ND1617:2006/11 AUTOMATED BUSINESS TO BUSINESS (B2B) TRANSACTIONS: ARCHITECTURE AND PRINCIPLES

Issue 1

Normative Information
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The Technical Secretary, Network Interoperability Consultative Committee,
Ofcom,
2a Southwark Bridge Road,
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Document history

Revision	Date	Notes
Draft 1	November 2006	First Draft based on update of Consult21 document
Draft 2	23rd November 2006	Updated introduction to remove historical information & update IPR section
Draft 3	24th November 2006	Inserted NICC number
Draft 4	29th November 2006	Issue for NICC Approval

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1.0 Introduction

This document provides high level architecture and principles for automated business transactions between UK Communications Providers (CP) using Business-to-Business (B2B) interfaces.

2.0 Background

It was first developed as part of the BT Consult 21 process in a number of workshops held with industry representatives. The focus of the discussions was on the likely characteristics of inter-provider management systems interfaces for BT's 21st Century Network (21CN) one of the first examples of what is now being called a Next Generation Network (NGN).

It was envisaged that: a series of XML/Internet based integrations would be offered to allow providers to integrate their management systems in support of various inter-provider management processes; and that these interfaces would be standards based and that some of these standards will need to be defined in collaboration with industry.

It has already been used to review BT's current and proposed interfaces and shape BT's interface architecture and design. Annex 1 provides an example of the checklist used.

3.0 NICC Systems Principles

3.1 Scope

Principle 1 - These principles and the work arising from them is related to the management of telecommunications and associated services between suppliers in the UK.
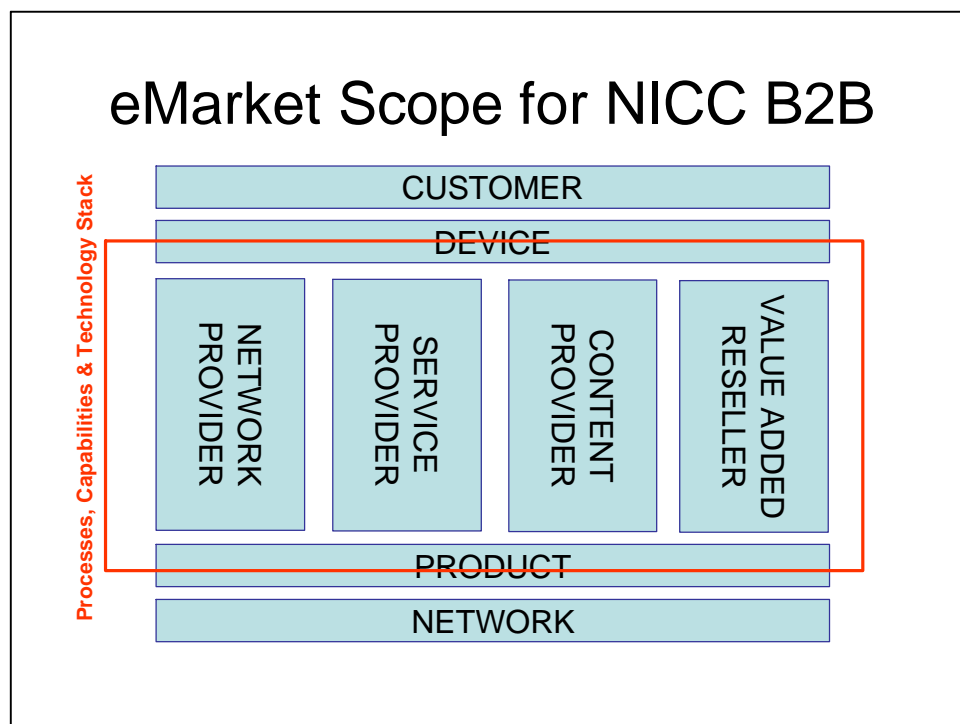
Principle 2 – The interfaces defined and exposed are principally related to the service management rather than any lower level network management oriented services.

The main services exposed to partners are integrations to CRM functions. Exposure of other "lower level" services may be required, but it may be relevant to use more Telco network management related standards for these interfaces.

Principle 3 – The interfaces defined relate principally to the eTOM Fulfilment and Assurance verticals.

The main B2B integrations delivered to date related to provisioning of services and repair. Services and inter-network accounting, fraud management and billing is a consideration for support by such interfaces, but there may be pre-existing standards that are more appropriate.

Principle 4 – The aim is for perfect zero touch provision and repair, which means in addition to the main order and fault management services a variety of interfaces are required to deal with data quality and inventory management issues.

