

e-Government Interoperability

A comparative analysis of
30 countries

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Status of this White Paper

This document is Version 1.0 of the White Paper, published in July 2010. We will keep its contents under review, posting updated versions of the White Paper at www.cstransform.com to reflect the ongoing development of this agenda and comments on this version by users and practitioners.

If you would like to comment on this document please email us at impact@cstransform.com.

1: Introduction

This White Paper presents the results of what we believe is the world's first comprehensive study of e-Government Interoperability Frameworks across the world.

CS Transform is a consulting business which is committed to helping governments deliver citizen service transformation. As part of that commitment, we are publishing a series of White Papers dedicated to understanding citizen service transformation and how governments can make it a reality. This White Paper forms part of that broader series, which can be accessed at www.cstransform.com. Specifically, it is a companion paper to an earlier White Paper published in November 2009, entitled "Beyond Interoperability: towards a new policy framework for e-Government".

In "Beyond Interoperability", we argued that the e-Government interoperability agenda - despite being espoused by an increasing number of governments around the world, and despite being actively promoted as best practice by organisations such as the United Nations - is failing to deliver on the expectations which many policy-makers in governments have for it.

And we went on to argue for a more holistic approach, which we called the "Policy Framework for Citizen Service Transformation", and which we believe represents a more complete model of the policies, guidelines and standards needed to achieve ICT-enabled transformation than is contained in traditional approaches to e-Government interoperability.

Since publication of this white paper, we have had much positive feedback on our proposed Policy Framework from policy-makers around the world - but also requests for additional evidence about the weaknesses in traditional approaches to interoperability.

This white paper responds to these requests for more detailed evidence. We are happy to acknowledge the assistance of Microsoft Corporation in enabling us to do this. Following publication of our initial white paper, Microsoft approached us offering access to a database they maintain, which attempts to keep track of all the standards lists being set and maintained by governments around the world. The database covers 30 published eGIFs, as set out in Figure 1. We have used this centralized dataset of eGIF standards to undertake the analysis presented in this White Paper.

The paper is in three main parts:

- Section 2 describes our **methodology**
- Section 3 presents **key results** of our analysis
- Finally, section 4 sets out our **conclusions and recommendations** - and includes comments from leading interoperability practitioners who have reviewed this report in draft.

Fig 1: national eGIFs analysed in this White Paper

Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Denmark, Egypt, European Interoperability Framework, Estonia, Ethiopia, France, Germany, Greece, Hong Kong, Hungary, India, Malaysia, Malta, Mauritius, Netherlands, New Zealand, Norway, Philippines, Poland, Saudi Arabia, South Africa, Spain, UK, USA

2: Methodology

There are over 3250 standards listed in the 30 eGIFs reviewed during this analysis. To help bring some order to our analysis of this universe of standards, we have taken the following four-step approach:

1. **Apply an "up-to-dateness" filter.** Specifically, we have selected for the most detailed analysis all those national eGIFs which have been published - or updated - since 2007. There are 17 eGIFs that meet this criterion. Given the pace of change in market and technology developments which we discuss more fully later in this paper, we believe it is sensible to focus on these most up-to-date eGIFs as the best basis for understanding what are governments' current technology standard needs.
2. **Rationalise the lists of standards** in these most up-to-date eGIFs, in order to remove duplication, variations in the naming of standards and variations in versions of the same standard. After rationalisation, the 3250 standards listed in the 17 most up-to-date eGIFs were reduced to 1180 - a 64% reduction.
3. **Analyse the lists of standards** with a view in particular to:
 - identifying the areas of commonality, and inconsistency, between them
 - reviewing the extent of their compliance with CS Transform's recommended criteria for e-Government standards as set out in "Beyond Interoperability"
 - evaluating the extent to which this analysis provides evidence for the three major pitfalls of interoperability which we described in "Beyond Interoperability"
4. **Validating the above analysis** against the older set of eGIFs, by checking that the emerging conclusions from the most recent eGIFs seem to hold good for older ones as well.

Inevitably, a number of assumptions and subjective interpretations have had to be made through this process, but we believe that, together with our own experience in this area, the analytical method is sufficient to support our conclusions.

