THE Open GROUP

World-Class EA: A Leader's Approach to Establishing and Evolving an EA Capability

A White Paper by:

Sriram Sabesan, Conexiam
Dave Hornford, Conexiam
Samantha Toder, Conexiam
Ken Street, Conexiam
Taylor Hornford, Conexiam

January 2016

World-Class EA: A Leader's Approach to Establishing and Evolving an EA Capability
Document No.: W160

Published by The Open Group, January 2016.
Any comments relating to the material contained in this document may be submitted to:
The Open Group, 44 Montgomery St. #960, San Francisco, CA 94104, USA
or by email to: ogpubs@opengroup.org

Table of Contents

Boundaryless Information Flow™

Boundaryless Information Flow ™
achieved through global interoperability
in a secure, reliable, and timely manner

Executive Summary

This White Paper puts forward current thinking on establishing an Enterprise Architecture (EA) Capability that aligns to a set of requirements and expectations specific to each Enterprise. It proposes an approach for the standing-up and enhancing of an Enterprise's EA Capability based upon the established best practice contained within TOGAF®, an Open Group standard.

This White Paper is structured to provide the context, content, and rationale behind choices and steps that an EA Leader can consult at any point in time to set up, operate, or improve the value extracted from the practice of EA in their organization.

The intended audience for this White Paper is as follows:

- Professionals who have been tasked with establishing and evolving an Enterprise's EA Capability
- Business Leaders who are contemplating an investment in EA as a strategy
- Strategy and technology advisors to an Enterprise's Leaders
- Enthusiasts in the field of EA or organizational transformation

A high-functioning EA Capability optimizes Boundaryless Information Flow™ within and between Enterprises based on open standards and global interoperability.

Introduction

This White Paper puts forward current thinking on establishing an Enterprise Architecture (EA) Capability that aligns to a set of requirements and expectations that are specific to each Enterprise.[1] It proposes an approach for the standing-up and enhancing of an Enterprise's EA Capability based upon established best practice. This document follows the recommendation in the TOGAF® 9.1 standard, Chapter 46 to properly architect your EA Capability. This document follows a configured path through the TOGAF Architecture Development Method (ADM).

This White Paper is written for an EA Capability Leader, the person who is tasked to lead the effort to establish or evolve an EA Capability. We have selected the term Leader very deliberately to reflect the role, rather than one of the myriad titles in an Enterprise the Leader may have. This White Paper is structured to provide the context, content, and rationale behind choices and steps that an EA Leader can consult at any point in time to set up, operate, and improve the value extracted from the practice of EA in their organization. A high-functioning EA Capability optimizes Boundaryless Information Flow within and between enterprises based on open standards and global interoperability.

The intended audience for this White Paper is:

- Professionals who have been tasked with establishing and evolving an Enterprise's EA Capability
- Business leaders who are contemplating an investment in EA as a strategy
- Strategy and technology advisors to an Enterprise's Leader(s)
- Enthusiasts in the field of EA or organizational transformation

Practicing EA requires deep interaction with several specialized functions such as strategy development, HR policies, and corporate accounting. This White Paper will:

- Introduce key topics of concern
- Define the terms related to the topic
- Show how it is related to EA Capability
- Discuss what the Leader needs to know
- Describe what the Leader should do with this knowledge

[1] We have observed that the terms business, company, organization, and enterprise are used interchangeably. We will use the term Organization to reference a team of personnel brought together to perform a set of tasks and deliver outcomes defined for them. Likewise, the Enterprise will refer to a logical entity that is taking part in an activity, whether some kind of risk-reward or new ways of solving socio-economic problems. The most important concept is the Enterprise is the highest level of description which identifies the boundary encompassed by the EA and EA Capability. We use the term "company" or "business" only when the usage improves readability, yet it means Enterprise.

This White Paper transitions its focus between setting up a new EA Capability practice and evolving or re-establishing the practice. We have decided to present in this way to reflect the reality of the state of EA prevalent in the industry at the time of writing. This paper is broken into four parts and nine advisory chapters. The first two contain a narrative that leads through a series of topics and related steps that will help you to step back from your current operational context to seek broader perspective. Ideally, the contents of these two parts act as a companion to the TOGAF ADM or similar architecture development process, method, or framework your Enterprise may choose to adopt. We have taken this approach deliberately. By simply talking about what you must do and what you need to achieve out of the steps, we focus on the outcome without any distraction related to implementation or evolution.

In the third part we cover adoption of the EA Capability. This includes preparation and initiation activities required to establish or enhance the EA Capability that would be relevant to your Enterprise.

Then in the fourth part, we show a simple mapping of how the TOGAF ADM can be practically used. This follows a "configuration" of the TOGAF ADM for architecting and establishing an EA Capability. It serves as an example to show how the TOGAF ADM could be customized to address the purpose for which your EA Capability is being established.

From experience, we know that not all scenarios or related fields discussed in this White Paper will be relevant for you, especially in your first pass creating the EA Capability. Establishing any capability is a journey. Use this paper as your starting point to create and evolve your EA Capability or when the purpose for performing EA changes or the charter for your team changes.

Even though this White Paper has a logical structure, it is not designed as a simple task-list. The depth and detail of every step taken by the EA Leader is iterative and the only variable is time spent for each step. As with all change work, listing what you need to know is not the same as defining the level of detail in documentation. We have provided a concise summary of what you need to know to establish the EA Capability in Table 9 (on page 99).

It is the EA Leader's judgment to consider the level of depth, level of documentation, and how to iterate in a manner that best suits your Enterprise. It is our recommendation that you complete reading Enterprise Context and EA Context (on page 18) and Business Objectives for the EA Capability (on page 34) of this paper before making any judgment call on the approach to building EA Capability.

At Conexiam, we have established and enhanced EA Capability focused on strategy, portfolio, project, reporting to organizational change leaders, to support specific transformation efforts, embedded in an IT organization, and to provide focused continuous change. This experience highlights there is *no one right* EA Capability model. This paper will help you, the EA Capability Leader, to identify the approach:

- Appropriate to your Enterprise
- Appropriate to your context
- Appropriate to your purpose

We cannot overstate the importance of aligning to your Enterprise's context and purpose. In our experience anyone who suggests there is a single correct approach or working around alignment to context is not providing the right advice for you to succeed with EA Capability.

State of EA

Before we get into the details, let us reflect on the state of EA, as practiced until 2015 and what impact it has brought to Enterprises. Academic and industry research conducted by the Association of Enterprise Architects (AEA), CEB, and Forrester during 2014 showcases a wide spectrum in the practice of EA, its maturity, and the lifespan of the capability in an Enterprise. The patterns in adoption of EA practice vary from early adoption and success through revival. The key message that EA Capability is a function of context and purpose is often lost, in practice and in discussions, across all approaches.

The pace of change in demography in every country, the technology, the environment, public attitudes, and political institutions is faster than ever experienced. This change is driving Government[2] and industry agendas as never before, as discussed in "The Second Machine Age".[3] In order to respond to the demands and needs of their stakeholders, organizations need to develop new and better ways of managing continuous change at ever-increasing pace to deliver significant value in a transparent manner.

Organizations need an EA Capability as an integral capability in order to support the consistently directed continuous change and transformational change. However, over the years, many organizations have attempted to set up EA practices only to see them fail after a few years. These failures are due to several reasons.

