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“PICTURE” As A Service For The Users From Public Administrations

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Abstract

This paper presents a tool called “PICTURE”, elaborated by an European project team including twelve partners from six countries. This project, named “Process Identification and Clustering for Transparency in Reorganising Public Administrations”, was realized within the 6TH EU Framework Programme. Its purpose is to facilitate ICT investment decision making process in European public administrations. It is a web-based application, that is planned to be distributed as a service for civil servants. The main goal of this paper is to show that “PICTURE” is an example of an application, known as “software as a service”. Both co-authors have participated in the “PICTURE” project.

Keywords: **MIS, public administration, software as a service**

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Introduction

The public administration, like every organization nowadays, uses the ICT technology, which helps enhance the business processes carried out within them. These applications can be used either for outsourcing or insourcing. Both of these solutions have their advantages and disadvantages.

Insourcing requires additional financial investments in the technical infrastructure, maintenance and development. Access to the data stored in the systems are only available to authorized employees, that is why this solution is considered to be the safest.

Outsourcing lowers the costs of exploitation of the application, because it does not need any

investments in the technical infrastructure and application management. Data is stored outside of the company, thus this solution is considered to be less safe and needs additional safety measures to be taken. One subtype of outsourcing is application distribution, known as Software as a Service (SaaS), which only requires access to the Internet and possession of a web browser. An example of such an application for the public administration is "PICTURE", which was created under the European project named Process Identification and Clustering for Transparency In Reorganising Public Administrations.

1. Concept of the „PICTURE” methodology

In the age of vast computerisation of the public administrations' activities, the management is challenged to develop a strategy of making investment decisions regarding the purchase of technology and IT tools. It is necessary to have a tool capable of supplying the management with an information base to aid in making the appropriate IT investment decisions. „PICTURE” is a tool created under the European project, which goal was to develop, demonstrate the usefulness of and distribute an Internet-using tool, that would allow to effectively measure the impact of IT on the business processes in public administrations. It is a web-based application and consists of two main parts: the Process Landscaping Module and the Impact Measurement Module.

The first module enables capturing the processes from the public administration unit, which are modelled based on the modelling method introduced in the „PICTURE” methodology. It allows to create a map of processes in a given public administration unit. The processes are modelled through the direct actors of a given process. Process modelling is being exercised with the use of Process Building Blocks (PBB), which identify operations performed by the process. The set of blocks was developed according to the needs of the public administration. For each block a set of attributes needs to be entered, different for various blocks, which in addition describe the operation performed, i.e. the people involved in this operation, objects (documents) processed under the operation, the duration of the operation, the number of copies created, etc. Before the modelling begins, the „PICTURE” tool needs certain data types to be entered: the organisation structure of the administration, the employees and their functions, as well as the software and IT tools currently used in the public administration unit.

The second module comprises of a process characteristics analysis and a pattern analysis component. It also includes components for measuring the ICT impact and the corresponding report components containing the process analysis results for business analysts. The aim of the Impact Measurement Module is identification and measurement of the impact of ICT on the processes taking place in the public administration units. The methodology used in this module concentrates on defining the advantages and weaknesses of the ICT impact on the processes and on integrating the ICT tools with the processes. The Impact Measurement Module relies on modelled processes analysis, based on weakness patterns, which must be defined in the system by an expert in the process management area and provide a basis for measuring the impact of ICT on the processes. As a result of the executed analysis reports are generated, which then the management can use in their investment decision-making process to derive a sound ICT strategy and hence to modernize these processes. Figure 1 shows how "PICTURE" works.

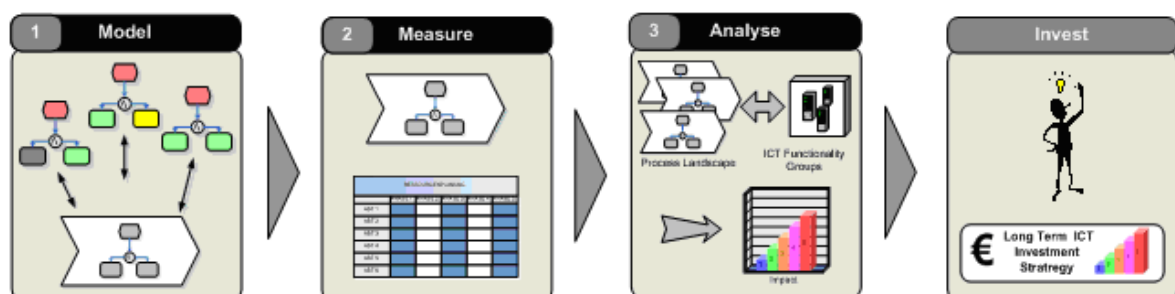


Figure 1: The way in which “PICTURE” works [PICTURE documentation]

2. Architecture of „PICTURE”

An architecture for eGovernment should provide a service oriented, modular and portable software architecture that is customizable to the specific requirements of a public administration unit. It is very important to use standard communication protocols, which enable an exchange of components and integration of existing applications into the architecture.

