SIP and the BIC Library Communications Framework

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What is the BIC Library Communications Framework?

It is a new standardised protocol to manage and facilitate electronic communication of library activity between library management systems (LMS) and unconnected remote systems operating in libraries, typically those running radio frequency ID technologies. It is completely independent of any specific manufacturer or product. Full details can be found at http://www.bic.org.uk/e4libraries/16/INTEROPERABILITY-STANDARDS/.

What is SIP and why are we where we are?

It was back in 1989 that 3M produced one of the first library self-service units, which they exhibited at that year's IFLA conference in Paris, and which was linked to a Dynix LMS. It took four years for 3M and other LMS companies to develop a solution that would enable them to work together. Many attempts were made to solve the problem. 3M offered a 'certification' programme that would reassure buyers that their self service solution would operate effectively with their LMS. The LMS companies had to pay 3M for the certificates of course. Many years later Talis tried a similar approach with their 'Talis Bridge' product by offering the RFID suppliers the chance to pay for certification from Talis that their products would work together. The wheel had turned full circle.

Two years into 3M's original self-service offer they had realised that building solutions (certifying) every supplier in the world was going to be unsustainable in the long run. What had begun as a simple transaction of barcode data had – in response to demands from both librarians and LMS suppliers – become a much more complicated business. More data was required to drive the additional functionality that could now be provided via self-service and that often made each new implementation unique.

3M's answer – in 1993 – was to create SIP, the Standard Interchange Protocol: a single protocol, with a limited number of elements, which would provide a minimum level of support for self-service operations regardless of supplier. Whether 3M's original intent had been to allow other self-service providers to use their protocol is unclear but by 2006 – when the last major version (2.0) was released - almost all self-service operations were using SIP as their communications protocol and 3M had generously donated the product to a grateful library world.

SIP 2.0 brought in new elements to support fees and fines, plus some other minor changes but it did nothing to address what was by then becoming a major problem – extensions.

With so many suppliers seeking to differentiate themselves from their competitors the limitations of the original SIP protocol with its restricted number of elements was a problem. Much of the data

required to drive functionality was unsupported by SIP and both LMS and an increasing number of other third party suppliers wanted to find a way to make the protocol work harder.

3M's answer was 'extensions'. With extensions any supplier could add elements to their implementation of SIP to deliver the functionality they wished to provide. In effect SIP stopped being the *de facto* 'standard' it had been at this point. Basic operations like issue and return were still supported across all platforms in the same way but more sophisticated operations – like renewals - often used extensions to deliver additional information and functionality.

What was the alternative?

As early as 1999 the National Information Standards Organization had produced a draft for a new circulation protocol to replace SIP. The first draft explicitly states that this new protocol – to be called NCIP – '*…will also support the deployment of self-service applications by building on experience obtained from the broad use of the 3M SIP'*.

That was twelve years ago. NCIP has never really fulfilled its promise or potential for self-service although it has been very effective in the USA in supporting other operations like consortial borrowing and inter-library loans (ILL).

Why do we need another protocol?

By 2011 RFID had arrived – in the UK at least - and both LMS and RFID suppliers were feeling some frustration at the slow pace of development of new functionality – this time for a much wider range of activities than self-service. During the negotiations on establishing a national data standard at the BIC/CILIP RFID in Libraries committee in London a recurring theme surrounded the limitations being created by the industry's dependence on SIP – and what could be done about it.

Both NISO and 3M were contacted to explore the possibility of BIC undertaking to draft a new communications protocol for LMS/RFID (and other third party) integration. There was no wish to reinvent the wheel but many suppliers had already taken matters into their own hands (as they had in 1989) and were busily developing new protocols to replace SIP. Most of these were based on web services, and all of them are entirely proprietary. Libraries were once again facing the technology 'lock-in' that SIP had been created to overcome 22 years earlier.

3M and NISO sent encouragement and good wishes but little else. In January 2011 BIC announced its intention to develop a new communications framework to improve and standardise RFID/LMS integration.