In terms of behavior, there are wide variances: there are teams that are control-centric (sometimes called the Ivory Tower model), others are focused heavily on IT, some are focused on modeling, and others on delivering business strategy-based EA. We have also come across EA Capability team models varying from multi-year planning for the target architecture to those working on a just-in-time or agile approach. Irrespective of the model, when disconnect exists between the team performing the EA Capability and the Enterprise's expectations, the team will be shut down and the EA Capability restarted. Successful teams have tight alignment to the context and the charter. We cannot overstate the importance of aligning to your Enterprise's context and purpose.

Below is the paraphrased version of the top reasons cited by EA professionals in the surveys conducted by CEB, Forrester, and Gartner in 2015 regarding unsuccessful attempts at EA in their organization:

- EA Leaders say that their business is so dynamic and business Leaders expect delivery at a pace that is always ahead of the competition … it is difficult to define target architectures and roadmaps.
- EA efforts are primarily focused on setting up technical standards and ensuring compliance to meet short-term business needs … at times standards are process documents leading to management overheads.
- EA metrics have been closely aligned to the CIO's operational metrics … it is very difficult to show

[2] The Future and How to Think About It, Performance and Innovation Unit (PIU) Report, UK Government, 1999.

[3] Eric Brynjolfsson, Andrew McAfee: The Second Machine Age; refer to: http://secondmachineage.com.

differentiation and value addition … sometimes these metrics don't show sufficient relevance to business needs.

- Teams are lost between creating a roadmap to achieve target architectures and a roadmap for establishing/maintaining the capability … sometimes convergence of a top-down approach and a bottom-up approach is not planned or gets defined … the end is normally not in sight.
- EA Capability is run like an operational process rather than as a strategy instigator and enabler.

Factors that influence the practice of EA in an organization are:

- Competitive environment of the organization
- Competency and the ability to measure and message the positive impact of EA
- Separation of concerns and coexistence of related competencies like program management

In spite of these previous failures, Enterprises repeatedly try to establish a successful EA Capability.

This paper discusses a pragmatic and tested approach to establish, manage, and evolve an EA Capability based upon established successful practices. We assume that your Enterprise has decided to use EA as a key tool in the management toolkit. We hint at ideas to promote the application of EA and the concept of EA.

We cannot overstate that in our experience anyone who suggests there is a single correct approach or working around alignment to context is not providing the right advice for you to succeed with EA Capability. Success is based upon aligning to your Enterprise's context and purpose.

Definitions

To share a clear understanding with the authors, a few terms need to be defined distinctly from common English usage. The terms below are distinctly defined, and Capitalized wherever found. The authors mean exactly these definitions and nothing else in this document.

Enterprise

The highest level of description of an organization used to identify the boundary encompassed by the EA and EA Capability.

Note: This definition is deliberately flexible and not associated with an organization's legal or functional boundaries. It must cover monolithic organizations and extended organizations that include separate organizations connected by a mission or supply chain, as well as operating entities within an organization. Consider an organization that uses outsourced partners to provide manufacturing, logistics, and support; a multi-national peacekeeping force; and a multi-billion dollar division of a Fortune 50 firm. All are Enterprises.

Capability

A management concept that facilitates planning improvements in the ability to do something that leads to enhanced "outcomes".

It enables measuring employed resources and achieved outcomes or goals within a specified context.

Note: Formal modeling often requires a crisp definition. Frankly, without the recurrent formal model definitions used in EA we would not have defined the term and relied upon the simplest definition in the Merriam-Webster Dictionary: "ability or potential for an indicated use"; "something that has the potential to be improved".

Enterprise Architecture (EA)

For convenience we routinely use EA as a shorthand for Enterprise Architecture.

While many in the EA profession find distinguishing the terms "architecture" and "architecture description" useful, we do not see a need in this document. We think it is a distinction without a difference.

Enterprise Architecture (EA) Capability

The Enterprise's ability to develop, maintain, and evolve an architecture, and use the architecture to govern change activity in the Enterprise.

Leader

The person tasked to lead the establishment and/or evolution of an EA Capability.

Note: This term reflects the role, rather than one of the myriad titles that may apply.

Concepts

Who is an EA Capability Leader?

This White Paper is written for a Leader, the person who is tasked to lead the evolution of an EA Capability. We have selected the term Leader very deliberately to reflect the role, rather than one of the myriad titles in an Enterprise the Leader may have. The essential characteristic of the Leader tasked with establishing an EA Capability is the ability to step back from their current operational context to seek broader perspective before making a decision; then following the decision to lead the change.

These Leaders take into account multiple dimensions, like business drivers, organizational culture, and maturity, the context their Enterprise operates within, and are cognizant of the fact that their decisions are likely to live longer than their tenure in their current role. This person understands that there are multiple systems in play that interact with each other.

What is an Enterprise?

The TOGAF framework defines "Enterprise'' in the context of formal modeling. We use a different definition focused on defining the boundary of interest and activity. For the purpose of this paper, an Enterprise is the highest level of description of an organization used to identify the boundary encompassed by the EA & EA Capability.

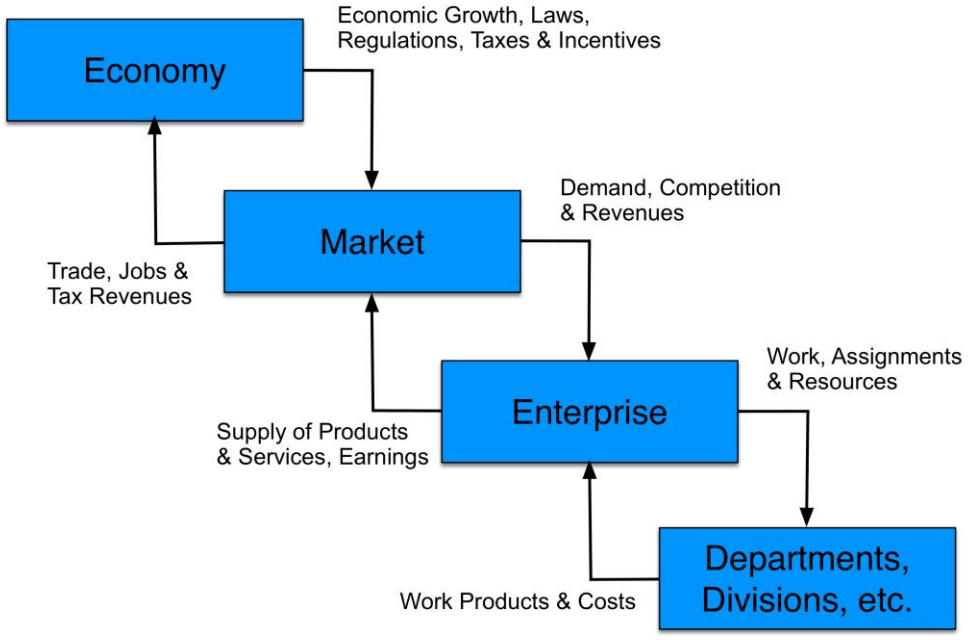

Figure 1: Context for Commercial Enterprise

This definition is deliberately flexible and not associated with an organization's legal or functional boundaries. It covers monolithic organizations and extended organizations that include separate organizations

connected by a mission or supply chain, as well as operating entities within an organization. Consider an organization that uses outsourced partners to provide manufacturing, logistics, and support; a multi-national peacekeeping force; and a multi-billion dollar division of a Fortune 50 firm. All are Enterprises.