In order to deliver "clean" orders and fault reports a variety of "pre-order" or other enquiry and diagnostics services are required. NICC standards interfaces work should deal with these as well as the main order and fault processes.

3.2 Rationale & Overview

Principle 5 – NICC Systems principles for industry are about the interconnection of <u>management systems</u> between providers.

In determining management systems principles for service providers and network providers NICC will focus on inter-provider interfaces for management of services.

The internal architecture of CP systems and the principles on which they are based are only of interest where they affect interactions between CPs.

Principle 6 – For the sake of interoperability, interface specifications will be required and elements of these need to be based on technical and business standards.

Any interface specifications will need to reference appropriate standards. Some of these are already available from computing, eCommerce and telecommunications standards bodies; some will need to be specifically developed by the NICC or international standards bodies..

Principle 7 – Some areas of standardization are "horizontal" (non-industry specific) and some are "vertical" (specific to an industry or group of industries). Horizontal standards will tend to deal with technologies, vertical ones will tend to deal with business semantics. Some business standards have a wider application than a single industry segment. Also some standards are more mature than others.
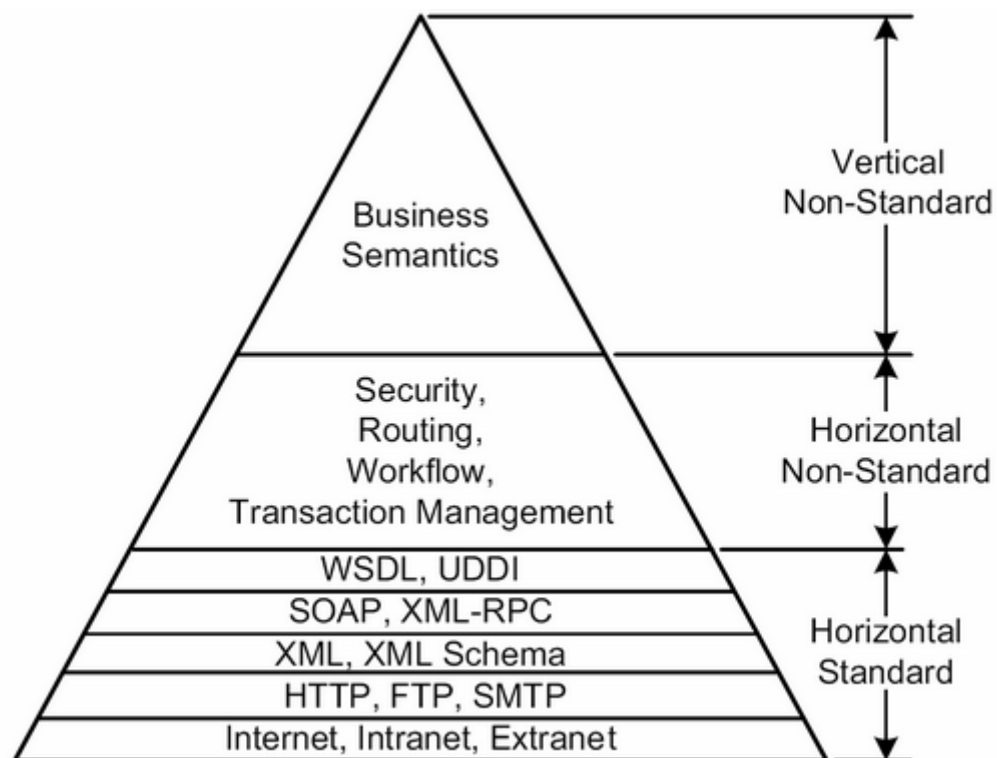
Figure 1 Web Services Pyramid (taken from Loosely Coupled – www.rds.com)

Figure 1 above describes a simplified pyramid of standards for web services integration.

Figure 2 below provides an expanded view showing a horizontal split through the stack of data and process standards. The "lowest tier" technical standards are likely to come from the computing industry. The "middle tier" technical standards refer to document and process description & execution languages. The process aspects of this middle tier and the notions of choreography and execution are the least mature of the technical standards.

The "top tier" business process and document semantics will need to be developed by industry as a vertical drawing on or using existing standards from the telecommunications industry, adjacent industries or eBusiness standards bodies as appropriate.

For the lower two tiers, OASIS and W3C have relevant technical standards.

For the "top tier" standards one needs to look to vertical Telco industry groups such as the ITU-T and TMF and more widely to eBusiness activities in groups like OASIS. These groups may provide either the standards themselves or the framework on which to develop UK industry standards.

