Chapter 30
Design Principles for E–Government Architectures

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ABSTRACT

This chapter describes a holistic approach for the design of e-government platforms. It defines principles for architecting a system which must sustain the entire e-government activity of a mid-level public authority (Geneva). The four principles are: Legality, Responsibility, Transparency, and Symmetry. The principles speak to policymakers and to users. They also lead to usable and coherent architectural representations at all levels of responsibility of a project, i.e. the client, the designer and the builder. The approach resulted in deploying multipartite, distributed public services, including legal delegation of roles and the outsourcing of non mandatory tasks through PPP on an e-Government platform that will support a threefold increase in services yearly until 2012. In this sense, as well as in its daily operation, the system is a success.

INTRODUCTION

The paper's subject is *architecting a system capable of sustaining the entire e-government activity of a mid-level public authority*.

The example we consider is the State of Geneva, where the results were elaborated and are currently applied in the e-government program [Secrétariat, 2008]. This corresponds to a population basin in the order of 1 million residents and 100'000 local businesses and non-government organizations (*NGO*'s). The number of lower level authorities depending on this mid-level authority is in the order of 100. There is a sequence of higher-level authorities (national and international) above it. Each authority defines a jurisdiction under which lower-level authorities as well as residents, businesses and *NGO*'s live or operate. Neighbor authorities can interact with our referential mid-level authority at the same level and at different levels, in particular in Geneva which is a center for

international organizations and shares its borders with France and the European Union.

A government is a working model of society: every regulatory aspect of society pertaining to the level of the referential is modeled, implemented and operated in the referential. There are many interactions between the referential and the world.

The standard repository of procedures of Swiss public administrations [e-Government, 2007] describes *ca.* 800 official procedures for our referential.

The components of society interact with the referential authority over technical and organizational channels, using specific rules and procedures. Organizational channels, rules and procedures change regularly under social evolution and new legislation, whereas the set of technical channels (teller, postal mail, telephone, fax) has recently been extended by ICT's and the internet. Integrating this new *channel* into the activities of an authority is called e-government. E-government requires resources, interfaces, procedures, and other components that were not present or not instantiated for the purpose of interacting with society, in the absence of e-government. Identifying necessary components, and implementing and integrating them in order to sustain *parts of* or *the whole of* e-government activities is the task of building an e-government platform (noted *EGP*). There is a fundamental difference between the "parts of" and the "the whole of" approaches. The former considers an *EGP* as the juxtaposition of components that deal each with some part of e-government, the sum of these parts and of their effects being the expected result. This leads to the definition of incremental strategies for e-government: projects "start small" with easy to deliver services; one might emphasize communication with citizens and develop a portal; etc. Over time, most incremental projects encounter difficulties.

The latter considers an *EGP* from the start as a system. Architecting complex systems is a delicate and risky task: because of the greater importance of component *interactions*, it is impos-

sible to foresee how well the design will work, if at all, before an initial version of the system is completed and tested. We chose this approach in the Geneva project, confident in an earlier success with e-voting through internet [Chevallier M., 2006] between 2002 and 2005, which at that time achieved world-class recognition.

Architecting Complex Systems

In complex systems, the definition of system components and of interactions between components is important from the start. Architecting the system ("architecture" comes from the Greek words for "principle" and "construction") consists in designing abstractions and representations of structural characteristics which will enable to understand, build, repair, and reproduce the system effectively and efficiently all through its life cycle. Modern systems architecting [Maier M., 2000] relies on six foundations, the first of which is a *systems approach*, and considers that "the architect is principally an agent of the client, not the builder". These elements are central in our approach and we will come back to them in section 5. Because governments are builders of their own information infrastructure, they tend to build e-government infrastructures as an Appendix to existing IT platforms –without "C". These are often juxtapositions of legacy applications, loosely connected through an intranet exhibited as proof that the systems interoperate. Initiatives, like the US Defense Information Infrastructure Common Operating Environment [Frazier G, 2001], define *Enterprise Architecture Frameworks* (*EAF*) [CIO Council, 1999] and standardization processes [NIH Enterprise Architecture Standards Development Process] for government information systems (see [Zachmann J., 1987] on information system and enterprise architectures). It is uncommon to approach the design of an *EGP* from the client's side. This is however necessary, because the client, *i.e.* society as a whole, *is not an enterprise*. Therefore, building an *EGP* is both *new*

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