

Electronic Invoicing: Almost Two Decades On

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Wouldn't it be great...

The following is the introduction I wrote to the Internet Document Transfer project I published online in June 2001¹.

Wouldn't it be great if you could receive your phone bill, electricity bill, bank statement, and any other kind of invoice or statement, by email. Wouldn't it be great if once you receive your invoice you could transfer it to your accounting system. Wouldn't it be great if you could send your customers your invoice, and they could pay it electronically once they receive it. I see a future where most paper documentation is replaced by Internet Standard Documents, and we can all send business documents as easily as we do with email today.

With the rise of the Internet email has now become a required part of business. A vast majority of businesses, and a huge number of consumers have access to email and the Internet. What is surprising is that despite this revolution in communication a vast majority of companies still send physical invoices and bills to each other and to their customers.

This projects primary goal is to introduce a method of transmitting business documents between different organizations without a requirement to coordinate the format of documents prior to transmission. In other words, you can send an invoice without the worry of the recipient not being able to import the invoice.

Not only did I write about the possibility of electronic invoicing, but I developed software to prove the implementations. In 2001 the technology to implement electronic invoices already existed.

My purpose in this submission is to discuss the non technical factors which have prevented widespread adoption of electronic business documents and their flow on benefits. I will also be addressing the question of governance.

¹ Internet Document Transfer Project - <http://idtrans.sourceforge.net/>

A Cautionary Tale

By establishing a proof of concept and promoting electronic invoicing and business documents I believed I would be able to secure the funding required from accounting system providers to continue implementation and promotion electronic invoices. In order to achieve this I committed a day a week working on an open source implementation in 2001. The technical aspects of the project were achieved, with a proof of concept end user application and the secure key servers required to mediate secure communication completed.

Over a six month period I was able to meet with a number of accounting software vendors to pitch the project. While one company extended limited support no organisation was willing to commit funds or resources towards the continuation of the project.

The benefits are clear to users of this technology but there are barriers within the software vendors space which were not at all technological. In addition another project was to start, ebXML², with the express aim of developing electronic invoicing and business document transfer. Since this project ended I have had time to reflect on what went wrong.

Vendors do not like Interoperability

While open standard protocols like TCP/IP, HTTP, SMTP and POP totally changed the world in terms of being able to connect computers prior to this software vendors simply would not collaborate to develop a common protocol. Each networking vendor had it's own products and the commercial world meant they were competing with one another. This was far from ideal for customers. Only after open protocols and the rise of the Internet did software providers like Microsoft embrace these open protocols³. But even then Microsoft attempted to embrace, extend and extinguish the open protocols, resulting in the Browser Wars.

From 2005 I was involved with efforts to challenge Microsoft's patent applications for using XML for word processing files⁴. The purpose of XML was to enable transfer of structured data. In order to shut down interoperability Microsoft attempted to patent how they used XML to store word processing documents. This would make it impossible for other software companies to interoperate with Microsoft XML documents. Interoperability is actually bad for software vendors who want to keep their customers locked into their product.

The same forces which conspire to prevent interoperation in networking and word processing were also at work in the accounting software field. By supporting proprietary formats a software provider can leverage their customers who wish to interoperate into applying pressure on their suppliers and customers to adopt their technology.

2 Electronic Business using eXtensible Markup Language - <http://www.ebxml.org/>

3 'The Road Ahead' by Bill Gates

4 NZOSS wins patent opposition - <https://nzoss.org.nz/content/nzoss-wins-patent-opposition>

This was one of the main reasons I met resistance with software vendors. While there were clear benefits to customers, businesses and government in having a single universal standard for business documents the software vendors had little reason to give it to them and a big reason not to.

The mess of different communication mechanisms means that unlike SMTP where people can send messages around the world to any recipient no similar system has been adopted. Major integration system companies make a good deal of revenue from this situation. I know because I worked for one developing health related integration systems.

Currently Xero offers an easy to use system where you can directly send invoices to your customers via Xero if they also use Xero. Xero does not support open standards based invoices such as ebXML. While financial self interest is not the only barrier to software vendors adopting open standards for business documents it is a major influence.

The Tragedy of ebXML and UBL

The electronic invoicing project plans to use OASIS UBL 2.1⁵

My efforts on Internet Document Transfer ended once I realised there was an international standards effort being made with ebXML and UBL. My assumption was that the standard would be published and then adopted by accounting system vendors universally. As a strong supporter of open standards I strongly supported this effort in principle. I assumed that it would only be a matter of a year or two before we would see widespread adoption.

