ID based UIs

(Physical & Tangible User Interfaces)

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Barcode

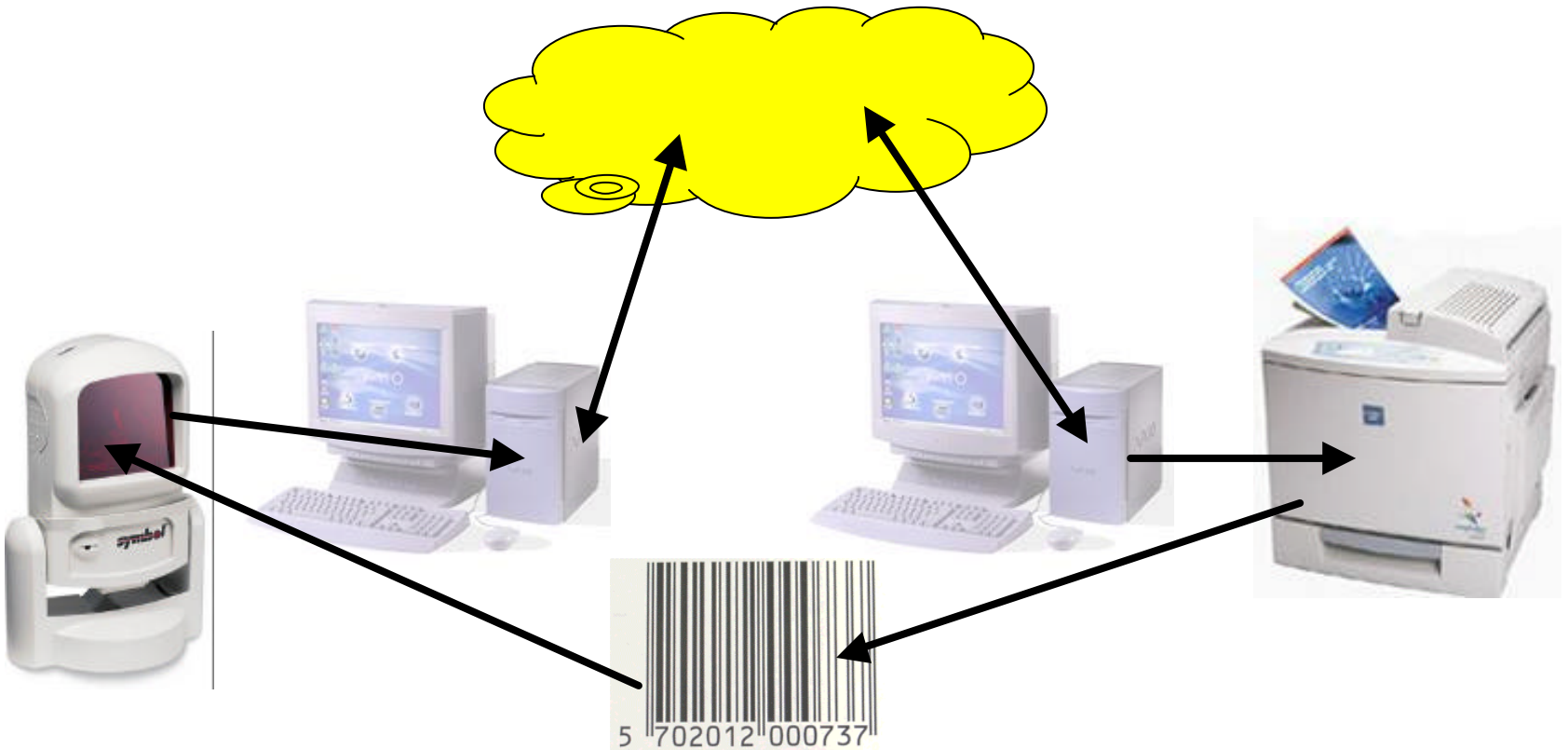
Creating Paper Interfaces components

- Barcode
  - Graphical identity code consisting of black bars of various thickness
  - Easy to create, cheap, easy to read
  - Line of sight
- Devices to read barcode
  - Connected via PS2, USB, serial
- Printers / Fonts

