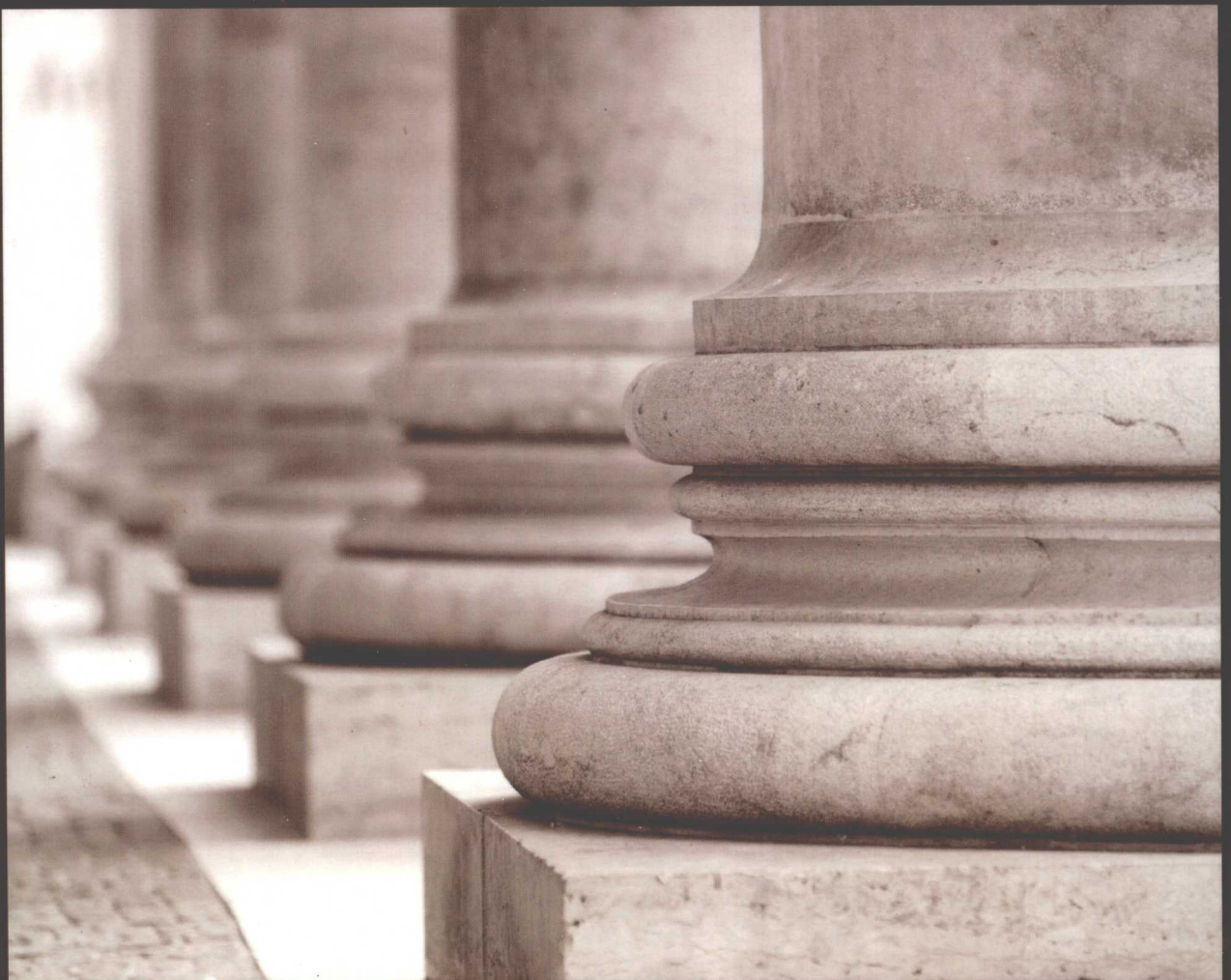


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Enterprise Architecture for Connected E-Government

Practices and Innovations



Pallab Saha



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Enterprise Architecture for Connected E-Government: Practices and Innovations

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This book is dedicated to my father, the late Shri Jagatbandhu Saha.