Almost twenty years later and we have not seen adoption. Invoices are usually sent to consumers in PDF format, forcing them to manually enter the invoice details into internet banking systems. So why did ebXML and UBL fail to achieve adoption?

We have already discussed the problem of commercial incentives for software vendors above, but this was far from the only reason. The other major contributing factor was complexity resulting from trying to address use cases being driven by large corporations.

The ebXML and UBL standard came out of a process dominated by corporations. The focus was on replacing the existing EDIFACT standards and catering to use cases specified by corporations with a focus on business to business communications rather than business to consumer.

They imagined that solutions would involve a complex chain of negotiation and system setup for each user. At the time my own approach was to develop a very simple schema to handle the most common use cases. My design principle was that any software implementing the standard would at least be able to understand the basic information in the invoice. Each company could extend the invoice schema to include more information if required by partners, but such information would not be included in the standard invoice schema.

5 Invoicing Business Process Specifications - <http://digitalbusinesscouncil.com.au/invoicing-semantics/>

This minimalist approach was not taken by the OASIS standards group, and so we ended up with schema which were bloated and difficult to implement.

Invoice document format was only the start however. In order to transfer invoices or other business documents requires security, including signing and encryption. The ebXML system addressed the larger issue of discovery by introducing a system for discovery.

Again the focus for the solution was focused on large corporations rather than consumers or small businesses without committed IT human resources. The needs of large businesses involved larger issues around process management.

In summary, the complexity of message formats and transmission systems made implementation expensive. Rather than being adopted universally it was seen as just another format for integration specialists to connect to. Those required to use it in order to communicate with large corporations who had adopted it were usually forced to purchase integration software.

What we did not see from these standards was a focus on delivering a system which would be similar to email, where the standard would be pervasive and broadly implemented. While it would be good for EDI implementation specialists it would do nothing to actually deliver on the real vision.

Where to now?

The discussion document published by NZBN has a focus on proposing the establishment of long-term operational governance for electronic invoicing. The real question here is how should Australia and New Zealand go about establishing a robust standard for electronic documents?

The answer I believe is to give this governance responsibility to an existing organisation that has a long history of promoting open standards and involvement with electronic communication. My concern is that establishing a group of vendors and large businesses with a motive to profit from the standard will only end up with the same outcome as ebXML, a system used only by a minority of corporations.

The logical organisation to front this effort in New Zealand would be InternetNZ.

They have a long history of dealing with communication related open standards. They have access to an existing network of technical professionals in this field. They are committed to an open Internet. They are not owned or controlled by any commercial software vendor and would represent not only the interests of organisations but of the public at large.

Unfortunately this glowing recommendation does not come after consultation with InternetNZ as I am writing this only a few days before the November submission deadline and only found out about this initiative a few days ago. Putting governance in the hands of an organisation that has a profit motive and without any representation for consumers in New Zealand would be a mistake.

Focus on Consumers and Small Businesses

Regardless of how the project is governed I believe the governments involved should ensure there is a understanding that this project is not simply about large organisations communicating among one another. The objective should be to see universal adoption of the standard across business and government, both national and local. We would see all utility companies adopt it for sending bills to customers.

The online banking experience for consumers would mean invoices appear directly in their online banking system and allow almost one click payment. Obviously there would be protections in place such as cryptography signing to ensure invoices are genuine.

Clearly banks, software companies, utility companies and Government must collaborate together to deliver this vision, but must also have consumer interests at heart. While each stakeholder will benefit financially from this project we must ensure that it is not done in such a way that profits can be made from forced compliance with a standard. Ideally the aim should be to encourage adoption on the basis of value and efficiency, not compliance.

Go Mobile Friendly

A consequence of going mobile friendly would be adopting a technology platform which is friendly to all devices, including popular mobile devices such as smart phones.

To facilitate this we should reduce the technical difficulty of implementation. Ideally it should use protocols and technologies which are already well supported and trusted. This is especially important with security algorithms.

I would recommend reconsidering the use of the existing UBL 2.1 standard which relies on XML parsing and SOAP, which is not well supported on mobile platforms. It may be better to use JSON and HTTP with SSL. We should ensure we make technology decisions which recognize technology has moved on since ebXML and UBL and that we should consider a more simple implementation and schema to support all devices.

Into the Danger Zone

The discussion document has a focus on business to business (B2B), between large entities in different countries.

“As e-Invoicing is an industry-led initiative for primarily business-to-business transactions, it would not be appropriate for our governments to unnecessarily expose themselves (i.e. taxpayers) to e-Invoicing operational costs and risks. “

There has already been an industry led effort. It too had a focus on B2B. The effort, ebXML, was a failure. Successful protocols like TCP/IP, HTTP and SMTP were created as open protocols for everyone, so to should this system. Without universal adoption by all it's value will be undermined. The majority of the benefit will only accrue with wide adoption.