In drawing several standards from such a wide base one has to be clear about the scope and applicability of standards from these various sources and use them appropriately.

Care also needs to be taken about the maturity and likely evolution of particular standards when considering them for use.

Immaturity of "middle tier" technical standards may set limits on how complex process oriented interfaces can be defined and built at this time.
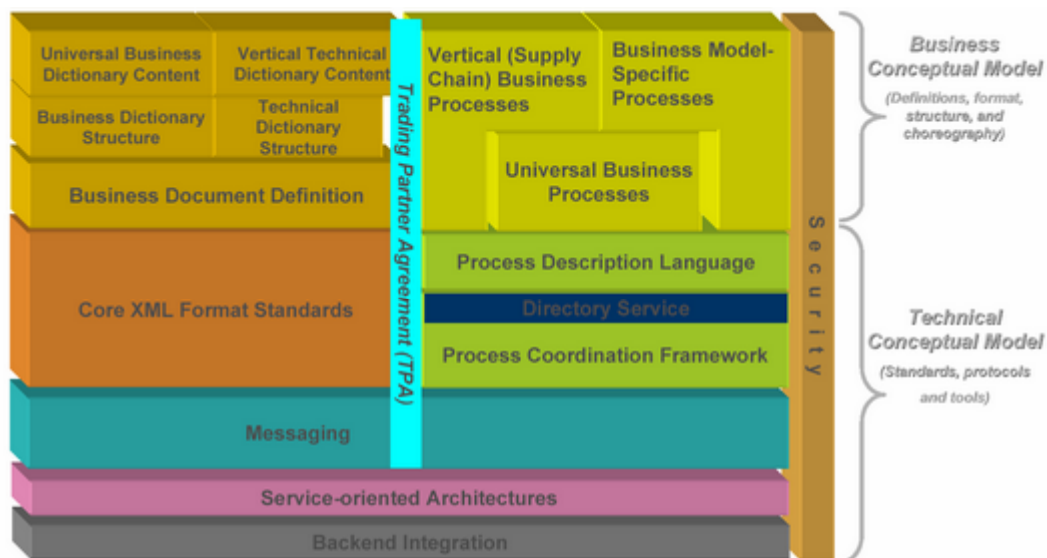
3.3 Architectural Approach

Principle 8 – Loose Coupling is the overriding architecture consideration for defining such inter-provider B2B interfaces

When considering the architecture principles for inter-provider management interfaces attention needs to be paid to

- minimizing the reliance on proprietary technical standards.
- minimizing interdependency on partners' systems availability
- decoupling industry product and process semantics standards from partner's internal processes and data.

Interface definitions should focus on those things that are genuinely shared in terms of technologies, processes and data.

The goals here are to ensure that the defined interfaces minimize interdependency between partners on technology and process/data model choices and are resilient to internal changes within partner businesses.

From a technical standpoint, the most broadly applicable approach to a loosely coupled integration is an asynchronous exchange of data in a document centric model. Typically this is based on asynchronous event based messaging but can also apply to batch oriented "extract transform and load" (ETL) exchange of data.

Principle 9 – Horizontal technical standards from the base of the web services pyramid, such as XML and internet transports, currently provide the most appropriate non-proprietary technical basis for B2B interfaces at this time.

The term "web services" is used here in the broadest sense of XML over internet/intranet transports rather than specifically SOAP (see Figure 1)

There are a number of web services standards defined for which there are interoperability guidelines. Currently these represent the most appropriate vendor independent standards for "simple" synchronous web services.

Web service standards for asynchronous messaging are less mature although ebXML messaging is a standardized interoperable asynchronous "SOAP with attachments" based messaging standard for document centric messaging applications.

Principle 10 – Middle layer horizontal technical standards for web services technologies such as business process execution languages are immature at this stage. Adoption of these in the definition of process oriented interfaces therefore needs to be approached with care.

Adoption of any of these standards prematurely would require industry specific "vertical" agreement as to how and in what context these might be used. To avoid adopting legacy versions of standards into interfaces this needs to be carefully managed and kept to only those things which are essential to business needs.

This principle is more than about the maturity of standards as it has a direct bearing on the how the process aspects of interfaces are defined as opposed to the definition of interfaces as individual services.

Principle 11 – Standards for business semantics (process and data) will be the key standards to be developed and agreed as an industry vertical B2B model.

Agreeing key processes and event information to exchange, in the form of business document content, will be the key activity of any industry group going forward.

