



Evaluating Enterprise Architecture Frameworks

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ABSTRACT: This article provides insights into the leading Enterprise Architect Frameworks/Methodologies and pros and cons of adopting each framework. Based on the desired business vision and outcomes the specific architecture can be adopted to provide business and IT leaders with ready recommendations for adjusting policies and projects to achieve target business outcomes that capitalize on relevant business disruptions.

KEYWORDS: Enterprise Architecture, Frameworks, Technical architecture.

I. INTRODUCTION

Enterprise architecture (EA) is the practice of analysing, designing, planning and implementing enterprise analysis to successfully execute on business strategies. Enterprise architecture applies architecture principles and practices to guide organizations through the business, information, process and technology changes necessary to execute their strategies. The enterprise architecture literature offers many definitions for the term enterprise architecture, below are some of the definitions from different school of thoughts.

Enterprise Architecture Body of Knowledge defines enterprise architecture as a practice which analyses areas of common activity within or between organizations, where information and other resources are exchanged to guide future states from an integrated viewpoint of strategy, business, and technology.

According to Gartner: "Enterprise architecture (EA) is a discipline for proactively and holistically leading enterprise responses to disruptive forces by identifying and analysing the execution of change toward desired business vision and outcomes. EA delivers value by presenting business and IT leaders with signature-ready recommendations for adjusting policies and projects to achieve target business outcomes that capitalize on relevant business disruptions. EA is used to steer decision making toward the evolution of the future state architecture.

II. ROLE OF ENTERPRISE ARCHITECT

An Enterprise Architect is one who is responsible for making sure that a company's business strategy uses proper technology systems architecture to achieve its goals. Enterprise architects have an enormous degree of responsibility and should be always on top of the company's vision. They need to keep up with the latest trends in technology.

Enterprise Architects ensure that business and technology are in alignment by linking the business mission, strategy, and processes of an organization to its technology strategy, and by documenting this using multiple architectural models or views.

EAs should be able to work strategically and work as a change agent in the organization. They should be able to quickly adopt to new technologies and contribute towards the company's/leadership vision. EAs should also be able to overlook if the technology standards are correctly applied in the organization.

III. DIFFERENT ENTERPRISE ARCHITECTURE FRAMEWORKS

Enterprise Frameworks methodologies have been practiced but the below four EA Frameworks account 90% of the methodologies/frameworks being followed by organizations.

1. The Zachman Framework
2. The Open Group Architecture Framework, TOGAF
3. The Federal Enterprise Architecture Framework, FEAF
4. The Gartner Methodology (formerly known as the Meta Framework)



Now let us take a deep dive into each of these four frameworks and also understand certain pros and cons with each of these four frameworks.

