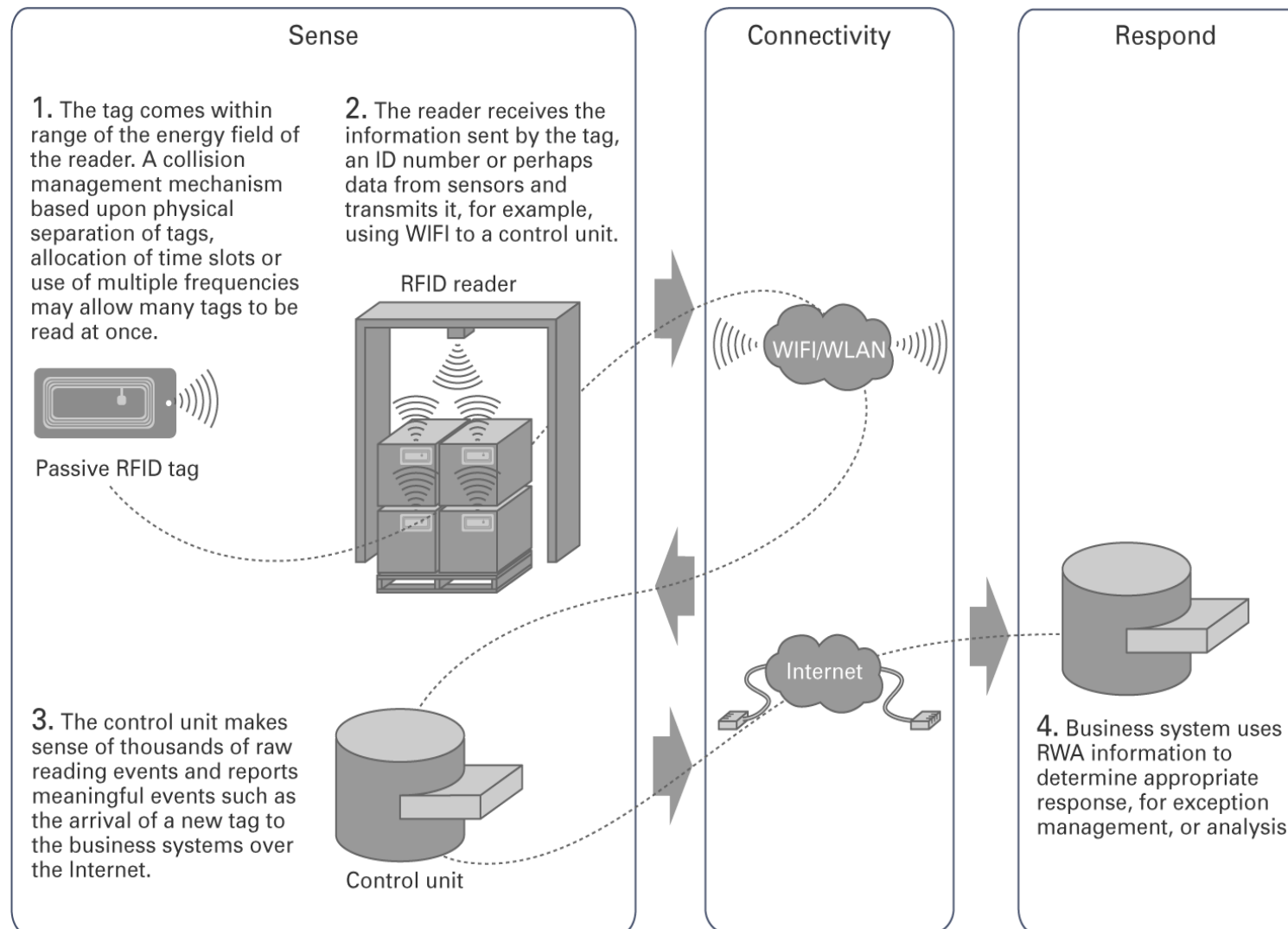
"Electronic Product Code" (EPC) – The emerging new global Standard

