Standards for RFID Systems in Australian Libraries

What does it all mean and why should you care?

ALIA Conference - Perth WA, September 2006

Discussion outline

- Introduction to RFID standards & Benefits
- What the RFID standards don’t cover
- What is being done to close the gaps
- Goals of the Standards Australia working group
- Progress to date and next steps

Standards Bodies

- Standards may be set at many levels
  - International
  - National
  - Industry or trade association
  - Individual organisation
- Two areas of standards activity in RFID
  1. International Standards Organisation (ISO)
  2. EPC Global / GS1 - GDSN
     - Global Electronic Product Code for consumer goods
     - The “Internet of things”

ISO Standards in Libraries

ISO 15693

3 Part standard defining parameters for vicinity RFID cards
- Started in 1995 - first published in 2000
- Three parts:
  - Physical Characteristics
  - Air Interface
  - Communication Protocol
- Established standard - received broad acceptance
- Some experts felt it didn’t address all the issues
ISO Standards in Libraries

**ISO 18000 family**

*Parameters for air interface communications (builds on 15693)*

- ISO 18000 - Part 1 Generic Parameters
- ISO 18000 - Part 2 Communications below 135Khz
- **ISO 18000 - Part 3 Communications at 13.56 MHz**
- ISO 18000 - Part 4 Communications at 2.45 GHz
- ISO 18000 - Part 5 Communications at 5.8 GHz
- ISO 18000 - Part 6 Communications at 860-930 MHz
- ISO 18000 - Part 7 Communications at 433.92 MHz

ISO Standards in Libraries

**Benefits of HF (13.56 MHz) for the library application**

- Widely adopted by libraries already
- Operates at 13.56 MHz internationally - global solution
- Excellent immunity to environmental noise & interference
- Reliability of bulk tag reading
- Less affected by human body shielding - used for EAS security
- Small tag size
- Appropriate reading range
- Low cost tags and readers
- Harmonised regulatory environment - global application
- Ideal for item level tracking
- Supported by many suppliers of RFID tags and readers

ISO Standards in Libraries

**Review**

- ISO 15693
  - Except for part 1 (smart card physical specification)
- ISO 18000-3 (communicates at 13.56 MHz)
  - Libraries use Mode 1
  - Mode 1 compatible with ISO 15693

ISO Standards in Libraries

**Where do the standards fit?**

```
Library system
```

```
<table>
<thead>
<tr>
<th></th>
<th>Item identifier</th>
<th>Item data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>Bibliographic data</td>
<td></td>
</tr>
</tbody>
</table>
```

```
ISO 15693 & ISO 18000-3
```

```
RFID Tag
```

```
Antenna Memory
```

ISO Standards in Libraries

**What are the benefits?**

- **Purchasing**
  - ISO tags are available from a range of suppliers
  - Not locked into purchasing from a single supplier
  - Cooperative purchasing possible

ISO Standards in Libraries

**What don’t the standards cover?**

- **The Tag Data Model**
  - What specific data is written to the tag
  - How the data is arranged on the tag
  - The data encoding standard
  - The item security methodology
- **Privacy and data security mechanisms**
What are the implications?

- No interoperability between systems
  - Adjacent systems with ISO tags - cannot be read
- Reprogram tags when swapping vendors
  - Tags require reformatting to suit new vendor
- Difficult to mix & match equipment
  - Self serve loans devices
  - Self Serve returns devices
  - Hand held devices

RFID system for libraries

- Database
  - Item identifier
  - Item data
  - Bibliographic data
- Interrogator
  - Antenna
  - Memory
  - ISO 15693 & ISO 18000-3

RFID Data Model for Libraries

- Provides a structure in which to place data
  - The format of the data fields
  - The arrangement of the data fields
  - Specifies how the data will be encoded
  - Specifies the methodology for item security
  - Specifies what is mandatory vs optional

Danish Data Model

Three part prescriptive data model

<table>
<thead>
<tr>
<th>Metadata elements</th>
<th>Mandatory Part</th>
<th>Structured Extension Part</th>
<th>Unstructured Extension Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item data elements</td>
<td>Primary item ID</td>
<td>Alternate item ID</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Library data elements</td>
<td>Country or owner library</td>
<td>Extended owner library</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Application data elements</td>
<td>None</td>
<td>Media format</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Supplier data elements</td>
<td>None</td>
<td>Item identification</td>
<td>Not Defined</td>
</tr>
</tbody>
</table>

Mandatory Part | Structured Extension Part | Unstructured Extension Part

- AFI
  - Standard Version
  - Type of Usage
  - CRC
  - Not Defined

- Not Defined
- Not Defined
- Not Defined

Danish Data Model

Prepared by a Data Model

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Prescriptive models - problems

- Difficult to gain agreement about data elements
- Very limited flexibility
- More appropriate for local needs than international use
- Large mandatory part may not suit all libraries
- Can be inefficient in some applications
- Truism: prescription begets more prescription

Finnish Data Model

<table>
<thead>
<tr>
<th>Metadata elements</th>
<th>Mandatory Part</th>
<th>Structured Extension Part</th>
<th>Unstructured Extension Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFI</td>
<td>CRC Standard Version Type of Usage</td>
<td>CRC</td>
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</tr>
<tr>
<td>Item data elements</td>
<td>Primary item ID Number of parts Ordinal part no.</td>
<td>Alternate item ID</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Library data elements</td>
<td>Country of owner library Owner library</td>
<td>Extended owner library</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Application data elements</td>
<td>None</td>
<td>Media format</td>
<td>MARC Media Type</td>
</tr>
<tr>
<td>Supplier data elements</td>
<td>None</td>
<td>Item identification Order number Invoice number</td>
<td>Not Defined</td>
</tr>
</tbody>
</table>

Goals of the Working Group

- To articulate the issues involved
- To understand what is being done internationally
- To study the Danish Data Model proposal
- To isolate any unique Australian factors
- To provide feedback & proposal through IT-019
- To act as a resource within the library community

Working Group Proposal

- To create a data model with maximum flexibility
- To lay a foundation for full interoperability
- To present a realistic project for vendor implementation
- To use existing standards where possible
- To mandate the minimum of data
- To allow for future technology or market changes
RFID system for libraries

Proposal advantages
- Creates a standardised Data Model
- Provides great flexibility for library customisation
- Provides a path towards open RFID systems
- Enables vendors to stage the implementation
- Mandates a minimum of data (item ID & security)
- Easily upgradeable - new objects may be added
- Allows for technology changes

Australian Data Model

Next Steps
- ISO ballot close October 12th - International project
- Standards Australia to submit working group’s doc.
- Standards Australia have nominated a National Expert
- First ISO meeting - Copenhagen December 1st 2006
- International standard for a data model to be developed
- Australia will decide if it is suitable for national use

Standards for RFID Systems in Australian Libraries

What does it all mean and why should you care?

To obtain a copy of the handouts from this presentation visit www.sybis.com.au