3: Key results

The findings from this analysis strongly support the approach set out in our "Beyond Interoperability White Paper". In that paper, we argued that most work on e-Government interoperability suffered from three major drawbacks (as summarized in Figure 2 below): over-engineering; lack of focus on government-wide business transformation; and inadequate implementation.

Fig 2: Three common pitfalls in e-Government Interoperability Frameworks¹

Over-engineering

Much of the technical content in many eGIFs is at a level of detail which, nowadays, is unnecessary. The market has matured significantly in recent years, so the solutions to many of what were previously seen as technical barriers to interoperability are now 'designed in' to a wide choice of competitive, commercial products. When the UK launched its eGIF, for example, it was an important and market-shaping decision to specify the use of XML for data exchanges and IP for interconnections - but now, in a mature market, the need for such government standard-setting is much reduced. Yet many governments still seek to specify long lists of detailed standards. This over-engineering at the technical level results in two problems:

- First, unnecessary mandation of standards by governments can distort the market, damaging competition and innovation, especially in areas where technology is still nascent and there are multiple possible standards that could emerge in a particular area.
- Second, it distracts attention and resources from the harder issues - that is, the business, organizational and cultural barriers which prevent agencies from joining-up services around customer needs.

Lack of focus on government-wide business transformation

Fundamentally, the interoperability agenda is still a technically-driven one. The focus on Enterprise Architecture has helped, but the work on this has been very much shaped by the specific needs of the largest government in the world, the USA. The US Federal Enterprise Architecture (FEA), which many others look to as a model, is very much focused around improving the efficiency of each individual agency (with every federal agency being required to develop its own EA consistent with the FEA), and much less focused on transforming the relationship of citizens with the government as a whole. And in Europe, the debate on expanding interoperability into the organizational and policy layers is right in principle, but in practice is being drowned out by the continued over-emphasis on the technical layer in the EIF. Moreover, the interoperability debate is being carried out separately from much of the real progress that some governments are making to address organizational barriers to citizen service transformation.

Inadequate implementation

Finally, many governments struggle in moving their eGIF from being a written document to a delivered reality. Despite the concerns raised above about the limitations of the interoperability agenda, there is no doubt that it also contains much which is good and useful. Too often though, governments find that a published framework can be difficult to translate into sustained and transformational change in practice.

¹ Source "Beyond Interoperability: towards a new policy framework for e-Government", CS Transform Limited, 2010

Below we look in turn at the evidence base for each of these pitfalls which is contained within our latest analysis.

3.1 Over engineering

Our analysis identifies a wide variation in the approaches taken and content included in the eGIFs. At one extreme there are over 700 standards listed in one eGIF (the Netherlands) whereas at the other end one eGIF (Norway) has just 47 entries, with the average being about 150 entries.

Of the standards listed, a relatively small subset appear in the majority of eGIFs, and there is then - as illustrated in Figure 3 - a very long tail of standards which have been selected by only one government, approximately 75% of the total number. Just over a third of the single entries all come from the Netherlands eGIF, but even so this still leaves a large set of standards being specified by one government which other governments see no need to specify.

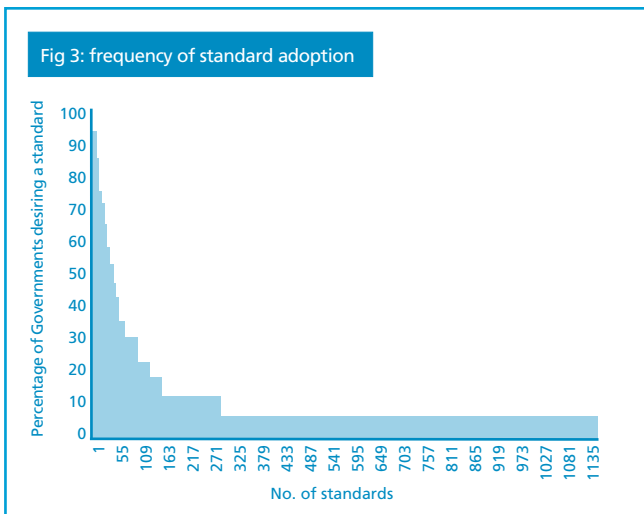
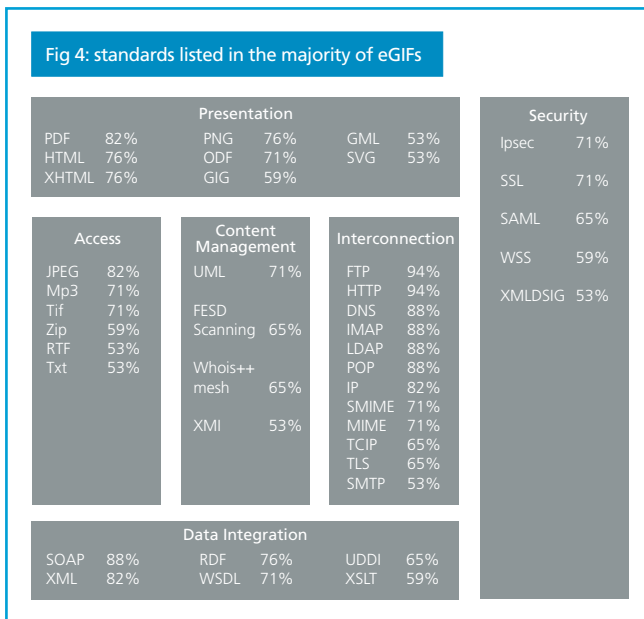