Creating Paper Interfaces architecture

- Networked Computers

- Barcode printer
- Barcode scanners

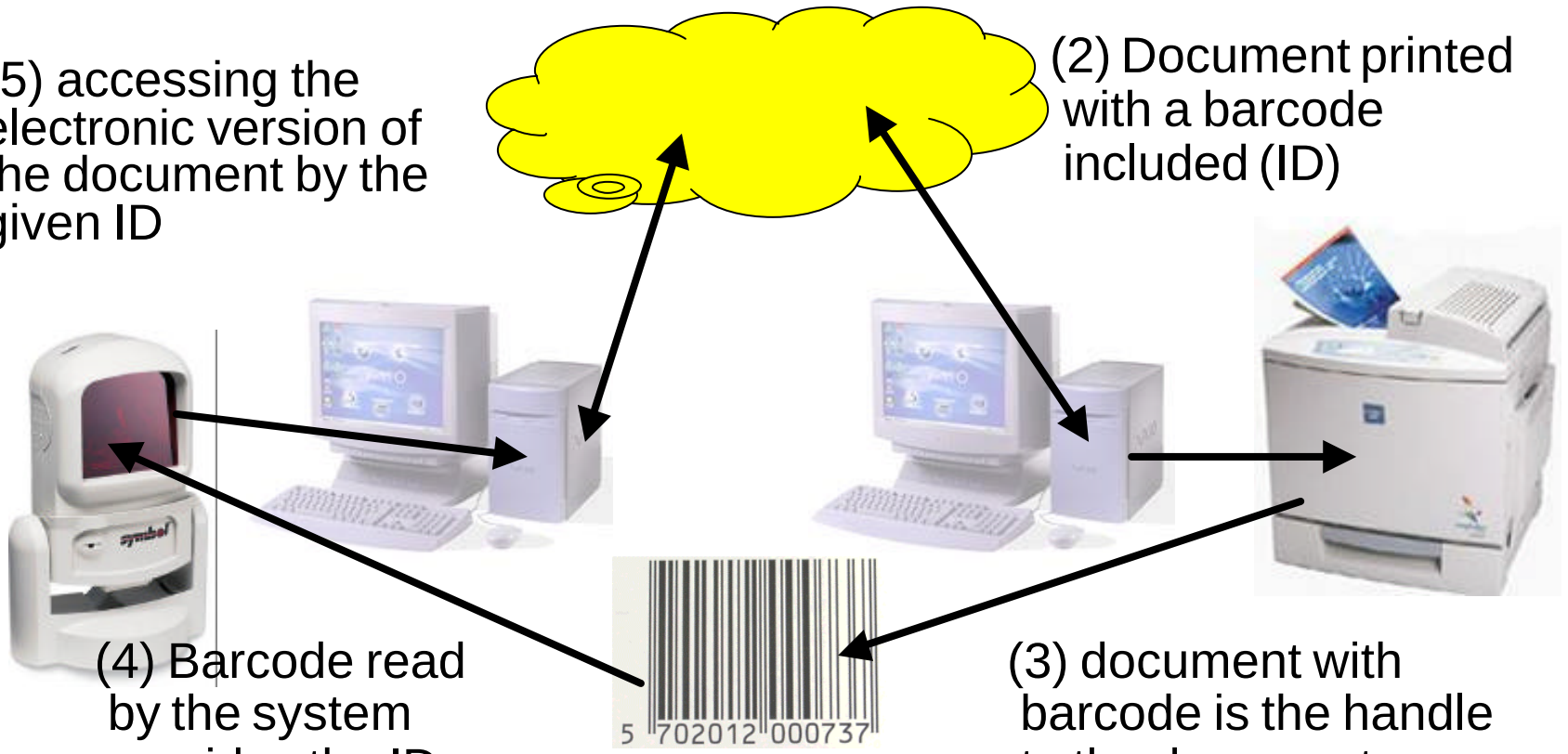


Creating Paper Interfaces Information

(1) Electronic version of the printout on a central server stored with that ID

(2) Document printed with a barcode included (ID)

