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NICC Document

Guidelines on Tools for Structuring B2B Specifications

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Executive Summary

The current technology deployed in the OSS (operational support systems) stack of communications providers in the UK are not yet sufficiently advanced to provide or support a fully automated solution of the generation and consumption of B2B interface specifications. However, some tools may be used to help improve the clarity, reduction of ambiguity and have potential to reduce the implementation time. A usage and development strategy is outlined later in the recommendation that would provide small incremental gains and be the initial steps on the road to full automation.

Foreword

This NICC Document (ND) has been produced by NICC B2B WG

Introduction

The “[NICC B2B Interface Framework document \(ND1507:2007\)](#)” provides the introduction and framework for all NICC B2B standards. It is important to read the Framework in conjunction with this document.

This document forms part of a suite of documentation developed and maintained by NICC B2B. The structure is shown @ http://niccb2b.org.uk/wiki/index.php/Main_Page/work/documents#NICC_B2B_Document_Structure [2]. The documents can be accessed from the NICC publication web site @ <http://www.nicc.org.uk/> and if they are in development from <http://niccb2b.org.uk/>. For access and further details please contact niccb2b@niccb2b.org.uk.

1 Scope

The scope includes automated business transactions between UK Communications Providers (CPs) using Business-to-Business (B2B) interfaces that are used to order and manage products traded between CPs in the UK telecommunications market. In particular, for high volume mass market data and voice products sold to “end user” consumer and business customers, for example voice, broadband and associated access products.

This document focuses on:

- specification documents associated with B2B interfaces cover many topics including descriptions of physical interconnection, messaging protocols, XML message structures, business rules and process descriptions.
- the challenges related to documenting B2B message structures and the business rules associated with their validation.

2 References

2.1 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] Code List Representation (Genericode) Version 1.0 – OASIS Committee Specification 28 December 2007, <http://docs.oasis-open.org/codelist/genericode/doc/oasis-code-list-representation-genericode.pdf>

2.2 Informative references

- [a] NICC ND1627 - B2B Lead-To-Cash (L2C) interface standard.
 [b] NICC ND1626 – B2B Trouble-To-Resolve (T2R) Interface Standard.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply:

<defined term>: <definition>

example 1: text used to clarify abstract rules by applying them literally

NOTE: This may contain additional information.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

B2B	Business to Business
BPEL	Business Process Execution Language
BPMN	Business Process Modeling Notation
BPSS	Business Process Schema Specification
ebBP	ebXML Business Process
ebXML	electronic Business eXtensible Markup Language
CP	Communications Provider
OASIS	Organization for the Advancement of Structured Information Standards
ISO	International Standards Organisation
UBL	Universal Business Language
XSD	XML Schema Definition

4 Purpose

This document describes some of the tools that may be used to help describe the B2B interfaces defined by the NICC B2B work group. It also identifies and discusses some of the issues in trying to use these tools and some of the limitations and implications of doing so.

This document should not be seen as a definitive reference and is only of an informative nature and is not intended to be a mandatory process or practice definition. However, some of the guidance may become NICC B2B best practice and be recommended for use in the future.

This document is based on the “state of the art” at its publication date and may be superseded at any time, please check the NICC web site for any updates before adopting any of the recommendations.

5 Requirements

The following is a list of requirements to improve the usefulness and accuracy of documentation created to define a NICC B2B interface specification.

- Documentation to be machine processable.
- Documentation to be accurate.
- Documentation to be timely, up to date and available sufficiently in advance of implementation dates to allow for each party to develop their solution.
- Minimum amount of optionality within documentation.
- Minimum amount of descriptive free text definition and explanation.
- Values defined in code lists accurately and consistently defined.
- Minimum (ideally zero) understanding and input from user.
- Use of common definitions, touch points and processes across different B2B interfaces.
- Minimum bi-lateral agreements – industry commonality.
- Incremental and compatible future releases to minimise impact if new functionality is not required or used in a particular relationship. (e.g. Values and meaning of codes do not change and new unique codes are added.)
- Minimise implementation time.
- Minimise implementation errors.
- Automated creation from operational support systems.