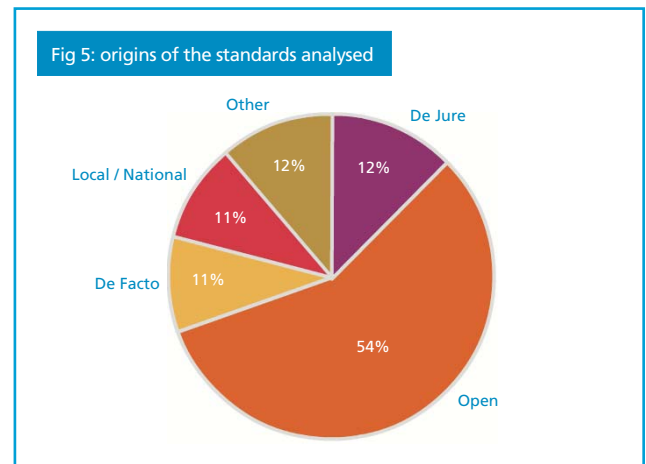
Figure 4 below highlights the most commonly listed standards - those which are contained in at least half of the eGIFs studied.



Two points emerge clearly from Figure 4. The first is that these commonly-used standards span all the main technical domains. In a sense, these standards can therefore be understood as representing a "common core" of technology requirements across the global public sector. Obviously, our criterion for inclusion in the standard-set illustrated is an entirely arbitrary one (ie that a standard is listed in 50% or more of eGIFs studied). Extending this parameter would introduce more standards into this set. And indeed there are some strong candidates to be included in any common core eGIF", but which for some reason do not currently appear in most existing eGIFs - such as for example HTTPS, IEEE 802, SQL.

The second point is that the standards are, very largely, "obvious" ones. These common core standards are in effect a fact of life in the marketplace - raising doubts about the extent to which there is a need to invest significant time in developing policy frameworks which specify such standards. In effect, the task is not to create a set of government technology requirements which are different from those used in other sectors, but to align government with private sector best practice. This was true even in the very early days of eGIFs. When the UK Government published its first version, aspects of internet technology were in their early days and so it was necessary then to put some stakes in the ground around a number of emerging industry standards like XML and TCIP. But even then the emphasis was on alignment with industry rather than driving industry to create a bespoke set of standards just for the government sector: "the Framework aligns government with the rest of industry"². The value of this approach is two-fold: it ensures that government can benefit from a competitive and well-supported market place, and also it facilitates interoperability and service integration between public and private sector service providers.

We also found a significant variation in the origin of the standards, as illustrated in Figure 5. Around two-thirds of the standards come from either one of the four De Jure standards organisations or from other Standard Setting Organisations which mean we can consider them to be Open standards (as defined in Figure 6 below). The other third is then split broadly equally between: de facto global standards; local/national standards; and other³.



² "e-Government Interoperability Framework", Cabinet Office, September 2000
³ Quite a few entries in the eGIFs studied are not standards per se, for example there are references to products, references to methods and/or good practice, references to Organisations, and references to open source implementations of standards. We have classed these as "Other" standards in the analysis results.