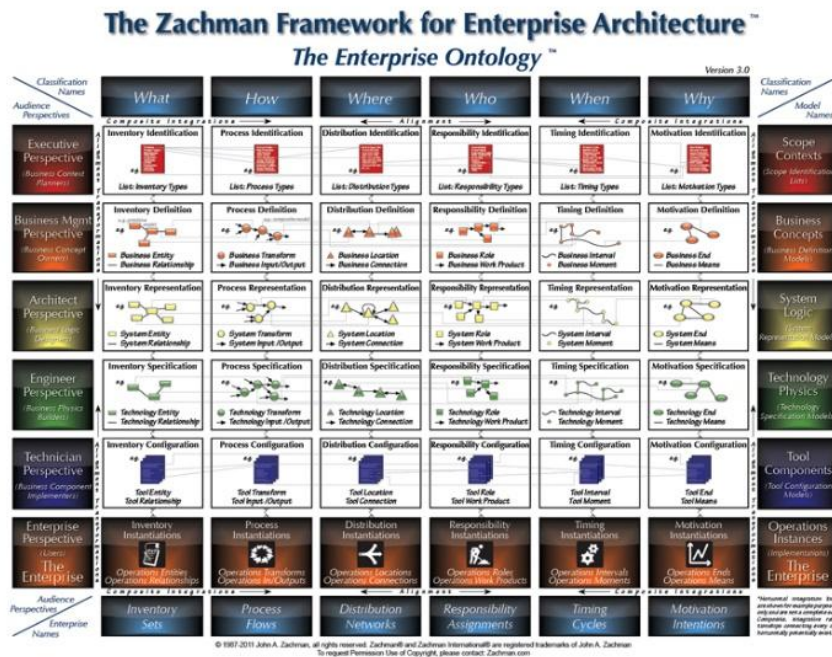
1. The Zachman Framework

Zachman Enterprise Architecture Framework [1] was started in 1987 with the publication from John Zachman and is considered as one of the pioneers among the other Enterprise Architecture Frameworks.

The definition of the Zachman Framework as said by “John A Zachman”:

The Zachman Framework™ is a schema - the intersection between two historical classifications that have been in use for literally thousands of years. The first is the fundamentals of communication found in the primitive interrogatives: What, How, When, Who, Where, and Why. It is the integration of answers to these questions that enables the comprehensive, composite description of complex ideas. The second is derived from reification, the transformation of an abstract idea into an instantiation that was initially postulated by ancient Greek philosophers and is labelled in the Zachman Framework™: Identification, Definition, Representation, Specification, Configuration, and Instantiation.

The basis of the Framework focuses on six descriptive foci and six player perspectives, depicted as a 6 x 6 “matrix” in “Figure 1”.



Phase	Contextual	Conceptual	Logical	Physical	As Built	Functioning Enterprise
Deliverables	List of Important things to business	Conceptual Data Model	Logical Data Model	Physical Data Model	Data Definition	Usable Data
	Business Process Model	Business Process Model	Systems Architecture Model	Technology Design Model	Program	Working Function
	Business Locations	Business Logistics System	Distributed Systems Architecture	Technology Architecture	Network Architecture	Usable Network
	Important Organizations	Workflow Model	Human Interface Architecture	Presentation Architecture	Security Architecture	Functioning Organization
	Events	Master Schedule	Processing Structure	Control Structure	Timing Definition	Implemented Schedule
	Goals and Strategies	Business Plan	Business Rule Model	Rule Design	Rule Speculation	Working Strategy

Figure 1: The Zachman Framework for Enterprise Architecture.



Pros and Cons:

- Zachman Framework covers both high-level project planning and project level technical architecture.
- Zachman Framework allows architects to look at an enterprise system in an organized way and helps in analysing the system.
- Zachman focuses on Taxonomy completeness, i.e. how well you can use the methodology to classify the various architectural artifacts.
- Complex framework but only at the metamodel level.

2. The Open Group Architecture Framework, TOGAF

The Open Group Architectural Framework, TOGAF [2] was first developed in 1995 and was based on the Department of Defence’s Technical Architecture Framework (DoDAF). 80% of the global 50 companies and 60% of Fortune 500 companies use TOGAF Framework.

TOGAF provides the methods and tools for assisting in the acceptance, production, use, and maintenance of an enterprise architecture. It is based on an iterative process model supported by best practices and a re-usable set of existing architecture assets.

TOGAF deals with the four architecture domains that are commonly accepted as subsets of an overall enterprise architecture

- The **Business Architecture** defines the business strategy, governance, organization and key business processes.
- The **Data Architecture** describes the structure of an organization's logical and physical data assets and data management resources.
- The **Application Architecture** provides a blueprint for the individual application systems to be deployed, their interactions, and their relationships to the core business processes of the organization.
- The **Technology Architecture** describes the logical software and hardware capabilities that are required to support the deployment of business, data, and application services. This includes IT infrastructure, middleware, networks, communications, processing, standards, etc.