(5) accessing the electronic version of the document by the given ID



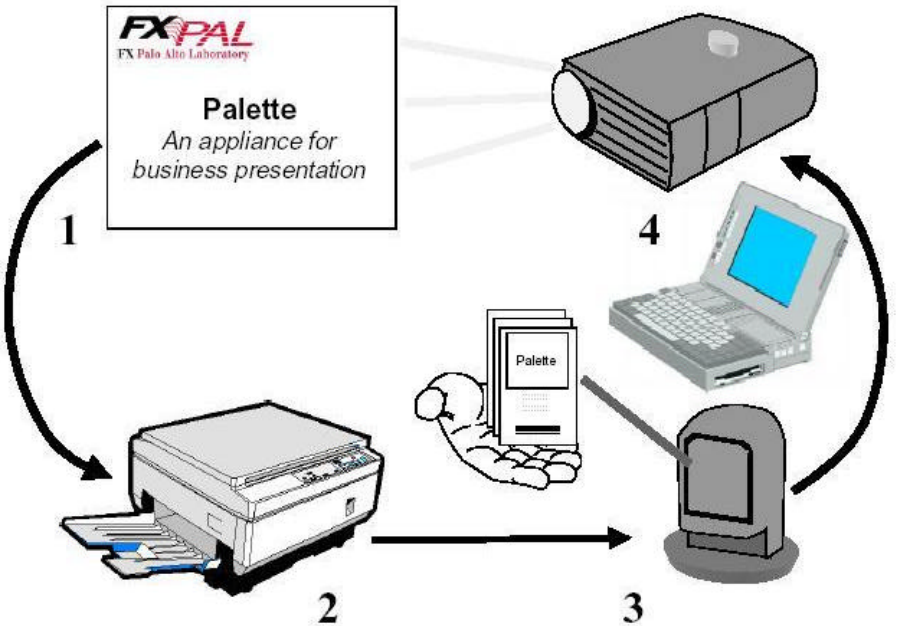
(4) Barcode read by the system provides the ID

(3) document with barcode is the handle to the document

Exercise – Paper based UIs

- Select one of the following tasks (time limit: 15 minutes):
  - … design a system that is using bar code technology for supporting presentations
  - … design a system that is using bar code technology for supporting mail order (catalog based) commerce

Creating Paper Interfaces
Example I



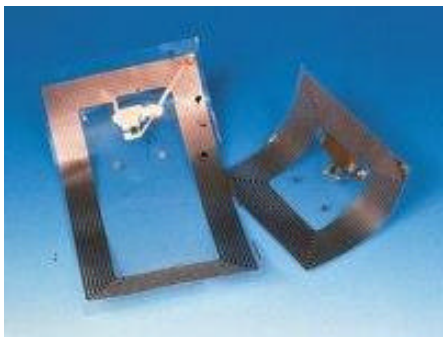
- **Nelson, L., S. Ichimura, E.R. Pedersen, and L. Adams. *Palette: a paper interface for giving presentations*. In Proceedings of CHI: Conference on Human Factors and Computing Systems. Pittsburgh, PA: ACM Press. pp. 354361, May 15-20, 1999.**

Creating Paper Interfaces
Example II: Cue Cat

- Adverts with barcode
- E-commerce via paper catalog
- …gone!

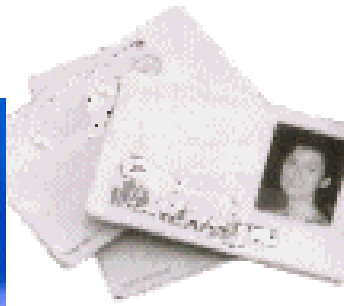
RFID Based Systems

RFID Based Systems Basics



- Electronic identity code within a single chip and read by a near electro-magnetic field
- Cheap, robust, secured by crypto algorithms
- No line of sight needed,
- Collision detection / multiple readings possible
- Various frequencies: 125Khz – 2.4 GHz

- RFID tags
  - active (tag includes battery powered radio)
  - passive (tag is suppled during the reading process with energy, no battery)
  - identifers (read-only)
  - memory (read-write)
  - Can be use on or within objects (subjects)
  - Reading range: ca. 2cm to 3m (passive tags)

