Craig Thompson
University of Arkansas, Fayetteville, AR

LANMAN, Princeton - June 11, 2007

cwt@uark.edu
Computer Science and Computer Engineering Dept., University of Arkansas
311 Engineering Hall, Fayetteville, Arkansas 72701
Everything is Alive

a world where everything can sense, act, think, feel, communicate, and maybe even move and reproduce. This might include equipment, vehicles, robots, toys, clothing, pets, and objects such as trees and walls.
University of Arkansas
RFID Research Center

Fully student staffed with 24 industry members, which recently became the first open test laboratory to be accredited by EPCglobal Inc.
Wal-Mart and Blue Cross Blue Shield funded center aimed at HC Logistics

- Largest U.S. industry at 15% of GDP & rising
  - Growing at 3 times inflation due to aging population, epidemic of chronic disease, advances in powerful but expensive technology
  - Costs impacts every household, industry & level of government
- Up to 30-40% waste, massive under-investment in IT, 90K annual deaths from preventable medical errors, 20% of tests lost & repeated, minimal continuity of care within the provider network, only half receive best-practice care, rampant perverse economic incentives, ...
**TagCentric RFID Middleware**

- Developed Ubiquity Agent System
- Developed TagCentric RFID application in Java
  - 4 reader types supported: Alien, Symbol, Thingmagic, and “Fake”.
  - 1 Tag printer supported: Zebra
  - 5 databases supported: DB2, Derby, MySQL, Oracle, Postgres
- TagCentric Open Source Toolkit available on SourceForge
- Next Steps (end of summer; longer term)
  - Low Level Reader Protocol (LLRP) - Java library developed, TagCentric Agent in progress, Rafidi simulator in progress
  - Item Level RFID Asset Management for Apparel
  - TagCentric Scalability
Soft Controller for Smart Device
Menu Based Natural Language I/F Plugin

- Predictive menu to guide user to correct sentence
## Security Threats to Identity

<table>
<thead>
<tr>
<th>STRIDE* Category</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spoofing</td>
<td>Cloning ID card, replay</td>
</tr>
<tr>
<td>Tampering with data</td>
<td>Change biometric, modify or delete database entry</td>
</tr>
<tr>
<td>Repudiation</td>
<td>Deny boarding plane</td>
</tr>
<tr>
<td>Information disclosure</td>
<td>Skimming ID card, eavesdropping ID card, information in database(s)</td>
</tr>
<tr>
<td>Denial of service</td>
<td>Jamming, access to database</td>
</tr>
<tr>
<td>Elevation of privilege</td>
<td>Upgrade privileges</td>
</tr>
</tbody>
</table>

Many Puzzles Remain

- Item level Tagging
- Mobility
- Cold chain and sensors
- SNMP vs. XML
- Universal plug and play, composability & MDE
- Querying collections of agents
- Policy languages
- Security, visibility, digital rights for agents
- Simulation
- Open source