



RFID

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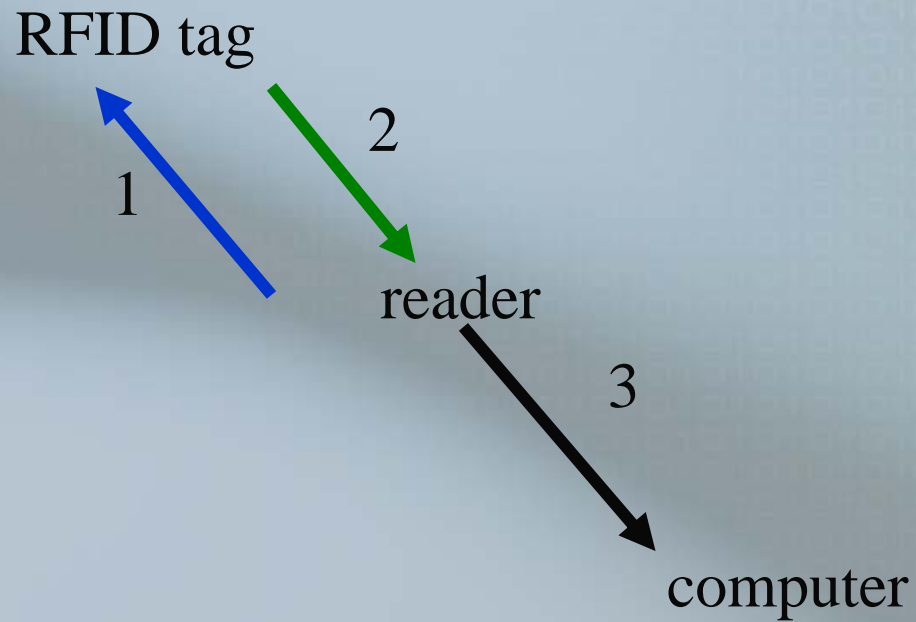
Radio Frequency Identification

- **R-F-I-D** (also "are-fid")
- automatic identification method to store and remotely retrieve data from transponders
- RFID tag (transponder): contactless integrated circuit that may be read remotely

Widely used

- inventory tracking
- drive through toll booths ("Fastrac")
- passports
- door lock systems
- car keys
- ...
- library book management and security systems

How RFID works



Library book check-out

book and borrower card



scanner

3



library system



check-out record



Library RFID

- check-out and check-in
 - easy self-check
- exit security
- record of item use in library
 - scan when re-shelving
 - accurate record of overall use
 - “no guess” collection management

Many types of systems

- active or passive
- long or short read range
- secure or non-secure
- one use or repeated use

- **Do not assume that functions apply to all systems**

Focus: library systems

- 13.56 MHz
- passive

computer chip and antenna



Laws of physics

- RF signal causes inductance in antenna sufficient to power transmission from chip
- passive 13.56 MHz cannot be read from more than 1 meter



RFID tags on school children

- elementary school – Sutter, California
- ID cards for each student
- readers in doorways
- automatic attendance record
- without parental permission

Outcome

- American Civil Liberties Union
- Electronic Frontier Foundation
- California Senator Simitian
 - Senate Bill 682
 - would prohibit RFID for all California government operations

SB 682 would prohibit RFID

- card keys
- “Fastrac” drive through toll systems
- hospital patient tracking
- library cards



Why?

- stalker “captures” library card ID #
- uses RFID readers to track movement
- false assumptions based on confusion re specific technology
 - presumes ability to hide many RFID readers connected to unified system
 - information gained is meaningless

Why?

- government agent “captures” library card ID number of suspect
- later scans crowd at demonstration and records suspects
- false assumptions based on lack of knowledge
 - passive 13.56 MHz has 1 meter read limit

Technology paranoia

- be wary of social issues
- understand how technology works
- be articulate in stating intended uses



Library book RFID data

- library system identification number
- same as “bar code number”
- could add author, title, etc.
 - would require different system, e.g., active (battery in book RFID tag)



Library borrower card

- library system identification number
- essentially random
- no personal information
- easily change ID number if card is stolen



Beware of “standards”

- library systems typically use 13.56 MHz passive RFID
 - data format
 - checkout status on RFID server
 - checkout status passed to library system server
- technically possible to migrate but might require substantial programming

Limited RFID library use: why?

- RFID tags in books
 - research libraries: large collections
- RFID library cards
 - public libraries: many users
- Expense means very few libraries can justify RFID library cards and books

Unique opportunity

- University of California, Merced
 - no security system
 - new book collection
 - small user base
- positioned to understand
 - details of technology
 - implications of SB 682
- “expert” by default