

An overview of The Open Group's Enterprise Architecture and Evolution of IT4IT

Krishnamoorthy Marimuthu¹, Dr. V.Prasanna Venkatesan²

¹BI Architect, Tata Consultancy Services, Chennai, India

²Head-Dept. of Banking Technology, School of Management, Pondicherry University, Puducherry, India

Abstract: An Enterprise Architecture (EA) provides an organization to operate effectively with a well-defined standards and artifacts in achieving its objectives. It maps all of the software development architectures and identifies the organization's Strengths, Weakness and Gaps and provides roadmap components to be used in achieving its mission. The Open Group was formed in mid-90's and is a vendor – technology neutral consortium with over four hundred member organizations contributing in developing and managing the Industry standards in providing an Industry standard Enterprise Architecture Framework (EAF). The TOGAF (1), its flagship framework emphasizes business goals as architecture drivers and provides a repository of Guidelines, Techniques, Models and Framework. With frameworks like TOGAF provides the Organizations with the guidance on the IT Architecture development, the need has raised to effectively manage IT and to have a professionalized IT architecture to run IT as a business. This has made the Open group's member organization to publish IT4IT (2) - An open standard value chain based Reference Architecture that can add values in managing IT as a Business. This study provides an overview of EA, its Framework and the importance of IT4IT with for executing IT as a business.

Keywords: Enterprise Architecture, TOGAF, ADM, IT4IT.

I. INTRODUCTION

There is being a considerable studies in the recent days by the researchers on the EAF, its quality and evaluation. More importantly, there are numerous member organizations that had adapted the Open Group's EAF across its organizations and are contributing to the development and management of the Standards, proposed in the Enterprise Architecture and its frameworks. With the widespread implementation of the EA and the emerging need for being Agile and Digitization, it has become evident to manage the Value Chain proposition of IT as a Business. This resulted in the evolution of the Reference Architecture IT4IT to manage the business of IT in improving its efficiency, optimizing its value and reduction in costs. This paper focus on the evolution of the IT4IT with a case study but after providing needed details of the EA, Open Groups other frameworks and standards.

II. ENTERPRISE ARCHITECTURE - DEFINITION

Before defining the Enterprise Architecture as a whole, it would be better to have the Enterprise and Architecture defined separately. An Enterprise can be defined as an Organization, or a part of the Organization or collection of Organizations. Be it a part or whole or group it should share a common set of goals (3). It can be a part of a corporation or a corporation by itself. An Architecture is the fundamental organization of something, embodied in its components, their relationships to each other and the environment and the principles governing its design and evolution (3). Now an Enterprise Architecture, - It is a conceptual blueprint that can be shared and used among the stakeholders to define the structure and operation of an organization. The main intention of an enterprise architecture is to determine the roadmap components in achieving the current and future Objectives of an organization in a most effective manner. (4).

A. Why - Enterprise Architecture:

One of the main aspects for the Business to be made more effective is by digitizing the key service areas through Information Technology. However there has to be an alignment between the Architectural interests of the Business and Technology to reap high return of investment. With the dynamism experienced by the service needs of business and the technology advancements, it gets easy for any organization in ending up digitizing or automating a not so significant business service or ending up choosing a wrong technology.

Then how can the business align to its capabilities to a better extent. This had made to think of a standard, generic framework that if adopted by any organization should make them align to its vision, goals and objectives. To go one step further, any organization's vision, its defined goals and the objectives will all contain metrics to measure if the stated objectives are met. These Objectives implicitly denotes the gap between, where the organization is currently to where the organization want to be. These objectives are the one which are transformed by virtue of the programs, programs and automation to get the gaps closed. However, the business transformations needs to be principally designed and formally governed in terms of a well-defined architecture and architecture building blocks. - The Enterprise Architecture framework provides these Architecture building blocks that can be adopted to describe the aspect of the Organization.

Now, by knowing what an Enterprise Architecture can provide, adopting it by an Organization will result in both Business and IT benefits. The Business can enjoy the faster time-to-market, managed innovations, consistent business process with more reliability and less risk. At the same time IT can enjoy the benefits of lower cost, less complexity, faster design and development with reduced risks .