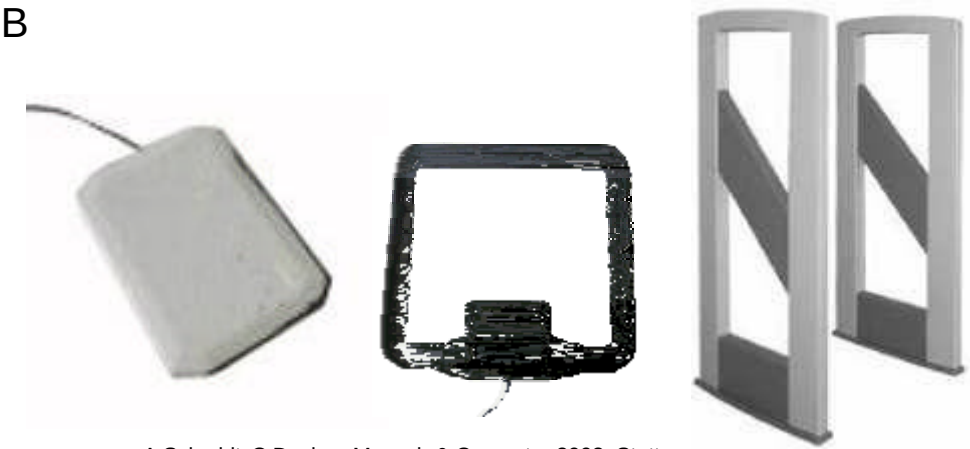


- to uniquely identify objects or persons
- to store data (small amount)

RFID Based Systems
Readers

- Communicate with the RFID tags
- Reader component and antenna
  - integrated in buildings (e.g. locks)
  - mobile devices (standalone or add-ons)
  - devices connected to PCs
  - embedded into objects
- Connection to the host device
  - Bus
  - Serial line, USB
- Antenna
  - Integrated
  - Panels
  - Gates
  - Custom

