**Use of Architectural Approach in the Public Sector:**

**Bahrain E-Government Enterprise Architecture**

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**Abstract**
The Kingdom of Bahrain eGovernment Authority (eGA) embarked National Bahrain enterprise architecture (EA) initiative. The objective is to improve the alignment between business and information technology (IT) by enhancing the ability of the government entity to better control IT-related changes in a manner that supports the overall business strategy. To do this, the government entity is required to map its current and future enterprise architecture states of the entity in relation to the business and IT perspectives and consequently prepare a transition plan that closes the gap between the two states - in other words, a blueprint for the entity’s IT. Bahrain enterprise architecture is the set of standards, mechanisms through which architecture is decreed in the enterprise. EA is principally about ensuring that business is conducted properly. It is less about control and strict observance to rules, and more about guidance and effective and reasonable usage of resources to ensure sustainability of an entity’s strategic objectives. The Bahrain national EA is a federated architecture model and it provides benefits in cost, schedule, scalability and robustness. The federated architecture arrangement maintains a good balance between enterprise-wide standards, reference architecture and frameworks\(^1\), and localized business-area driven innovation. National Bahrain enterprise architecture team has primary responsibility for reference architecture, standards and frameworks that are common across the Kingdom of Bahrain.

**Keywords**
Bahrain Enterprise Architecture; eGovernment Enterprise Architecture. Bahrain National Enterprise Architecture

I. **INTRODUCTION**
The drive of national enterprise architecture objective is to develop and enable adoption of architecture design, review, execution and governance capabilities around Bahrain national enterprise architecture framework. The Bahrain eGovernment authority’s EA group is responsible for national architecture strategic planning and oversight, including reviewing information technology plans, creating technology standards and guidelines, providing steering input into the enterprise-wide technology plan, and studying technology acquisitions. Through the enterprise architecture process, cross functional leadership will guide the future direction of information technology. The achievement of this highly collaborative process will depend on the strength of its governance structure and the commitment of the participants to its goals and guiding principles.

II. **BAHRAIN ENTERPRISE ARCHITECTURE**
Bahrain EA is a collection of models, meta-models, compliance mechanism, technology standards and guidelines and governance\(^2\) put together to guide effective development and implementation of Enterprise Architecture by different government entities across Kingdom of Bahrain which is referred and customized with The Open Group Architecture (ToGAF)\(^3\). Enterprise architecture shall assist different purposes to highlight few key areas are

- Capability portfolio - Holistic view of the complete capability
- Formal traceable relationship between Why, What and How
  - Why We Do What We Do (Strategy, Objectives and KPIs)
  - What We Actually Do (Business Functions & Services)
  - How We Do What We Do (Business Process, Organization Structure, People & Systems)
- Enable informed decision making
- Readily traceable impact of any potential change
- Identification of glaring gaps and improvement opportunities
- To lower the cost of IT, fix its effectiveness, fix its strategic value, use IT to generate new strategic value or in many cases to transform the business with IT.
Bahrain national Enterprise architecture framework helps -

- To ensure alignment of IT projects to main strategic objectives of vision 2030, eGovernment strategy and individual Government entity business objectives.
- To align business and IT objectives and resources.
- Improve the effectiveness and efficiency in using Information technology.
- Improve IT project management process.
- Improve communication, prioritization, and governance of initiatives:
  - Provide a foundation for skills development.
  - Quicken decision-making: Architecture Principles, models, standards and processes
  - Lessen integration problems: Compliance with architecture:
  - Reduce costs: retiring duplicative or outdated assets.
  - Speed time-to-market: Have the technology ready before it is needed.
  - Follow an established roadmap for infrastructure development.

**III. BAHRAIN ENTERPRISE ARCHITECTURE DOMAIN**

Bahrain National Enterprise Architecture defines the business, the information necessary to operate that business, the technology necessary to support the business operations, and the transitional process necessary for implementing new technologies in response to the changing needs of the business. As illustrated in Figure 2, EA is simply defining the four layers of Business Architecture, Data / Information Architecture, Application Architecture and Infrastructures / Technology Architecture. These layers are usually called domains and it captures following information:

A. **Business Architecture:**
The domain provides a view of business capability through a traceable relationship across business functions, business services and business processes.

B. **Data / Information Architecture:**
The domain provides a view of the information and data models required for the business.

C. **Application Architecture:**
The domain provides a detailed view of the application portfolio which supports the business capabilities.

D. **Technology/Infrastructure Architecture:**
The domain provides information on IT and network infrastructure required by the entity.