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Foreword

Governments around the world increasingly rely on online services to accomplish core mission functions with citizens, industry, and other governments. Effective, cost-efficient designs for these Electronic Government (E-Government) functions require a robust, scalable approach to Enterprise Architecture (EA) that integrates strategic drivers with business requirements and technology solutions. EA began as a technology design discipline in the late 1980's, as a need arose to integrate systems and share data across organizational boundaries. Since those early beginnings, EA has evolved into a management and technology best practice that has a global following and is singularly able to provide authoritative views of current and future states for various types of enterprises; including organizations, consortia, supply chains, lines of business, programs, and systems.

This book provides valuable insights from authors who are active in government, business, or academia, and have a common interest in how EA can support and promote the creation of a new generation of E-Government services that will more effectively function within and between agencies at the international, national, regional, and local levels. Because resources are often tight, there is a tremendous need for E-Government services that more effectively cover horizontal mission and support functions, and that vertically link various levels of government in a way that eliminates waste and duplication.

My own experiences as a U.S. Federal Government executive, management consultant, and university instructor have reinforced the view that EA is the only management and technology discipline capable of serving as a meta-context and source of standards for developing enterprise-wide E-Government services. The problem is that agency leaders are often not aware of the ability of EA to enable the transformation of mission and support functions, despite their desire to do just that. Perhaps it is because EA is still viewed by many as an IT discipline, or that EA projects in the past have sometimes delivered expensive shelfware instead of scalable designs using agile / rapid application development methods. The EA community's record for adding value needs improvement, and the material in this book provides many recommendations and case studies for doing that. Thank you to the authors of this material and especially to my long-time friend and colleague, Pallab Saha, for providing this book during a time that it is needed by governments that are looking for ways to create and improve E-Government services.

Scott Bernard
Syracuse University, USA

Scott Bernard is currently the Federal Chief Architect with the Office of Management and serves as Co-Chair for the Federal Enterprise Architecture's Security and Privacy Profile for the U.S. Federal Chief Information Officers Council, Architecture and Infrastructure Committee. He has previously served on the faculty of Carnegie Mellon University's Institute for Software Research, School of Computer Science, where he developed a professional certificate program in enterprise architecture, and he served for over a decade on the faculty of Syracuse University's School of Information Studies. Dr. Bernard has thirty years of experience in information technology management, including work in the academic, federal government, military, and private sectors. He has held positions as a Chief Information Officer, IT Management Consultant, Line-of-Business Manager, Network Operations Manager, Telecommunications Manager, IT Systems Security Manager, and Project Manager for several major IT systems installations. He has served as a senior IT executive for a federal agency, started an enterprise architecture practice for an IT management firm, developed his own consulting practice, and lectured on the topic of enterprise architecture worldwide. Dr. Bernard was the founding editor of the Journal of Enterprise Architecture, and served as Chief Editor from 2005-2010. In 2004, he wrote the first textbook on enterprise architecture that is now in use at universities and in training programs around the world. He also created the EA3 Cube TM framework and methodology that is featured in this book, as well as the design for an on-line architecture repository that is called Living Enterprise™. Dr. Bernard earned his Ph.D. at Virginia Tech in Public Administration and Policy, a Master's degree in Business and Personnel Management from Central Michigan University, a Master's degree in Information Management from Syracuse University, and a Bachelor's degree in Psychology from the University of Southern California. He is a graduate of the United States Naval War College, and earned a Chief Information Officer Certificate and an Advanced Program Management Certificate from the National Defense University. Dr. Bernard is also a former career naval aviator who served on aircraft carriers and with shore squadrons, led IT programs, and was the Director of Network Operations for the Joint Chiefs of Staff at the Pentagon.

Preface

The United Nations has played a pivotal role in elevating the need for connected government through its biennial e-government readiness surveys. Specifically, the surveys in 2008 and 2010 elaborate the criticality of governments to connect seamlessly across functions, agencies, and jurisdictions to deliver effective and efficient services to citizens and businesses. Governments of the future will have to be *connected*. This is also emphasized in the World Economic Forum's *The Future of Government* report published in 2011. In this context, the role of enterprise architecture as a disciplined and structured approach for planning and realizing connected government cannot be overstated. Connected governments have deeper *engagement*, encourage *participation* and *collaboration*, and exhibit greater *openness* and *transparency*. Resultingly, connected governments deliver services that are more *personalized* and *choice-based* anchored around the *whole-of-government* paradigm. The focus shifts from efficient delivery of e-services to value of services delivered that are enabled by *blurring boundaries*, *user driven governance*, and *open government*. This transition is being further accelerated by the advent and proliferation of social media. In short, democratization is a significant and visible outcome of connected government. In terms of scale, intensity, and impact, this transition is nothing short of transformational.