An Enterprise exists within a context; it has an interaction with what happens outside the Enterprise. The context is different for Public, or Governmental Enterprises, Defense Enterprises, and Private, or Commercial Enterprises. Political, Economic, Social, Technological, Environment, and Legal forces provide a context for the Enterprise – as shown in Figure 1 (derived from a presentation by William B Rouse, The Open Group Conference, January 2012).

A given EA will align with the defined boundary of an Enterprise. Whether that boundary is an exact match for an organization, a subset, or superset is not material. We assume that the EA Capability will align with the boundary of the Enterprise and be able to deliver the EA.

Public agencies, government, and defense organizations all benefit from EA. This paper does not comprehensively address all nuances and/or outlier aspects for government, defense, or not-for-profit Enterprises, mainly not to distract the reader with alternate methods or special focus. This paper will assume your Enterprise is a profit-making publicly traded organization. The reader will have to make a few adjustments to context and motivation. We may in the future provide an update to this paper focused on the special needs of public organizations.

What is an EA Capability and EA?

In short, *an EA Capability is the ability to develop, use, and sustain the architecture of a particular Enterprise, and use the architecture to govern change*.

This paper discusses establishing and evolving an EA Capability; it explicitly does not discuss an EA department or any other organizational element. The term *capability* is often defined tortuously, most commonly when it is used as part of a formal analysis technique when definition must be precise and constrained. In this document, we are using the term as a management concept that facilitates planning improvements in the ability to do something that leads to enhanced outcomes enabled by the Capacity.

An EA Capability is the ability to develop, use, and sustain EA; deliberately improving this ability is done to provide more value from the use of the EA.

In its simplest terms, EA is used to describe the future state of an Enterprise to guide the change to reach the future state. The description of the future state enables key people to understand what must be in their Enterprise to meet the Enterprise's goals, objective, mission, and vision in the context within which the Enterprise operates. The gap between the Enterprise's current state and future state guides what must change within the Enterprise.

Using the capability model in the World-Class Enterprise Architecture White Paper (The Open Group) as a base, we assume that an EA Capability is established specifically to support one or more purposes. The World-Class Enterprise Architecture White Paper classifies four purposes:

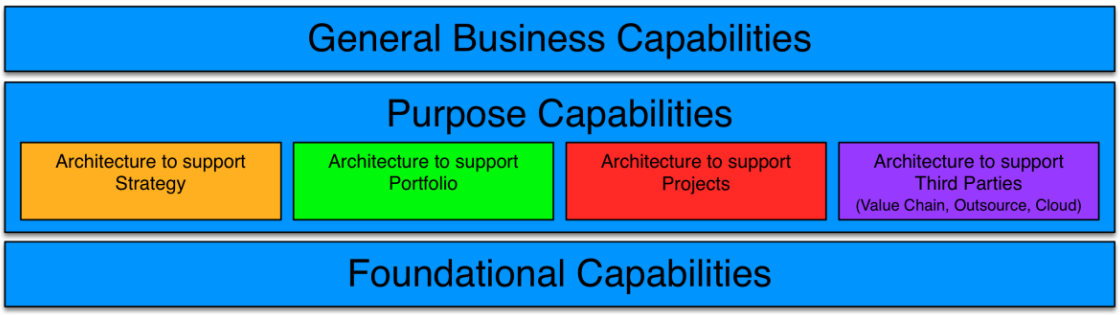

Figure 2: EA Capability Model (Adapted from the World-Class Enterprise Architecture White Paper)

- **EA to support Strategy**: Deliver EA to provide an end-to-end target architecture, and develop roadmaps of change over a three to ten-year period. EAs at this level will typically span many change programs, or portfolios. In this context, architecture is used to identify change initiatives and supporting portfolio and programs. Set their terms of reference, identify synergies, and govern their execution.
- **EA to support Portfolio**: Deliver EA to support cross-functional, multi-phase, and multi-project change initiatives. In this context, architecture is used to identify projects, set their terms of reference, align their approaches, identify synergies, and govern their execution.
- **EA to support Project**: Deliver EA to support the Enterprise's project delivery method to assure compliance with architectural governance, and to support integration and alignment between projects.
- **EA to support Third Parties**: Deliver EA that is used to support the procurement process, establish the basis of how the sub-contractor will deliver change, and finally act as a governance framework for change.

EA Lifecycle

Whether your Enterprise is embarking on establishing an EA Capability for the first time, is enhancing an existing EA Capability, or re-booting, this paper will provide an approach to lead the EA Capability lifecycle and maturity. In all cases, the best practice is to establish a roadmap that provides an end-state and a set of capability increments.

At the time of writing the most common industry practice is a re-boot after a failed attempt to establish an EA Capability. When enhancing an existing EA Capability or performing a re-boot, we strongly recommend performing the activities described in Enterprise Context and EA Context (on page 18) and Business Objectives for the EA Capability (on page 34). These activities will assist in identifying the pitfalls prior efforts ran into, and will strongly influence the external Communication Plan and Roadmap. There are never simple answers to questions like:

- Should I create the organization first and then build the capability with them?
- Is charter and sponsorship a good enough starting point?
- Should I start understanding my company and its external interactions or start with the team that gave me a charter?
- Do I need a formal toolset first or is back of napkin documentation enough?

Organizational culture, external competition, investment, and risk appetite will influence your best option. This paper will discuss such questions as pragmatically and generically as possible to give you good starting points. This paper follows a best practice approach based upon work that has established some of the most successful long-lasting EA Capability teams.

EA and Other Fields

An EA Capability is normally established in an organization to bring about changes to the current method of operation. Achieving the transformation outcome demands analysis of the current state of the organization, its interaction outside, staying current with industry trends. Implementation of recommendations from such analysis requires planning, funding, and monitoring. In the course of this journey, the EA profession interacts with business strategy, cash flow management, environmental and competitive sustainability, organizational design, information and physical security, IT and operations management to name a few. Within your Enterprise, many of the functions of an EA Capability will be performed, even implicitly, by several organizations.

This paper does not take the position that a specific EA organization will perform the process, and provide resources and deliverables embedded within an EA Capability. However, this paper, in the following sections, will introduce you to related fields, an approach to set, build, and evolve the practice of the EA Capability. You as a Leader will frame your charter – the extent of overlap with related functions, sharing of responsibilities, and having the necessary organizational conversations at your Enterprise.

Characteristics of EA Practice

The purpose of EA is to optimize the Enterprise to realize the business strategy, or mission. All optimization must be responsive to change. Optimizing an Enterprise to realize best the business strategy or mission requires all components working together. When all components are optimized to the Enterprise strategy, or mission, achieving competitive advantage is possible.

An EA that highlights the relationship between an Enterprise's parts facilitates effective management and exploitation opportunities. EA provides a strategic context for the evolution of the Enterprise in response to the constantly changing needs of the business environment.

Furthermore, a good EA enables you to achieve the right balance for your Enterprise between conflicting demands. Without the EA, it is highly unlikely that all the concerns and requirements will be considered and addressed with an appropriate trade-off.

The World-Class Enterprise Architecture White Paper highlights that there is no single correct scope, level of detail, or purpose for an EA. Different Enterprises will expect their EA to guide change at different levels within the Enterprise.

