

# Semicolon

## Semantic and Organisational Interoperability Issues in Public Sector in Norway

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### Introduction

Full electronic interoperability between public and private sector and between public agencies is highly prioritised in Norway as in most other European countries. Even though much has been accomplished during the last 20 years, many unsolved issues remain – especially in the areas of semantic and organisational interoperability. In Norway, the Semicolon-project<sup>2</sup> is a contribution from the research community to shed light on interoperability challenges and suggest solutions to overcome obstacles for better interoperability.

There is a common understanding that full interoperability between public and private sector is necessary for the benefit of citizens, businesses and public sector, and thereby to the benefit of society as a whole. Full interoperability inside public sector is necessary in order to provide effective and efficient services to citizens and private businesses. EU's Lisbon strategy claims that a well-functioning public sector represents a competitive advantage for businesses. It is claimed that collaboration between public organisations, citizens and businesses is necessary to provide a more effective and efficient public sector.

Semicolon is a three year research project partly funded by the Norwegian Research Council. It addresses the challenges to establish compatible ontologies, information models and the necessary organisational coordination and collaboration to simplify public service production across several public bodies. The project runs 2008-2010, and has a budget of about 6.3 million euro.

### Assets in Norway

The interoperability situation in Norway is not bad. The Norwegian public sector is increasingly user-oriented and there is strong national and international policy support for electronic collaboration. A report to the Norwegian parliament<sup>3</sup>, addresses electronic collaboration as a means for the provision of electronic services on a 24/7 basis.

Quite a lot of infrastructure is already in place. Altinn ([www.altinn.no/en](http://www.altinn.no/en)) is a service through which citizens and businesses can report information to public authorities. MyPage ([www.norge.no/minside](http://www.norge.no/minside)) is a portal through which services from different public bodies are made available to the citizens. SERES II is a project run by the Brønnøysund Register Centre and the goal is to provide a national metadata register. SERES II will launch its first services by the end of October 2009.

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<sup>1</sup> Employed by Karde AS, acts as the project leader for Semicolon on behalf of Det Norske Veritas.

<sup>2</sup> Semicolon – Semantic and Organisational Interoperability in Communicating and Collaborating Organisations – is partly funded by the Norwegian Research Council and the participating public organisations.

<sup>3</sup> 'An Information Society for All', Report no. 17 (2006-2007).

## Challenges in Norway

One observation is that the stove-piped managerial structure in the public sector is an obstacle for collaboration and communication. The public sector organisations are allocated a budget by their ministry. All of the goals and evaluation criteria are intra-organisational. No, or only very limited, funds are allocated for collaboration activities spanning several organisations belonging to different ministries.

As a consequence, most of the services available today stem from one public body only. There are almost no cross sector services, e.g. services to citizens in life-cycle situations where a child is born or a person dies. Such services require streamlined business processes running through several public organisations. There must be integration with existing data registers, and a common view of the information following the processes e.g. represented and supported by a national metadata register. Last, but not least, an easy to comprehend, universally designed user interface to the services through well known public portals must be supported. Few of these assets are in place.

In July 2008 the Office of the Auditor General in Norway published a report about electronic information exchange and service development in public sector in Norway<sup>4</sup>. The main conclusions are that several public organisations possess information which could be of benefit for other in their service development. Better utilisation of this information would provide more secure, faster, more effective and efficient services to citizens and businesses. Reuse of information is considered necessary to ensure high quality case handling, but happens only too scarcely, mainly due to the fact that public information is not made available through publication.

## Semicolon Approach

Semicolon takes a holistic view on interoperability. All dimensions from the European Interoperability Framework are in principle covered. However, the project does not put much emphasis on technical interoperability. Semicolon is centred on the semantic and organisational dimensions, but we also take into account the legal and political perspectives. The basis for the work is real collaboration cases where the aim is to produce public electronic services to industries and citizens.