Linked to this, we found significant variation in what might be termed the "quality" of the standards selected. As a proxy for quality, we assessed the extent to which the standards complied with the four criteria recommended in "Beyond Interoperability" for selecting eGIF standards (which for ease of reference are repeated in Figure 6 below).

Fig 6: CS Transform's recommendations for eGIF standard selection⁴

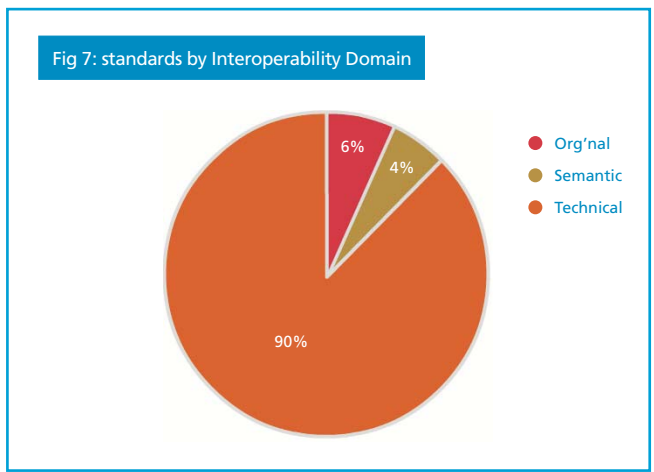
Don't seek to micro-manage the technology market. Only specify the minimum technical standards needed to guarantee a competitive market place and to ensure system and data interconnectivity for your e-Government programme - more than this risks closing off innovation. When you do specify standards, make sure you do so through an inclusive and transparent process which is open to all stakeholders, and aim to select standards which are:

- **Open** - have been developed through an open decision-making process
- **Mature** - have been around for some time and therefore are tried and tested
- **Internationally accepted** - are global in nature and not parochial to any specific country or region
- **Easily deployable** - are openly published (including availability of specifications and supporting material), either with no royalties and other restrictions on reuse, or with any such restrictions offered on reasonable and non-discriminatory terms
- **Well supported in the market place** - a standard is more than a ratified specification, it should have gained acceptance in the marketplace, including a choice of suppliers whose products support the standard.

The common core of standards listed at Figure 4 were by far the most compliant with these best practice principles - 85% of them meet the guidelines listed in Figure 6. Of the remainder - the "long tail" of standards illustrated at Figure 2 - only around 65% meet our guidelines, which raises some significant questions related to the utility of these standards and why they have been listed.

3.2 Lack of focus on business change

Our analysis also provides significant evidence for the view that eGIFs largely focus on technical interoperability, at the expense of broader business and organizational issues. Despite the increasing focus - in theory at least - on what the European Interoperability Framework calls "the organizational, legal and political domains of interoperability", in practice the eGIFs we studied focus almost entirely on the technical domain, as illustrated in Figure 7.

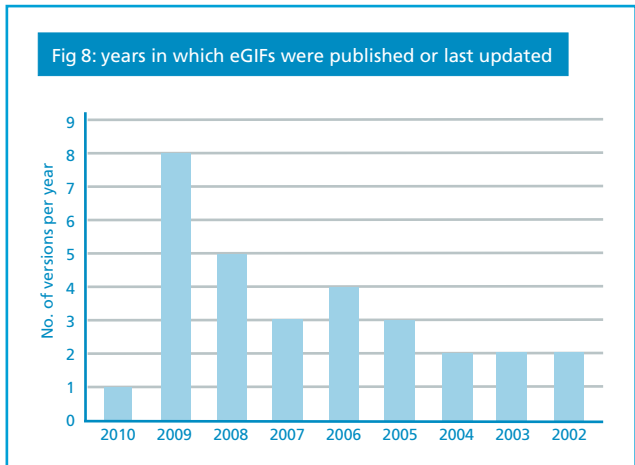


3.3 Inadequate implementation

Finally, the analysis also provides further evidence for the view that eGIFs are often not effectively implemented after publication. We emphasize in "Beyond Interoperability" the need for good governance around the whole e-Government Programme and that applies just as much to eGIFs as it does to other aspects of the Programme. Without an appropriate eGIF governance regime then the initial investment in time and resources will be wasted and effective technical interoperability will not happen. As a caveat, we have not as part of this new analysis attempted to review the implementation or governance regimes associated with the eGIFs being studied; merely the eGIFs themselves.