We have a pair of substantive challenges. First, recognizing that the range, scope, and scale of an EA are as broad as the scope and scale of Enterprises and their change programs. Second, the ability to develop, use, and sustain the required EA will be as broad. Later in this paper, we will discuss various approaches to scope (strategy, portfolio, or project) the effort and an approach to enhance the positive impact of EA.

How do I Use this with the TOGAF Framework?

We believe the TOGAF framework provides essential universal scaffolding useful in a range of organizations, industries, and architectural styles. Customization of the TOGAF framework is necessary to align to your Enterprise's requirements and expectations.

This paper provides advice for establishing or enhancing your EA Capability and EA content framework. It contains specific guidance on customizing and configuring the TOGAF framework; selecting, configuring, and customizing appropriate tools and techniques; and selecting, configuring, and customizing appropriate architecture practices. This paper essentially provides specific advice for the Preliminary Phase of the TOGAF ADM.

Referenced Techniques

We reference techniques and key literature created by thought leaders that we actively use in our work. We have limited reference to materials freely available through standards organizations and academic publications. We do not promote or reference any commercial techniques or tools, even our own. There is often commercial material available for topics discussed in this paper. It is up to the reader to seek them.

We do provide a summary of EA content frameworks, many of which are industry-specific, as starting points that can accelerate development of your content framework. (See Appendix A: Partial List of EA Frameworks (on page 103) for the summary and Customization of Architecture Contents and Metamodel (on page 52) for the discussion.)

References to key literature and their techniques are intended to be only representative. The reader is expected to read and assimilate referenced publications for a full understanding of these related topics. We can only highlight why it is used and what outcome is expected. Further, we do not mean to suggest that the referenced techniques and literature are definitive. Other techniques and key literature can readily be substituted. In fact, the literature referenced is part of a body of knowledge that continuously evolves, and the reader is advised to explore updates to literature and techniques referenced in this paper.

To summarize, this paper offers guidance on what should be considered, how to customize your version of the TOGAF ADM to your Enterprise context, and when to seek use of automation tools. It also provides a commentary on the successful approach to continuously evolve and grow the application of EA Capability to meet the evolving nature of the Enterprise context.

Part 1: Guidance on Context

Enterprise Context and EA Context

To develop an EA Capability requires an understanding of your Enterprise. The understanding gained through this exercise is the foundation for tailoring, prioritizing, and building the EA Capability. The focus of this section is on gaining an understanding about the need for EA Capability to be built for your Enterprise.

Every Enterprise has a different context – the circumstances that led to its creation and current setting must be fully understood and assessed. Without an explicit understanding of an Enterprise's context, we will carry an implicit or derived context into the analysis, usually based upon prior experience or an Enterprise's recent past. Proceeding with derived context often results in failure of the EA Capability. Creation of an EA Capability is often associated with change events, and must be aligned with the current context.

Questions that must be answered to have clarity about your Enterprise context and your EA context include:

- What is the Enterprise?
- What is the Enterprise's purpose or mission?
- What is the Enterprise's strategic position and approach?
- What is the Enterprise's environment?
- What is the context of the EA Capability?
- What architecture principles will drive choices?

Strategic business architecture involves understanding what the Enterprise is, analyzing the purpose for the Enterprise and success measures, along with its environment. Operational business architecture is about analyzing, documenting, and refining how the parts of the Enterprise execute their work on a day-to-day basis.

Providing context requires the strategic business architecture. Developing other capability will use the same understanding. Developing these descriptions is iterative. This section will tell you why it must be iterative. The first principle of being iterative is to obtain the level of detail necessary to answer the question at hand and as your questions become more precise increase the level of detail captured.

Always revisit existing material to simply confirm that the content is current. Refine or update only when necessary. When existing principles are available, at this stage of your iterative process, review the existing architecture principles to understand how the EA Capability has been framed in terms of purpose, role, and engagement.

What is the Enterprise and What is its Purpose?

The very first activity is to define your Enterprise. The use of the term Enterprise within the TOGAF 9.1 standard is fungible; it covers monolithic organizations and extended organizations that include separate organizations connected by a mission or supply chain, as well as operating entities within an organization. This allows us to use a single term that covers a complex ecosystem where partners provide manufacturing, logistics, and support; a multi-national peacekeeping force; a government ministry, and a small-medium business.

Second is understanding the Enterprise's purpose, which may be described as the mission or mandate. The purpose is the most common approach to describe its context. Three major categories are: Public, Private, and Social.

To simplify drafting, this paper will operate on the assumption that your Enterprise is a profit-making public organization.

What is the Enterprise's Strategic Position, Approach, and Environment?

Structuring the EA Capability requires an understanding of how the Enterprise works. In order to play in the market context, the Enterprise defines how it competes and serves customers in its market – also known as the strategic position. Exploring the Enterprise context and the strategic position is done by understanding the:

- Business Model
- Operating Model
- Organization Model
- Econometric Model
- Accountability Model
- Risk Management Model

Even when a strategy statement is available, the spirit and intent can be better understood by exploring these models. Development of the strategy for the Enterprise rests with the Executive Board or the Chief Executive Officer (CEO) or the Chairman. The EA Capability team or its Leader may be asked to facilitate the strategy development session. The EA Capability Leader or the EA Capability team should not create or own the strategy statement of the Enterprise. When an explicit strategy statement is not available, explore the models presented below to understand whether the Enterprise is operating under implicit interpretation. When the strategy is not stated explicitly or implicitly, it is upon you, the EA Capability Leader, to request the Executive Board, CEO, or the Chairman to define the strategy.

Business Model and Operating Model

The business model for an organization keeps changing to stay current with the economy and environment within which it operates. Michael E Porter in his 1979 article titled "How Competitive Forces Shape Strategy" stressed the needs to track external and internal factors. As described by Alexander Osterwalder, the business model can either be a visual representation (business model canvas) or a catalog of:

- Customer segments
- Channels to reach the customers
- Value proposition brought to the customers via the products and services created by the company
- Cost structure and how product or service development is funded
- Pricing and revenue generation model

- Key partners, suppliers, and resources required to develop and deliver the products and services

The business model is an indicator of the cash flow and cash reserve management approach of your Enterprise, including how it plans to stay in business for a conceivable period of time in the future. The smaller the financial margins, the higher the need for operational efficiency – lean but effective architecture to sustain the business. A higher profit margin is one of the several factors that result in poor sponsorship for a dedicated EA function. There are other factors like compliance, governance and risk, and challenges with long-term planning that may instigate a need for EA Capability to be built. When the team providing the EA Capability is aligned to an organizational unit that is operating as a cost function, sponsorship for the EA Capability will not be dependent on the financial margins of the organizational unit.

Identify the business model for your organization "as-is" or the direction for next few years. Business models evolve with economic and social maturity. By altering any one of the aspects discussed by Alexander Osterwalder, disruption to an industry or a business model can happen. The business model drives the selection of the appropriate operating model. As the models change, the operating model will have to be adjusted. Over the past few decades, the nature of external forces and their impact on the operating model evolved, as the highly inter-dependent global economy emerged. Some of the key literature are:

- Arie De Geus: The Living Company
- Henry Mintzberg: The Structuring of Organizations
- Dean L. Wilde II and Arnoldo C. Hax: The Delta Model
- C.K. Prahalad, Allen Hammond, and Stuart L. Hart: The Core Competencies
- C.K. Prahalad and Stuart L. Hart: The Fortune at the Bottom of the Pyramid

An operating model is the conceptual representation or a description of how the Enterprise executes its broad functions to achieve its stated purpose. The rationale behind how the Enterprise executes its functions to achieve the stated purpose is called the business model. A pivot for a business model is the ability to manage cash flow and profitability considering how it functions, whereas operating model is just the description of how it functions.