The TOGAF ADM “Figure 2” is the result of continuous contributions from large number of architecture practitioners. It describes a method for developing and managing the lifecycle of an enterprise architecture and forms the core of TOGAF. It integrates elements of TOGAF described in this document as well as other available architectural assets, to meet the business and IT needs of an organization.

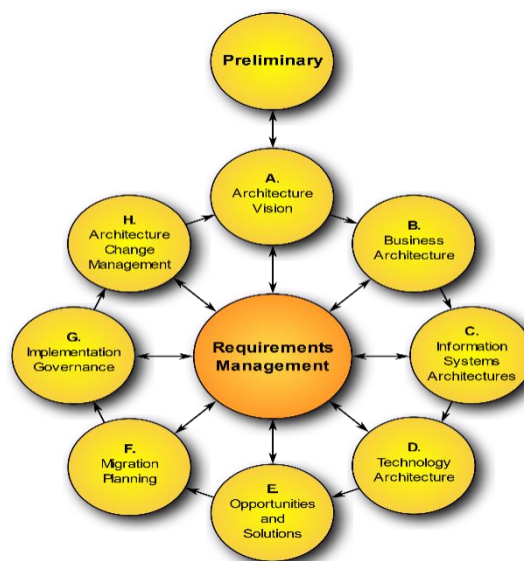


Figure 2: Architecture Development Cycle.



Phases within the ADM are as follows:

The **Preliminary Phase** describes the preparation and initiation activities required to prepare to meet the business directive for a new enterprise architecture, including the definition of an Organization-Specific Architecture framework and the definition of principles.

Phase A: Architecture Vision describes the initial phase of an architecture development cycle. It includes information about defining the scope, identifying the stakeholders, creating the Architecture Vision, and obtaining approvals.

Phase B: Business Architecture describes the development of a Business Architecture to support an agreed Architecture Vision.

Phase C: Information Systems Architectures describes the development of Information Systems Architectures for an architecture project, including the development of Data and Application Architectures.

Phase D: Technology Architecture describes the development of the Technology Architecture for an architecture project.

Phase E: Opportunities & Solutions conducts initial implementation planning and the identification of delivery vehicles for the architecture defined in the previous phases.

Phase F: Migration Planning addresses the formulation of a set of detailed sequence of transition architectures with a supporting Implementation and Migration Plan.

Phase G: Implementation Governance provides an architectural oversight of the implementation.

Phase H: Architecture Change Management establishes procedures for managing change to the new architecture. Requirements Management examines the process of managing architecture requirements throughout the ADM.

Pros and Cons:

- Most popular and extensively used framework
- Supported by an active community of researchers and practitioners.
- Complex, time consuming and difficult to adopt.

3. The Federal Enterprise Architecture Framework, FEAF

Federal Enterprise Architecture Framework (FEAF) [3] is an EA framework developed by the Government of the United States. FEAF promotes an overall approach to developing and using enterprise architecture in the federal government. First version of FEAF was published in 1999 and the latest version of the framework is FEAF-II (v2), which was released in 2013 following the publication of 'The Common Approach to Federal Enterprise Architecture'.

FEAF implementation provides numerous benefits, one of the benefit among them is to provide a common approach for IT acquisition in the United States federal government. FEAF provides a common framework and management tools and is designed to ease sharing of information and resources across federal agencies, reduce costs, and improve citizen services.

It consists of a set of interrelated “reference models” that describe the six sub architecture domains in the framework:

- Strategy
- Business
- Data
- Applications
- Infrastructure
- Security

Collaborative Planning Methodology in “Figure 3” provides steps for planners to use throughout the planning process to flesh out a transition strategy that will enable the future state to become reality. It is a simple, repeatable process that consists of integrated, multi-disciplinary analysis that involves sponsors, stakeholders, planners, and implementers.



The Collaborative Planning Methodology is intended as a full planning and implementation lifecycle for use at all levels of scope defined in the Common Approach to Federal Enterprise Architecture: International, National, Federal, Sector, Agency, Segment, System, and Application.