This book covers a subject matter that has gained prominence in the recent years. The need arises from the fact that there is a dearth of literature demonstrating field tested concepts substantiated with real examples of countries embracing enterprise architecture and its role in realizing the vision of connected government. The lack of literature and guidance oftentimes acts as an impediment. Over the years, I have had the privilege of working directly in several national enterprise architecture and electronic government programs in various capacities. These experiences triggered my earlier book *Advances in Government Enterprise Architecture* in 2007. As part of my ongoing work, I received a Microsoft grant for my research titled *Enterprise Architecture as Platform for Connected Government* in 2010, which eventually triggered this book. In the course of my research, it was all too evident that despite the existence of adequate literature in electronic government and enterprise architecture as separate disciplines, governments still struggle to embrace enterprise architecture as a means to realize the vision of connected government. The current situation is further exacerbated by the unavailability of credible reference material. Put together, this book, a first of its kind in the world, aims to address this gap and provide governments across the world a comprehensive compilation of high quality chapters that form a definitive reference for national and local governmental initiatives. With the intention of balancing theory and practice, this book aims to:

1. Demonstrate the importance of government enterprise architecture in elevating the effectiveness of e-government programs;

2. Disseminate current advancements and thought leadership in the area of enterprise architecture in the context of connected government;
3. Provide national e-government initiatives with evidence-based, credible, field tested, and practical guidance in crafting their respective architectures; and
4. Showcase case studies and experience reports of innovative use of enterprise architecture in enhancing national e-government initiatives.

The book is structured into five (5) sections consisting of twenty-one (21) chapters in all. The chapters were carefully selected after being subjected to a rigorous review process spearheaded by the Editorial Advisory Board (EAB). In addition to rigor, relevance, and applicability, I have also attempted to make the book representative of the different regions in the world. Most chapters are in-depth case studies symbolizing different types of governments, cultures, and practices. This selection is deliberate as it allows readers insights into a multitude of country-specific challenges, peculiarities, and nuances. It is obvious such initiatives would be ongoing activities; thus, the chapters represent snapshots in time, representing the current state of practice. The following paragraphs provide an overview and summary of book sections and chapters.

SECTION 1: THE CONNECTED GOVERNMENT PARADIGM

The first section, consisting of one chapter, establishes the context for the entire book. Chapter 1, “Connected Government as the New Normal: A Strategic (Systems) Thinking Approach to Whole of Government Enterprise Architecture Adoption,” presents the dimensions of connected government and positions it as a multi-dimensional construct with crucial constructional elements that the governments aspire for. The chapter then discusses the policy and strategy levers available to positively influence the dimensions of connected government. The role of enterprise architecture in impacting the levers is then proposed and elaborated. Despite good intentions, it is well known that governments face increasing challenges in realizing connected government by making enterprise architecture effective. If not tackled early on, these challenges have the potential to derail initiatives. The chapter uses strategic (systems) thinking to uncover the systemic challenges faced by governments to embrace connected government with a whole-of-government paradigm. The facilitators and inhibitors are presented and analyzed. Given the complexities involved, the chapter proposes plausible intervention strategies that countries can cogitate in order to accelerate their respective initiatives. This chapter is the genesis for the rest of the book.

SECTION 2: GOVERNMENT AS A COMPLEX ADAPTIVE SYSTEM

Consisting of two chapters, this section takes forward the ideas presented in Section 1. It takes a systemic view of governments, wherein it is imperative to understand and tackle inherent complexities within governments. This section aims to make evident the benefits of taking a problem-oriented approach to enterprise architecture and how taxonomies, a first class citizen of government transformation initiatives, are used to enhance the effectiveness of management decisions.