III. THE OPEN GROUP AND ITS MISSION

While talking about the Enterprise Architecture and its benefits it's always worthwhile to be aware of the consortium that manages and provides an open environment to enable the benefits of EA to the member organizations. The Open Group is an International and vendor - technology neutral consortium that leads the development of IT standards and certifications [1]. The membership of the Open group currently holds 400 plus corporate memberships and is open to all enterprises, anywhere in the world be it small , medium or large in size.

The primary vision of the Open Group is create an environment of Boundary less Information flow. The boundary less information flow is a trademark of the open group and is achieved through global interoperability in a secure, reliable and timely manner.

A. Boundary less information Flow:

The Enterprise needs to know what applications and information are available and there should be an enablement for the enterprise to get any information there are in need of in any time. Also the enterprise needs to respond and react for any of the new information they receive from the external world.

For IT, The Boundary less information flow means being able to deploy IT so that its boundaries align with real business boundaries with the value to the business and the business utilization of the function delivered by IT.

B. Architecture Forums:

The mission of The Open Group Architecture Forum is to keep intact the vision of the Open Group, the Boundary less Information Flow. The Forums conducts conferences and workshops with the focus on all the architectural aspects of any enterprise. Members have early access to relevant knowledge, which helps them in leading the developments of EA standards and best practices.[5]

The intent of the architecture forum revolves around

- The EA community broad and deep leadership in the Enterprise Architecture space.
- Publishing and certifying best practices of EA
- Publishing and researching thought leadership in EA.
- Initiating and managing programs and projects to support these activities

IV. EA - STANDARDS AND FRAMEWORKS

A Framework is a conceptual structure that complements the Enterprise Architecture and can be used to develop, and sustain the EA for any Organization. The framework provides a structural and organized design methodology to achieve the target state of the enterprise in terms of the architecture building blocks which are needed to build the target state. It contains set of tools, standards that can be used in implementing the building blocks in a common vocabulary. It serves as the practical starting point for any Architecture project and creates clarity while implementing a larger projects.

A. TOGAF – The Open Group Architecture Framework:

TOGAF, first developed in 1995 was based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM). From there on, the TOGAF framework is the de facto global standard for Enterprise Architecture. The TOGAF framework enables organizations to effectively address critical business needs by ensuring that every stakeholders stays in same page and speaks a common language with reduction in costs and time achieving demonstrable Return of investment.

TOGAF 9.1, is the most recent version of the TOGAF published by the Open Group. The key to TOGAF is its development methodology- the TOGAF Architecture Development Method (ADM). The ADM is cyclic methodology for developing an enterprise architecture that addresses business needs in an efficient manner.

B. TOGAF – Architecture Types:

Before discussing the details on the TOGAF – ADM, it gets necessitated to throw some lights on the Architecture types that are addressed by TOGAF. The overall Enterprise Architecture comprises of subset of commonly accepted types of architecture.

The below Table.1 list the architecture types and its descriptions.

TABLE.1: TOGAF – ARCHITECTURE TYPES

| Architecture Type | Description |
|--------------------------|---|
| Business Architecture | Key Business process and Strategies |
| Data Architecture | Key Data resources – Logical and Physical data elements of the Organization. |
| Application Architecture | Core applications to be deployed and their key relationship to the other business processes. |
| Technology Architecture | The Infrastructure, process and standards required to support the Business, Application and Data Architectures. |

C. TOGAF – Architecture Development Method (ADM):

The TOGAF ADM resulted from the research of many architecture practitioners and forms the core of TOGAF. The ADM is an iterative process and for each iteration, it reconsiders the Scope, Detail, Schedules and Milestones of the engagement. It address the enterprise business and IT needs by providing a set of Architecture views and recommended deliverables. It also guides on managing the requirements and the tools used for the architecture development.

