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STRATEGIC ELECTRONIC GOVERNMENT PROCUREMENT

- STANDARDS FRAMEWORK -

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Foreword

The application of online technologies to government service delivery has reflected as much on the difficulties of transforming human affairs as on the quality of initial expectations generally.

Part of the explanation of the difficulties involved has been the tendency to graft these information technologies onto traditional industrial models of commerce and production. This tendency has been found even with leading enthusiasts for new technology who have failed to always see that its single most transforming attribute is ‘interoperability’. Thus we have experienced, *inter alia*, the development of closed networks designed to limit this very attribute.

Despite the disappointments, governments both of developing and developed countries are continuing to allocate significant resources to e-government in all of its forms. Some of these programmes involve substantial funds and significant risk, and no doubt there will continue to be disappointments as well as success. While governments are understandably often most concerned with their services delivery to the broad public - that is the service output side of government - experience suggests that more immediate success might be gained by applying online technologies to the input side of government. This brings into focus the possibilities of electronic government procurement (e-GP). For e-GP, just as for other spheres of activity, the issue is substantially one of exploiting the opportunities deriving from ‘interoperability’, and it is the imperative of preserving and extending this capability that defines the pivotal significance of ‘standards’.

Often this idea of ‘interoperability’ for e-GP is taken to refer to the software that enables technical systems to interoperate with each other. This interpretation is too narrow – systems interoperability is only part of the equation. Other elements for which interoperability is required include product catalogues, business descriptors, legislation, security, confidentiality, etcetera.

Discussion of standards by technical experts and systems developers has its own language that means nothing to other executives and managers, yet decisions at the technical level can be of great policy, financial and operational significance. This brief seeks to define these issues and assist in the development of a proper understanding of their policy and operational significance.

Introduction

Standards are the infrastructure of commerce. Just as power networks and transport systems are the infrastructure of economic production. The establishment of each of these infrastructures forms a cornerstone for modern economies.

The national and international development and adoption of common standards is crucial to not only the effective working of economies but also of societies themselves. Examples include:

- SWIFT which facilitates international banking
- Greenwich Mean Time
- International Standard Atmosphere
- European Article Number
- Building & Construction Codes
- Computing Language Standards
- Food, hygiene and labeling
- Metric weights and measures
- National and international currencies

While of critical importance, the development and adoption of such standards is inherently complex, reflecting the complexities of the economy and the broader community. Good standards are taken for granted and are substantially invisible, while a failure of a consistent approach to standards can be at great cost. Examples include mismatching railway gauges in Australia, TDMA versus GSM telephony in South America and the complete loss of the Mars probe - the Polar Explorer (1999) - due to confusion between metric and imperial standards.

Perhaps there is nowhere that standards are undergoing such broad and rapid developments as for the online environment generally and for e-commerce specifically. Electronic government procurement (e-GP), as part of e-commerce, is inextricably part of these developments.

The immature status of many, if not most, of the standards on which e-GP is dependent poses special risks to governments. These risks include systems obsolescence, lack of interoperability, higher operating costs, vested interest influences, sub-optimal functionality and reduced innovation and, more broadly, retarded technological enablement of commerce generally. These financial, commercial and social risks mean that these standards become

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essential dimensions of government policy, legislation and leadership. It is important that executives and managers be able to appreciate and engage with these issues if the risks to governments are to be managed. Web architects and developers may recoil in horror that government policy and leadership might intrude into these issues. But government is an obvious leader, not suggesting that it should or could regulate such standards, but because of the significance of its choices for its own operations and the weight that these carry in the economy. Government leadership in this area is more often *de facto* than *de jure*, but leadership nonetheless, which reflects the reality that government represents more than one third of the economy in most countries. This reality will be of particular significance to developing countries seeking to accelerate the technological activation of their economies and communities.

Government Procurement

The benefits of online technologies for government operations are commonly described in terms of governance and efficiency. Online technologies as applied to government procurement have the potential to greatly enhance accountability and transparency of this function which is especially vulnerable to poor practice and improper influence. Similarly real gains in efficiency for e-government procurement (e-GP) are possible. These are not incompatible objectives and both can be the targets of any strategy.

