

## INFRASTRUCTURE FOR E-GOVERNMENT IN DENMARK WITH FOCUS ON XML AND DIGITAL SIGNATURE

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As you see from my typical Danish name (!) I am originally Chinese. I moved to Denmark when I was 16 months old so I am totally Danish in my mind.

The theme of this year's ICA conference is "Innovating and transforming government through information technology" and ICT is one of the main agents for innovation and transformation today, not just in the public sector but broadly in society.

I have chosen to speak about e-infrastructures for e-government, because e-infrastructures are the foundation for digitising government administrations. By supplying common career and cost-effective e-infrastructures it will be possible to secure that e-infrastructure investments are only made once and on a common, open basis for all public institutions and authorities to use. But delivering common solutions on e-infrastructures, it will be easier to cash-in on the efficiency gain in the public sector, as it has been possible for efficient private enterprises to do.

In many ways e-government is one of the biggest challenges for the public sector today. You may ask yourself whether e-government is just hype, a buzz-word, with no real implications for your own organisation and the way you choose to work. It is easy to jump to this conclusion, looking at the impact so far of introducing new technology in the public administration. Did new technology really change things fundamentally? And why should e-government do this today?

If you take a look [\[slide\]](#) at the pressures today on public institutions you will quickly recognise that the demands made by the public are far more complex and differentiated than they were just five or 10 years ago. The citizens and businesses in your countries are more aware of getting more services for the tax money paid each year. They are focused on better services, perhaps even more flexible services, true 24/7 services, meaning services 24 hours a day, seven days a week, all year long.

Public institutions should be more aware of the customers and their needs. The public want easy access to public services and they want services when it is convenient for the citizens to get them and not when it is convenient for the public institution to deliver them.

The public institution is also under considerable political pressure to deliver services more cost-effectively and efficiently, and typically under increasing budgetary constraints. These different kinds of pressures on the public institution give key incentives to do things differently in order to make room for new priorities and avoid the negative results of cut-backs and pessimism in your organisation.

The smart way of handling pressures is to force yourself and your organisation into a positive change process, with focus on development and innovation of your organisation and your employees. This is why the Danish government has its focus on e-government, looking at it as a means of forcing structural and organisational changes onto the public sector and public institutions in order to make the public sector more efficient and flexible and more responsive to public demands.

Often when I discuss e-government with colleagues I say that IT and electronic communication is *not* the issue of an e-government. This often raises fierce discussions on the nature and content of e-government. When you take a look around the world and observe what initiatives are taken under the title of e-government initiatives, they are often linked to technical projects delivering online web services to citizens and businesses in various sectors.

Online web services are typical: a nice web page, a front, a façade. The real challenges lie behind the façade. It is easy to set up an online service for a specific target group of citizens or businesses but it is extremely difficult to change processes in order to make the back office and a technical backbone efficient. Therefore I see e-government as a tool for change - a tool for change in the way we do things, a tool for change in the division of labour both within the organisation and between organisations, a tool for change of technology and a tool for change of competencies.

[slide] The Danish focus is simple: how can we make the public sector more effective? How can various political initiatives establish a secure environment where each citizen and business will rely on electronic means in their communications with the public sector? By fully digitising the public sector it is our aim to harvest the efficiency gain and at the same time make sure that the public sector can continue to offer more services without diminishing their quality and scope.

Compared with today, there will be 150,000 more people aged 60 to 66 years in 2010. In the same period the number of 20 to 34 years old will decrease by just over 200,000. I may remind you that Denmark has a population of 5m inhabitants.

In addition, demographic development does not happen proportionally in all industries and sectors. The public sector in particular stands out by having a considerable over-representation of employees over 45 years of age. Therefore the need for drastic changes in public services is immense and increasing, if Denmark is to maintain the same standard of public services as for today.

Digitisation of the public sector is one way to go. It is an enormous task which will challenge the way the public sector is managed today. If public organisations are not changed to support new ways of doing things you may not achieve the efficiency gain from using IT in administration and in support of other activities. In other words, it is necessary to re-engineer the way the public sector does business, looking at all aspects of activities. This means developing new ways of doing things, new ways of managing public organisations, and employees with a new kind of commitment to develop organisations and competencies.

[slide] In 2001 the European Commission initiated a benchmark of public online services in Europe in connection with the program eEurope 2002. The benchmark covers 18 countries (the 15 EU member states and Iceland, Norway and Switzerland) and 20 public services. The public

services cover both services directed towards citizens, such as income tax, social security benefits, enrolment in higher education, and services directed towards businesses, such as corporate tax, VAT, customs declarations.

[slide] It is possible to see the development of the level of digitisation in different countries in Europe. The Commission's benchmark shows the results from April 2002 compared with the benchmark from October 2001. The percentages show the average digitisation level based on the chosen 20 public services mentioned on the previous slide.

It is interesting to note that the Nordic countries together with Ireland lie in the forefront of digitisation in Europe, with Ireland and Sweden at the top with more than 75% digitisation. The benchmark initiative gives us a general indication of the level of the digitisation process in each member state in Europe. But the benchmark does not say anything about the efficiency gain from true back-office integration of online services, looking at work processes and the division of labour between public entities. The benchmark does not give an indication of how well integrated online services are, with a common and coherent e-infrastructure supporting the digitisation of the public sector.

