E-Government in Agriculture and in Segments of the Food Chain - A Practitioner Report

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Abstract: Aiming to share our experience this paper targets managers running complex projects, persons interested in open source technology and players of e-government. The project commenced in 2006 as one of the largest interdisciplinary, multi-stakeholder e-government-projects of Switzerland. The intention was to create a simple, cheap, stable and safe system for agriculture administration and control as well as for segments of the food chain. For this purpose multiple disciplines had to be considered and multiple stakeholders from different fields had to be brought together. Subjects of this paper include: transparent government, models of collaboration among government, NGOs and citizens, customer-centric e-government and infrastructure for data sharing.

1 Initial situation and motivation

For many years, the burden of farmers due to administration increased [SB06] [RD10]. Food scandals in the past led to a confidence loss in many consumers [TH04]. Consumers worldwide increasingly demand proof of production and food distribution. Because of this there are more and more controls on farms. In Switzerland, federal agencies, cantonal authorities, farms, private-legal bodies and label-organizations employ information systems for the processing of their tasks. These hardly interact with each other and cause farmers to have high administrative costs for the notification of data. For example, a farmer who lives on the border of two cantons has to send data to both cantonal governments, to different federal agencies, to the slaughterers and to label organizations. The government uses the submitted data to calculate direct payments, generate statistics, prepare controls of the farms and evaluate the political measures for regions etc. Thus there is a strong demand for an e-government portal that serves all stakeholders: farmers, farm controllers and various users with veterinarian or food scope.

A new administration and information system for agriculture was composed in Switzerland, aiming to simplify administration while also coordinating controls. A common and constant agricultural information system for all participants of the sector of agriculture

was targeted, both on the canton as well as federal level. A project was created and a system (web portal) built. Farmers are the main users of the system, in certain ranges also controllers of the federal and of the cantonal government (agricultural and food controllers), employees of the administrations and of label organizations. Thereby it is assumed that all users have a SuisseID, the standardized electronic certificate of identity in Switzerland.

2 Requirements and specific challenges

The project had the practical goals of
• reducing the total administration costs,
• ameliorating the usability and the accessibility of the data base for stakeholders,
• covering new aspects like control coordination or primary production and
• staying abreast of computing changes.

In conclusion the principal purposes are:
• a simplified administration, realized through a central web-portal;
• a standardized identification of firms and single users;
• standardized processes and data with a fully automated and fast synchronization;
• the adaptation of data quality and actuality on user needs under compliance with data protection, and
• the allocation of an information system to support new or changing needs.

The large number and width of stakeholders as well as the great differences between the involved systems were specifically challenging with this project. The project was a prime example for multi-project management. IT-systems of the federal administration, which covered different ranges of agriculture and veterinary, had already been implemented in Switzerland for some time. Most of these federal systems are part of the internal network of the federal administration. From there they communicate with other systems in the same network, in cantonal and in external networks. The positioning in and the security policy of the federal network make the access from outside even more complicated. With the introduction of a new allocation to the network zones, it is intended to transfer individual specialized application systems to a newly created network zone. The process allows entitled persons to access systems more simply while meeting safety-relevant standards that enable improved protection from external attacks.

3 System design

A very flexible solution was selected, allowing to adapt the system to future needs and with little expenditure. Ensuring the realization of this solution it was necessary to take into account the structure of the central components by the federation, adjustments of existing systems for the connection at the intermediate, and the harmonization of data.

The architecture provided is future-oriented, highly durable and investment-friendly; thinking in individual systems (silo) was omitted; processes and data were standardized.

However the system remained flexible and safe; the business processes are transparent; the conversion of a technically and semantically standardized integration infrastructure is provided and standardized, centrally documented and managed interfaces are developed. During the development of the theme, two communication scenarios were differentiated: system-to-system and user-to-system.

4 Results achieved and analysis of results

The selected solution makes application modules centrally available for new ranges of the agricultural, veterinarian and health administration. It integrates existing applications used by the federal and cantonal government through a central data hub. The most important components of this new information system are:
- Switzerland-wide identification for primary production enterprises, central assignment service of a standardized identificator;
- central administration of controlling entities in the primary sector with selective access of all participants as a basis for the national control plans;
- central information hub for data synchronization between different systems;
- central calculation of direct payment contributions of the federation and
- central internet portal for all participants to the electronic completion of the administrative business between enterprises and federation and/or canton.

A service bus was used for the realization, surrounded by a service landscape with SOA (service Oriented Architecture) - standards. The format for the transmission is Extensible Markup Language (XML). This language allows exchange of data among different information systems of collaborating organizations without interruptions [NK04] [Po05]. The implementation of XML-standards works especially well for large organizations and governments [Nu09]. The transmission runs over a Sedex platform (secure data exchange) of the Federal Office for Statistics in Switzerland.

The employment of a service bus had different effects on the respective participants: For the federation in Switzerland the communication platform improved the quality and actuality of exchanged data, which now can be exchanged between canton and federal systems, by standardization and automation. The existing systems of the federal administration were extended to the service bus with interfaces. Thus, cantons were enabled to access national exchange and alignment of agricultural data. In principle, proven functionalities, which were already present in the decentralized systems, had not been centralized. This procedure protects previously transacted investments for the existing systems and required only few adjustments. The farmer does not feel any direct impacts of the bus. However, the farmer indirectly benefits from the current alignment of the data, since thereby double collections of data can be reduced. The structure of the national internet portal substantially simplified the farmer communication with the government. The user is in the center stage of this internet portal (of course).

The key idea was to build a simple operating, cheap and safe system for agriculture and most segments of the food chain in Switzerland. This has been widely achieved. Farmers don't have to log on several times, but use one account for all systems they require. They

only need to submit data once, which can then be collected from each authorized system via Enterprise Service Bus. Even if there is a controlling entity of the farm, the controller still is provided with the data and the farmer has no additional work effort. Slaughterers can track the origin of an animal through the system. They can check the farm and animal controls. The employees of the cantonal and the federal agricultural government now use the same system as the employees of the veterinarian government. They therefore don't send data several times, but use the system to access all required data at anytime. If they have to control a farm, they can collect data with one mouse click and get a detailed view of the farms and its last controls.

A closer analysis of the project shows that it was indeed a highly interdisciplinary undertaking. Its main disciplinary perspectives:
- Technology: the key decision taken was to use a Service Bus and to work with SOA. As a result, the flexibility of the solutions reduces future re-engineering resistance.
- Public Administration: The main objective in the area of public administration was to compose a new administration and information system for agriculture and for the food chain with the goal of simplifying administration and the coordination of controls. These objectives have mostly been fulfilled. As of now, only the adaption of all participants of the food chain has yet to be completed.
- Law: To get the commitment of all participants it was important not to change the law. Through the technology of a Service Bus data sovereignty didn't change. Since the usage of the web portal is optional, it didn't have to comply with the law.

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