Whilst needing to agree these standards as a vertical specifically for the telecoms, it would be useful if the basis for these came from a source which had the widest possible horizontal applicability.

For B2B processes, groups such as RosettaNet and TMF eTOM may offer the basis for a library of transactions. *However, end to end processes that define the choreography of these transactions will most likely need to be defined by industry.*

For B2B documents, there are adjacent standards upon which could provide the widest base for such agreements (such as UBL or xCBL) together with the telecoms information models of the TMF and ITU-T. *Again these would have to be considered and extended/adapted against the specific B2B integration needs of the telecoms industry.*

The ITU-T is a source of relevant standards for management systems and inter-operator interfaces. As NGN networks take hold around the globe it is likely that the ITU-T will be used to revisit the various X-COOP standards for this purpose globally and account of this needs to be taken in any UK national context.

Whilst using general B2B standards alongside the telecoms models of the ITU-T and the TMF, one will need to distinguish between

- general B2B integration requirements,
- Telco specific B2B integration requirements,
- internal enterprise OSS integration requirements.

Without this, there is a danger of trying to map too many different models to each other without a clear rational for doing so. Since each of these is based on a different philosophy and level of detail, this mapping may be too complex to achieve.

Principle 12 – Product independent interfaces that are broadly applicable to a range of telecoms scenarios are preferable to tailored solutions per product

To minimize the possibility of product specific silos being developed, interfaces should draw on the widest set of standards for process and data that are as product independent as possible.

Also product specific features need to be dealt with in a manner which separates them from core standards and allows them to be used in support of new products without redefining the standard.

Principle 13 – B2B Integration for current interfaces are essentially Data rather than Process Oriented. However, one needs definitions of industry processes as well as the B2B services and events used to support the processes.

<u>In defining industry interfaces one needs to define the business processes as well as the technologies and data used to support them</u>.

Often the process and the interfaces have been defined side by side for products such as Wholesale Access, Wholesale Calls, CPS and Unbundled Loops. This will continue as a practice for management interfaces for Next Generation Networks (NGN).

The roadmap for web services based integration offers the possibility of *combining* the description of interfaces and process orchestration in a common set of technologies and description/execution languages (using XML based languages such as BPEL4WS and BPSS).

However, for the moment it is likely that end to end business processes will continue to be described in a separate form from the manner in which the interfaces that support the processes are defined.

This is because

   I)   the standards for business process definition and execution are immature
   II)   the QoS characteristics of current B2B data exchange would not support the reliable asynchronous integration of complex long-lived independent processes in this tightly bound fashion.
   III)   OSS systems are essentially queue rather than process oriented. Industry processes are in fact executed by duties/people performing independent tasks, therefore strict end-to-end execution of a process as a predefined sequence of tasks is brittle when it comes to anything other than the simplest of normal scenarios.

However, despite process and interfaces being described separately, it may be in time that formal process description languages could be used to define processes rather than using word documents if only for the semantic rigour they bring to the specification process.

Feeds from the Wholesale billing platform for CDRs and ebills are based on proprietary formats that are outputs from the COTS package that BT uses in this domain. The fraud feed output from BT's mediation device has been standardised on this format. It would be possible to move to a web services open billing standard with an XML wrap around but this standard would need to be agreed within the industry and we would be looking for the COTS suppliers to provide this within their development plans for their product.

3.4 Usage & Extension

Principle 14 – Many of the newer UK Telco industry processes need to look beyond the "BT-OLO" two party model to multi-party processes and those not involving BT at all.

Many of the interfaces defined to date have focused on providers bilateral integrations with BT.

Apart from the increasing issue of non-BT to non-BT migration of usage of BT wholesale services (which involves the coordination of three parties) there are increasingly likely to be requirements for integration of processes that do not involve BT at all.

Work on interfaces and processes should therefore not exclusively focus on the provider to BT scenarios.

Principle 15 – Core industry vertical standards need to be community owned

The shared standards and interfaces developed in this way should be available for all providers to adopt for their use in their own business relationships.

Principle 16 – Business semantics standards must be extensible for the needs of individual parties

New products and business relationships will often require extensions to such standards and the adoption of any core standards should not preclude the use of additional ones.

Some of these extensions may in time find their way to the core standards. However until they do such extensions should be regarded as separate and made in a modular fashion according to extensibility and reusability guidelines.

Principle 17 – Any process and document standards and interfaces developed should clearly distinguish between "hard"/structured data that forms part of agreed interfaces and "soft"/unstructured information that is effectively content.