The project involves five large influential public organisations: the Directorate of Taxes, the Brønnøysund Register Centre, the Norwegian Directorate of Health, Statistics Norway and The Norwegian Association of Local and Regional Authorities (KS). The organisations performing the research are Det Norske Veritas (DNV, the coordinator and project owner), the company Karde (initiator of the project), consultancy Ekor and the Norwegian Centre for Informatics in Health and Social Care - KITH. The University of Oslo and the Norwegian School of Management as well as the universities of Oxford and Aberdeen provide expertise in semantics, object orientation and organisational theory.

The idea is to build competence and understanding and also generate recommendations for methodologies, tools and metrics, i.e. give the public sector a set of guidelines to construct, launch and evaluate the effect of, cross sector services. Due to stove-piped budgeting and evaluation principles in the public sector, the Semicolon project addresses collaboration and coordination issues that would not have been addressed by the individual organisations alone.

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<sup>4</sup> The Office of the Auditor General in Norway: Electronic information exchange and service development in public sector in Norway, Document 3:12 (2007-2008). (In Norwegian)

## Semicolon Cases

The public partners provide collaboration cases as study items for the project. All cases are cross sector in nature. In total, the cases cover a large spectrum of typical collaboration and communication issues. In addition the projects itself has defined some subprojects in order to fill inn the picture. Our ambition and assumption is that Semicolon shall make a substantial contribution both to identify and give advice on strategies and solutions to overcome obstacles for interoperability in the Norwegian public sector.

Case studies:

- Realisation of eDialogues (Tax Directorate and Health Directorate)  
The eDialogue-concept is introduced by the Tax Directorate. eDialogue services are cross sector and long lasting services for life cycle events such as the birth of a child, the death of a person, and the foundation of a new company. The eDialogue requires modelling of cross sector processes and accompanying information. Metrics and indicators should be developed in order to measure the socio-economic effect of each eDialogue. The measures should be both quantitative and qualitative, and will among other things be used as a basis for decisions to implement an eDialogue service or not.
- Metadata model (Tax Directorate)  
The goal in this activity is to come up with a recommendation for the use of metadata for both internal and external purposes. Internal purposes are to get a better overview of internal systems and easier service development. External purposes are addressing the exchange of data between public sector organisation and between public sector and citizens and businesses, and the effective use of a national meta data register. This case will constitute an example for other public organisations and pave the way to the establishment and further development of a national metadata register. It will provide specific requirements to the SERES II work at the Brønnøysund Register Centre.
- Open data and metadata (The Brønnøysund Register Centre and Statistics Norway)  
The purpose of this activity is to provide an overview of which organisations in public sector which possesses which information. Another purpose is to ensure the reuse of Public Service Information (PSI), both for internal cross sector purposes, but also for commercial purposes.

An EU report<sup>5</sup> claims that PSI is considered to be the single largest source of information in Europe. PSI is behind the development of new added-value services, products and applications created by private companies by combining data from different sources. Recent studies indicate that the economic value of PSI is substantial. A study from 2006, contracted by the Commission, for example, puts the overall market size for the reuse of PSI in the European Union at 27 billion euro.

Semicolon will base its work in this activity on the W3C initiative Semantic WEB/WEB 3.0 called Linked Data and Linked Open Data.

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<sup>5</sup> COMMISSION STAFF WORKING DOCUMENT on the re-use of Public Sector Information, [COM(2009) 212 final] <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2009:0597:FIN:EN:PDF>

Subprojects:

- Business model for public sector (all partners)  
This activity is closely connected to the Open data and metadata activity. It will provide of an overview of the organisation, the services and processes of public sector. It will also provide an overview of which organisations exchange information with each other.
- Measurements and metrics (all partners)  
Semicolon puts much emphasis on measurements of interoperability according to the slogan "what gets measured gets done". Four different activities are launched in order to identify useful metrics for interoperability: 1) organisational stage and growth model, 2) a survey of organisational drivers and obstacles, 3) semantic maturity model and obstacles and drivers for semantic interoperability, and finally, 5) cost benefit analyses.