Chapter 2, “A Problem-Oriented Enterprise Architecture Approach Applied to Wicked Problems,” argues that a problem oriented approach to enterprise architecture can deliver better outcomes than one

based upon needs and requirements, especially when dealing with wicked problems. The chapter draws a distinction between what an enterprise architect does (i.e. solve business problems) and what the architect produces (i.e. descriptions of the end states). It also suggests that the approach to modelling and understanding business problems can have significant impacts on the quality, effectiveness and efficiency of potential solutions, and the decisions made in identifying optimal solutions and implementation projects. Finally, the chapter discusses the use of the proposed approach to wicked problems in the context of e-Government.

Chapter 3, “The Power of Enterprise Architecture Taxonomies in Enhancing Portfolio Visibility and Optimising Decision Making,” describes the efficacy of using enterprise architecture taxonomies in making sense of organizations and its components to support portfolio visibility and optimise decision making. It describes the use of taxonomies in a manner that has been successfully applied across a range of medium to large organizations particularly at a whole-of-government level within the Queensland Government, the Gold Coast City Council, and at an agency level within the Queensland Department of Justice and Attorney-General. These taxonomies enable increased visibility of the organization’s investment portfolio in supporting more structured decision-making and provide a basis for evidence-based policy development. At the whole-of-government level, this supports optimisation of information and IT investments across the entire connected government portfolio.

SECTION 3: FRAMEWORKS FOR CONNECTED GOVERNMENT

Actualization of connected government using enterprise architecture requires methods, practices, guidelines, tools, and mechanisms. These play a crucial role in bringing in structure and standards in the way architecture outputs are developed and used. These also bring about a certain degree of maturity in the way the outputs are communicated and outcomes derived. Section 3, consisting of five chapters presents enterprise architecture frameworks developed by various countries. All the chapters in this section are descriptions of initiatives undertaken in various countries. I do not subscribe to the notion that a framework developed for one country will be applicable to another without any adaptation. That said, I do believe there is still a lot to learn from the experiences of other countries.

Chapter 4, “Integrating Agency Enterprise Architecture into Government-Wide Enterprise Architecture: The Case of Korean Government Initiatives,” describes the successful case of government enterprise architecture implemented by the Korean Government. First, a brief history and current status of the Korean government enterprise architecture program are introduced. Next, the characteristics of Korean government enterprise architecture are reviewed using an analytical framework. Finally, the strength and potential weakness of the case is discussed in terms of its relevance in realizing connected governments and furthering future advancement. The fact that South Korea ranks first in the world for e-government maturity makes this chapter immensely valuable, enriching the potential learning.

The growth of ICT-mediated services in the private and public sectors demands that organizations become more focused in delivering efficient services to well-informed and demanding consumers. Governments being very large enterprises are increasingly under pressure to optimize and align their ICT strategies and resources to support the business of government. The Kingdom of Saudi Arabia responds to this challenge by adopting the use of enterprise architecture to transform traditional government services into eGovernment services or eServices. Y-ELAF (Yesser Enterprise Level Architecture Framework) is an enterprise architecture framework that is an adaptation of the industry-recognized

framework TOGAF Version 9 (The Open Group Architecture Framework Version 9), modified to fit the government environment of Saudi Arabia. Chapter 5, “Government Enterprise Architecture: Towards the Inter-Connected Government in the Kingdom of Saudi Arabia,” elaborates the iterative phases of Y-ELAF used to develop the enterprise architecture of a government agency. Further, the chapter describes the outcomes and lessons learned.

Building on the belief that there exists a positive correlation between the desired level of e-government capability and maturity and the required level of architectural maturity, the eGovernment Authority (eGA) of the Kingdom of Bahrain embarked on a three year eGovernment program aimed at improving service delivery to citizens through seamless integration and connected governance. In order to achieve this objective, eGA realized the need for a Kingdom-wide strategy and holistic guiding plans, and hence decided to design and develop a National Enterprise Architecture Framework (NEAF). NEAF is an aggregation of models and meta-models, governance, compliance mechanisms, technology standards, and guidelines put together to guide effective development and implementation of an enterprise architecture by different government entities across the Kingdom. Chapter 6, “National Enterprise Architecture Framework: Experiences in the Kingdom of Bahrain,” describes a NEAF development project success story, its objectives and its importance to Bahrain’s economic vision 2030. It describes the NEAF development lifecycle and highlights at each stage the findings and challenges faced during the development of the framework.