Obviously, the „PICTURE” software architecture complies with the regulations and frameworks defined for software used in public administration. It also complies with relevant guidelines of interoperability frameworks, such as standards recommended for programming languages, database interfaces and modelling notations.

“PICTURE” architecture is divided into a server-side, a client-side and a backend database. This three layers’ approach allows to isolate the application logic located on the server from the presentation based on a web browser and a backend service.

The “PICTURE” prototype may be hosted centrally by a provider. With this solution a client-capable system could be feasible in two versions:

1. Individual instance for each of the public administration unit interacting with a physically independent installation of “PICTURE”. It allows a customization of the application to specific public administration’s requirements without affecting the instances of other administrations.
2. One shared client-capable system which is jointly used by all connected administration units. It may be needed to provide each user with different views on the system and at the same time deny users access to information beyond the data captured for their individual administrations.

It also may be realized by using on-site installations. In this solution every single administration runs its own individual system. The disadvantage of this installation lies in its difficulty and complicated maintenance.

There also exists the possibility of mixing the two mentioned above options. In this case one municipality acts as an application service provider (ASP) for smaller surrounding partner cities, which provide application via the Internet or other common network. This way, the smaller public administrations would not have to make ICT investments (hardware, administration, backup-management etc).

For implementing the presentation layer in a multi-tier software architecture in the “PICTURE”, a thin client approach with a web browser was chosen for presentation. This model provides the required functionality, ease of use, platform independence and allows to present information in different browser applications (Mozilla Firefox, Internet Explorer) on different operating systems (Windows, Linux). Web browsers are available for many operating systems and familiar to most users. The set of functionalities available in different browsers is standardized (there may be smaller differences in specific implementations of standards). This makes web browsers an economical user interface choice with regards to portability, user acceptance and maintainability.

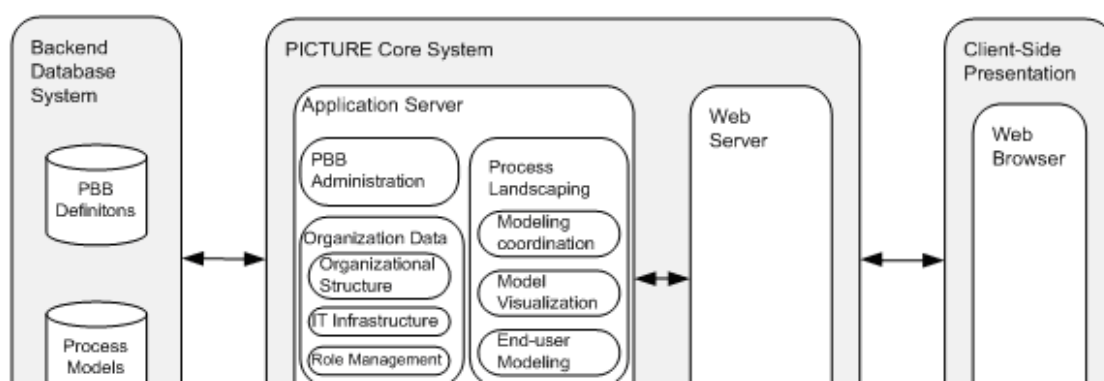


Figure 2: Software Architecture of the PICTURE Application [PICTURE documentation]

“PICTURE” uses a backend DBMS to persist the business and configuration data of the application in two distinct data sets, which contain:

1. Data about the domain-specific PBB definitions, the PBB repository.
2. The business data captured by users (organizational structure, IT infrastructure, process models).

The database interaction is abstracted from the application logic thanks to using the approach of separating all persistence related functionalities into a separate component. The communication of application logic with the database is done through a defined interface and the exchange of data does not affect the core application logic.

The main components of the “PICTURE” architecture are shown in figure 2.

3. “PICTURE” as a Service

Public administrations requires, for their modernization, a new approach to technology. It can not rely on rigid, monolithic service systems but demands technology which increase efficiency, improve economic viability, enhance process transparency, and help communicate with the public. Public administrations around the world are seeking ways to improve constituent services, streamline operations, and control costs. To meet these needs, a cost-effective way of using ICT resources to support business processes is required. The SaaS solution helps to increase the flexibility and scalability of applications to support new levels of performance and innovation. Web services are neutral by nature; because they are based on open standards, so they do not require a particular vendor, language, or technology. For governments, a Web service could be a single command to issue a driver’s license, verify a service entitlement, or process a building permit.