Some data is exchanged for the purpose of aiding process automation. Other data is more malleable and is provided just for information and visibility. A distinction needs to be made between these two classes of information for change management purposes.

Principle 18 – B2B Standards and Technologies need to scale to the broadest range of provider sizes and types whilst supporting cost effective solutions.

No technology can be infinitely flexible to suit all pockets. Also much of the cost of integration comes from complexity. However, the choice of standards and architectures needs to support cost effective solutions.

Principle 19 – Legacy migration of interfaces and business processes need to be addressed in any new standards but there is a limit in the range of such legacy that can be addressed.

There are many interfaces and process that have emerged over the past decade. Many of these are based on older technologies and pre-date the XML over http approaches used more recently. Also many of the industry processes are oriented around single products and have features that no longer reflect current industry concerns. Some of these standards will in effect have to be "left behind" in future standards work if future architectures are not to become catch-all in nature.

Principle 20 – B2B Integrations are combination of technical standards and service level standards. Deployed B2B interfaces need to be managed as services.

Besides the technical and business standards upon which interfaces are based, inter-provider interfaces need to be provided and managed as a services. For this reason in addition to the technical standards of the interfaces provided and the business processes they support their additionally needs to be commercial agreements on the support, usage, service and change management of these interfaces.

4.0 Commercial

4.1 Intellectual Property Rights

The vast majority of the intellectual property rights (IPR) protecting the various interfaces will be owned by third parties. Whilst it can never be guaranteed, it is hoped that these 3rd party IPR owners are members of relevant international standards bodies which promote use of the interface, thus obliged to offer licenses under their IPR's (preferably on fair and reasonable terms).

Principle 21- NICC IPR Policy will apply

The NICC IPR Policy can be found @ http://www.nicc.org.uk/

Annex 1: Principle Checklist

The table below lists the principles and provides a checklist to compare current interfaces and future proposals against.

	2.0 NICC SYSTEMS PRINCIPLES **2.1 Scope**	**Comply ?**	**Comment**
1.	Principle 1 - These principles and the work arising from them is related to the management of telecommunications and associated services between suppliers in the UK.		
2.	Principle 2 – The interfaces defined and exposed are principally related to the service management rather than any lower level network management oriented services.		
3.	Principle 3 – The interfaces defined relate principally to the eTOM Fulfilment and Assurance verticals.		
4.	Principle 4 – The aim is for perfect zero touch provision and repair, which means in addition to the main order and fault management services a variety of interfaces are required to deal with data quality and inventory management issues.		
	2.2 Rationale & Overview		
5.	Principle 5 – NICC Systems principles for industry are about the interconnection of <u>management systems</u> between providers.		
6.	Principle 6 – For the sake of interoperability, interface specifications will be required and elements of these need to be based on technical and business standards.		
7.	Principle 7 – Some areas of standardization are "horizontal" (non-industry specific) and some are "vertical" (specific to an industry or group of industries). Horizontal standards will tend to deal with technologies, vertical ones will tend to deal with business semantics. Some business standards have a wider application than a single industry segment. Also some standards are more mature than others.		
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10.	Principle 10 – Middle layer horizontal technical standards for web services technologies such as business process execution languages are immature at this stage. Adoption of these in the definition of process oriented interfaces therefore needs to be approached with care.		
11.	Principle 11 – Standards for business semantics (process and data) will be the key standards to be developed and agreed as an industry vertical B2B model.		
12.	Principle 12 – Product independent interfaces that are broadly applicable to a range of telecoms scenarios are preferable to tailored solutions per product		
13.	Principle 13 – B2B Integration for current interfaces are essentially Data rather than Process Oriented. However, one needs definitions of industry processes as well as the B2B services and events used to support the processes.		
	2.4 Usage & Extension		
14.	Principle 14 – Many of the newer UK Telco industry processes need to look beyond the "BT-OLO" two party model to multi-party processes and those not involving BT at all.		
15.	Principle 15 – Core industry vertical standards need to be community owned		
16.	Principle 16 – Business semantics standards must be extensible for the needs of individual parties		
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18.	Principle 18 – B2B Standards and Technologies need to scale to the broadest range of provider sizes and types whilst supporting cost effective solutions.		
19.	Principle 19 – Legacy migration of interfaces and business processes need to be addressed in any new standards but there is a limit in the range of such legacy that can be addressed.		
20.	Principle 20 – B2B Integrations are combination of technical standards and service level standards. Deployed B2B interfaces need to be managed as services.		
	3.0 COMMERCIAL **3.1 Intellectual Property Rights**		
21.	Principle 21- NICC IPR Policy will apply		