That said, two significant findings are relevant.

First, it is clear that many governments tend to publish an eGIF and then update it very infrequently or never. Figure 8 illustrates, for the 30 eGIFs studied, the year in which they were last updated (or published, if they have not subsequently been updated). The Hong Kong government updates its eGIF every six months, but this is an exception. Over half of eGIFs are over two years old. This is a serious weakness when operating in an-ICT-based environment, where new standards and new versions of existing standards appear on a regular basis. Unless there is regular maintenance of the eGIFs then inconsistencies and incompatibilities will arise which in turn will increase the difficulties of intra-government interoperability. Even worse, eGIFs that fail to keep up with the rapid pace of change in ICT standards may actually retard progress within government, by restricting government users to aging or out-of-date technology.



Second, the sheer number and variety of standards being listed in eGIFs represents a barrier to effective implementation, because:

- It becomes more difficult to establish the conformance testing programmes which are really essential to delivering effective interoperability. Most Governments and a lot of the standards organisations have not addressed this aspect of supporting eGIFs.
- Compliance becomes more difficult for technology suppliers. Having to support these numbers increases the operating cost for suppliers, and for many smaller, national companies this can mean restricting the market place in which they are able to operate. Even for the larger, global companies the scale and fragmentation of the standards being required by governments collectively represents a significant challenge.

⁴ Source "Beyond Interoperability: towards a new policy framework for e-Government", CS Transform Limited, 2010

4: Conclusions and recommendations

Overall, it seems clear that the arguments put forward in our White Paper on "Beyond Interoperability" have been validated and strengthened by the detailed analysis which has been facilitated by Microsoft's help in sharing their database of national eGIFs. The ten best practice principles for driving forward genuine, citizen-centric interoperability which are set out in that White Paper remain, in our view, vital. They are summarised in Figure 9, and can be reviewed in full at www.cstransform.com.

Fig 9: Developing a Policy Framework for interoperable, citizen-centric services - 10 principles for success⁵

1. Ensure top-level ownership
2. Focus on business change, not technology
3. Ensure cross-government coordination
4. Map the current environment
5. Prioritise
6. Don't re-invent wheels
7. Promote competition and innovation in the IT supply market
8. Don't assume you have all the skills in-house
9. Drive Change
10. Be prepared for the long haul

In addition, however, we believe that our new analysis highlights in particular three important additional messages for interoperability policy makers:

- Keep it simple
- Keep it current
- Sharing and collaboration is needed at a global level.

4.1 Keep it simple

There seems a strong prima facie case that the real value in the eGIF approach lies in its ability to align public sector IT behind best-of-breed standards and approaches which are already broadly adopted across the wider market. This is what the majority of governments are already doing with the "common core" of technical standards we have highlighted at Figure 4 above. But the value for any government of spending a significant amount of policy time in developing that country's own version of the "long tail of bespoke standards" which is also illustrated in that chart, seems very doubtful.

As we said in Beyond Interoperability, governments should not seek to micro-manage the technology market. They should only specify the minimum technical standards needed to ensure system and data interconnectivity for their e-Government programme - more than this risks closing off innovation.

4.2 Keep it current

Regular maintenance of eGIFs is essential to the overall goal of technical interoperability. New standards and new versions of existing standards appear

on a regular basis and certainly since the first eGIFs started to appear in the early 2000s there has been a plethora of new standards. For example in the Security domain it is only in the last few years that standards like SAML and WSS have really come to the fore and gained true market penetration. Similarly standards like ebXML and UBL are now well established but were hardly being discussed back in 2000. Because of this fast pace of evolution we believe that Governments should review their eGIFs at least every two years and update their lists of standards.

4.3 Sharing and collaboration is needed at global level

There seems to us a strong case for a more collaborative approach to interoperability policy at a global level, for three reasons.