Figure 1 - Procurement Processes

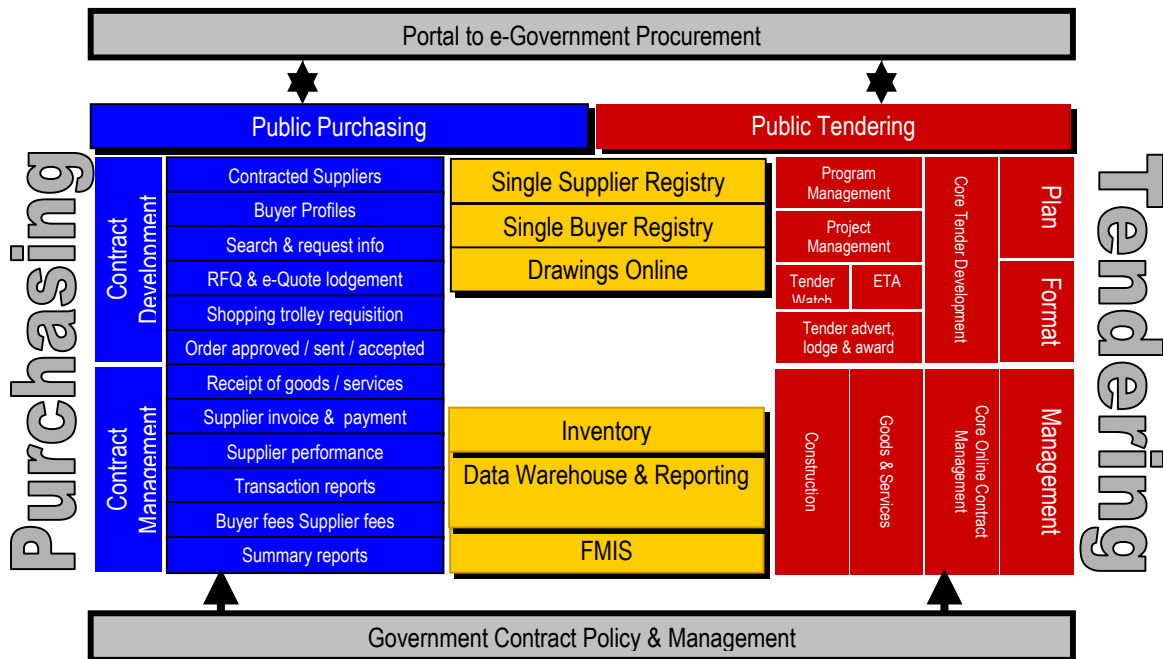


Figure 1 is representative of the functionality required by government buyers. The associated high standard of governance combined with the substantial value of government business, its complex functionality and the weight of transactions means that government is an obvious leader in e-standards establishment.

As important as they are, these objectives of enhanced transparency and efficiency in the operational framework understate the significance of e-GP and the importance of government design decisions in this area. While governments increasingly recognise the imperative for their economies to

accelerate the take-up of online technologies, the significance of their own activities is often overlooked. Government procurement, commonly regarded as a back-office activity, can account for up to 20% of a national economy. Especially significant in many jurisdictions is government commerce for regional economies and small and medium businesses. For these businesses the ways that governments initiate their own transition to the online environment and the standards that they adopt can be of great significance for the business cases for supplier participation.

The significance of this reality means that one of the first challenges for an e-GP policy and standards framework is to recognise that e-GP can represent an e-commerce marketplace involving the complex interactivity of public-private, private-private and public-public sectors rather than just a simple interface between government buyers and private sellers. These considerations have the potential to substantially influence the design of government e-commerce systems as well as its policies, legislation and standards roles.

The promotion of the strategic concept of an open e-marketplace is not new but success has been uncertain. The reasons for this are not difficult to discover including the lack of common messaging standards, the agenda to create closed marketplaces in pursuit of more limited process efficiencies and the disengagement of a critical mass such as government procurement.

For these and other reasons the policies of government for e-GP should not be separated from those of economic development. In selecting standards to ensure interoperability in e-GP governments need to be aware that their decisions will strengthen (or hinder) the broader roll out of e-commerce throughout the economy.

E-GP can represent an e-commerce marketplace involving the complex interactivity of public-private, private-private and public-public sectors

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The Policy Framework

Before the full benefits of technological interoperability can be realized there is a need for certainty: certainty in relation to all of the attributes that ensure efficient commerce such as legislation, security, systems interoperability, etcetera.

Business responses to these issues are often complex and ambiguous. Business environments rich in practices and legacies can lead to diverse technical developments for short term solutions that may conflict with longer term trends at a wider level for market development. The take-up of common standards for the functioning of an open e-marketplace will be a hesitant process with many companies uncertain about the risks of investing in any standards in their current state of development.

Neither can this uncertainty be resolved by governments through unilateral decision-making or prescriptive regulation, which are likely to elevate rather than alleviate the commercial and social risks. However, government is often a new player and big enough to take a leadership role for the establishment of standards not only for the objectives of e-GP but for interoperability more generally. The existence of a well defined and broadly generic framework in government can play a catalytic role of bringing together developers and networks to promote common methodologies, modelling and standards. For example the UK Office of Government Commerce is working with the Business Applications Software Developers Association (BASDA) to define standards that allow different purchasing software packages to interoperate. At another level ASEAN and the EU are seeking standards to promote interoperability of e-commerce legislation.

To effect a leadership role in the establishment of standards it is important that governments, at an early stage, identify the public interest and principles that should be protected and advanced within their own business dealings.

A paramount objective of government policy in relation to its interactions with the business and community sectors should be, *inter alia*, to seek to preserve and enhance efficient and affordable connectivity and interoperability with online technologies of government, business and the broader community.