One month later 3M announced SIP 3.0.

In March 2011 BIC published the first draft of its new Interoperability Standard and explained their purpose:

BIC has commissioned of a new set of library interoperability standards, which define a framework for the communication of data between self-service devices and other library terminal applications to and from library management systems. This framework replicates and extends the range of activities commonly conducted using 3M's open SIP.2 protocol and additionally provides web services functionality for the exchange of information.

It is anticipated that further functionality will be added over time, as new requirements are identified by libraries and by their management system and terminal application developers and suppliers. Support for additional functionality in the areas such as stock management is under consideration.

Since then work on version 1.0 has been completed and the new protocol – with considerable assistance from the RFID industry's leading developers, and written by Francis Cave, an expert systems designer with years of experience in the book trade – was offered free of charge to LMS companies in the hope that they would be prepared to adopt it in preference to continuing development of their proprietary solutions.

As always with standards, adoption is governed by commercial benefit; and although it is clear that there is huge gain to be had for all parties through having a neutral communication protocol in place, it will require an act of faith for individual companies to make the first move. The LMS companies have indicated that they would only be prepared to use the new protocol if the market demands it; and in this case the market constitutes libraries, which on the face of it stand to gain least from standardisation.

So why should libraries demand the new protocol?

Libraries are increasingly investing in RFID solutions to provide self-service circulation and deploy advanced stock management functionality. These solutions need to talk to their LMS to be able to interpret loans policies and identify stock accurately.

Early RFID implementations managed this communication using the SIP2 protocol. But SIP2 only offers a limited and partly unregulated dataset, and some recent solutions rolled out by RFID suppliers are no longer SIP2-compatible as they need additional data to provide additional functionality.

Various alternative standards have been discussed but none that meets the needs of RFID suppliers have yet been published - until now. BIC has taken the initiative and developed a non-proprietary communication framework that can be deployed via an API or web service and which incorporates all the known SIP2 functionality – including extensions.

By insisting that your LMS and RFID providers support the BIC interoperability standard you will be ensuring that the RFID functionality you enjoy now will still be available if you change either your LMS or your RFID solution.

It would be unusual if you didn't have some questions about something so new. Here are some that we've anticipated on your behalf – but please let us have yours.

What are the advantages of using a protocol?

A protocol (or standard) enables the LMS and RFID suppliers to implement a single, 'open' communication protocol to connect RFID and LMS systems instead of using a unique implementation for each system combination. This both reduces the costs of rolling out the technology and encourages development and innovation by creating a more homogeneous platform. Implementation will be more straightforward - so costs should reduce.

The new BIC protocol has been created in a format that may be easily translated to a web service environment. This was quite deliberately done for two main reasons.

Firstly the web services environment offers a proven means by which LMS suppliers extend the capabilities of their solutions through integration with other third party products. It is both familiar and reliable and some LMS companies have already begun to favour web services for RFID integration anyway – most notably in the USA. Promoting a web service approach to a community already very familiar with its benefits is likely to meet with less resistance.

Secondly the web service environment is simply better suited to RFID solutions. Speed and multi-processing characterise RFID – and also web services – enabling both to work at full speed for the first time.

Who created it?

BIC and CILIP jointly run an RFID group which counts all the major RFID and LMS suppliers and many other interested parties including public libraries amongst its members. This group worked first to establish the RFID tag data model (to agree the data on the RFID tag) and then the new protocol to improve on SIP2. The BIC/CILIP RFID in Libraries Group worked with members of the RFID Alliance (including 3M) and a leading BIC consultant, Francis Cave, an expert on XML and book industry web services, to create this framework.

This is surely a systems issue. Why should libraries be concerned about this – we pay our suppliers to worry about these things for us?

This **is** a systems issue and its complexity often makes it difficult for librarians to engage in the subject and your systems supplier may be happy to handle it for you.