- First, while the eGIFs we have studied may help achieve technical interoperability and e-Government Programmes within national, regional and local Governments, they do not help interoperability between governments. This is because of the sheer range, variety and lack of agreement on versioning which is seen in the standards being used. In today's global world, with freedom of movement and global trading, that can be a very serious drawback.
- Second, there are significant economies of scale that governments could realise if they co-operated more and reduced the variation of standards. If the central task of keeping up to date a core catalogue of technical standards that align governments with industry best practice could be managed collectively, this would free up resources in governments to concentrate their efforts on any further local standards that may be required because of specific needs not shared by others - and also, crucially, on addressing the non-technical barriers to effective e-Government.
- Finally, a more collaborative approach would reduce supplier costs and hence make it cheaper all round to buy standard conformant products.

⁵ Source "Beyond Interoperability: towards a new policy framework for e-Government", CS Transform Limited, 2010

4.4 Perspectives from policy-makers

Having started to test the conclusions of this report on selected policy makers, we believe they are very much along the right lines (see Figure 10 below).

Fig 10: Perspectives from policy makers

Perspective 1 - United Kingdom:

"One of the things we've learned in the UK is that interoperability 'in the round' is certainly not a problem with a single, simple solution - like making a list of standards. Instead, a complete, long game solution begins with a cold, hard examination of the business change that is required, and then moves to the means by which it will be achieved through persistence over time.

Albeit that making and maintaining lists of technical standards may indeed be one of those means, we have to beware that it does not become an easy distraction activity, used present a picture of action while there is avoidance of the difficult people and process changes that are most likely to be the biggest challenges of all.

Put most directly, clarity of purpose on the customer side, and a competitive and innovative supplier market-place: these are the two keys to success, and they don't get delivered by lists.

Reflecting upon the decade or so since the launch of the UK e-GIF in 2000, and looking to the future, I believe that interoperability continues to be ever more important to the effective use of IT. I see that the public government sector is ever more cognisant of its Siamese-twin roles as a large, significant customer of the private sector IT suppliers and the setter of the wider regulatory and legal environment within which all parties must operate. It's important that both roles work in harmony to apply pressure towards a presumption of interoperability. All parties focusing on delivering the desired business outcomes together will see all the people, process and technical standards/ technology interoperability issues resolved as a matter of course.

In order to maintain momentum, a key challenge for the near future is to understand how best to engineer such an open and collaborative approach to detailed problem solving while respecting the necessity for market competition in supply; but, as I said at the beginning, interoperability in the round is certainly not a problem with a single, simple solution."

Dr Andy Hopkirk

Director of e-GIF Programme, UK National Computer Centre

Perspective 2 - World Bank:

"CS Transform's analysis is very much consistent with our own view on ICT implementation. Often governments put too much focus on technology, and not enough on the governance, business model and change management issues which are really the key to interoperability. Building lists of technical standards is just not as important now as it may once have been - we can simply use open standards that are widely available in the market. Some governments, like Canada, have avoided the eGIF approach altogether and are doing very well without it. As we see it in the World Bank, the value of the eGIF approach lies not in listing the technical standards which are available in the market, but in developing the schemas and use cases for how these will be deployed within government. CS Transform's suggestion that the basic task of keeping up-to-date a catalogue of core technical standards should be managed at a collective, global level is a good one. Many governments are reinventing the wheel in this area - paying consultants to copy some other country's eGIF. So a global reference model eGIF would be a very positive development, enabling governments to focus on the more significant business issues. We in the World Bank would be very supportive of the idea."

Randeep Sudan

Lead ICT Policy Specialist, World Bank

5: Next Steps

The analysis which CS Transform has undertaken so far - particularly the identification of the "common core" of technical standards - could form the early basis of the next stage of this work, leading to the production of a single catalogue of standards that align governments with industry. Much more would be needed to be done to define this properly - not least in addressing issues of which version of these standards is most appropriate.

How could such work be taken forward? One possibility would be for a relevant international body - for example, OASIS, with its mandate to promote e-Government standards and best practices - to provide a forum for this work.

We believe that the potential benefits to the global e-Government community suggest that this work would be worth doing and we invite comments and views on the value of this and suggestions and proposals for how it could be accomplished.

If you would like to, please:

- Email us at impact@cstransform.com
- Or post your comments and views, and join in the ongoing discussion, at the LinkedIn Group "eGov - eGIF analysis" (see www.linkedin.com/nhome/).

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