Governments around the world have acknowledged the complexity associated with public sector transformation and have initiated enterprise architecture programs to help manage those complexities and enable the desired strategic transformation. However, most of those EA programs are of limited scope in both EA and SOA practices, and are not comprehensive enough to deal with and manage the associated complexities. As a result, EA programs suffer from the inability to leverage EA and SOA benefits across agencies or jurisdictional boundaries. Currently, the majority of government agencies use EA and SOA within the confines of agency boundaries to deliver solutions by focusing on technical factors that define detailed blueprints of systems, data, and technology. Research has pointed out that whole-of-government enterprise architecture is currently at the conceptual level and still has a long way to go to reach the maturity level required for true value realization. Chapter 7, “Towards Whole-of-Government Enterprise Architecture with TOGAF and Service Oriented Architecture,” gives a brief analysis of the current state of enterprise architecture in governments to highlight the current challenges. It discusses various scopes of whole-of-government enterprise architecture and recommends the plausible approaches to enable sustainable connected government based on The Open Group Architecture Framework (TOGAF) and SOA.

Architecting in countries with stable governance has the advantage of continuity, predictability, and reliability. This has been instrumental in creating a perception that enterprise architecture has higher applicability in countries with stable governments. However, in reality there are countries exhibiting characteristics of volatility, political instability, low quality of regulations, absence of rule of law, and widespread chronic corruption. Such countries are assessed and ranked by the World Bank Institute. Such countries come with their own peculiarities and complexities in terms of governance. These countries, too, require architecture and planning. This chapter explains how a disciplined approach brought in by enterprise architecture can be adapted for adoption in countries with volatile governance. Chapter 8, “Enterprise Architecture in Countries with Volatile Governance: Negotiating Challenges and Crafting Successes,” is a practical description of how the challenging environment can be negotiated and successes crafted.

SECTION 4: TRANSFORMING TO CONNECTED GOVERNMENT

Connected government requires fundamental changes in the way governments operate and interact. This necessitates challenging and transforming several long-held and strongly ingrained mental models. For nations to realize this transformation, the role of methods, practices, guidelines, tools, and mechanisms cannot be overstated. This section, consisting of ten chapters, is primarily a collection of cases. This compilation of chapters represents experiences from both national and local governments, developed and developing economies, and large and small countries. I have selected this mix deliberately so as to provide a wide perspective to the readers. However, I expect countries to use their own discretion and judgment when adopting the methods, practices, and tools described in the chapters.

The emergence of e-governance within Tacoma, WA, a progressive, midsized, U.S. city located in the Pacific Northwest, has been a process of insights and solutions. The interrelationships of e-government, enterprise architecture, and sustainable practices as a means to e-governance are examined through the case study of one Tacoma city division, Building and Land Use Services (BLUS). BLUS managers have redesigned business processes to automate service delivery by the optimization of enterprise-wide interoperable information technology. Chapter 9, "Emergence of Coherence through Cultural Change: A Case of the City of Tacoma," discusses the consideration of the influences that collective decision-making, codes, culture, and vision have on governmental transformation. The identified gap between enterprise architecture and e-government systems is consistent with the emerging convergence of knowledge for developing enterprise architecture maturity, developing best practices for shared information management, and expanding human potential. Internal and external stakeholders have experienced the successful emergence of BLUS into rationalized data and applications, in which the optimization of existing interoperable technology has enabled an enhanced partnership between the city government and the community.

Sustainable benefits of enterprise architecture efforts can only be realised if all structures and behaviour are taken into account together with their drivers and controls. Chapter 10, "Whole-of-Enterprise Approach to Government Architecture Applied for Implementing a Directive of the European Union," tells the story of an e-Government project in Bulgaria where a whole-of-enterprise approach is applied to identify together legal, organizational, and technological measures related to achieving compliance with a new regulation and improvement of a set of e-Government services. One of the main objectives of the project was to discover the potential for simplification of administrative procedures for authorisation of service providers in line with a new regulation in the European Union supporting realisation of a single market of services. The obtained analytical results and the defined target state are not limited to improvement of online services but include pertinent legislation harmonisation and other non-IT related changes. The applied agile EA approach helped with completing the project within six (6) months, realising results exceeding its scope.