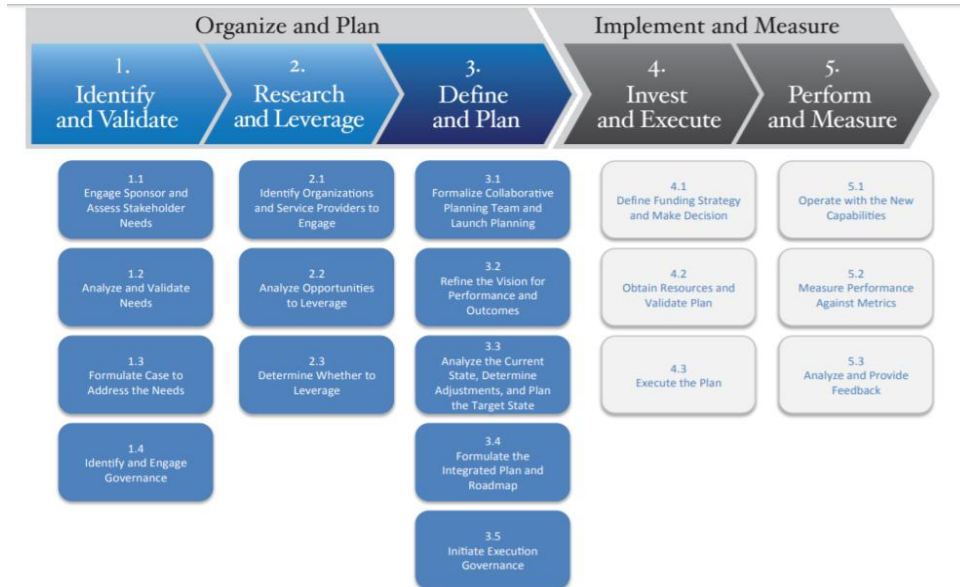


Figure 3: Collaborative Planning Methodology (CPM).

The Collaborative Planning Methodology consists of two phases: (1) Organize and Plan and (2) Implement and Measure.

The Consolidated Reference Model “Figure 4” of the Federal Enterprise Architecture Framework (FEAF) equips OMB and Federal agencies with a common language and framework to describe and analyse investments. It consists of a set of interrelated “reference models” designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across agencies.

Federal Enterprise Architecture Framework version 1 had five reference models, they have been regrouped and expanded into six in the current version of the Federal EA-II (v2).

Consolidated Reference Model (CRM)

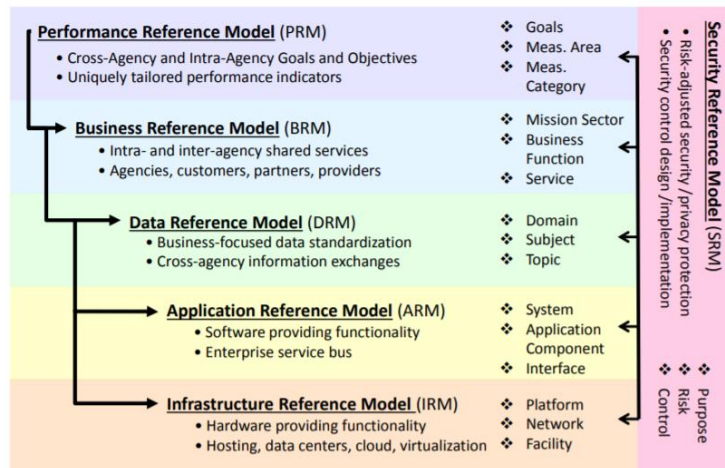


Figure 4: Consolidated Reference Model (CRM)



Pros and Cons:

- Framework covers the entire organization
- Limited to U.S. Government or Government projects.