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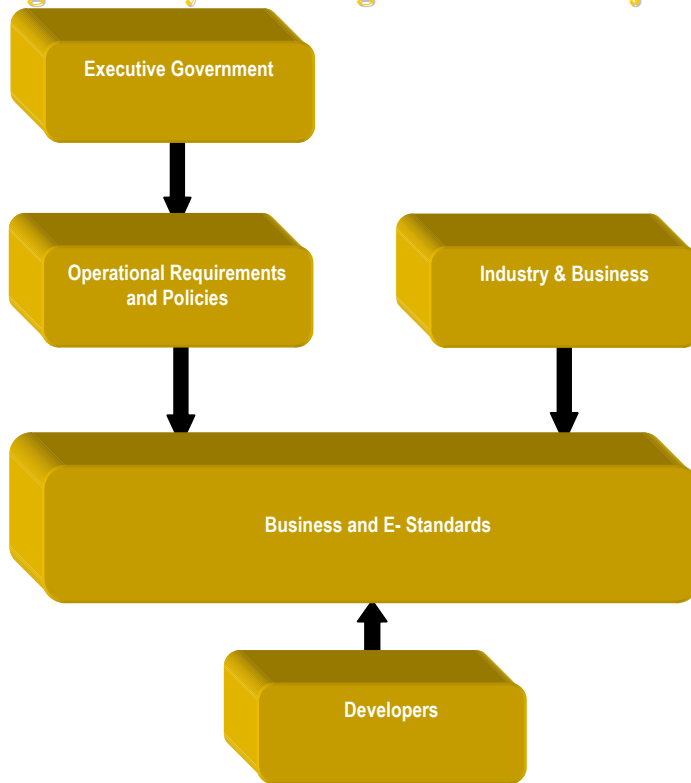
The existence of a well defined and broadly generic framework in government can play a catalytic role of bringing together developers and networks

However, the identification of options for the selection or design of systems in terms of the standards that deliver these attributes is a technical issue which is fast moving and evolving. It is neither practical nor desirable for the executive levels of government to become embroiled in this landscape.

Instead, as with many areas of government, the specialist technician and the executive of government develop an effective understanding about such issues. In these circumstances it is appropriate for governments (as major users and clients) to identify their policy objectives, just as business represents its commercial needs, which become guidelines for the more specialist technical decision making, as illustrated in Figure 2.

In establishing a set of guidelines from which government policies, standards, and legislation can emerge, governments need to understand the core attributes of the online environment that are likely to transform commerce

Figure 2 – System Design and Client Objectives



In establishing a set of guidelines from which government policies, standards, and legislation can emerge, governments need to understand the core attributes of the online environment that are likely to transform commerce and business competitiveness. It is these attributes that government policies can target to preserve,

strengthen and promulgate with the ultimate objective of exploitation of the online environment for transparency, economic efficiency and competitiveness and community development.

The following guidelines reflect these values:

- That government policy and practice enhance efficient and affordable online connectivity and interoperability between government, business and the broader community.
- That government legislation, policy and practice enhance the confidence of commerce towards online technologies in relation to the treatment of commercial information.
- That governments need to work cooperatively with other governments and business to seek efficient and flexible public and private sector e-commerce environments;
- That policies, standards, legislation, infrastructure and procedures should support a cooperative and transparent relationship between all parties.
- That the standards selected should support the evolution of both the technology and processes of e-commerce.
- That the standards selected for government operations should be internationally supported and maintained and developed on a consensus basis to maximise utility and adoption.
- That standards and legislation support e-commerce policies rather than determine operational practices.

It is these attributes that government policies can target to preserve, strengthen and promulgate with the ultimate objective of exploitation of the online environment for transparency, economic efficiency and competitiveness and community development

The key objective for the beneficial exploitation of online technologies is the combination of interoperability and broad-based access: this means open standards.

These guidelines allow commerce to efficiently operate across diverse marketplaces, each with its own custom functionality, catalogues, directories and other individual characteristics. This environment also provides the opportunity for each party to manage their own systems as preferred. Such a trading environment allows the full spectrum of commercial interactivity and exchange to occur through all major open standards without

requiring participants to implement specific software or hardware, or be liable for any third party licensing or service charges.

An important consideration is also that online technologies are experiencing a great flux of innovation and development which will continue for the foreseeable future. These guidelines recognise the need for an environment that provides opportunities for innovative solutions to join the market rather than being required to create new markets.

These features again underscore the inextricable relationship between government operations and economic development.

Management and Collaboration

The dominant benefits of online technologies flow from interoperability. This interoperability involves multiple parties, public and private sector organisations and networks at the domestic and international levels for any country.

These standards that deliver interoperability are only meaningful if they are adopted into common use, implying consultative and incremental processes at the international level with substantial consensus about their form and definition. This reality means that the establishment of new standards frameworks is inevitably tedious requiring changes in business behaviour, both for public and private sectors.

The design and public policies for e-GP are unlikely to succeed unless they emerge from these collaborative processes. To participate effectively in these developments it is essential that government organisations (as major stakeholders) maintain the expertise to understand and participate in the development of standards at the technical, legislative and business levels. This expertise, unaligned with any proprietary model is central to government development, implementation and policies for e-GP.

In some areas it may be also be appropriate for governments to initiate ongoing collaborative processes to facilitate, for example, e-commerce legislation that allows cross-border commerce.