ELECTRONIC PRODUCT CODE

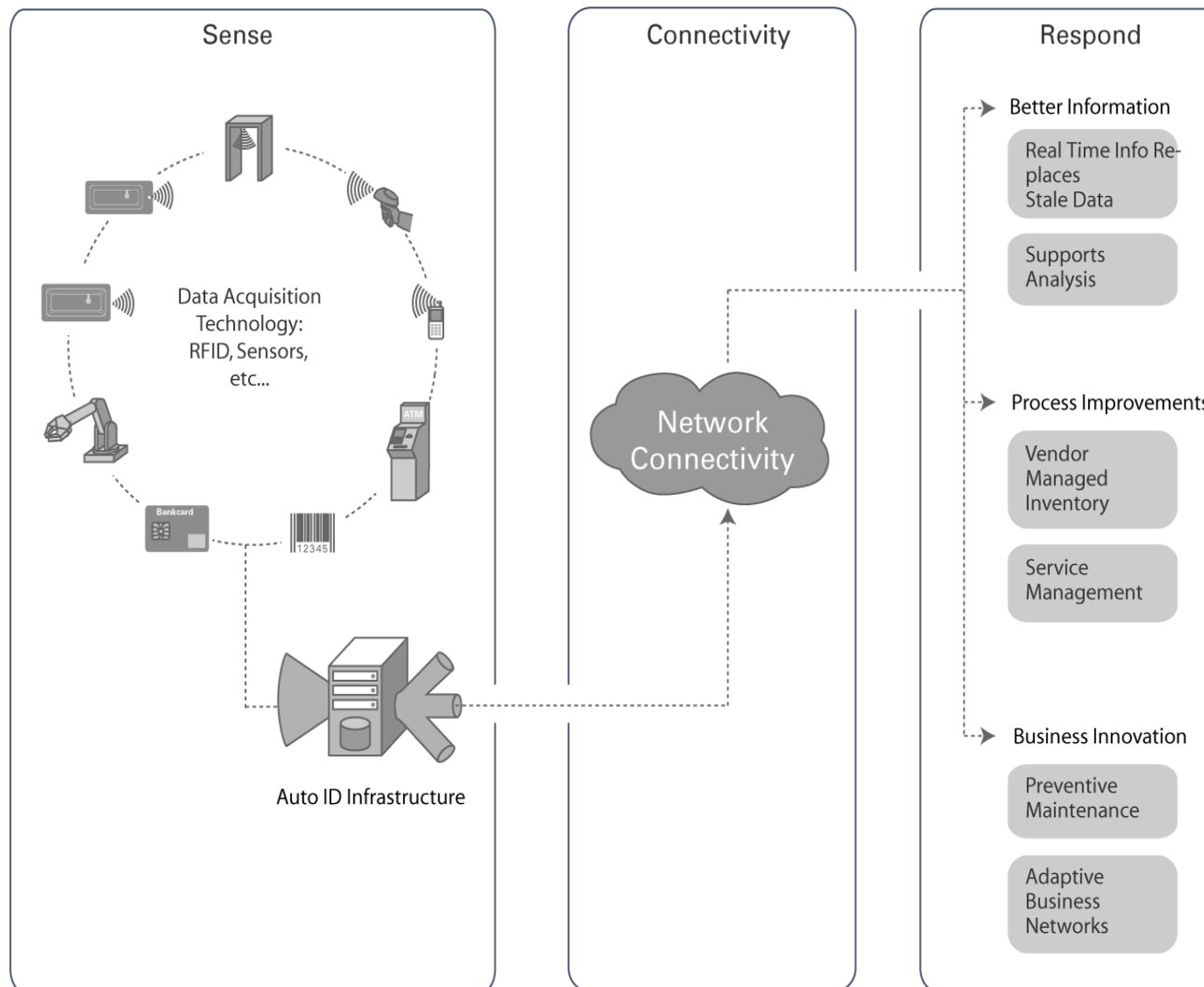
01 . 0000A89 . 00016F . 000169DC0

Header 0-7 bits	EPC Manager 8-35 bits	Object Class 36-59 bits	Serial Number 60-95 bits
--------------------	--------------------------	----------------------------	-----------------------------