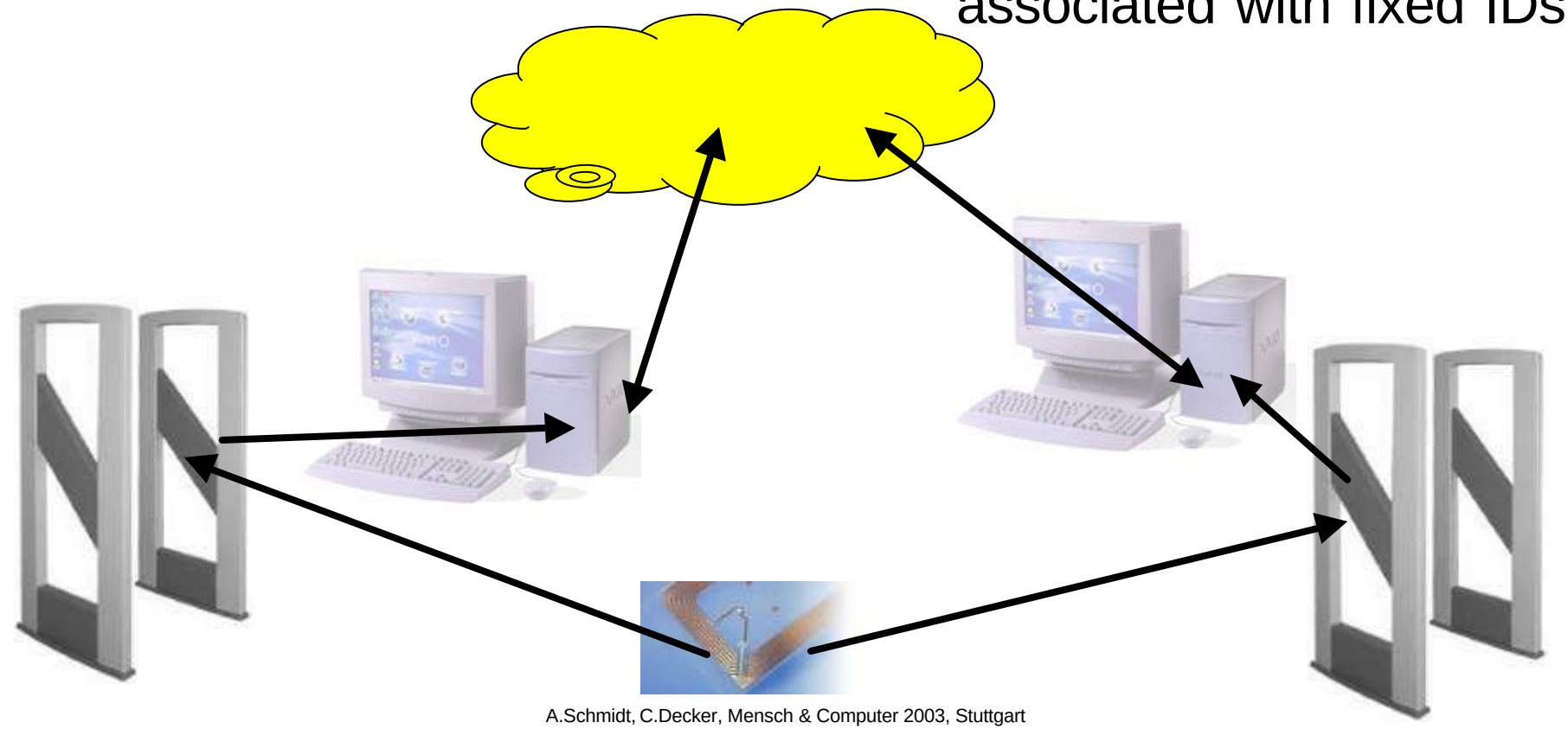
ET-WS



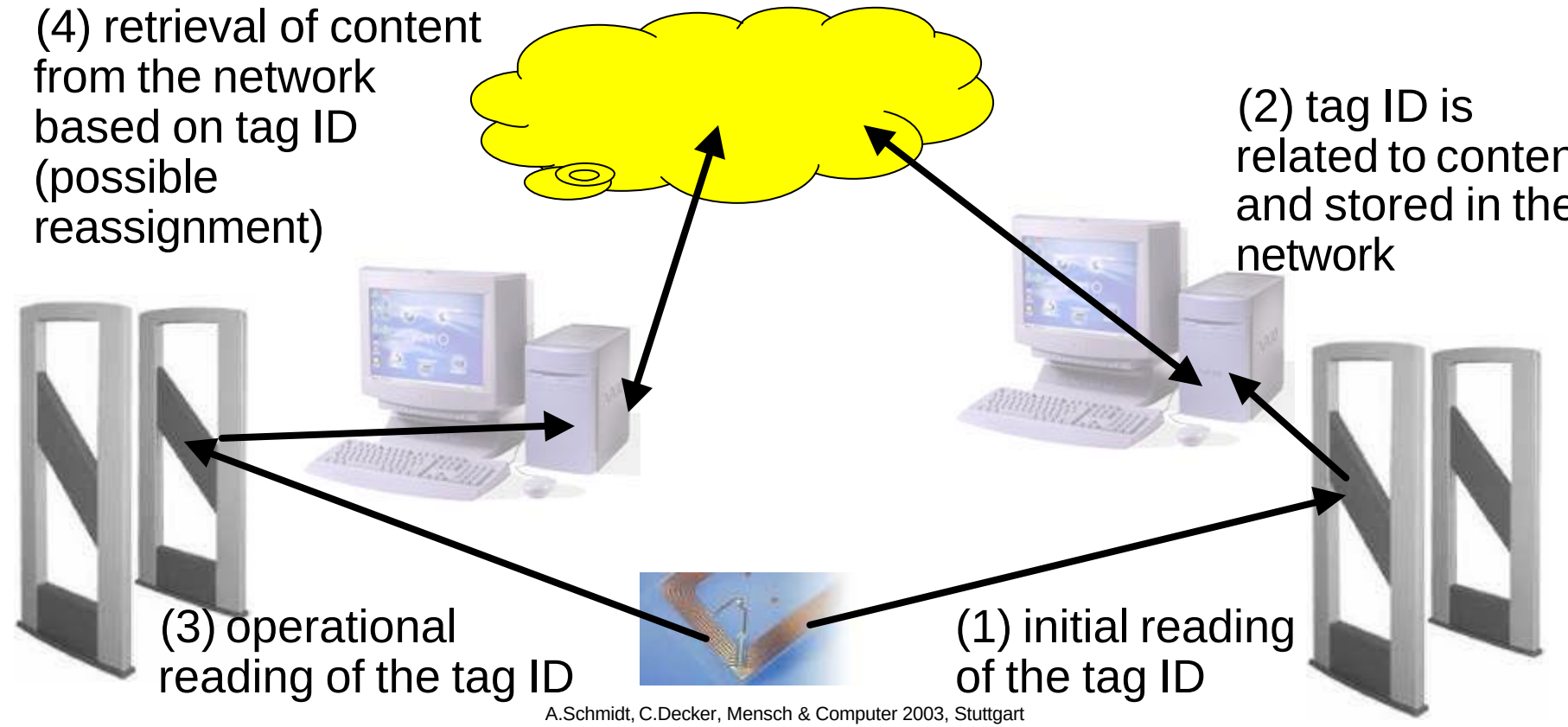
RFID Based Systems architecture (read only)

