Chapter 15

COLLABORATIVE CYBERINFRASTRUCTURE FOR TRANSNATIONAL DIGITAL GOVERNMENT

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CHAPTER OVERVIEW

This chapter discusses issues faced when both the IT infrastructure of the government agencies of different countries and existing software applications must be reused without modification to develop a cyberinfrastructure for transnational digital government. The sources of heterogeneity across IT infrastructures and software applications are identified and the impact of these sources on interoperability and compatibility of hardware, software, communication, data and security mechanisms are analyzed. Virtualization technologies are introduced as a means for coping with infrastructure heterogeneity and enabling the deployment of unmodified applications on existing infrastructures. A concrete case of digital government that entails the sharing of immigration information between Belize and the Dominican Republic is described. This example is also used to validate and evaluate the benefits of virtualization technologies in developing and deploying the cyberinfrastructure needed to implement a transnational information system for border control.
1. INTRODUCTION

Transnational digital government (TDG) entails collaboration among organizations of different countries towards solving problems whose nature transcends geopolitical borders and boundaries. Primary means of collaboration include services for the exchange of data and information, and processes that make it possible for knowledge to be extracted from data and for informed actions to take place. These forms of collaboration are precursors and enablers of other types of collaboration such as the sharing of human expertise, health assistance, financial support, disaster relief, and successful solutions to common problems.

This chapter discusses a general approach for developing cyber-infrastructure for collaborative digital government based on experiences and lessons learned from a concrete TDG system implementation. The TDG project, involving three countries, required the integration of existing applications into the information systems of immigration agencies in Belize and the Dominican Republic. The applications include conversational user-interfaces, automatic translation tools and a distributed query system. In this context, the key problem to be addressed (and the focus of this chapter) can be stated as follows: what methods and technologies should be used to build and deploy transnational DG systems that aggregate several independently developed applications with different resource requirements, without modifying either the IT infrastructure of the government agencies or the software of the applications.

The implementation of TDG is complicated by several interrelated problems which include:

- **Sociopolitical issues**: these result from differences in cultural, governmental and strategic goals and practices among participating entities of different countries; these differences often result into conflicting requirements for the design, implementation and operation of TDG systems; examples of similar challenges and how they can be addressed are the subjects of Chapters 21 through 30 of this text.

- **Scalability and sustainability issues**: these result from the need to integrate a potentially large number of participants and the common expectation of effective participation by all of them (possibly over long periods of time); in regional and global efforts the numbers of participants can be in the hundreds or even thousands and the overall system may be compromised by the weakest link (i.e. any participating entity that fails to fulfill its part in the collaborative effort).

- **Cyberinfrastructure issues**: these result from the ever-present, often extreme, differences in hardware, software and data schemes used by