4. The Gartner Methodology (Formerly known as the Meta Framework)

Gartner’s [4] new view of enterprise architecture provides a solid base for new research into the discipline and provides insight into the best practices for building a well-defined, well-aligned enterprise architecture in a mature, productive enterprise architecture program. Gartner EA framework does not conform to models, taxonomy or to structures/framework.

Gartner methodology was not solidified until year 2006, after the Gartner/Meta merger.

Gartner believes that enterprise architecture is about bringing together three constituents:

- Business Owners
- Information Specialists
- The Technology Implementers

Gartner’s Enterprise architecture from “Figure 5” is view is about Strategy and is focused on the destination. The two important things to Gartner are *where an organization is going* and *how it will get there*.

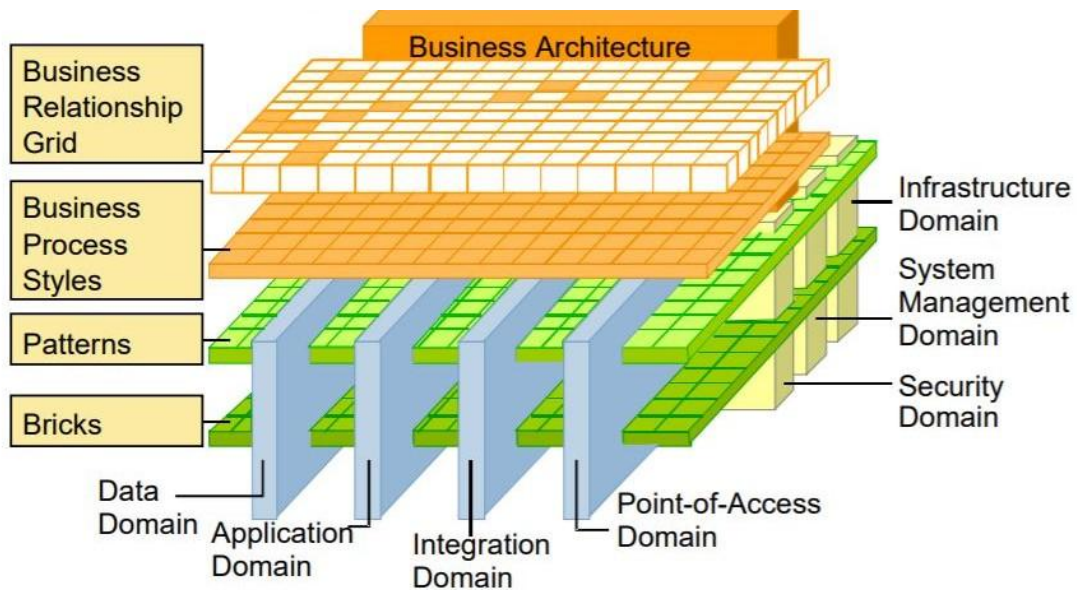


Figure 5: High-level Business and IT Architecture Model

Pros and Cons:

- Gartner EA Framework relies on a constant correction that allows the three core entities to tackle any oncoming problem i.e. Business Owners, Information Specialists and the Technology Implementers
- Gartner EA framework does not conform to models, taxonomy or to structures/framework.

IV. CONCLUSION

Enterprise Architecture and different frameworks helps in analyzing, designing, planning, and implementing enterprise analysis to successfully execute on business strategies. It guides organizations through the business, information, process and technology changes necessary to execute their strategies. Based on different frameworks the most used framework in enterprise level is TOGAF followed by the Zachman framework.



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BIOGRAPHY



Sharan Kumar Paratala Rajagopal is a Senior Manager with Capgemini America, Inc. having 14+ years of design, development and architecture experience. He is specialized in Java/J2EE, Integration methodologies, Guidewire Product, Data Analytics, AI and Cloud technologies. He has vast domain experience in Public Services, Hospitality and Property & Casualty Insurance. He has also contributed multiple technical articles to major Dev communities.