For example, a philanthropic organization's business model is about the activity to achieve a social goal – like availability of clean water to people hit by floods. Distinct business models would be to raise funds to provide this service or put people in the field to directly deliver the social goal, or both. The operating model for this organization defines how the awareness is maintained to raise money, how to respond to such needs, and show results that the need is being met efficiently and effectively.

Trends in development and application of the operating model have shifted from strategy to capabilities and competencies. Kaplan and Norton articulated a common mechanism to measure the success in using a business model and strategy in the Balanced Scorecard. More often, this analysis and documentation is considered a management strategy function, especially when the scope and context of the EA Capability is strategic.

To help you get started with documenting business and operating models, consider the following pivots:

- Ownership of design of products and services, and how it is transferred to end-users
- How the products and services are charged (tactics to acquire customers)

- Diversity of products and channels employed

Operating models bridge the detailed organizational design with the strategy, values, and purpose of your Enterprise. In simple terms, the operating model describes the internal expertise required and how the resources are managed to provide the services to customers of your Enterprise.

There are several templates and references available for documenting the operating model – differentiated by industry, geography, or public, private, or social. One of the commonly used models is shown in Figure 3.[4] It should be noted that some of the industry verticals have their own operating model classifications – like retail, wholesale, online and digital, etc. The CISR model shown here is industry-agnostic, and focuses on patterns for "how" business processes are handled by the Enterprise for growth and sustainability.

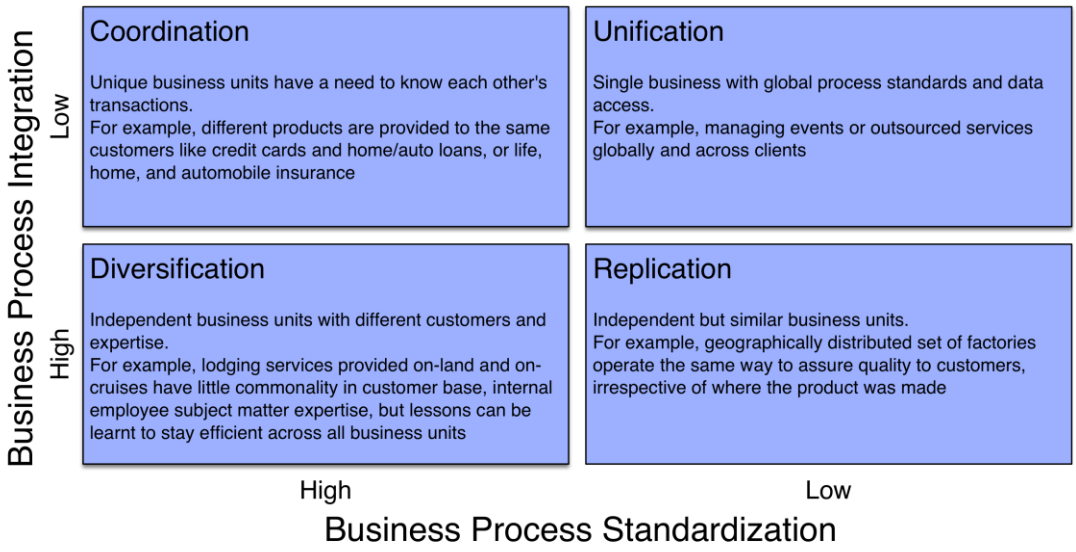

Figure 3: Operating Model (Adapted from the Center for Information Systems Research (CISR))

It is possible for the same firm to have more than one operating model. Common examples can be found in the financial services or Engineering, Procurement, and Construction Management (EPCM) industry. A global banking and insurance company operating in say the United States, Brazil, and Germany may have a replication model – each country operates as its own independent entity offering insurance and banking products meeting the needs of local demography and laws. Product design and financial structuring of these three units may replicate best practices across each other. The global holding company may be performing the coordination function to assure viability of the organization's business model to its investors.

While capturing the operating model, it is essential to explore and document the value of products or services or both delivered by the Enterprise, its target market, value chain, revenue generation model, and the strategic

[4] This diagram is adapted from Jeanne W. Ross, Peter Weill, David C. Robertson: Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, Harvard Business School Press, 2006.

advantage your Enterprise has. Yet another dimension to consider while creating the operating model is the primary or core nature of the business like manufacturing, marketing, sales and distribution services, professional services, community business, and public utility. Value chain and revenue generation models will be covered in detail later in this White Paper.

The best way to capture and validate the model is by stakeholder analysis. Some of the data points that would help you identify the operating model are: success measures for your Enterprise, number of brands employed and geographical regions served, strategies employed to reduce operational costs, center of gravity for decision-making, speed of execution as compared to its competitors, diversity of competitors, trend of operating expenses over the past few years, and cultural diversity including the number of levels and span of control management has.

At the end of this exercise, you should have created a catalog of customer value(s) and segments, financial and shareholders considerations, goals and objectives, and operating principles (like for public, private, and social; religious and cultural preferences).

Operating Environment and Compliance, Regulations, Industry Standards

It is normal that the law catches up with practices of organizations to assure common good for the mass population. As innovations happen, the Enterprise tends to believe that is it not under any compliance or regulatory restrictions. Though not apparent, functions like HR and finance always fall under some form of regulatory controls.

Simple research on the number of legal issues faced by the new Enterprises disrupting taxi operations worldwide in 2015 is an illustration of the tension between innovation, social balance, and law. An Enterprise that is making new armor to protect human life is probably inventing new material for which no standards exist for mass production or testability. Just like medicinal drug formulation, this Enterprise is also required to follow a protocol for development and validation before entering the live human trial phase. As the EA Capability Leader, it is one of your responsibilities to educate the executives and other Leaders in the Enterprise, where standards and compliance apply and where the Enterprise is a pioneer, if they are not acknowledging these needs easily.

It is good practice to create a catalog of compliance needs, local and international regulations, and industry standards that are applicable to your Enterprise.

Organization Model of the Enterprise

A simple question to start with is: Why document the organization model for the entire Enterprise? Next is scoping of the question: Should I document for the entire Enterprise or just model the team to which the EA Capability is aligned or chartered to transform or build the model for the EA Capability team? In most cases, your Enterprise should have an organization model and it is good enough for you to have it accessible. We will deal with these questions throughout this chapter, starting with understanding the Enterprise's organization model. EA Capability team's model and the model of the organization to which this team is aligned is a separate discussion, handled later in this paper.

An organization structure or organizational model provides insights into leadership style, authority and center(s) of power, and values of the organization. It also informs lines of communication, local and global culture, segregation of duties, and resource allocations to achieve the stated mission and objectives of the Enterprise. The model will provide insights into the kind of challenges the Enterprise faces.