[slide] Statistics Denmark made a survey of the barriers for e-government in Denmark. They asked the municipalities which barrier they thought was the largest for implementation of e-government. The results clearly confirmed our own analysis of the main barriers for digitising public administration in Denmark. The survey showed that the largest barrier was that digital signatures were not sufficiently standardised. This was followed by managerial and organisational challenges, such as prioritising resources for development and the difficulty of changing work processes.

The areas mentioned on this slide were target areas for initiatives commenced by the government within the last year. It is interesting to note that four of the barriers are linked with the underlying e-infrastructure. Even though I said earlier that IT is not the issue in e-government, it is necessary to modify that statement. In fact, IT is also an issue in e-government. Without IT and electronic communication you won't have e-government solutions and you won't have the necessary incentive to change work processes of organisations and develop new competencies with your employees.

IT in e-government is a tool for change and it should be used as such. Otherwise it will not be possible to make the efficiency gains which our politicians are all too eager to use for other prioritised tasks in society.

[slide] I will now turn to the specific e-infrastructure initiatives which have been commenced within the last year in Denmark. In August 2001 the Danish government started a new, large initiative on e-government, in close collaboration with the municipalities and the counties. A new task force on the digitisation of public administrations was formed and several large, key projects were commenced covering broadly all aspects of e-government.

The Danish Ministry of Science, Technology and Innovation was given the responsibility to supply the public sector with common e-infrastructures covering the exchange of data between public administrations, the modernisation of legislation, the establishment of an IT security infrastructure for digital signatures to all the citizens and businesses in Denmark, and, lastly, the broad matter of strengthening IT security in general in Denmark.

I will give you an overview of each of these projects, starting with the exchange of data between administrations.

[slide] This shows an example of data flow in the public sector in Denmark. In the middle is a municipality which has electronic communication interfaces with different public authorities. The public procurement portal DOIP is an electronic marketplace to which both private and public purchasers and their suppliers have access and whose functionality, interface, security and transaction costs are regulated by the public sector. The portal was fully launched on 3 January this year and I believe it was among the first public procurement portals in Europe. The portal is also characterised by the circumstance that the public sector hasn't invested anything in the system but pays solely for the use of it.

CPR is the Danish civil registration system and functions as the main supplier of basic personal data to public authorities and the private sector. BBR is the Danish property registry supplying basic property data to public authorities and the private sector.

A municipality will also communicate with a number of other public authorities in central government and in the county to which the municipality belongs. And of course a municipality will also have to communicate with national and regional archives concerning the different case files.

All these entities are different public databases which have to have agreed communications standards and structures known by each responsible public authority and implemented as communication interfaces in their own IT systems. Historically there is no common agreement on either technology or data structures in the public sector and each public authority has to make bilateral agreements on communications standards and structures for data exchange. Therefore much effort has gone into the formation of a common accepted public data policy, based on what you could call free access to public data. Public data should in principle be free of charge and accessible for all - of course under consideration of the protection of sensitive personal data and information. This principle was laid down in order to secure that taxpayers should not pay twice for something that the public sector had already been paid for once. Since 1994, data collection by the public sector has been built up on the main principle that a citizen or business should report data wanted by the public sector only once, leaving it to the public sector to exchange relevant data internally for administrative purposes.

[slide] It was decided last year that all public sector data exchange should be based on the international XML standard. A national organisation, the National XML Committee, was formed by the Danish Ministry of Science, Technology and Innovation in order to centrally coordinate the public sector usage of XML and the standardisation of public data and metadata for exchange purposes.

In order to create a maximum of transparency in the public sector, an info-structure database is under construction. The info structure database will be the central key in making publicly available all interfaces for data exchange in public databases, all described in XML.

In the Danish government it has been decided to establish procedures for complaining concerning access to public data, in close collaboration with the Danish Data Protection Agency.

[slide] By far the most difficult and complex project in progress is our digital signature project. It has a variety of different perspectives covering technical challenges and commercial and market-oriented challenges. PLS Rambøll Management made a survey in 2001 covering Danish public institutions' opinion on digital signatures. The provision of digital signatures should be a public responsibility. Since the year 2000 there have been market players offering qualified digital signatures for sale in Denmark but the economic barrier and the technical difficulties connected with the purchase and installation of digital signatures have resulted in only about a total of 100 digital signatures sold in Denmark. Therefore the Danish government changed strategy last year in order to push forward the dissemination and usage of digital signatures in society.

[slide] The deadlock for digital signatures was very clear to the Danish government. It was too difficult and too expensive to get one. On the other hand, there were no electronic services at the time that required a digital signature in the identification. That meant that, if you were able to overcome the first challenge of purchasing and installing a digital signature on your computer, there was nowhere to use it.

Therefore it was seen as equally important to establish the technical infrastructure supporting the use of digital signatures and at the same time to push public institutions to build electronic services that required the use of a digital signature.

It was seen as very important that the infrastructure that was to be established wouldn't destroy an upcoming market for digital signatures and other means of electronic identification.