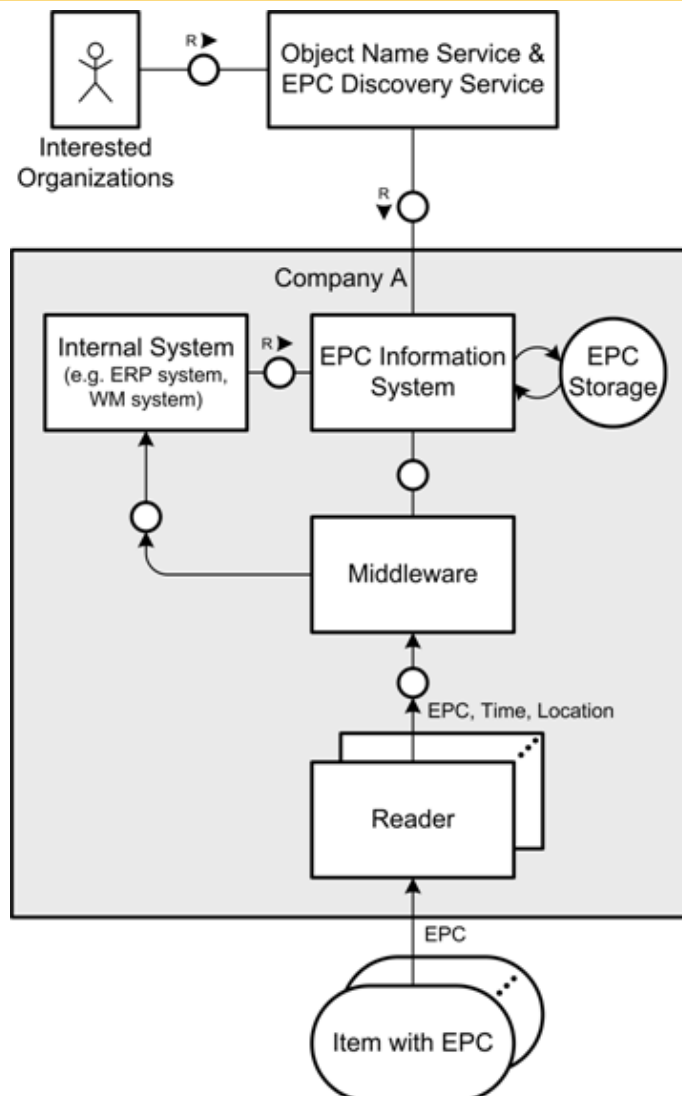
RFID Reader and Process



The Impact of RFID and RWA for Business Processes

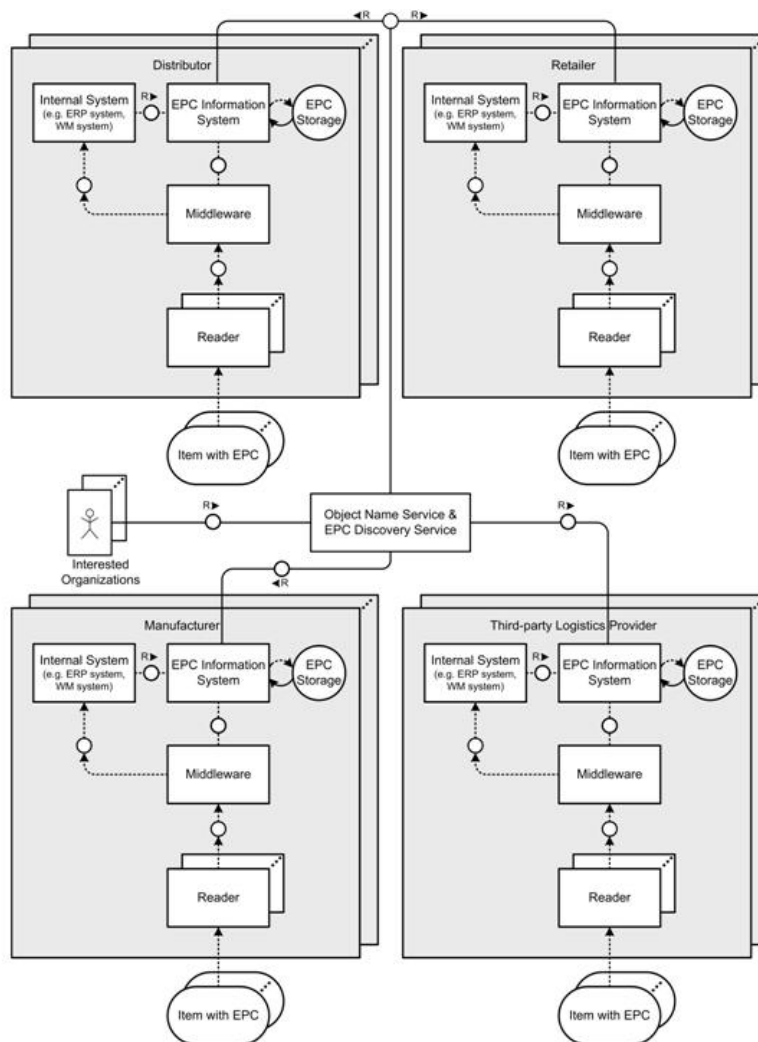


EPCglobal Network Architecture I / II



- Interfaces to other external companies
- Additional IT components
- Security of infrastructure
- Tremendous volume of incoming data
- Capacity limits of
 - Network links
 - Database systems
 - Processing power
 - ERP system

