Library RFID standards: complying with ISO 28560-2 and the UK data model

by Mick Fortune and Simon Edwards

1.   Introduction

This brief report is designed to ensure that implementations of RFID systems in UK libraries comply with the new ISO standard for tag structure and content, ISO 28560. The hope is that all UK libraries, which have or intend to have RFID tags in their books, will use a common standard which will enable their RFID tags to be read correctly on any RFID hardware in any UK library. This will enable libraries to use hardware from more than one supplier and, if required, to self-issue a book in one authority and return it to another. The UK RFID industry has agreed to adopt part 2 of the standard (ISO 28560-2) and a UK data model developed by the BIC/CILIP RFID in Libraries Group which specifies the mandatory, conditional and optional fields in the standard. This can be found here.

2.   Reasons for producing this report

This report has been produced because there is some uncertainty in the market about whether new RFID implementations are compliant with the standards. Given that the standards are new and that publication of the ISO 28560-2 standard on which the UK data model is based has been severely delayed, libraries implementing solutions or about to go out to tender need to know where they stand. The following points may help:

1. The publication of ISO 28560 has been seriously delayed. There is no doubt, however, that it will be approved at ballot and we are assured that there will be no further technical changes which will affect the contents of the standard. Most suppliers will already have access to the Final Draft International Standard and this should be sufficient to enable them to start to develop compliant solutions with immediate effect.

2. Solutions can only be compliant if the data on the RFID tags is encoded to (another standard) ISO 15962. There also needs to be a process of compliance testing to ensure that tags really are compatible and can be read by different hardware. The RFID Alliance, which comprises all the major suppliers, has agreed to undertake an ongoing programme of mutual RFID tag testing so that as far as possible all tags will be compliant.

3. The UK data model which is the UK's recommended subset of ISO 28560-2 has been published and agreed by the RFID Alliance and virtually all RFID suppliers but there are still two outstanding issues which are in the process of being resolved:

    -   A non-circulation flag is needed to enable self-checkout to be suspended when the link to the library management system is not operational, for example to prevent a DVD with an '18' certificate being issued to a minor. A change request has been submitted to the ISO working group to allow additional values in element 5. These are: (i) circulating item, not for issue

while offline, (ii) circulating item, not for return while offline and (iii) circulating item, not for issue or return while offline. Once these values have been confirmed this will be the requirement to comply with the standard. This change request is expected to be agreed by ISO shortly.

- The level – authority, branch library, or possibly even consortium - at which the required ISIL (International Standard Identifier for Libraries) is assigned. This is a mandatory element in the data model. The BIC/CILIP RFID in Libraries Group has resolved that this will vary between implementations according to circumstances and the level should be decided on the merits of each situation.

4. Some library authorities have reported that they have been told that their new implementations are fully compliant. This is hard to accept for the reasons given above and because there is as yet no test for compliance. It is very important that libraries understand what they are getting and whether it is compliant, if they want to avoid unnecessary future conversion costs. In one case, a tagging contractor has indicated to BIC that they have not updated their software which does the programming on to the tag, even though the supplier says that their tags have recently become compliant. This may all be a matter of interpretation of what is understood by compliant. For example, a supplier could call their tags compliant even though they have no data on them, but they would not actually be compliant with 28560-2 and the UK data model unless the tags contain the three mandatory fields. Libraries need to be aware of this full compliance issue and protect themselves by obtaining a strong commitment to compliance from their suppliers.

5. To be fair, RFID suppliers should be fully capable of converting tags fairly easily in the future if they do not conform to the standard at present but this is unnecessary extra work and could be avoided by developing the tags to the standards upfront, encoding the data correctly, ensuring that the mandatory fields are populated and that an ISIL is used. Some RFID suppliers may be capable of building a conversion process into their issue or return solution. This could check each tag issued or returned and re-format the tag to the correct standard, adding the OID index and an ISIL for the issuing authority. If this functionality is accurate and reliable then this would make the conversion process almost automatic.

3. How to be compliant

Full compliance with ISO 28560-2 requires adherence to the specifications set out in ISO 28560-1 in addition to those specified by ISO 28560-2. (Again 28560-1 has not yet been published so suppliers may be working to various draft versions.)

Security data
The use and values to be set for security purposes and for the use of ISO/IEC 18000-3 Mode 1 RFID Tags is covered in some detail within the Compliance documentation produced by Paul Chartier and Paul Sevcik for the ISO working group. Suppliers can find this document [here](#).

Data Encoding
The following is a précis of the requirements for compliance in a form that should help non-technical interested parties. (These might include library customers of RFID and sales and marketing teams within RFID suppliers etc.)

There are two initial features that require an explicit declaration of whether they are supported, based on the **types of RFID tags** that are supported:

- Declare whether the encoding process is capable of encoding a soft-coded DSFID, where a separate DSFID memory and commands are not supported by the RFID tag.
- Declare whether the encoding process is capable of selectively locking the soft-coded DSFID if used on the tag and specified to be locked by the user.

These are followed by these **mandatory** requirements:

1. Full compliance with ISO 28560-1 data elements.
2. Support for the selection of a sub-set of data elements to comply with a national data model (e.g. the UK data model), by the further selection (or de-selection) of optional data elements.
3. Ability for the library to specify the sequence of data objects for a given scenario, so that the most important data objects are encoded in the lowest numbered memory blocks. This ensures optimum performance.
4. Support variable length data input where this is permitted by ISO 28560-1 and ISO 28560-2.
5. Validate input data objects to comply with ISO 28560-1.
6. Automatically construct the OID Index (Content Parameter) if called for by the application and encode this in the correct second position as defined in ISO 28560-2.
7. Prevent changes in the encoded data that would breach the ISO 28560-2 standard, specifically:
    7.1 Avoid the removal of Relative-OID 1 (Primary Item Identifier);
    7.2 Avoid a change from position 1 of Relative-OID 1 (Primary Item Identifier);
    7.3 If encoded, avoid a change from position 2 of Relative-OID 2 (Content Parameter – OID Index).
8. ***Encode data to the ISO/IEC 15962 rules called out in ISO 28560-2.***
9. ***Exclude ISO/IEC 15962 encoding rules not specified in ISO 28560-2, for example access methods [encoding schemes] not referred to in ISO 28560-2.***
10. Encode data to the specific ISO 28560-2 rules, for example the ISIL, OID index (Content Parameter), and Set Information.
11. Correctly format the encoding when a data set is specified by the user to be locked, including the implications for adjacent data sets.
12. Provide or record a message when the intended encoding exceeds the memory capacity of the RFID tag.
13. Encode data such that a potential data overflow issue is resolved without permitting the partial programming of any data element on the tag.
14. Optionally, provide or report messages for any input errors.

Points 8 and 9 in bold type may be where the industry is currently having the most difficulty especially involving the encoding to ISO 15962.

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