Last but not least, we have to eliminate all judicial barriers for the usage of digital signatures.

[slide] In order to meet the different requirements and to test the market and the creativity of the market players, it was decided early this year to commence a public tender using a project competition to get proposals from the market players on how a full-scale dissemination of digital signatures to all citizens and businesses in Denmark could be done in a market with several market players. At the same time the e-infrastructure should secure full technical and economic interoperability between several certificate authorities (CAs). A judicial matter was to ensure that the same digital signature could be used in all public electronic services across governmental levels, in the municipalities, the counties and in central government.

A central task was therefore to define a common standard and a common security level for public sector digital signatures which also could be used by the private sector.

[slide] The Danish public sector digital signature standard is a software-based digital signature which should be as easy to install and use as the digital signatures used in different internet bank solutions offered in Denmark. The OCES certificate has no requirements of personal identification by authority. It can be used for authentication, access control and authorisation. It is possible to use OCES certificates to encrypt communication. It will be issued in three different types of certificate: a personal certificate which can be used by a citizen to access public electronic services; an employee certificate which can be used by an employee in a public or private organisation, and a business certificate which identifies a certain organisation or public authority.

How does this work? How should a citizen get a digital signature?

[slide] He/she will get it pretty much by the same procedure as is used in internet bank solutions. A citizen accesses a secured website and applies for a digital signature by giving his personal registry number, name and address. This information is checked up on the central civil registry database operated by the Ministry of the Interior and Health.

The certificate authority (CA) returns by e-mail a link to the certificate. An activation code is mailed by ordinary mail to the citizen's address. The activation code is then used by the citizen to activate his/her digital signature, which is then returned and installed on the computer.

The Danish government has set aside a budget of 6.7m euros, to give all citizens and businesses wanting one a digital signature, and to establish the necessary infrastructure to support their usage. We are still in the public tender process at the moment, which hopefully will lead to the signing of one or more contracts in January 2003.

[slide] Another important project which will end in the summer of 2003 is a total modernisation of all Danish legislation, in order to identify and change legislation that is a barrier for electronic communication with the public authorities.

The Danish government decided earlier this year to go through all acts in order to identify barriers for electronic communication and the usage of digital signatures. By summer this year all ministries should have changed administratively rules and regulations that could be changed in that way. By summer next year, all legislation that has been identified as a barrier for electronic communication should be changed and adopted by parliament.

In total, there have been identified 365 rules and regulations to have been changed by this summer; 88 legislative rules in 21 different acts will be changed and adopted by parliament by summer 2003. 1085 legislative rules that have been identified as barriers have not been changed due to different circumstances. For instance, it is still mandatory to show up personally if you want to get married! And most of the barriers not changed are in fact due to Danish international obligations, in the EU or in other international organisations.

[slide] There is a pressing need to strengthen IT security handling in the public sector. If citizens and businesses are to rely on electronic means in their interaction with public authorities, they have to be sure that public authorities create trustworthy and reliable electronic environments, based upon common high levels of IT security handling.

Therefore the Danish government has decided to establish an independent Council on IT Security by 1 January 2003. The Council should provide the Danish government with recommendations on how different security challenges should be handled.

The Council will be supported by a national Centre of Competence on IT Security which was established in August this year. The Centre will focus on:

- public campaigns, advising the public on best practices
- strengthening statistics covering the state of IT security incidences in the public and private sectors in Denmark
- defining minimum levels of IT security in public institutions based upon international IT security standards

- establishing an early warning organisation warning public institutions about hackers and viruses and thus making it possible for the public sector to take the necessary precautions
- in collaboration with the proper authorities, co-ordinating alert tasks in order to secure that vital IT systems will still run in the event of a national crisis situation.

The focus on e-infrastructures is a way to create common platforms for IT development in the public sector. By establishing common e-infrastructures it is possible to have a common backbone and common systems leading to a better economy of scale in the public sector. IT is therefore also an issue in e-government but the focus should be on organisational development and the development of competencies in the staff.

For your information, I have brought with me three publications and those of you who are interested can get them at the registration desk. The first one is the newly adopted IT political action plan. For those more interested in a description of the IT status in Denmark there is a more descriptive book. Finally I have a publication describing the newly formed ministry after our general election last year. I have not brought enough publications with me so those of you who don't get one are welcome to leave a business card for me and I will send you a set of publications when I get home.

Thank you for your attention.

### *Questions*

**Keith Thurston:** We can allow a couple of questions now and then we will have some at the end.

**Olavi K ng s, Finland:** I would just like to ask, if I correctly understood, you are using the certificates for authentication only. Do you have a policy on digital or qualified electronic signatures?

**Yih-Jeou Wang:** Yes, we have tried to analyse the different demands on the usage of qualified digital signatures and our data protection agency has in fact cleared most communications from citizens and businesses to public authorities using a software-based digital signature. The aim of our project is to migrate to qualified digital signatures, a hardware-based digital signature. But at the moment, looking at the difficulties and the barriers that citizens are experiencing, we have come forward with this software-based signature which we anticipate will be used for the next three to five, or at most perhaps seven, years.