In the public sector, Information Technology (IT) as means to support governmental processes is as important as in the industry. Delivering high quality eGovernment services requires an efficient and effective IT support. This IT support can only be provided if the requirements specified in the processes are correctly and completely transformed into IT solutions. Services are seen as major means to support this transformation. Chapter 11, "The Role of Services in Governmental Enterprise Architectures: The Case of the German Federal Government," proposes a method which systematically translates business processes into services. The method contains: (1) a data model describing the structure of the work products of the method, (2) a technique for emergent data modeling, which allows its users to customize the

data model according to the government's needs, (3) a role model describing the required competencies for each step, and (4) a process model describing the required steps to derive services from business processes. To succeed in a governmental context with diverse, federative organizational structures, the method needs a high degree of flexibility. In particular, the proposed method has been designed to be compatible with different process modeling techniques.

Chapter 12, "An Investigative Assessment of the Role of Enterprise Architecture in Realizing E-Government Transformation," investigates important e-strategies concerning the existence and contribution of enterprise architecture to strategic implementation and transformation. Different architecture frameworks are compared, and architectures are aligned to strategic and to transformation objectives, in support of Connected Government. Moreover, the necessity of the alignment of enterprise architecture to the strategy is underlined, and a maturity roadmap to Connected Government is considered. Major e-strategies around the world are being implemented for more than a decade and they have resulted in digital public service delivery and in internal efficiency for further transformation. Most of these strategies have or are being updated and their current versions focus on cross-departmental service delivery leading to Connected Government. Enterprise architecture offers the ability to determine and close departmental gaps, and in this context, it can support the migration to Connected Government.

The healthcare system in many countries is operated by the governments, and interaction with the healthcare system is one of the most frequent interactions between citizens and governments. Demographic, medical, and technological changes are likely to bring new aspects of connectedness into the everyday life of people and place healthcare and homecare professionals in new roles. A transformation is underway where hospital best practices are constantly reducing in-hospital stays to alternative, less-costly care—notably at home. Telemedicine, telehealth, eHealth, home monitoring, and self-care are essential aspects of this transformation. Many issues are influencing this transformation and new barriers are showing up where others are being removed. A broadly oriented enterprise architecture effort is adopted for the underpinning of the change process. The architectural approach encompasses views of the citizen, the healthcare system, the information infrastructure, and the citizen-oriented technology. Chapter 13, "Architecting for Connected Healthcare: A Case of Telehomecare and Hypertension in Denmark," is a case of telemonitoring and self-care using mobile hypertension measurement on a large-scale population cohort. Evaluation of the acceptance and success of the solutions is done within a combined understanding of elements like technology, economy, organization, and culture.

Chapter 14, "Government Enterprise Architecture in Countries with Initial Levels of E-Government Capability and Maturity: Experiences from South Africa," introduces an emerging enterprise architecture approach to e-government. Within the South African context, it is fair to expect e-governance to achieve a minimum level of standardized, data-management practices. For the purposes of this chapter, this level of governance is viewed as the desired strategic objective for e-government. For the past four years, an approach for engaging with government was prototyped and tested. Its intent is to deliver governance-oriented, ICT solutions. Its main objective is to provide data integrity to multi-agency requirements and help design solutions aimed at satisfying those requirements. The diplomatic path towards standardizing data-management practices within government is not always direct. Due consideration is given to organization, business process, technology, and people aspects. It would seem that the outcomes, which resulted from employing the ontology, addressed an underlying need of governmental agencies across the board, namely the need for unification. This chapter explains how multi-agency and intra-agency unification was facilitated through the described initiative.