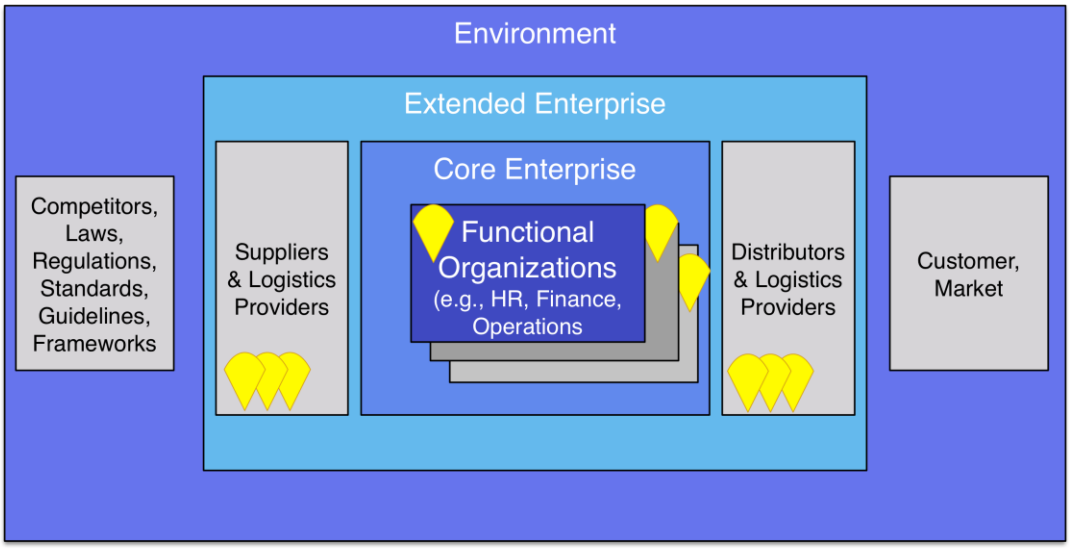

Figure 4: Extended Enterprise

Note: The yellow icons represent the geographical locations from where the teams could be operating.

Depending on the nature of the business, your Enterprise may be procuring raw materials or augmenting its work force via independent agents, partners, vendors, or all of them. You will have to create a catalog of key contacts and their locations for each type of "extension" to your Enterprise. The version of organization model documented by you need not necessarily look like Figure 4.

The default organizational model will reflect the lines of businesses or business units. Some of the other aspects to capture are: locations, proximity to customer and interaction, value of innovation and data sovereignty (can employee, customer, partner, or revenue data be shared across geo-political boundaries), suppliers, and partners.

Performing an analysis of the current organizational model informs the concentration of skill sets within the Enterprise, expertise and experience levels, and identification of what is core and extended intellectual property the Enterprise wants to protect. Such analysis can be done in subsequent iterations of understanding the organizational model. Creating an extended view as shown in Figure 4 will enable development of alternate viable options for business architecture or cost structure management.

Some of the popular models used in creating an organizational model are: functional, product-based, and matrix. Some organizations add a customer-centric pivot, such as retail, wholesale, business-to-business, or product-centric or function-centric. Most of the Enterprises have one (and only one) or a combination of these in existence. In today's business climate, it is very difficult to find organizations that are true to these types. When hybrids exist there is always one dominant model and others are included to achieve a specific goal.

A *functional organization* pretty much follows Porter's value chain model: marketing, sales, order management, product design, manufacturing, customer support, finance, HR, etc., working as separate vertical units, brought together by business processes and interface procedures. Utility service providers are likely to have this model.

A *product-based organization* is pivoted by specific product lines and products may not overlap with each other. Common functions like HR, finance, and marketing may either be duplicated by each product line or segregated as common, or shared, functions of the Enterprise. Each product line is likely to have its own organization head, sales, order management, product design, and manufacturing functions. Governmental or organizations with diverse products like General Electric are likely to follow this model.

Organizations that are heavy on *project-based* execution are likely to have a *matrix* structure – where functional skill set specialization and maturity are managed by separate Leaders and product and operational needs are championed by different sets of personnel. Each execution effort will require functional and product leaders to agree upon team size and composition to complete the task at hand.

As you walk through the model you should have a catalog of business units, product lines, levels of management, and execution hierarchy. The next action is to document the locations of business and operations. It may not be obvious to identify locations of incubation centers or IT data centers.

In order to develop a comprehensive digital and physical threat model or to meet regulatory compliance or to create a purchase credit policy, it is important to have a listing of locations by categories: legal and financial registered location(s) per each country of operation, raw material extraction facilities, manufacturing and storage facilities, sales locations – owned and franchised (as applicable), branch, operational offices, R&D facilities, data centers, customer support centers, customer centers where active construction projects are being executed, and primary financial settlement centers.

It is not necessary to have this information completed before you start building or executing the EA Capability. It is important to have at least the location catalog of your sponsor(s), the first set of customers, and a plan to complete the rest of the detail. This documentation will help you identify what is under your direct control; what, when, and whom you can influence to adapt the EA Capability recommendations; and a list of things that you should watch out for – as they may impact the process or outcome of the EA Capability.

Irrespective of the scope and charter for your EA Capability effort, understand what your Enterprise is and, where applicable, identify the organizations outside the boundary as shown in Figure 4. Essentially, define what your Enterprise is, in the context of what is being expected from the EA Capability effort.

So far we have looked at the Enterprise as a whole. We will deal with design of the organizational model for the EA Capability team in Organization Model for the EA Team (on page 59).

While performing a first pass through discovery, analysis, and documentation process, data at the function level and actors will be very directional and indicative. As we revisit these for each of the operational views, quality and quantity of data for organization and functions will improve exponentially.

Scope the Impacted Teams

- Identify the core – those who are most affected and achieve most value from the work
- Identify softly associated elements – those who will see change to their capability and work with core units but are otherwise not directly affected
- Identify the extended Enterprise – those units outside the scoped Enterprise who will be affected in their own EA

- Identify communities involved – those stakeholders who are outside the scoped Enterprise, and will be affected by the outcome delivered by the EA Capability – grouped by communities of interest
- Identify governance involved, including legal frameworks and geographies

When we discuss planning horizons in a later section, we will go into the details of how time impacts the depth and breadth of detailing.

As stated earlier in this paper, the starting point is dependent upon the sponsorship received. The most critical step is to understand what the expectations are. Often there is a confusion of level of detail with purpose. Working across the Enterprise is fine, but if the purpose is architecture to support portfolio, the architecture will be developed in slice, each slice addressing one portfolio. For that scope, gain the 360° view – from motivations, goals, success measures, to operational details like toolset inventory, data catalog, and logistics provider.

If you follow the balanced scorecard method, it is preferable to have the financial perspective defined for the whole Enterprise; a customer perspective may differ by segment – but carrying some of the common goals for all segments; Process and learning/development perspectives should be specific to the departments or divisions with common objectives for people maturity.

As we discuss the team delivering the EA Capability, we will deal with opportunities to pursue multiple capability architectures at the same time. As the transformation is executed via projects or programs, seams and glue within the Enterprise will present themselves; parameters for trade-off decisions will be solidified. The process naturally becomes replicable and scalable.

At the end of this exercise, you should have a view of key stakeholders, key collaborators inside and outside the Enterprise, and locations of operations. You should also have a structural view of the organization, either by functional control or by financial control or both. Though it may be too early to identify influencers and centers of power and decision-making, it may be a valuable dimension to keep track of.