- Networked System

- Tags are only read
- Information is associated with fixed IDs

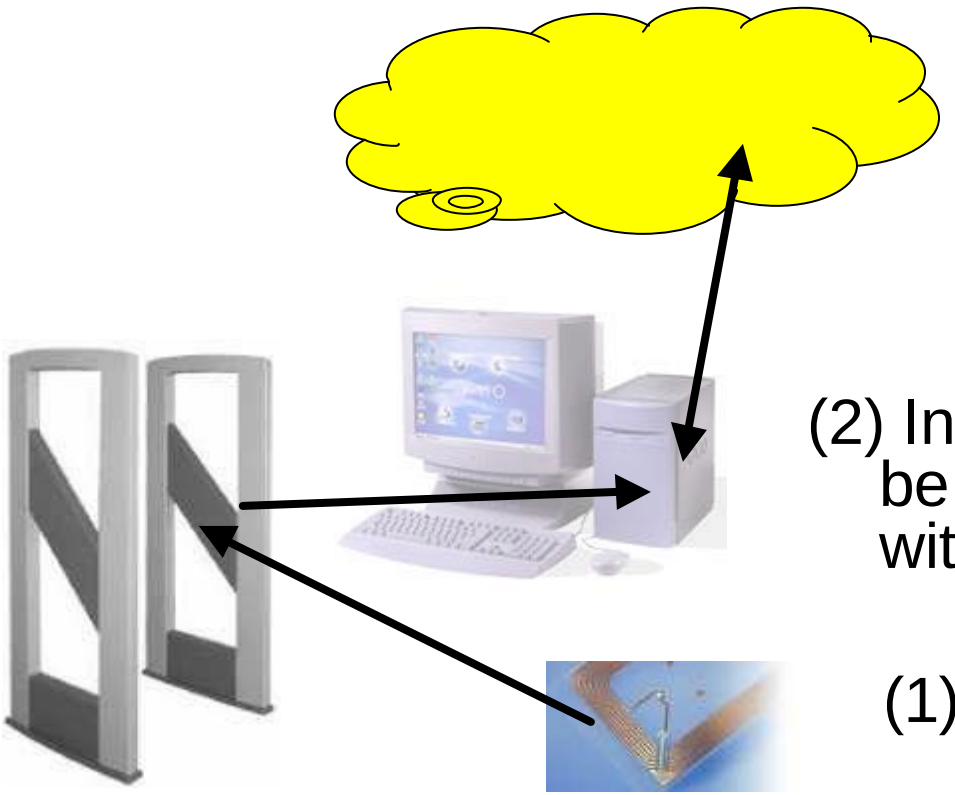


RFID Based Systems architecture (read only)



RFID Based Systems architecture (read/write)

- Tags can store information



(3) Content may be stored in the network

(2) Information may be associated with the tag

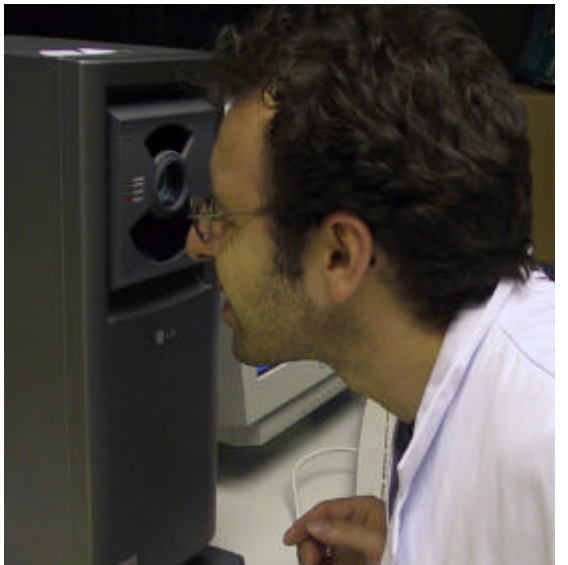
(1) Tags are read and written

Exercise – RFID based UIs

- Select one of the following tasks (time limit: 15 minutes):
  - … design a system that is using RFID tags and handheld readers (PDA with reader add-on) to create a explorative game for young museum visitors
  - … design a mirror for a fashion shop that advises customers on their choice of garments. (Assumption all garments have an RFID tag included)

Biometric Sensors

- to identify individuals
- examples
  - fingerprint
  - retina scanner
  - voice recognition
  - face recognition
- prime use in security & access control
- may also be interesting for other forms of interaction



Break