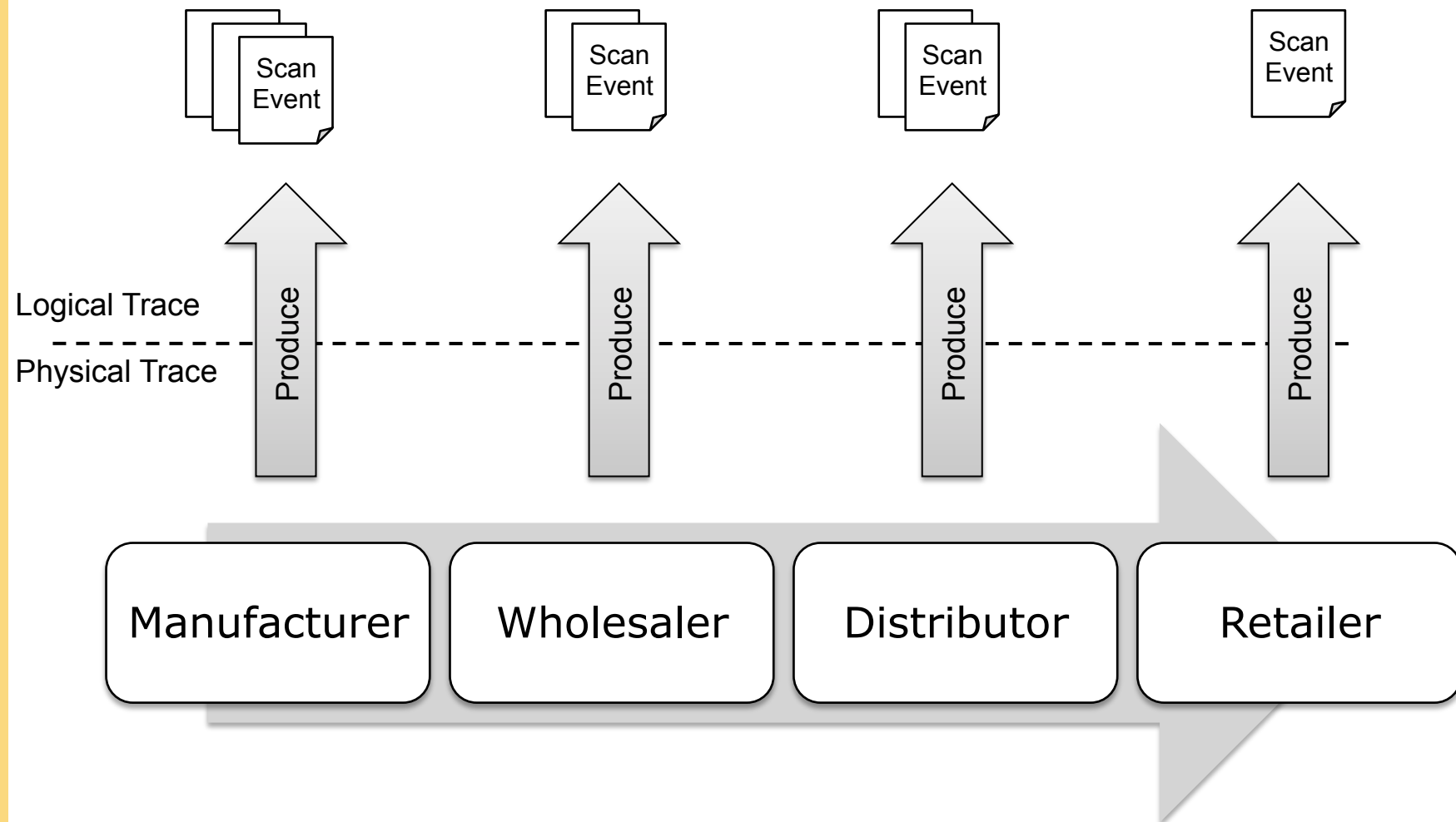
EPCglobal Network Architecture II / II



■ Issues

- Data exchange between supply chain parties
- Information retrieval from unknown resources
- Dynamic trust relations

Track & Trace



Vielen Dank für die Aufmerksamkeit!