## Semicolon Results

Some results are already achieved and some are presented in the following.

In the "metamodel" activity, the project group has analysed a specific, but still representative, application domain. The analyses indicate that the domain is not well documented. The existing documentation is scattered in several different information sources. Much of the information is not documented at all and resides hidden in code and inside the heads of the employees. This is a typical scenario when systems have been updated and maintained over a period of several years. This situation leads to quality errors in the production which again lead to capacity problems in the IT staff. Education of new staff becomes cumbersome because of the low quality of the documentation.

To overcome this situation, also taking into account the need for information exchange and the publication of own information, the Semicolon project recommends that each public organisation should describe its business model: the services, the production processes, the use of systems and data, responsibilities, organisational structure etc. Also, a metadata strategy should be defined and implemented. There is strong evidence that a business model and metadata strategy, amongst other positive effects, will increase the quality of the production quality and the capacity in the IT staff. Turnover of personnel will be easier and you get a more competent and flexible staff.

In the "measurements and metrics" activity a four-stage growth model for the evolution of e-government interoperability is suggested. The level of interoperability has the following four stages: aligning work processes, knowledge sharing, joining value creation, and strategic alignment<sup>6</sup>.

Also, organizational interoperability can be seen as an important enabler of all interoperability, semantic as well as technical. Common goals and practical agreements have to be in place before any collaboration can take place. The Semicolon project has performed empirical studies related to obstacles to

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<sup>6</sup> P. Gottschalk and H. Solli-Sæther, "Stages of e-government interoperability," *Electronic Government, an International Journal*, vol. 5, pp. 310-320, 2008.

organisational interoperability<sup>7</sup>. The findings are classified in ten categories. Three important categories are:

1. Competency gap  
Organisational interoperability is based on a good understanding of business processes, and models of these. In many public organizations and government agencies, modelling of business processes has not taken place.
2. Lack of measurables  
This lack of proper instruments has a negative impact on both planning, execution and evaluation of organizational interoperability. Performance indicators, score cards or barometers for organisational interoperability are clearly missed. In this connection, economic indicators that describe the effects of successful interoperability are also called for.
3. Money talks  
In Norway, governmental departments and agencies operate according to a strict fiscal sector principle. Each department takes care of its own business, and collaboration in general and interoperability issues in particular are typically not part of this enterprise.

Other categories are:

4. The absence of national joint efforts
5. Archipelago of small uncoordinated project islands
6. Disharmony in legislation
7. Anaemic arenas
8. Invisible best practice
9. People and their leaders; some people do not want to cooperate
10. Ubiquitous heterogeneity; unequal levels of competency in general and digital literacy in particular

In autumn 2009 and 2010 the Semicolon-projects will go into detail on the identified barriers. This will be done by quantitative measurements of the barriers. An on-line survey will be designed for this purpose and carried out twice during the project.

## **Exploitation of Semicolon Results in Public Sector**

For the time being (October 2009), there is discussion with The Agency for Public Management and eGovernment (DIFI), to take on the role as a repository for Semicolon results. DIFI aims to strengthen the government's work in renewing the Norwegian public sector and improve the organisation and efficiency of government administration. DIFI works to ensure that government administration in Norway is characterised by values of excellence, efficiency, user-orientation, transparency and democracy.

DIFI, through its Council of Public Sector Standards, maintain a set of mandatory standards and recommendations for public sector in Norway. The idea is that Semicolon results will be turned into standards and recommendations for increased interoperability in public sector in Norway.

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<sup>7</sup> R. Hellman, "Organizational barriers to interoperability: Norwegian case study", *Electronic Government, Proceedings of Ongoing Research, General Development Issues and Projects of EGOV 09*, 8<sup>th</sup> International Conference, Linz, Austria, August 31-September 3, 2009, pp. 182-189