The discussion paper continues to discuss the roles and functions:

- *ownership of the trans-Tasman framework and any associated Intellectual Property (IP);*

As a standards setting body all intellectual property should be open. A standard should be available to all to use openly. Implementations might be created by commercial entities such as software providers, but these fall outside setting standards.

- *change management for network impacts;*

Network impacts implies that the organisation would be providing services. As an organisation which sets standards it should not be able to directly profit from this role.

- *financial management including oversight of a self-funding model and charging structure, which may include licensing charges to providers and/or transactional costs for use.*

This sounds very concerning. A body able to set a standard and enforce it's use could would also set the fees? Such fees would be an utterly unnecessary barrier to adoption. This organisation should certainly not be involved in anything transactional. One possible option would be for it to run the trust network; the mechanism that ensures distribution of public keys. This would be similar to other signing authorities.

- *oversight of the accreditation model;*
- *stipulating the level of insurance requirement;*
- *identification of agreed process for dispute resolution;*
- *defining the level of contract disclosure between parties;*
- *defining and governing behaviour between service providers operating under the framework*
- *establishing and maintaining service level agreements, the security framework and ongoing compliance with all relevant requirements (e.g. MoU).*

All the above have more to do with large corporations, not small business or consumers. It is questionable to say the least whether this body should be involved in any of the above. The governing body should be there to manage implementation and deployment. It should not unnecessarily inject itself into business relationships.

Question 1

What do you consider to be significant policy or legal barriers to the implementation of e-Invoicing in Australia and/or New Zealand?

Currently there are no policy or legal barriers to adoption. The two primary barriers to adoption have been commercial interests opposing open standards that endanger vendor lock in and the difficulty of implementing open standards which were designed for complex B2B rather than real world B2C. Wide adoption requires a strategy which will handle both.

Question 2

What do you think would be the best legal structure for the operational governance body?

I believe the best option would be to offer responsibility to respected existing non profit organisations that have substantial experience in open standards and communications technology. Specifically in New Zealand I would recommend InternetNZ.

InternetNZ has substantial experience with policy development, open standards, managing the Internet domain system and taking care of the public interest.

The recommendation in the discussion document on the other hand would establish a new organisation with no track record, constructed of existing stakeholders who have a financial interest in profiting from those excluded; small business and consumers.

Question 3

a) Beyond the initial establishment phase, who do you think should lead the operational governance of trans-Tasman e-Invoicing; and what functions and roles should the operational governance arrangement include?

Similar to the domain name system I see a need for a trust system for distribution of public keys or certificates. This will be required to ensure security and verify authenticity of documents. My own view of such a system is that it would be distributed among many providers, not run by central government or a single contracted provider. Certification and licensing of these public key trust servers would be handled by this organisation.

b) Do you see sufficient incentive in our proposal for you to consider participating in the operational governance body?

Under the recommended formation which only includes vendors and larger stakeholders I could not participate as a small business owner. If it were assigned to an organisation such as InternetNZ where individuals could have input I would be more than happy to commit time and effort.

Question 4

How do you think the long-term sustainability of the operational governance of trans-Tasman eInvoicing, with appropriate cost allocations, can best be assured; and what funding models do you suggest?

The framing of the question is putting the cart before the horse. The real question is how eInvoicing can be developed and deployed broadly in both countries. You will note that there are no organisations managing SMTP, but everyone depends on email. This is a winning model that is sustainable.

Another model is the domain model where there is a registration system. The public key security system would work well using a similar system where commercial providers could provide the live services under the authority of a central body. That central body would take a fee from the revenue from these public key service providers.

Leveraging existing well tested models would be best. Creating new models and introducing new transaction fees on every invoice would only serve to undermine the ultimate objective.

Question 5

Do you have any additional comments or information to assist us with reviewing and further developing our early thinking and conclusions about a preferred option for operational governance of trans-Tasman e-Invoicing?

In conclusion I believe that if this undertaking is understood to mean bringing eInvoicing to a wide audience including consumers who would greatly benefit everyone. My vision of 2001 where people could receive and pay bills online at the click of a button has not yet been realized.

The challenges were not technological, they were a consequence of narrow thinking, of ebXML being treated as the exclusive domain of the EDIFACT brigade. The published discussion document appears to be making many of the same mistakes, proposing to add barriers to adoption and enabling large software vendors to impose additional costs on small business while ignoring consumers. In my view such a strategy is not just a gross waste of an opportunity but doomed to fail, repeating history.

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