Connected government implies that citizens and enterprises can interact with governments as with a single entity rather than with a number of different public authorities. In countries characterized by a highly fragmented system of local governments, connected government at the local level can be achieved only through a process of progressive integration on a wider area of systems of local government already integrated at the local level. Chapter 15, “An Architecture Driven Methodology for Transforming from Fragmented to Connected Government: A Case of a Local Government in Italy,” argues that this process should be based on a maturity model and a reference model that defines the technological and organizational conditions that allow the establishment of more integrated aggregations of municipalities. With reference to a study funded by the Region Lombardia (Italy), the chapter introduces the concept of Integrated System of Local Government (ISLG) and describes the process that leads to the establishment of ISLGs as an intermediate step toward connected government at the local level. Moreover, the chapter discusses the conditions that can induce different aggregations of municipalities to comply with a set of standard requirements in the implementation of their integration processes.

Chapter 16, “Moving towards the Connected Transformational Government: Perspectives from Malaysia and Beyond,” provides insights into interoperability from the point of view of delivering government services. It shows that today, technology and industry have progressed to such an extent that the technical barriers to interoperability can be overcome in many ways. The real challenge is to address business interoperability that involves the interplay of technical, architectural, strategic, organizational, policy dimensions, and even legal dimensions. This in turn has influenced the evolution of government interoperability frameworks, wherein some governments have incorporated enterprise architecture based approaches. Today, new socio-economic challenges require policy makers to rethink their approaches in ways that will enable them to constantly improve and evolve citizen-centric services powered by ICT enabled Connected Transformational Government.

As there has not yet been enough work on enterprise architectures for fully integrated knowledge-based, highly-sophisticated (citizen-oriented) personalized services, this chapter aims to articulate upon a perspective to design architectures for the development and provision of such services. In doing so, the authors benefit from their knowledge and experience gained via the Turkish e-Government Gateway (eGG) and general e-government services development and provisioning. Chapter 17, “Enterprise Architecture for Personalization of E-Government Services: Reflections from Turkey,” is a discussion on development of eGG services in Turkey, and provides a visionary suggestion for knowledge-based personalized, citizen-centric e-government. Among the suggested perspectives, an E-Citizen Decision Support System, and Entity-Utility and Information Flow Model could be useful for eGG development in Turkey and elsewhere.

Chapter 18, “IT Reform and Enterprise Architecture in the United States’ Public Sector Reforms: Issues and Recommendations,” looks at whole-of-government public sector reforms from an IT focused enterprise architecture perspective. The chapter summarizes reforms carried out under three US presidents—Clinton, Bush, and Obama—and discusses how they have too frequently failed to meet expectations of policy makers, public servants, the public, and other stakeholders. We find that IT reforms in support of larger public sector reforms have been ineffective and unsustainable, although many IT reforms have been successful in a narrower context. Enterprise architecture has suffered as a once promising methodology that did not become the “silver bullet” in managing the IT and information infrastructure to support reforms, knowledge management, and decision-making. It is also seen as an important tool for reducing information management silos that successive governments have unsuccessfully tried to

reduce. This chapter raises the spectre of endemic barriers to reforms that must be overcome if enterprise architecture and IT reforms are to realize their potential, and offers recommendations for overcoming these hurdles in the context of whole-of-government public sector reforms.

SECTION 5: PUBLIC VALUE MANAGEMENT IN CONNECTED GOVERNMENT

Countries make large investments in numerous initiatives in their quest to be more connected. Furthermore, a large proportion of these investments are for ICT. This is necessitated because these countries realize the contribution of ICT to national economies leading to digital prosperity. Developing countries, in general, face the spectre of digital divide, which at times undermines the benefits derived from connected government. Additionally, many times the benefits that are derived tend to be subjective and socio-cultural in nature. These are difficult to quantify and monetize. Proliferation of connected government-centric architecture programs can lead to competition for resources and influence. Thus, it is imperative, that all such initiatives and programs are accompanied with rigorous value assessment, and such assessments become integral elements of any methods, practices, guidelines, and mechanisms. The rigor alleviates any concerns about inadequate value and benefits that the citizens demand and expect. This section, consisting of three chapters, shows how.