6 Possible improvements and Solutions

The following sub-sections describe topics and associated tools and approaches to address the requirements defined in the previous section to improve the documentation and support of NICC B2B interfaces

6.1 Code lists

The extensive use of codified information in system interfaces improves understanding and consistency as a definition must be attached to each code but is also a potential point of failure as they may be changed by the sending party at any time and this must be controlled and communicated if errors and issues are not to arise. Currently these code lists are frequently presented as tables in text (Microsoft Word/PDF) documents, this does not make the automatic processing simple and frequently they will be manually transcribed which is a source of potential errors. The following alternative exist that could help to address the situation.

- Include the code lists within the XML Schema (XSD)
 - Advantages
 - Well understood

- No extra software or systems required to implement
- Disadvantages
 - Frequently schemas are not used in full business as usual running systems due to the processing requirements to fully validate all documents against them. (Issues with time taken and amount of system resources required.)
 - If a single schema is used for many transaction types and hence large and potentially complex, the changes may not be easily seen.
 - Increases size and complexity of schemas.
 - Inclusion of codes may limit the ability to automatically generate the schemas from existing tools as the codes may need to be added manually as they may be part of the system logic or even other systems deeper inside the end-to-end process.
- Make code lists available in a simple machine readable format e.g. as a file of Comma Separated Variables.
 - Advantages
 - Well understood
 - Relatively simple
 - Can be made both human and machine understandable. (Can easily be read using spreadsheet tools)
 - May be used to update many related systems.
 - May be embedded or included in formal specification documents without great processing or understand requirements.
 - Disadvantages
 - No agreed “standard” for defining code lists.
 - Requires the NICC B2B WG to define a common format for code lists.
- Use Genericode to define and describe all code lists (<http://www.genericode.org/>)

The OASIS Code List Representation format, “genericode”, is a single model and XML format (with a W3C XML Schema) that can encode a broad range of code list information. The XML format is designed to support interchange or distribution of machine-readable code list information between systems. Note that Genericode is not designed as a run-time format for accessing code list information, and is not optimized for such usage. Rather, it is designed as an interchange format that can be transformed into formats suitable for run-time usage, or loaded into systems that perform run-time processing using code list information.¹

- Advantages
 - Purpose designed for defining and transporting code lists.
 - A standard controlled by OASIS.
 - Designed to be machine processable.
 - May be used to update many related systems.
- Disadvantages
 - New technology with little current uptake
 - Few tools yet available.

¹ Definition of GeneriCode copied from OASIS Code List Representation (Genericode) Version 1.0 [1]

- Not human friendly – requires expertise or tools to read and understand a code list.
- Not easily included in formal specification documents.

General issues with code lists

- If new codes are received they may impact more than one system within the receivers systems which will still require modification.
- Generally the most susceptible to change of any part of a B2B interface.

6.2 Cross field validation

The need to be able to describe the relationship between individual data items may be critical to the accurate processing of B2B documents. However, within XML Schema there is very limited functionality to support relationships between individual data items, this is generally limited to items hierarchically linked and items in separate hierarchies can not be cross validated or limited. e.g. a child can not be present if a parent is not, could be defined but not that a child must present if a particular sibling of its parent is present.

- Schematron - <http://en.wikipedia.org/wiki/Schematron>, <http://schematron.com>

Schematron is a rule-based XML language that may be used to check rules that go beyond the document structure. It can identify individual elements (data items) in a document and compare them to other elements or values and also constrain interdependency rules. Its primary use would be to enforce business rules depending on the value of data items and not just the structure of the document.

- Advantages

- Can be used to validate a document before processing it by any application.
- Conforms to a standard (De facto and ISO 19757)
- Tools available to support the creation and editing of Schematron definitions.

- Disadvantages

- More software applications to run in the end-to-end process.
- Needs to be created and lifecycle managed.
- Generally seen as additional to XML Schema or other technology (RelaxNG, DTD).
- No tools for automatic generation from existing systems.
- Lack of skilled resource to create, validate and implement these definitions.
- Not integrated with XML Schema Definitions or any other existing process.