The ADM describes covers 10 phases which describe the Architecture Development Cycle.[1]

These steps are:

- Preliminary Phase
- Phase A: Architecture Vision
- Phase B: Business Architecture
- Phase C: Information Systems Architecture
- Phase D: Technology Architecture
- Phase E: Opportunities and Solutions

- Phase F: Migration Planning
- Phase G: Implementation Governance
- Phase H: Architecture Change Management
- ADM Architecture Requirements Management

The Open Group depicts the ADM as shown in the below figure, Figure 1. [7]

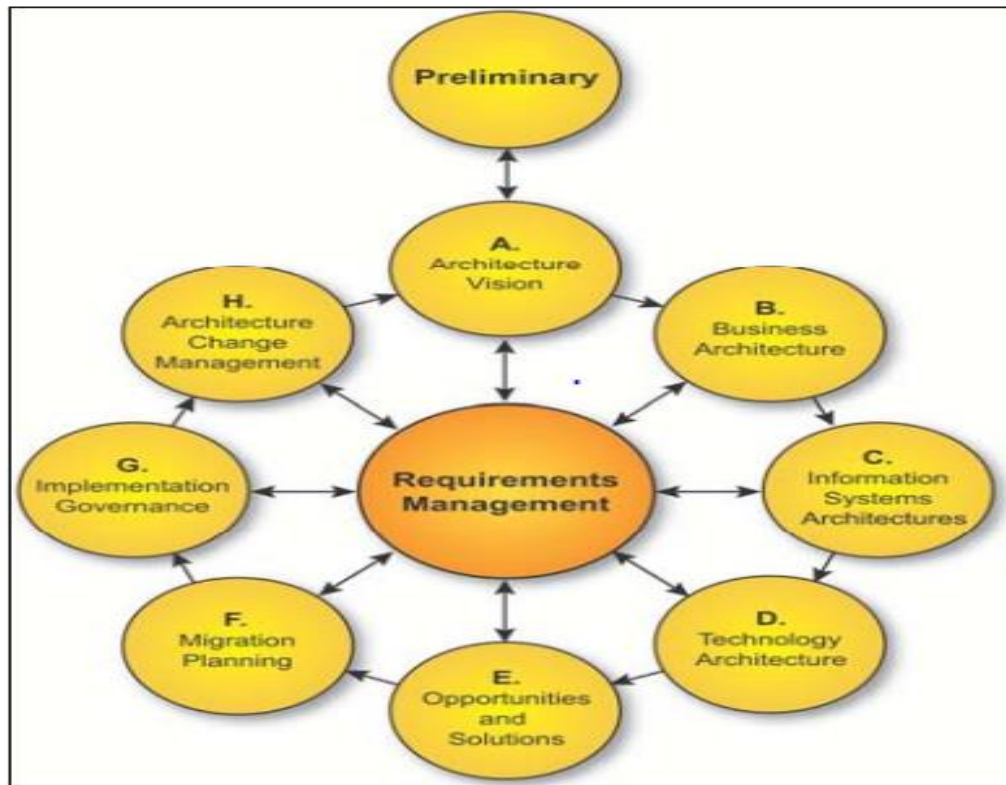


FIGURE.1

Preliminary Phase:

The Preliminary Phase determines and establishes the Architecture Capability desired by the organization. The Preliminary Phase makes sure there is a well-defined Request for Architecture Work, and that the organization – and Enterprise Architecture team in particular – have everything in place to be able to fulfill that request. In this phase, the subsequent phases of ADM are customized exclusively to meet the needs for the engagement in scope. Underlying principles are defined, the ability of the enterprise architecture and the business to make the required changes are assessed.

Architecture Vision:

Phase A, the Architecture vision is the starting point of the iteration which provides a Statement of the Architecture Work in an unambiguous and common terminology that will be delivered in an iteration of the ADM. It also provides the Vision of the proposed enterprise architecture. The Statement of Architecture Work defines the elements that will be delivered by the architecture outlined in the Architecture Vision. It is the Vision that sets the aspiration of the capabilities and business value that can be reaped by the proposed enterprise architecture.

Business Architecture:

Phase B, the Business Architecture's key objective is to develop a Target Business Architecture along with the roadmap components to bridge the gap between the current baseline state to the newly identified Target Business Architecture. The knowledge on the business architecture serves as a prerequisite for architecture work in other domains, such as Data, Application, and Technology. It is the Business Architecture that gets the project sponsor's interest on the business values and return on investment of architecture work that will be implemented.

Information Systems Architecture:

TOGAF divides Phase C – the Information Systems Architectures – into two, the Data and Application Architectures. Similar to the other architecture phases, the phase C as well defines target architecture for the Data and Application and identifies the candidate roadmap components that are to be required to the achieve the target architectures. The order of execution between the Data and Application can be of any order and it is left to interests of the Enterprise Architects.