Government investments in enhancing the interoperability of ICT systems have the potential to improve services and help governments respond to the diverse and often incompatible needs and interests of individual citizens, organizations, and society at large. The diversity of stakeholder needs and the complexity inherent in interoperable systems for connected government require an architecture that is up to the task. The value propositions that underlie the architecture's performance assessment or reference model are fundamental. The propositions must be broad enough to span the full scope of the government program goals. Chapter 19, "Assessing the Value of Investments in Government Interoperability," puts forward two perspectives for assessing the value of interoperable ICT investments incorporating outcomes beyond financial metrics. The first is the network value approach to assessment of investments in interoperable ICT systems for government. The second is the public value framework developed by the Center for Technology in Government, which expands on the network value approach to include a broader range of public value outcomes. These approaches are illustrated via two case studies: (1) the I-Choose project designed to produce interoperable government and private sector data about a specific agricultural market and (2) the government of Colombia's interoperability efforts with expanded metrics based on the expansion of interoperability networks.

Cloud computing is a very demanding technology regarding the level of maturity (stages) of enterprise architecture, and more so when the business processes of the governments are directly affected by the implementation of cloud computing. Therefore, an extra stage in enterprise architecture and an extra service model are conceived to better map the opportunities and risks while investing in cloud computing. Chapter 20, "A Public Economics Approach to Enabling Enterprise Architecture with the Government Cloud in Belgium," proposes a holistic generic investment framework aimed to align cloud computing and other investments with the strategy and operations 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 (investments) 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 addressed is whether governments can implement ambitious cloud computing projects without enterprise architecture, and if not, then, which stage should be used.

The United States' Federal Government is in an extreme financial crisis. The national debt is \$14 Trillion and the national deficit is \$1.3 Trillion. The Federal Government seeks to improve government-wide performance, reduce operating costs, reduce national debt, and reduce national deficit. If the Government continues its current enterprise management approach, the national debt and national deficit could become greater and the Government could default on its debt. Chapter 21, "Addressing the United States' Federal Government Financial Crisis: A Case for Department of Defense Enterprise Architecture Based Approach," proposes that the DOD institutionalize an enterprise architecture based approach to improve department-wide performance, reduce operating costs, reduce national debt, and reduce national deficit.

I expect this book to be greatly useful and have direct application benefits to a wide spectrum of audiences. The intended audience and potential uses include:

1. Government Leaders, Chief Architects, Analysts, and Designers seeking better, quicker, and easier approaches to respond to needs of their internal and external customers;
2. Policy Analysts, Line-of-Business Managers concerned with maximizing business value of IT and business competitiveness;
3. CIOs/CTOs of business software companies interested in incorporating government enterprise architecture to differentiate their products and services offerings and increasing the value proposition to their customers;
4. Consultants and practitioners desirous of new solutions and technologies to improve the productivity of their government clients;
5. Business management, public policy, and IS management educators interested in imparting knowledge about this vital discipline;
6. Academic and consulting researchers looking to uncover and characterize new research problems and programs; and
7. Electronic government professionals involved with organizational technology strategic planning, technology procurement, management of technology projects, consulting and advising on technology issues, and management of total cost of ownership.

In being the first book that explicitly investigates the role of enterprise architecture as a means to connected government, this is seminal. The subject matter covered in this book has been my passion for a decade. I take immense pride in sharing my work and the outstanding works of the other contributing authors to a wider audience. In the coming years I envision a greater maturity in government enterprise architecture initiatives, and I anticipate that the book will make a direct contribution to that vision.

This book is about the future and how steps are being taken to realize that future. The book, through a confluence of ideas and practices, demonstrates foresight and is a guide to inventing tomorrow's good practices today. In this context, my assumption is that countries would rather lead than follow. If that happens to be your goal too, then welcome aboard.

Pallab Saha

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2012

Acknowledgment

This book reflects the ideas and contributions of many individuals. I have always been deeply interested in the discipline of enterprise architecture. Given that the government sector presents some very complex challenges, it has been my area of research for several years now. As part of this journey, I have been privileged to contribute to Singapore's Government Enterprise Architecture; collaborate with some outstanding experts at the United Nations and the World Bank; advise several national governments through their journeys and be part of the government enterprise architecture community globally. All of the above have reinforced my passion and interest, and provided the trigger for me to conceive this book. This book is an excellent example of team effort.

First and foremost, I would like to thank IGI Global for giving me the opportunity to continue my wonderful collaboration with them. This is my third book with IGI Global, and it has been a great partnership so far. Secondly, I would like to thank all contributing chapter authors. Their contribution has been invaluable. They are all well experienced and respected experts representing both academia and practice.

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