Software as a service, also called software on demand, is deployed over the Internet to run behind a firewall in a local area network or on a personal computer. In this solution an application is provided to customers as a service on demand, through a subscription or a “pay-as-you-go” model. It is a way for businesses to lower the costs of software. In the “Picture” project a similar model of distribution was chosen for the public administration’s employees. It allows the public administration unit to save money by not having to purchase servers or other software to support the usage, thus they can focus their budgets on competitive advantages instead of infrastructure, flexibility and scalability of the application.

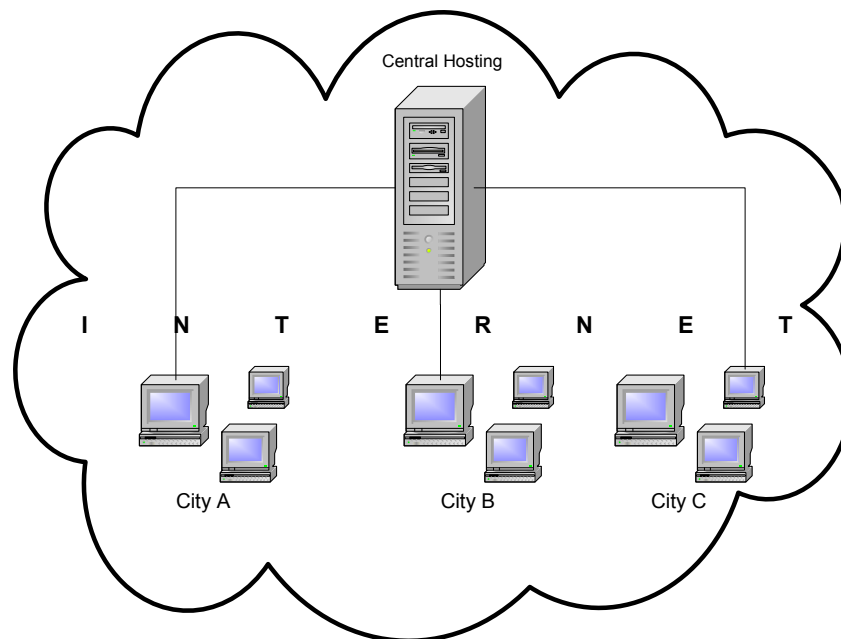


Figure 3: Technical Hosting – Central Hosting [PICTURE documentation]

The key characteristics, proving that the “PICTURE” solution is a type of a software as a service application, are as follows:

- Network-based access to software and its management (see Figure 3),
- Activities managed from central locations, which enables users to access applications via WWW,
- Application delivery is closer to a one-to-many model, including the architecture, pricing, partnering, and management characteristics,
- Centralized feature updating, which bypasses the need for end-users to download patches and upgrades,
- Frequent integration into a larger network of communicating software,
- Embodiment of recognized best practices.

“PICTURE” has a chance to be accepted by end-users as a service, because of:

- Requiring only the basic computer skills from workers, who already possess such skills.
- Computing has become a commodity in public administrations and there is need of using network for doing e-service for citizens.
- Outsourcing, whereas insourcing ICT applications requires expensive overhead (salaries, liability, physical building space, etc).
- Standardization of “PICTURE”,
- The possibility of customization with a basic set of functions,
- Meeting specific public administrations needs,
- Using Web systems,
- Sufficiently well trusted and transparent security.
- Allowing small and medium public administration units to access a level of functionality, which was formerly the domain of larger units,
- Facilitation data aggregation of business processes, which simplifies running queries, mining data connected with business processes.

“PICTURE” is based on a common, European wide approach. It has a function of “rapid modelling” - decision-oriented modelling to learn about potentials that are in the administration, which could be leveraged through ICT as well as re-organisation efforts. This is also the platform for sharing experiences and expertise, on which processes are compared, and encouraging the creation of best practices.

“PICTURE” is innovative, has standardized semantics, and a combination of modelling and analyzing. This tool is end-user driven and distributed.

The “PICTURE” prototype was tested by civil servants from six countries (participants of the project). Generally, officials positively evaluated the functionality of the tool and the access to it. They also stressed the innovation of this solution, as the market currently lacks the tools to support decisions of computerizing the public administration unit. Taking into account the results of these tests, it can be expected that the application “PICTURE” will be accepted and used by public administration units.

4. Conclusion

“PICTURE”, the tool dedicated to public administration, is an example of an application used as a service. This kind of software is often distributed via the Internet, which lowers its costs and is easy to use. But there is a security issue of confidential data, which are stored outside of an organization. Electronic transactions via the Internet require security from hacker attacks and a monitoring of service usage, with technologies such as electronic signatures, coding, certificates.

The “PICTURE” tool presented in this paper is a step towards creating a modelling and evaluation framework, which seems to be useful in that matter and can be distributed as SaaS.

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