Technology Architecture:

Phase D is the Phase in TOGAF that develops the Technology Architecture for an architecture project. Technology architecture defines the organization and communication between the platform services, logical and physical technology components. Phase D develops the Target Technology Architecture and ensures that it complements the data and application components (developed in Phase C) which in turn complements the business architecture.

The architectures developed in Phases B, C and D combine to enable the Architecture Vision – which addresses stakeholder concerns and the Request for Architecture Work. As like the other architecture development phases, Phase D identifies the candidate Architecture Roadmap components to make the transition from Baseline to Target technology architecture. The steps in Phase D are almost identical to the steps in Phases B and C – the main difference is that the focus is now on Technology. So this includes Technology Reference Models and Technology criteria or measurements – such as Performance, Maintainability, Location and Latency, or Availability.

Opportunities and Solution:

T Phase E - The Opportunities and Solution generates the first complete version of the Architecture Roadmap and the initiates the implementation and the migration plan. It also combines the analysis and outcome of its predecessor phase phases – B, C & D. This phase concentrates on how to deliver the architecture and introduces the timeline to realize the architecture along the draft of the implementation and the migration planning.

Phase E also introduces the incremental approach made of the Transition architectures also termed as intermediate architectures. The final activity of the Phase would be to map the required architectural changes to investment programs and projects to carry out the Work Packages and which is where is the Project Management office and the delivery managers comes into picture.

Migration and Planning:

The Implementation and Migration Plan drafted in phase E gets a shape in Phase F – The Migration and Planning and the details are finalized, together with the final Architecture Roadmap. It is in Phase F, the change management approach is coordinated to align with the approach used within the enterprise. Finally, Phase F ensures that key stakeholders fully understands and accepts the business value, the cost of work packages, and the Transition and Future Architectures.

Implementation Governance:

By the time Phase G is reached, the architectures from the Phase A to D is developed, the opportunities and solutions for delivering the architecture have been identified (in Phase E), and the detailed implementation and migration plan has been finalized (in Phase F). The role of the architecture team in Phase G is all concerned about providing monitoring and governance of the architectural implementation.

Architecture Change Management:

Phase H, Architecture Change Management describes the change management process and approach to monitor and manage changes to the architecture in a cohesive and architected way. This requires continual monitoring of dynamism around the engagement and the changes happening with in the scope of the business environment. The process should support the implemented enterprise architecture as a dynamic environment that has the flexibility to evolve rapidly in response to these changes.

In Phase H it is critical that the governance body has to set up checklists and criteria to decide whether a identified Change Request required a simple architecture update or whether it is warranting a start of a new cycle of the Architecture Development Method (ADM). At most care should be taken in such decisions as the changes relate directly to business value.

Requirements Management:

Requirements are produced, analyzed and reviewed in each of the phases of the ADM. The Requirements Management Phase is central to the ADM and it describes the process of managing the architecture requirements throughout the iterations of ADM. Along with describing the process of Requirements Management, it also shows how the other phases of the ADM are linked with the Requirements management process.

Requirements are not static – they dynamically evolve as we complete each Phase of the ADM, and also between cycles of the ADM. Dealing with changes in requirements is crucial. The complete requirements of the enterprise architecture and the subsequent change requests are identified, stored, and fed into and out of the relevant ADM phases, and also between cycles of the ADM.

D. TOGAF – Is it good enough for IT as a business?

From the details discussed so far, it's evident that TOGAF is a vendor neutral, technology neutral and industry neutral framework that can be adopted by any enterprise freely from the open group. The Enterprise architecting based out from the TOGAF is proven well and many leading enterprises has tasted success by adopting to TOGAF. However the frameworks are prescriptive enough to be considered as a reference architecture excursively for IT.

Other mature industry verticals, such as retail or telecom, and professionalized management functions such as HR and Finance, all have a standard approach and reference architecture. The lack of such in IT is driving up cost. The Architecture framework brings in standards and architecture building blocks which can make the IT implementation and faster and less complex. But what IT as a business look for is the VALUE.

The Open Group and its member had worked around this and had published a new Value based reference architecture, IT4IT. The main intention for this architecture is to manage IT as a business and by focusing more on the business outcomes and developing insights for the agile improvements.