- CAM and JCAM – <http://www.oasis-open.org/committees/cam/>, <http://www.jcam.org.uk/>

The vision of CAM is, describing machine-processable information content flows into and out of XML structures so as to normalize the semantic dispersion between information points and the associated processing systems. The purpose of the OASIS CAM TC is to provide such a generalized assembly mechanism using templates of business transaction content and the associated rules. These templates augment and enhance schema structure definitions with context driven business rules so that accurate information content can be produced consistently.

The jCAM tool provides an Eclipse based desktop editor that allows users familiar with XML to quickly create templates and rules to match their exchange model. Then the jCAM runtime engine can be integrated into solution environments via a selection of interface options including Java API, DOM pointer, command line or web service integrations.

- Advantages

- A standardised methodology for assembling component part of a process flow and its related XML document structures.
- CAM has specific features that support business processing technologies such as BPEL, BPSS (ebBP) processors and BPMN modelling tools. (SOA and future automated development oriented).
- Disadvantages
 - Lack of skilled resource to create, validate and implement these definitions.
 - Not yet integrated with other existing processes.
 - Education and training required to understand
 - No established best practice.
 - No tools for automatic generation from existing systems.
 - Relatively new and little exploited technology
 - More software applications to run in the end-to-end process.

6.3 Standardised interface data exchange documentation

The process to produce standardised documentation has begun by the process of publishing the NICC B2B Trouble to Repair[b] and Lead to Cash specifications[a], these define a standardised end-to-end business process with a number of reusable components defined for each of the touchpoints. These specifications do not, however, define the actual data exchanged or the format used for its exchange. A number of recommendations and conventions are currently being used to help in mutual understanding and increase reusability such as using data components based on UBL standards.

If all of the data exchange specifications were in a common format and tables defining code list were included in a standard layout it would be easier to have a standard and repeatable method of converting to the required implementation. It may even be possible to programmatically extract the information for inclusion in systems.

- Advantages
 - Low cost.
 - Easy to implement
 - Common definition and understanding of what must be included and how it should be defined to completely define the data requirements for the interface.
- Disadvantages
 - Minimal improvement
 - No tools for automatic generation from existing systems.
 - B2B group would need to develop the standard and the best practice guide to its use.

6.4 General issues

One overriding issue exists with all the ideas and solutions in the previous sub-sections; they cannot be automatically generated from or consumed by the current generation of operational support systems. This is compounded by the general OSS solutions deployed in the UK market as being a number of interlined and related systems, no single one containing all of the business rules or logic for the entire end-to-end process within a single CP. This leads to the “business rules” and code lists being created manually as part of the system or interface specification which is prone to errors, misinterpretation, omission and poor change control – frequently unintentional as people do not know or understand the end to end impact of relatively minor changes. This is also compounded by the inclusion of validation rules at the gateways which are the initial validation based on the interface specification which can add another layer of complexity.

Other lesser challenges exist, and the following list is non-exhaustive:

- Automated documentation dissemination.
- Lifecycle / release control management for documentation
- No formal adoption and use of a standardised process definition language, system or strategy.

7. Recommendations

As stated in the previous general issues section a complete solution does not exist at this time with the complexity of systems currently deployed and in use, only limited steps can be taken at this time but improvements can be made in an incremental manner.

- Investigate and implement a standard data exchange specification format.
- Re-use data format were possible especially with compound data items such as names and addresses, this is currently being used in an informal manner but the NICC B2B WG does not have a library etc.. (This has been common practice for over 20 years in Electronic Data/Document Interchange.)
- Investigate with a view to implement a common code list format. (Genricode is longer term solution but CSV may be sufficient for the NICC B2B Group)
- Monitor developments in Schematron and CAM technologies to look for future development and deployment.
- Monitor work on business process definitions – BPEL, BPSS, etc. to see if any applicable developments occur and potentially adopt as suitable NICC standard process.
- Liaise with other organisations (TMForum, ETSI, etc) working in these areas to find best practice and commonality of requirements and developments.

History

Document history		
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