Econometric Model

Econometrics is a deep study of its own standing. One of the areas of econometrics involves arriving at the right price for the products and services offered by your Enterprise. For the purposes of this White Paper, we will limit the discussion to documentation to create an understanding of how your Enterprise defines economic value and cost of mitigating risks. Some of the sub-models that make up the econometric model are:

- **Accounting Model**: Total Cash Accrued = sum of sources of income – sum of all expenses.
- **Forecasting Model**: Estimation of future impact of current actions, with a given set of constrained variables or risks for income and expense. Some of the risks the company would be handling are interest rate fluctuations, currency exchange rate fluctuations, inflation, and cost of raw materials. For example, a leading low-cost airline in the US managed its operational cost by placing appropriate investments in future fuel cost.
- **Planning and Allocation**: What are the trade-off criteria applied by the Enterprise to distribute its investments across the Enterprise? For example, one of the technology suppliers has worked out that IT investments should not be more than 3.5% of its total operating expense. Financial constraint is now a forcing function to trade off strategic and operational IT investments.

When it comes to operational expenses and building awareness around optimizations, models like chargeback and showback can be used as appropriate. For example, a leading IT service management vendor suggests using a showback model as a necessary step in the path to adopting cloud services.

So, from an accounting perspective, you need to be aware of:

- Ownership of the company – privately held *versus* publicly owned
- For-profit, not-for-profit, or governmental accounting principle
- Sources of funds for the Enterprise or the team that the EA effort is impacting
- Controls for spending the funds – for the Enterprise, the impacted team and the EA Capability team
- How the spending on EA is accounted for in Operating Expenditure (OPEX), cost of product development, and the Cost of Goods Sold (COGS)

Some of the other dimensions to document are how the Enterprise generates revenue and profit. A few generic models are:

- Creating products using intellectual property, including leveraging others' products and services. For example, a paint manufacturer is creating a new product, but uses machinery and products created by others. The formula for the paint is its own intellectual property.
- Buying, stocking, and reselling products made by other Enterprises. For example, a distributor sources paint and painting supplies in bulk and then distributes them to smaller businesses.
- Offering management, financial, legal, technical, or support services with thorough understanding of other organizations or industries. For example, business services organization providing logistics consulting and implementation projects.

There are other ways to look at the revenue model based on how the Enterprise views itself – like pricing pivot, commerce and retail, subscriptions and usage fees, licensing, auctions and bids, advertising, data, transactions, intermediation, and freemium. These views are variations of the first three models.

It is possible that your Enterprise may handle more than one such revenue generation model. Internally, the revenue model for a division is never more than one. It is possible for one division to generate revenue from its own intellectual property while other divisions may generate revenue by offering services in technology, general management, and project management domains. In such scenarios, understanding and separating by operating models will help you define the right boundaries for the Enterprise impacted by the EA Capability.

Investment priorities and spending patterns for the EA Capability will depend on the appropriate revenue and accounting model of the sponsoring unit of the Enterprise. As the recommendations are turned into projects or operational efforts, the business and economic model of the Enterprise will play a huge part in prioritization and rollout. We will provide detailed insights while discussing the governance model and process model for the EA Capability.

Another vital piece of information to document is whether the EA Capability organization is aligned with the revenue stream of the Enterprise or cost functions or other management functions. This informs the level of autonomy, influence, and focus the EA Capability will have within your Enterprise. For example, an EA Capability might be inside an organizational unit that is part of the strategic planning office. In this case the autonomy and level of influence is different than if the EA Capability organization depends on the Project Management Office (PMO). A combination of revenue model and alignment will manifest itself as motivators or constraints for trade-off decisions and development of architecture principles.

At the end of this exercise you should have a clear view of cash flow and economic principles of the Enterprise. It is a key consideration while defining governance principles and structure. This data will be used when defining alignment of frameworks and building a process for EA Capability.

Accountability Model and Decision Model

Welcome to the first ambiguous and non-empirical area that impacts trade-offs. An accountability model provides a reality check for the sponsorship and alignment of the EA Capability to deliver on the expectations set for the EA Capability. For example, when a change is made in the Generally Accepted Accounting Principles (GAAP) and an expected date for compliance is set, the decision to adopt the change either on the expected date or sooner is jointly decided by the Chief Financial Officer (CFO) and Legal Counsel for the Enterprise. Likewise, the decision to upgrade recommended security software on a specific machine is best decided jointly by the data center administrator and personnel from the information security team. The EA Capability team normally operates in between the layers mentioned in these examples.

There is detailed management literature and research on this subject. Every Enterprise has an accountability model and decision model, with a pattern for exercising the model. It may not be apparent, if you are not observant. The key focus here is to understand the empowerment, freedom, political, and financial support provided to the EA Capability and the control the Leader has to navigate the competing priorities.

Depending upon the inclination of your Enterprise, models like SCORE and RACI can be used to identify and document roles and accountability. The Project Management Institute proposes a 2x2 matrix shown in Figure 5, which accounts for expectations, interests, the role in EA, and the role in the EA Capability for various members within the Enterprise.

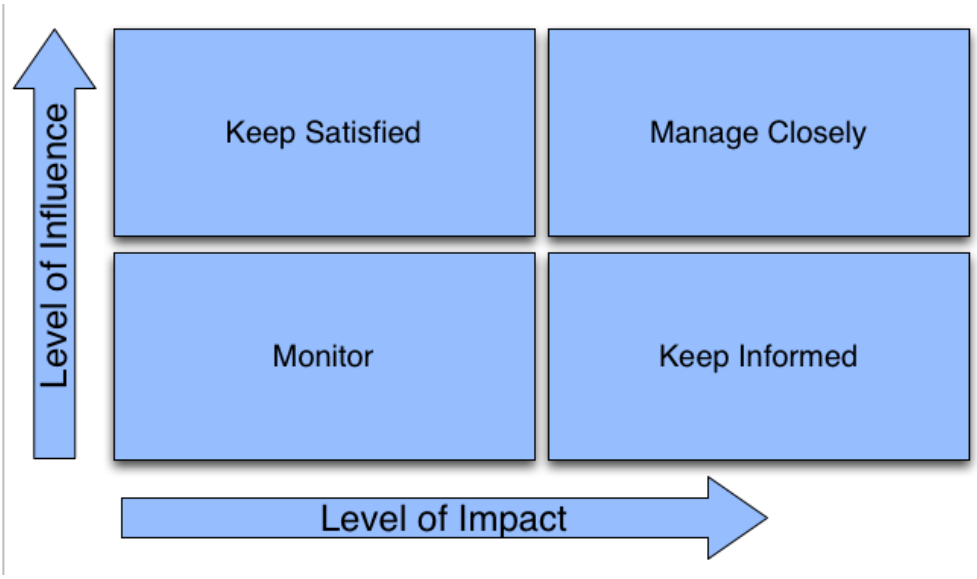

Figure 5: Project Management Institute's Influence Matrix

As you go through documenting the accountability matrix, it will reflect and inform key decision-makers for various business and architectural decisions. It is important to define the organizational and decision-making boundaries, as the EA Capability could and will interact with various existing disciplines.

This may be the right time to consider who would be the right person to evaluate the effectiveness and impact provided by the EA Capability.