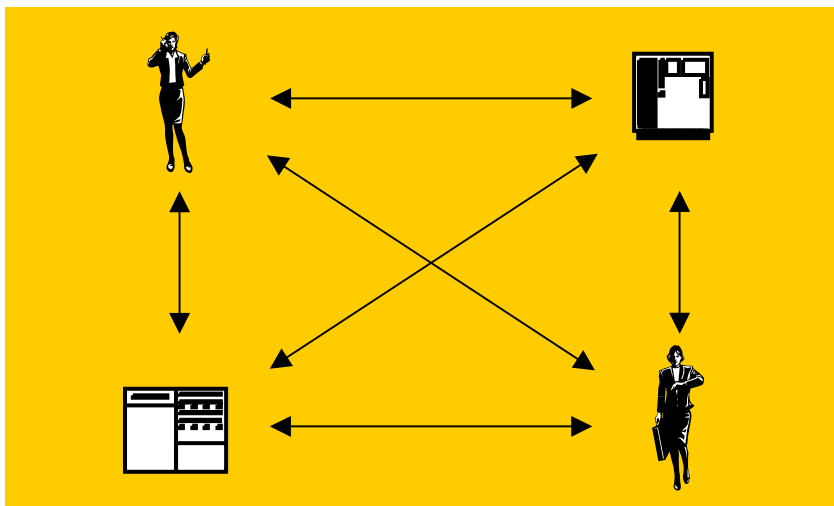
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Standards for e-GP and e-Commerce

Standards evolve with society and technology, and e-commerce, particularly B2B, is now the subject of intense ongoing standards development which is set to continue for many years. Initially, despite the hype around the significance of online technologies, the awareness of the role of standards was disappointingly low amongst developers who often sought to promote closed networks, or only envisioned static well defined interactions.

Online technologies combine traditional communications with information technologies, thereby enhancing collaboration, networking, information discovery and transactions processing.

Figure 3 - Interoperability



Online technologies in an open environment are required to promote interoperability between machine-machine and machine-people in complex combinations across heterogeneous technologies, business practices, laws and languages.

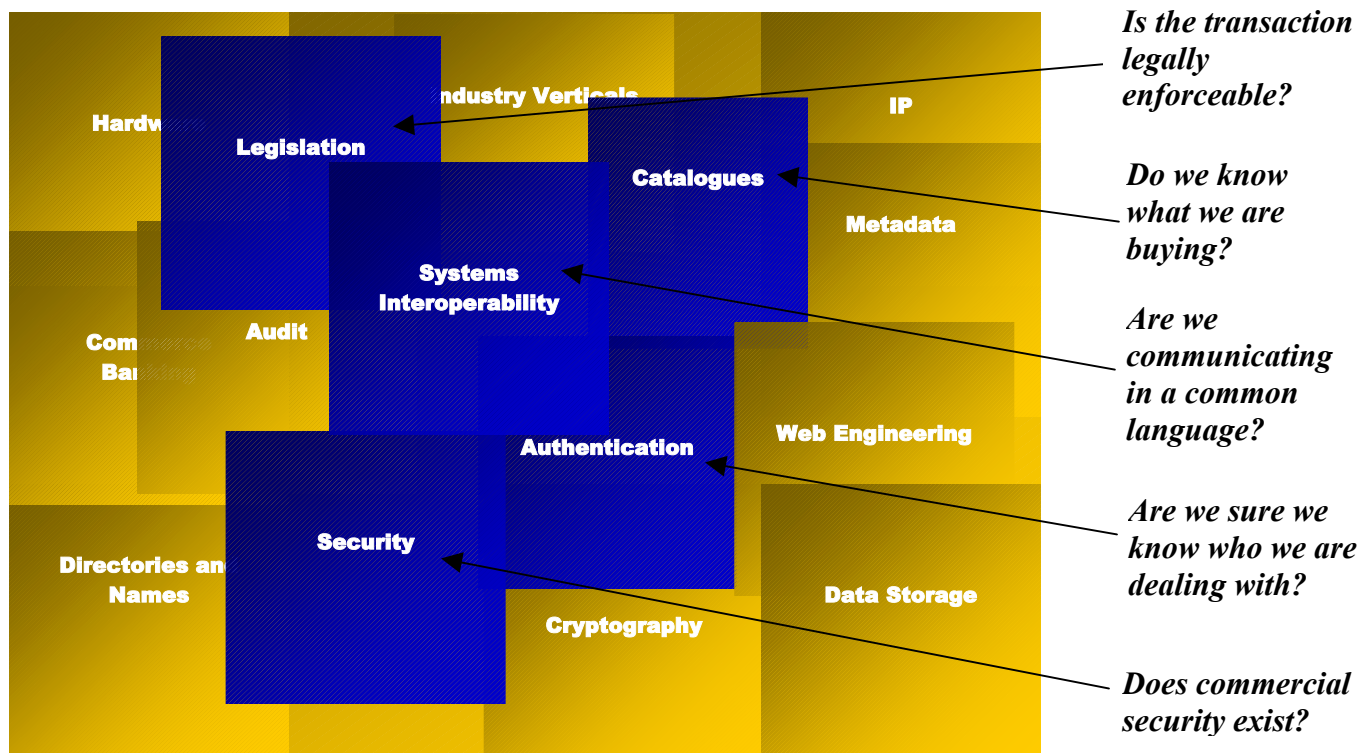
Online technologies in an open environment are required to machine-people in complex combinations across heterogeneous technologies, business practices, laws and languages, as illustrated in Figure 3. This requires that common elements in business languages and processes be identified or created. Standards are the vehicle through which these requirements are delivered.

