

# Chapter 20

## A Public Economics Approach to Enabling Enterprise Architecture with the Government Cloud in Belgium

Marc Rabaey  
University of Hasselt, Belgium

### ABSTRACT

*Cloud computing is a very demanding technology regarding the level of maturity (stages) of Enterprise Architecture (EA), certainly when the business processes of the government are directly affected by the implementation of cloud computing. Therefore, an extra stage in EA and an extra service model are conceived to better map the opportunities and risks while investing in cloud computing.*

*A holistic investment framework (generic) is proposed to align the cloud computing and other investments with the higher strategy and operational strategies of the government. Real options and option games (along with classical investment techniques) are used to give the public management the flexibility to adjust the course of actions of the (investment) projects.*

*In this framework, the move of legacy systems to the Cloud and the overall risks related to the implementation of cloud computing are discussed. The main question is if a government can implement ambitious cloud computing projects without EA, and if not, which stage should be used?*

### INTRODUCTION: HOLISTIC APPROACH

A government is a collection of institutions that act with authority and create formal obligations. A Government may administer or supervise a state, a set group of people, or a collection of as-

sets (UNU-IIST-SP, 2008). Therefore, it needs an information system to manage its functions and responsibilities, but a common characteristic for many governments is that the information systems of all the departments of the governments were in the beginning of Information Technology (IT) isolated. They look more like an archipelago with

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a deep sea in-between than (inter)connected governmental departments, and although Enterprise Architecture (EA) has already been on the scene for many years, the smooth interfacing of all the different departments and their information systems remains a problematic area in need of further attention.

The Information Technology (IT) implemented by these departments was based on their needs and culture. In some departments, like Defense, multiple different, incompatible IT systems were implemented. From the government (business) unit's point of view, it looks to optimize its investment. However, at the level of the national government, there are often incompatibilities and vulnerabilities that result in serious expenses due to the inability to collaborate or communicate between the different governmental departments in an efficient and effective way, but worse, the citizen is suffering from this: less service, more tax, and thus a less productive government.

Luckily, we are observing that the IT industry is moving towards an (more) easy integration of technological solutions. This is not caused by an altruistic reflex of those companies, but by the Internet as the concept of interconnecting everything, everywhere at any time.

The newest trend (some call it hype) is cloud computing (pay per use IT-services), which uses models such as the public cloud (for everybody), private cloud (only for one organization), hybrid cloud (mixture of public and private), and community cloud. We will present GovCloud which is a form of community cloud specific for governments and how Enterprise Architecture is as a matter of fact, a *conditio sine qua non*, to succeed the implementation of cloud computing.

However, security issues are still very important. They need to be addressed by the government in order to protect the privacy of the citizen and the national (or regional) confidential information. So when investments in IT have to be made, not only the service (efficiency and effectiveness)

have to be considered but also the risks. Classic investment techniques such as Return on Investment (ROI) or Net Present Value (NPV) do not implicitly consider these risks. Real Option Valuation (ROV) does and moreover it gives the organization the flexibility to decide to postpone, start, stop, exit projects, where ROI and NPV give only a decision for a project from start to end, without the possibility to handle uncertainty (lack of information, no information coming from pilot projects, market evolutions, etc.).

Of course, investments (in IT or other domains) should be aligned with the grand strategy and business strategy of an organization (or group of organizations). Starting from a study on the *Art of War*, Rabaey et al. (2005a, 2007) proposed a generic process of aligning investments with the higher strategy, whereby all resources (not only IT) are evaluated and decisions made based on ROV. As such, it is a holistic approach, because all aspects of business and resources are being brought into consideration in what they call Interdisciplinary Forum (IF). Besides portfolio management of projects and business processes, Steering Plans and Service Level Agreements (SLA) are established: the citizens are put in the spotlights. In addition, the links between the governmental departments are taken into account.

As already mentioned, the process is generic so that an instantiated process based on existing decision methods (except classic investment techniques) and frameworks like Enterprise Architecture (EA) can be designed in function of the culture of the organization.

From an e-Government perspective, we will show that IF provides a way to assess Cloud Computing as an enabler for a more integrated (connected) government(s) based on government EA. We will first discuss EA and Cloud Computing before handling the Interdisciplinary Forum (concept, ROA and processing). Before we conclude, we will bring all concepts together in the light of e-Gov in a Cloud Computing environment.

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