**Bahrain EA Governance:**
A cross-organizational, multi-disciplinary EA review committee with the backing of IT executive management to oversee the implementation of the technology governance strategy and framework definition.

**IV. INFORMATION USAGE IN ENTERPRISE ARCHITECTURE**

In every enterprise architecture project, a current state, as-is architecture: (As-Is) are first defined to measure their EA maturity of the organization. Then based on a comprehensive study of the entity, the future state target architecture (To-Be) would be developed. The journey of moving the organization’s current to target architecture with sets of action plans is called the transitional plan. Finally in order to complete the circle such transitional plan would be possible without a management and a governance process. These processes provide policy guidance, advice and assistance in the definition, design and implementation of the enterprise architecture discipline and practice through the enterprise, an
understanding of the process for making co-operative and collaborative IT investment decisions and designate who is responsible for making these decisions.

Figure 3: Information Usage in EA

The information to enable growth and alignment with the strategy includes, but not limited to:

- Current business capability
- Target business capability as per strategy
- Dependencies between capabilities and change impact
- Systems (Non-IT and IT) currently supporting business capabilities
- Systems (Non-IT and IT) required for delivering new capabilities
- Dependencies between systems and associated change impact
- Planned Alignment & Integration between capabilities and systems

V. BENEFITS REALIZATION THROUGH ENTERPRISE ARCHITECTURE

Realization of the EA benefits will require well planned effort on architecture development enabled by specific set of information. In below Figure4, exhibits the benefits alignment process model in the Kingdom of Bahrain EA initiative.

- IT Solutions aligned to Business needs and drivers
- Reduce Costs by streamlining solution development and procurements
- Adopt common approach for common capability
- Identify and develop shared services
- Reduce Risk by restricting technology usage to a predefined set of standards and principles
- Increased Agility by improved impact and gap analysis
- Improved integration and interoperability between entities by leveraging standards and guidelines and architecture principles

VI. LESSON LEARNED AND WAYFORWARD

During the Bahrain enterprise architecture journey there was lot of opportunity to learn and correct many areas in the government. The art of Enterprise architecting relies not only on the methodology of the adopted frameworks, but also on the degree of stakeholder participation.

- Stakeholder participation is such an important factor that it constitutes the heart of an EA program.
- Stakeholder participation constitutes two dimensions – first, the sponsors and second, the ones involved in architecture generation and implementation.
- The enforcement absence of architecture governance, which could provide mandate for architecture maturity activities across the ministries, was always felt.

Several ministries felt that the proactive adoption of activities promoted through the initiative will help them to not only align with Bahrain 2030 vision and but also to increase the efficiency and effectiveness of their systems. However, they had their own issues during the adoption of EA such as

- Lack of senior management mandate,
- Motivation and time for training.

Fortunately, there were many candidates who had zeal to learn new things and they understood that the knowledge they were gaining will definitely uphold their ministry. However, due to huge gaps between training sessions and various engagements of the candidates, they found it difficult in grasping the concepts. Hence continuous awareness and regular coordination are the key area where continual improvement needed to promote and align with EA and governance framework.

To trade the model of optimal, efficient utilization of IT in shared service concept were tiresome across government entities.

Competency to execute the centralized and shared service program across government entities are really challenging factor in the ministries.

To ensure a resounding success for the future activities in the initiative, the adoption of the
recommendations mentioned is of utmost importance.
A proper enforced governance mechanism should
in place to make all government entities to get
enroll with the following key initiatives to realize
the actual benefits of EA program
- Participation in national EA maturity
  improvement program.
- Participation in IT strategic planning program.
- Adoption of outlined national ICT policy and
  standards.
- Adoption of Technology Standards and
  Guidelines.
- Usage of IT Investment Framework across
  government entities.

VII. CONCLUSION
Improved business and IT alignment, efficient
utilization of resources, effectiveness cannot be
achieved without partaking a proper level of EA
maturity. It is vital to cognize the integral
dependencies-dimension embedding EA into the
ministry’s leadership buy-in, executive’s supports,
organization, and investment have to be addressed
before moving forward.
Without tight integration into business functional
units and without business architecture being
addressed clearly together with business functional
units, EA will not work. Government entities top
management attention to strategy (business
strategy, IT strategy), and business architecture
may be a good starting point to establish business
and EA efforts...
To conclude, Bahrain EA is long term, continuous
effort, it is a model of enterprise and its future
direction, EA value to business operation should be
more than simply IT investment decision
management, it is a main tool to reduce the
response time for impact assessment, strategic plan
redirection and tactical reaction, tradeoff analysis,
reduce time-to-market, EA is not the end but a
continuous journey.

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