Standards must accommodate flexibilities in business and business must accommodate technological constraints if the benefits of

technology, such as enhanced efficiency and transparency, are to be realised.

A partial list of issues around which standards development for e-commerce is relevant is presented in Figure 4. These standards are required to satisfy the basic everyday needs of commerce as shown:

Figure 4
Standards Relevant to E-Commerce



The discussion that follows is limited to the map highlighted in Figure 4 as the concerns most immediately relevant to the design and policy agendas of governments embarking on e-GP implementation.

By the very nature of commerce the development and adoption of standards in these and other areas should not only be appropriate within the context of local business and national policies but also consistent or interoperable with the national economy and international trading partners.

Figure 4 shows also that these standards environments overlap but are not all technical. Much of the requirements for security as well as authentication, for example, are to do with organisational management systems rather than software. Similarly legislation requires a standardised approach if it is to facilitate inter-jurisdictional transactions but this may have little to do with e-commerce systems development. On the other hand systems development has found ways of encoding legislation to facilitate, for example, e-contracts. The message here is that the idea of e-commerce standards cannot be well defined in a technical sense – it relates to whatever conventions, rules, protocols or regulations (technical or otherwise) that may influence the efficient conduct of commerce in the online environment, and these are evolving.

Catalogues

The business standards chosen for identifying goods and services catalogue items are significant because of the cost consequences of this decision. Thus suppliers to government will need to construct their online catalogues, sometimes representing thousands of line items, in accordance with these standards. Considerations affecting the selection of a cataloguing system for e-GP should include cost of maintenance, international standards and a careful analysis of purpose. For the purposes of e-GP it is advantageous for these classifications to have a simple correspondence with natural language and also that they have an hierarchical structure to facilitate the all important management and financial analyses that these technologies make practical for the first time.

Jurisdictions need to be clear about why they are seeking a catalogue coding system and how it will be used

There is a range of catalogue coding schemes in use. Some of these are competing standards while others have complementary purposes. Examples include:

- **CPV - Common Procurement Vocabulary**
This scheme is aimed at clarifying procurement notices and providing statistical analyses. The use of CPV is mandatory for EU member States.
- **EAN-GTIN European Article Number/Global Trade Item Number**
This is a very widely used, bar-coding system which is well supported. It is non hierarchical and not readily adaptable for financial analyses.
- **UN-SPSC - UN Standard Product and Services Code**
Well supported and widely used. Hierarchical structure supports financial and management analyses as well as product search. UN-SPSC complements rather than competes with EAN.
- **ISIC, NAICS International Standard Industry, North American Industry Classification System**
Industry classification systems found in various forms in many countries. Used for statistical analyses, but not useful for many procurement management purposes.
- **NAPCS North American Product Classification System**

A developing demand-based or market oriented product classification system led by USA, Canada and Mexico.

UN-SPSC (the United Nations standard) is an open and well supported standard without copyright restrictions. Copyright is owned by UNDP and the use of this standard is supported by a number of governments worldwide. UN-SPSC is hierarchical and very suitable for financial and procurement analyses. UN-SPSC forms a good fit with the requirements of e-GP. The UN-SPSC is the first standard that classifies both services and goods in the international market.

Some managers find difficulties with the seemingly modest number of codes used by UN-SPSC. UN-SPSC is not intended to be a detailed product descriptor for inventory control; it is a classification framework for products and services in all industries and for some purposes is relatively coarse grained. For detailed product description an EAN.UCC code would be appropriate. These are equally mature open and well supported standards. However, only UN-SPSC is designed for product aggregation and analysis.

Jurisdictions need to be clear about why they are seeking a catalogue coding system and how it will be used. For example an organisation specializing in office supplies may need to know how many 'fine red ball point pens' were traded in the past quarter and the EAN code may be suitable for keeping track of such detail. But it seems unlikely that this detail would be worth the cost of management and collection for most government operations. More important data attributes for government agencies will include the capacity to support financial analyses.

Systems Interoperability

E-Marketplaces have not arisen as spontaneous discontinuities from traditional ways of enacting business. They have instead developed from the convergence of EDI and internet technologies bringing together the existing mature EDI standards of major organisations with the capabilities of smaller companies through the internet. With this convergence has been an expectation that more sophisticated business process management will emerge. These developments are sometimes characterised by legacy non-XML systems maintaining past investment with XML based developments occurring for future frameworks. This environment explains some of the uncertainty faced by new players.

The goal of interoperability requires common business and systems standards, with agreed communicability and interpretation of messages and business concepts for unambiguous machine-machine and machine-people communication (middleware). Despite uncertainties, the trend towards interoperability is becoming prevalent with convergence of key standards supported by collaboration between leading standards organisations.

The emergence of web based e-commerce has placed great demands on the standards framework compared to the pre-existing EDI environment. These demands are continuing a process of rapid evolution. An e-commerce standards environment aims to deliver the requirements of:

- basic service enablers such as messaging and information identification, location and storage, (where, what, when, who)
- business processes, collaboration (choreography) and management, (how, authorisation), and,
- business services and e-marketplaces (efficiency, enablement)

- all this across a landscape of heterogeneous technologies, languages, legislation, business conventions and commercial processes. These requirements are indeed challenging.