V. IT4IT – IT BUSINESS MANGEMENT

The Open Group IT4IT Reference Architecture standard comprises a reference architecture and a value chain-based operating model for managing the business of IT. It provides prescriptive guidance on how to design, procure and implement the functionality needed to run IT. The end-to-end, 'how to' emphasis of the IT Value Chain and IT4IT Reference Architecture also enables the state of services that IT delivers to be systematically tracked across the service lifecycle [8].

A. Why IT4IT ?

IT4IT provides,

- A Reference architecture for managing the business of IT, focusing more on business outcome and enabling insight for continuous improvement.
- Faster, better, cheaper and less risky execution approach across the entire value chain.
- An industry-independent solution that can be adopted by any one with the same problem.
- Best suited solutions to accommodate the new IT paradigms such as Agile, Big data, Cloud and mobility.

The key highlight of the IT4IT Reference Architecture is that it provides an operating model based on prescriptive standard with its value chain-based information model that enhances and complements traditional process based frameworks and standards.

As the name "IT for IT" denotes, it refers to the internal activities of IT and the relationships among the IT functions within the enterprise to govern IT by itself. It is about business value improvement of IT by using IT for the development of IT in the same effective way the business use IT. The standard enables optimized IT resources and more efficient and IT operations in a better controlled manner. These IT-related results can be translated into business benefits to enhance its competitive position.

B. IT4IT – How it provides?

IT4IT reduces cost, simplifies, and brings end-to-end trace-ability to the IT production. But it wasn't enough to just solve the operational side of IT. It is becoming increasingly apparent that IT is a production-organized business. IT takes demand from the business lines, then produces and delivers services.

And what kind of method would a production-organized business employ to increase efficiency and drive-down cost? The Open Group would use the Value-chain concept. The value chain is tested and proven. It is business-based and can be measured. IT4IT provides structures and tools for organizations to manage their IT function as a business of its own kind. The tools are structured with the same quality attributes as that of a tool or function provided to any of the service areas of the business. The same level of discipline and efficiency are set as the benchmarks for the IT4IT tools and structures.

The IT Value Chain operating model is a structures model with a set of value chain also termed as value streams. The key functional components and the key data objects are all identified with in each of the value stream and they form the backbone of the reference architecture. More details of the functional components and data objects are considered out of scope for this study but this study definitely forms a base on which the more of exploration could be added. The IT Value Chain has four value streams supported by a reference architecture . The four value streams are: [8]

- Strategy to Portfolio
- Request to Fulfill
- Requirement to Deploy
- Detect to Correct

Each IT Value Stream is centered on a key aspect of the service model, the essential data objects (information model), and functional components (functional model) that support it. Together, the four value streams play a vital role in helping IT control the service model as it advances through its lifecycle.

C. IT4IT – Benefits

The IT4IT Reference Architecture enables a more streamlined, transparent, and automated IT function across the entire IT value chain. Its strategic goal is to create value through IT. This value can come through enabling the business to develop innovative products and/or services, expanding markets (growth strategy), or helping the business become more efficient and cost-effective (productivity).

- Cost Effective – An IT cost reduction of around 5 to 20 percent is identified as possible for a larger IT function in both its operating expenditure and capital expenditure [8].
- Reduced Risk – Improved Risk profile for the enterprise and a greater transparency and tighter control of IT services throughout its lifecycle can be achieved. In other words, the uncertainties and ambiguities around the IT implementation can be reduced
- Faster Time-to-Market – More reliable and predictable IT services are rendered increasing Customer loyalty. Products that depend on IT can be launched quicker due to the improved throughput of IT operations

VI. CONCLUSION

This paper presented an overview of the Enterprise Architecture and the framework by the Open Group. The Phases identified in the Architecture Development Method of the TOGAF were listed and defined. With TOGAF considered as a key framework for any organization stepping up for an enterprise level engagement it's also discussed that the existing frameworks are not prescriptive and are not based on the value. The value based new reference architecture introduced and published by the open group looked promising and this paper throws light on Why, What and How on the IT4IT reference architecture. The benefits of the IT4IT were just listed leaving out the Reference architecture and its applications for the further studies and research work on the Enterprise Architecture.

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