But your supplier's position might also be that they are quite happy to implement systems without a standard and they will simply pass the extra costs onto their library clients. Only you – the customer - can and should insist on using the new protocol.

Some systems suppliers may believe that standards open up the market to new entrants or more easily enable competitors to imitate their functionality. That could mean that their non-standard solution is protected from competition and that by this technology 'lock-in' they prevent libraries from moving to another supplier if they so wish. It may therefore not be in their interests to champion standards. It is in yours.

Will implementing the protocol cost more in the short term?

There is no reason why implementing a standard solution should be any more expensive that a proprietary one. Indeed the design work has already been done – by BIC - so arguably it should cost less.

Is there any evidence that libraries have suffered from this lock-in? What were the approximate costs of this?

Any library that has already implemented an RFID solution that uses non-SIP based communication to communicate with their LMS is already 'locked-in'. Many are unaware of their situation until they try to effect change. The same applies to libraries that have allowed their suppliers to choose how RFID tags should be encoded.

Lock-in may be relatively inexpensive to resolve, e.g. by developing a new and equally proprietary solution to work with the new supplier, but there may be a price to pay in terms of lost functionality. In the worst case the disposal of redundant hardware may be necessary.

How does BLCF differ from SIP3 and why should libraries not just wait for SIP3 to be fully developed?

SIP 3.0 development has, up to the present, been primarily focused on updating the existing SIP strategy rather than on delivering a new communications framework capable of exploiting the full potential of RFID. Most of the development work has centred on adding new values or elements to the existing protocol rather than revising the way in which it could be implemented - and most of those involved have been RFID rather than LMS suppliers.

There is also a slight concern that SIP 3.0 is not guaranteed to be an 'open' protocol since it will remain the intellectual property of 3M.

Who owns SIP, SIP2 and NCIP?

SIP and SIP2 (and for that matter SIP3) are owned by the 3M corporation. 3M have always insisted that they will never use their ownership of the protocol to prevent other companies competing against them.

NCIP is developed and maintained by the National Information Standards Organization in the USA. The NCIP protocol is widely used by libraries for mediated circulation and ILL but hardly at all for self-service (anywhere in the world). This may partly be due to the lack of progress by the 'self-service' sub-committee in defining requirements for this activity. This may in turn be partly due to the predominance of SIP in the US market.

What is the new protocol called?

The BIC Library Communications Framework for LMS/RFID interoperability – or BLCF for short.

Does the protocol cost anything to use?

BIC will not make a charge for providing the protocol. However librarians should be aware that 3M make no charge for using SIP either – but LMS suppliers do make a charge for using that.

Is BLCF Open Source or is it owned by BIC? Will BIC commit to maintain it?

Copyright in the framework is owned by BIC, but BIC is a not-for-profit organisation committed to promoting and maintaining standards in the wider book industry. No charge is made for using any BIC standard; and, provided this standard is implemented, BIC will continue to maintain it and update it as long as demand for it exists.

Which RFID suppliers have said they support the protocol?

Bibliotheca-Intellident, 2CQR, and D-Tech.

Will use of the protocol improve my existing service?

SIP was designed years before RFID systems appeared on the market and has many limitations that make it less effective for use with RFID based systems. Most significant among these is probably the fact that SIP still processes transactions one at a time rather than altogether. Anyone who has watched as their items are read by an RFID scanner will have noticed a slight delay as each title is displayed. That's SIP in action.

The new protocol allows devices to pass data relating to multiple items to the LMS simultaneously so issue and return speeds should be significantly faster.

At the moment each LMS provider uses their own proprietary means of communicating the necessary information to drive the RFID providers 'front-end' solutions for activities such as shelf order checking, taking inventory, finding misplaced or dirty stock, etc. The protocol would not only provide a single common means of handling the data transfer but allow handheld devices to be fully integrated with the ability to export and import data from the LMS transparently.

In a public library context the protocol (run as a web service) – although originally created to support library based activities - could also enable kiosks to deliver additional self service facilities for other applications through linking to other service providers.