The selection of technical standards for e-GP is guided by the government policy framework and risk management which

Selected Established and Emerging Standards

Registries

- UDDI, ebXML-registry, DUNS

Catalogues

- UN-SPSC, GTIN

Networks

- UDDI, WSDL

Communities

- SWIFT, EAN

Security

- XML-DSIG, XML-ENCRYPT, WS-S, XKMS, SPML, SAML, XACML

Reliability

- HTTP/R, WS-R

Portability

- *Open Standards*

Communicability

- ebMS, SOAP, RNIF

Interpretation

- Namespaces, DTD, RELAX-NG, XML-Schema, RN/Dictionaries, CC, UBL

Collaboration

- BPSS, RN/PIPS, WSCI

Workflow

- WSCI, WSDL, BPEL4WS, CPP, CPA, WS-T, WS-C, UMM, BPSS

Documentation

- RN/PIPS

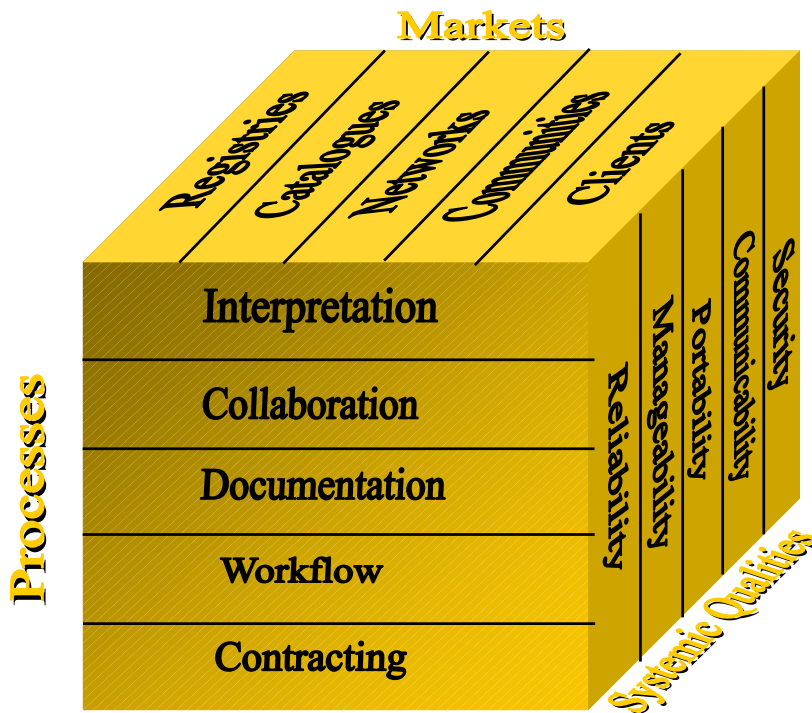
Contracting

- Legal XML

recognises that the relevant international open standards are in various states of development and maturity. Nevertheless there is increasing stability of standards in much of the important areas of e-commerce that are applicable to e-GP.

Figure 5 illustrates part of the challenge with a range of systemic qualities required for a variety of procedures across numerous markets and components of markets, all within a context characterised by an absence of contractual arrangements or system standardisation. Identification of standards depends on what processes are to be integrated, the markets to which they are applied and the qualities inherent in the sustainable technologies and business requirements.

Figure 5 – Standards Space



This ‘standards space’ is required to address all levels of functionality of the online marketplace such as was illustrated in Figure 1.

The complexities are not to be underestimated. Resolution will be a long process. These issues have been addressed since the 1980s in terms of the original EDI framework which faced implementation problems arising from reticence to change within organisations, ‘standards imperialism’ by organisations wanting to ‘own’ the ‘standards’ that they used, as well as the cost of systems and connectivity. With the emergence of the internet has come an urgency to move beyond organisational politics. To address this new environment the original EDI standards have evolved through a succession of XML derivatives and now onto Web Service standards. Selection between Web Service and ebXML standards depend on the nature of the subject market and maturity of available standards.

Jurisdictions should operate an open standards environment for their own operations and encourage this policy in the broader economy in the interests of widest possible interoperability. The underlying XML standard with the ebXML schema as well as the Web Services standards, together with their various derivatives, seem to be emerging as leaders and have been endorsed at national and international levels. Examples of this include the UK XML, US and French government support for ebXML, Korea for XML/SOAP/EBMS and the Danish support of XML/WSDL/SOAP/UDDI standards. These open schemas have been developed through worldwide collaborative processes of W3C, OASIS, UN/CEFACT, RosettaNet and IEEE which strengthens the probability that they will become mature and be maintained.

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Legislation

Countries have implemented various legislative models in response to the need for confidence and certainty for e-commerce and e-GP. As a general principle cyber legislation should conform to international standards to ensure interoperability with similar legislation in other countries. Such standards include the EU Procurement Legislative Package (and its definitions) and the UNCITRAL model law on e-commerce and e-signatures. UNCITRAL model law is currently being considered for e-contract management. Such legislation should be technologically neutral and aimed at avoiding legal ambiguity between contracting parties within and across borders.