Fragen?

**Weitere Informationen auf
[http://epic.hpi.uni-potsdam.de/Home/
RWainRFIDAidedSupplyChains2011](http://epic.hpi.uni-potsdam.de/Home/RWainRFIDAidedSupplyChains2011)**

(EPIC --> Teaching --> Bachelor Curriculum Summer Term 2011)

Soviel zur Einführung in die Thematik!

Fragen?

**Nun zur Vorstellung der
Projektseminarthemen...**

1. Betreuer: Martin, Jürgen

1. Eclipse RCP-based simulation framework (max. 3-4 Studenten)

2. In-memory data mining from RFID data sets (max. 3-4 Studenten)

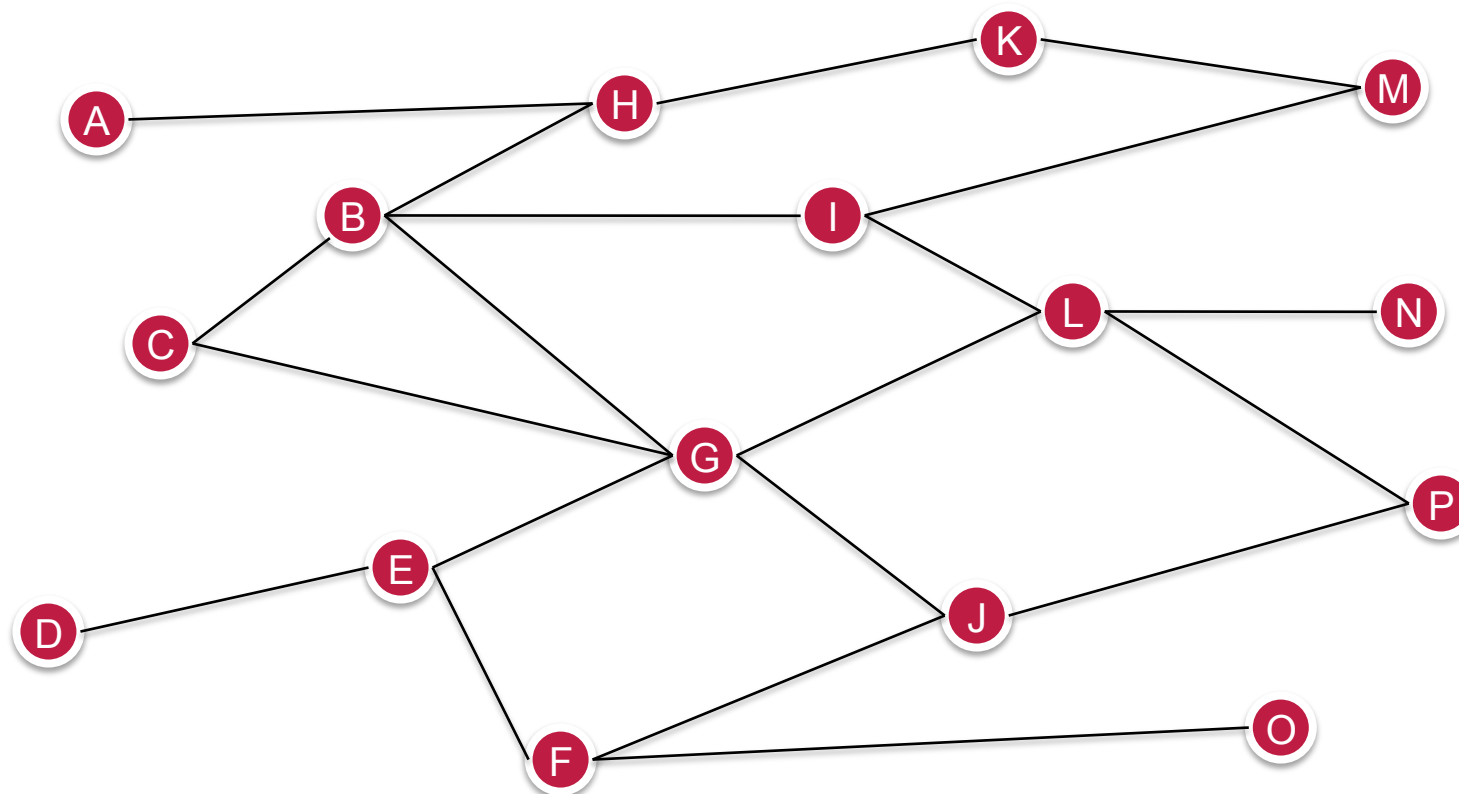
3. SAP OER on NewDB (max. 4 Studenten)