These demands on the legislative framework are ambitious, with many countries quarantining some procedures and contracts from electronic formalisation. Such instruments commonly include documents of title, property sale, powers of attorney and wills. Other issues may arise in countries subject to Islamic law. Although the UNCITRAL law could be considered as providing a standard template, countries have not interpreted it in similar ways so that e-commerce laws do not allow inter-jurisdictional trading in many cases. Similarly for the EU standard, issues of interpretation have arisen. In the case of the UNCITRAL model, some countries have adopted legislation which is based on a particular technology standard, while others are technology neutral and some are mixed. In many cases e-commerce is difficult between countries with technology based legislation versus neutral based legislation.

As a general principle cyber legislation should conform to international standards to maximise interoperability with similar legislation in other countries

The UNCITRAL and EU standards are themselves only a narrow part of the relevant legislative framework. Other elements include:

- Electronic records management.
- Admissibility of electronic records in court
- Consumer protection.
- Data protection and confidentiality.
- Intellectual property, copyright.
- Codes of practice.

Other complexities will include jurisdiction for cross border transactions, and cross border taxation regimes. In most cases the comprehensive interpretation of cyber laws (where these exist) by the courts has yet to occur.

Security & Authentication

Affecting the rate of take-up of e-commerce and its development is the issue of confidence on the part of users in the integrity and reliability of systems. This issue is important both for local markets and international trading. This issue is also complex and requires governments to have developed policies, standards and legislation for their own business dealings and economies but also to be able and prepared to harmonise these settings in relation to their trading partners.

Confidence will be contingent upon users perceiving appropriate assurances of the following key attributes, each one of which is the subject of various existing and developing standards, regulations and business systems:

- **Security** – that their commercial e-information cannot be altered, added to or manipulated
- **Confidentiality** – that their commercial e-information cannot be accessed by unauthorised parties
- **Authentication** – that there is an appropriate level of assurance about:
 - the identity of other parties,
 - confidentiality and integrity of information transmission and storage, and
 - contractual or commercial intentions.
- **Privacy** – that information about individuals that may be part of commercial undertakings will only be used as intended.
- **Non-Repudiation and Traceability** - that parties that commit to contractual arrangements online cannot subsequently deny this.
- **Reliability** – systems can be relied on to perform in time-sensitive commercial environments.

These are sometimes collectively referred to simply as security and authentication. There is often a perception of security and authentication as technological issues. Security and authentication are first and foremost management issues, and require integrated

The standards and methods applicable to authentication and security should be commensurate with risk. Security and authentication are inseparable from the broader notion of risk management and should be addressed as part of a comprehensive information security management framework.

management frameworks addressing personnel and business issues throughout an organisation and in relation to other organisations. Technology interoperability is just part of this and is addressed in the interoperability standards. The standards and methods applicable to authentication and security should be commensurate with risk. Strong authentication can be supported by, for example, public key infrastructure with accredited digital certificate service providers, but this will not be appropriate for low risk transactions.

Security and authentication are inseparable from the broader notion of risk management and should be addressed as part of a comprehensive information security management framework. Extensive standards exist for such frameworks at the international level which is often reflected in country specific standards. Of particular relevance are:

- **ISO/IEC 17799:2001** IT Code of Practice for information security management.
- **AS/NZS 7799.2:2003** Specifications for information security management systems.
- **HB 231:2000** Information security risk management guidelines.

The requirements are non trivial, but more important each cannot be delivered by a single player and require multiple parties to act cooperatively. This adds to the burden of confidence building in this environment.

A further issue in relation to confidence is that of systems ownership and support. Governments sometime seek to outsource elements of the support or even seek the private ownership of the e-GP delivery system itself. The arrangements for private involvement of third parties need to be carefully addressed to ensure that these do not undermine the confidence of competing organisations in their business dealings with government.

Conclusion

This discussion is aimed at raising awareness amongst executives and managers of the significance of standards in maintaining and extending the key attributes of access and interoperability. These standards are to be found throughout the e-GP environment and not just in relation to software development, but extend to catalogues, security and management and even the legislation itself. This is an area that governments need not only to be aware of but to also participate in developments.

The roles for governments in this area extend to:

- Defining the policy framework determining the standards to be used for their own operations.
- Recognising the roles and methodologies of leading international standards bodies.
- Participating in the international collaborative developments of these standards.
- Recognising that their own operations should be designed consistent the wider application and development of e-marketplaces in their economy.

These roles and values support the objectives of enhancing transparency and accountability, management efficiency and economic advancement through the design and application of online applications.

Many governments, non-government organisations and companies worldwide support the work and recommendations of the leading open standards bodies especially W3C, OASIS, UN/CEFACT and RosettaNet for systems interoperability standards, UN-SPSC and CPV for catalogues and tendering, and international and regional collaboration for legislation and security management. Embracing these standards and participating the ongoing international developments of these, and related standards, represents the most advisable course for jurisdictions embarking on this path and seeking to maximize the benefits while managing the risks.

APPENDIX

Standards Organisations & References

For many areas of the business environment the standards bodies are established and mature, such as EAN, ISO and UNCITRAL. For e-business e-developments the situation has only recently begun to crystallise. Here there is a mix of national and international public, private and NGO organisations and associations with their own commercial / non commercial objectives:

- de jure standard bodies (e.g. UN/CEFACT, ANSI, ISO),
- de-facto standards (e.g. W3C and OMG)
- non profit standardisation consortiums (e.g. IEEE, OASIS, RosettaNet, CommerceNet),
- proprietary organisations (e.g. HP, VISA, SUN, Microsoft),
- other standards bodies involved in specialised markets or related work.

Previously many, these organisations were often competing with little consensus as to their necessity, now the strategic elements are broadly appreciated and have been reduced to a few major organisations which are becoming collaborative rather than competing – meaning that developers can increasingly expect to obtain unambiguous low risk guidance. For example UN/CEFACT works in close collaboration with ISO and OASIS and others, while the OASIS network includes UDDI and CGM Open. W3C coordinates with many standards bodies including IETF, ISO, IEEE, ICANN and OASIS. This switch from competition to collaboration between these standards bodies is perhaps the most significant development for e-commerce since the widespread emergence of online technologies

Standards for web based commerce being relatively new can be characterised as being in a state of development. For web based commerce there are scarcely any standards that might be confidently identified as being candidates for the long term, with the exception of XML and some of its derivatives. Because e-

commerce is in such a state of development it is important that jurisdictions not only monitor its developments but also actively participate and develop their own authorities on standards.

E-business standardisation bodies include the following, many of which are committees or affiliates of the leading bodies of W3C, OASIS and RosettaNet. IEEE is also a central to the formal establishment of recommended standards:

IEEE (Institute of Electrical and Electronics Engineers)

<http://www.ieee.org>

IETF (Internet Engineering Task Force)

Internet standards

<http://www.ietf.org>

W3C (World Wide Web Consortium)

Web and XML standards

<http://www.w3.org>

OASIS (Organisation for the Advancement of Structured Information Standards) –

Various sites:

<http://www.oasis-open.org>

XML.org

The OASIS repository and actions

<http://www.xml.org>

Cover pages

<http://www.oasis-open.org/cover/xml.html>

BASDA

<http://www.basda.org/design/front.htm>

Relax NG

<http://www.oasis-open.org/committees/relax-ng/>

UDDI

<http://www.uddi.org/>

UBL

<http://www.oasis-open.org/committees/ubl/>

XACML

<http://www.oasis-open.org/committees/xacml/>

SPML

<http://www.oasis-open.org/committees/provision/>

ebXML messaging

<http://www.oasis-open.org/committees/ebxml-msg/>

CPP / CPA

<http://www.oasis-open.org/committees/ebxml-cppa/>

Registry / Repository

<http://www.oasis-open.org/committees/regrep/>

WS-I

<http://www.ws-i.org/>

WSDL (W3C)

<http://www.w3.org/TR/wsdl>

SOAP (W3C)

<http://www.w3.org/TR/SOAP/>

CGM Open

<http://www.cgmpopen.org/>

IBM

<http://www-106.ibm.com/developerworks/webservices/>

BPEL4WS

<http://www-106.ibm.com/developerworks/webservices/library/ws-bpel/>

Web Services Security

<http://www-106.ibm.com/developerworks/webservices/library/ws-secure/>

Web Services Security: Trust Centre

<http://www.xmltrustcenter.org/faq.htm>

RosettaNet

www.rosettanet.org

CEFACT-OASIS

<http://www.ebxml.org/>

Specs ebXML

<http://www.ebxml.org/specs/index.htm>

ebXML adoption

http://www.ebxml.org/ebxml_jmt/

Registry Repository: the French Social Security proposal

<http://www.edisante.org>

CEFACT (United Nations Centre for Trade Facilitation and Electronic Business)

<http://www.unece.org/cefact/>

Data Interchange Standards Association

<http://www.disa.org/>

CEN ISSS (Information Society Standardisation System)

<http://www.cenorm.be/iss>

ISIS (Information Society Initiatives in Standardisation)

<http://palvelut.tieke.fi/edi/isis-xmledi/>

EAN International

<http://www.ean-int.org/index800.html>

UCC (Uniform Code Council)

<http://www.uc-council.org/>

Global Commerce Initiative

<http://www.globalcommerceinitiative.org/oas/gci/gci.home>

Swift (Society for Worldwide Interbank Financial Telecommunication)

http://www.swift.com/index.cfm?item_id=41667

Governments

Australia

http://www.noie.gov.au/NOIE/interop_frame/framework.htm#3.2

<http://www.apcc.gov.au/>

Denmark

<http://www.oio.dk/english>

European Commission

<http://europa.eu.int/ISPO/ida/export/files/en/1571.doc>

http://www.europa.eu.int/comm/internal_market/en/publproc/general/2k-461.htm

France

ATICA - ADAE

<http://www.atica.pm.gouv.fr/index.php>

UK

<http://www.e-gif.org/>

http://www.ogc.gov.uk/embedded_object.asp?docid=2350

US General Services Administration (GSA)

<http://www.gsa.gov/>

US Government

<http://xml.gov/>

<http://www.xml.gov/registries.asp> (a list of US administration XML registries)