2. Betreuer: Matthieu

4. Management of fine-grained authentication details in EPC information service

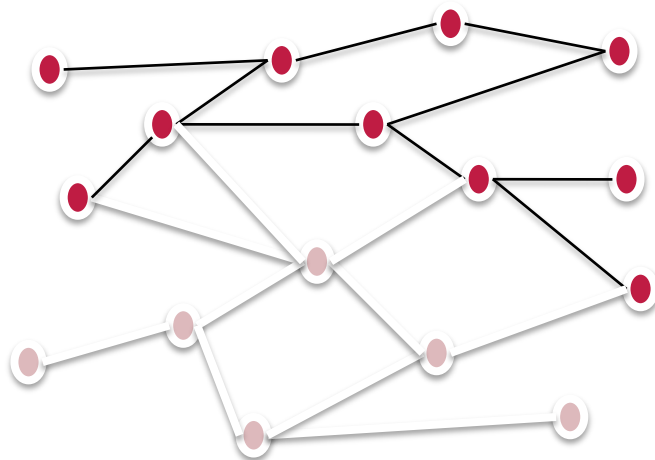
5. History-based access control for EPC information services

Supply Chain Structure:

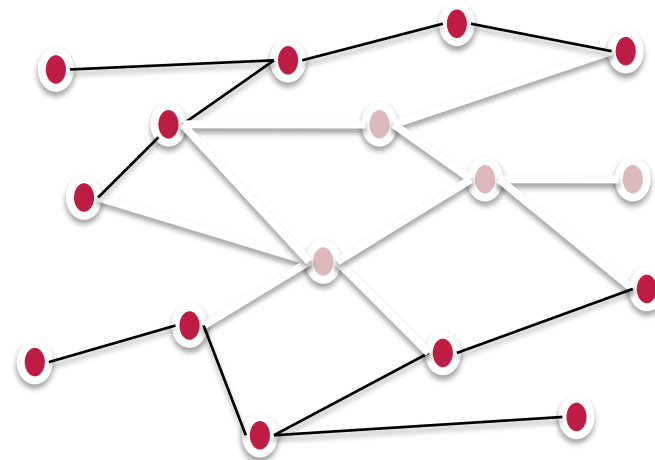


Supply Chains can vary among products

Product A



Product B



In-memory data mining from RFID data sets

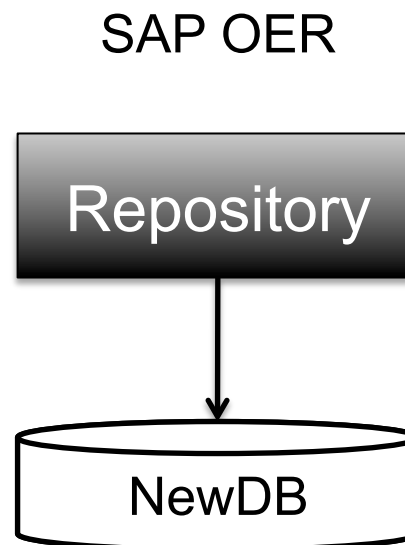


Eclipse RCP-based simulation framework



EPC Information Services on NewDB

NewDB aka. HANA -> SAP's High Performance Analytical Appliance



Management of fine-grained authentication details in EPC information service

- **problem:** what is an appropriate level of granularity for authentication of individuals, e.g. per company, per department, per floor, etc.
- **hypothesis:** the use of individual authentication details per supply chain participant can reduce impact of key exposure
- **tasks** to solve:
 - learn to work with and extend our fosstrak in-memory prototype
 - learn to measure and interpret benchmarks
 - show that in-memory technology is applicable for very fast key/license lookup
 - multiple key renewals per day are feasible
 - malicious clients can be blocked individually in case of disasters without affecting operation of remaining supply chain participants
 - implement key renewal with the help of in-memory prototype

Thema 5

History-based access control for EPC information services

- problem: classic access control builds on a static role concept
- hypothesis: analysis of query history can influence granted access rights in real-time
- tasks to solve:
 - learn to work with and extend our fosstrak in-memory prototype
 - learn to measure and interpret benchmarks
 - derive and analyze key performance indicators for access control in RFID-aided supply chains
 - proof applicability in real-world scenarios (pharmaceutical supply chain)