Risk Management Model

Central to the best practice Enterprise Risk Management (ERM) is a very precise definition of the term *risk*. Within the risk management profession, risk is understood to be the: "effect that uncertainty has on the achievement of business objectives". EA is one of the key tools that can be employed to:

- Support best practice ERM
- Reduce organizational risk
- Improve sustainability and profitability

Enterprise risk is a term used to encompass the different types of risks that an Enterprise faces, including strategic risk, financial risk, and operational risk, amongst others. Risk can be threat-based with a negative business impact or opportunity-based with a positive business impact. The investment model employed by your Enterprise may address risk either via mitigation efforts or cost avoidance efforts in its operations.

Enterprises typically employ a formal or informal ERM framework to assess and manage risk at the Enterprise level, increasing visibility and transparency of risks to allow an Enterprise's management to make decisions on how to manage risk to an acceptable level for the Enterprise. One of the essential steps to set up the EA Capability is to identify the risk management framework employed by your Enterprise. The risk management model employed by your Enterprise may not be apparent and might require some level of investigation.

From the EA point of view, there is a need to identify the risk appetite of your Enterprise. Risk is a complex area, and central to an effective EA Capability. Consider an automobile insurance provider that is exposed to anti-theft technology risk introduced by auto manufacturers. While accepting this risk, the same Enterprise may counter-balance the risk via anti-theft research, cost of products offered, or improving data exchange solutions with law enforcement and its competitors.

For example, when the architecture roadmap includes adoption of a new technology or initiating a transformation effort is accepted for implementation, how does your Enterprise approach the following questions:

- Using the Innovation Adoption Model shown in Figure 6, where does your Enterprise fall in the bell curve? It is possible that different parts of the Enterprise may fall differently in this picture. It is essential to identify and catalog them.

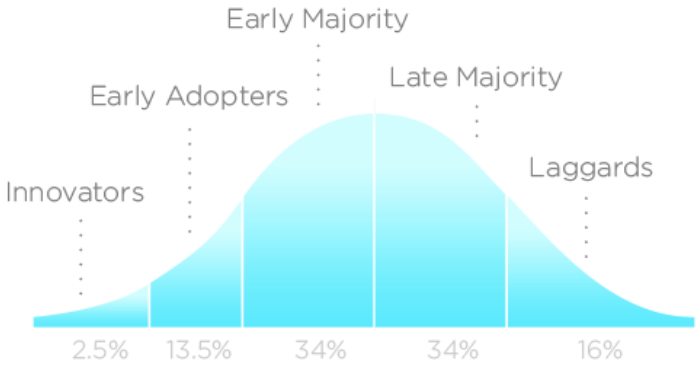

Figure 6: Everett Roger's Innovation Adoption Model (*aka* Technology Diffusion Model)

- What is the deviation from projected costs that are considered acceptable? (For example: 10% for the 1-year plan, 25% for 2nd and 3rd year.)
- What size and kind of project should go through additional layers of governance?
- If Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis is performed by the Enterprise, what are the threat mitigation strategies and how are the efforts being quantified?
- Is your Enterprise accepting some single-point failures – like vendor lock-in, interest rate variations?
- How often does your Enterprise visit the risks and the effectiveness of mitigation efforts, and where in the Enterprise are these addressed?

If the ERM approach at your Enterprise is not clear it makes sense to start with facilitating one. The ISO 31000 standard[5] and "Integrating Risk and Security within a TOGAF® Enterprise Architecture", a guide

[5] ISO 31000: Risk Management; refer to: www.iso.org/iso/home/standards/iso31000.htm.

specifically developed by The Open Group Security Forum in collaboration with The SABSA Institute, are starting points. Through this section the Leader has been advised to look at the broad Enterprise context. Within the Enterprise, the EA Capability will be heavily influenced by the context created by:

- Financial Accounting Model
- Planning Horizon
- EA Principles

Understanding your Enterprise's purpose informs key dimensions to consider. These specifically inform the business rhythm and delivery schedule and value proposition guidelines for transformation efforts. They are critical inputs to the design of the EA organizational model and what kind of expectation your Enterprise has for the EA Capability.

Existing EA principles provide a special context for prior activity performed by an EA Capability.

At the end of this exercise, you should have a point of view to position value messages for the EA Capability and the appropriate time year-round to inject the mitigation efforts.

What is the Special Context for the EA Capability?

Financial Accounting Model

As a Leader, identify and document the model for your Enterprise. The financial accounting model supports the business model and econometric model. There are two purposes to understanding the accounting model for your Enterprise. First, the model that supports the economic purpose of the Enterprise, like private, public, and social. Second, it helps you understand how the EA Capability is viewed – cost *versus* revenue function, Capital Expenditure (CAPEX) *versus* Cost of Goods Sold (COGS) *versus* Operating Expenditure (OPEX), Customer acquisition function *versus* operational efficiency (risk mitigation or capacity management) function.

Simply put, you should know how the EA Capability is paid for and how its outputs are accounted for. In the event of an audit, your output and value proposition should match the accounting model. If the organizations that perform the EA Capability are accounted as capital expenses, then your deliverables should be of tangible value. If it is operating expense, the expectations of the output can vary from advice to effecting tactical improvements. In the event that technology exploration is included in the charter supporting your EA Capability, there are potential financial implications depending on the nature of work done by the team providing the EA Capability. For example, technology research for home safety done by a property insurance organization is likely to get R&D tax exemptions.

Some of the data points that can be derived from the accounting model are:

- An understanding of legal hierarchies – where credit-debit happens at transactional level and where profits are accrued
- Silos and distribution of decision-makers and influencers
- Value measurement criteria for the EA Capability
- Investment amortization options while recommending projects

- Development of Capital Expenditure (CAPEX) *versus* Operating Expenditure (OPEX) or Return on Investment (ROI), Net Present Value (NPV), or Internal Rate of Return (IRR)-based trade-off guideline

This list can keep growing depending on your Enterprise's design, approach, and the depth of understanding the team providing the EA Capability has.

If your Enterprise operates in more than one geopolitical boundary, then it is likely there is more than one model. However, it will predominantly follow the model in the country of registered headquarters. It is essential that investments in EA work can reflect both costs and savings appropriately, so that effort justifications and ROI can be framed, communicated, and realized by key sponsors.

Planning Horizon

The amount of time into the future the Enterprise looks at while creating business and investment strategies is known as the *planning horizon*. Different Enterprises will operate substantially different planning horizons for the same level of planning. Knowing that your Enterprise will look 1, 3, 5, 10 years into the future for change programs, improvement initiatives, or capital planning will directly inform the structure and process integration of the EA Capability. Aligned to purpose, the EA Capability will have to provide inputs to align with the horizon.

Each Enterprise has a different appetite for the duration into the future. In most cases, plans drafted for less than 12 months would be more operational and tactical in nature than those for 25 months and beyond.

Another dimension that falls into this bucket is the fidelity of content. In general, data for the next 12 months will have high fidelity and accuracy, most likely because of inputs provided by solution architects, the project management office, and other operational plans. One of the key success criteria for EA Capability is about driving fidelity into future plans.

Along with the planning horizon, the frequency of refreshing future plans informs your EA Capability's process integration. Identify the cycles and time horizons. The refresh cycle for EA Capability outputs will be driven by your Enterprise context and the uncertainty surrounding the subject of your EA. As the degree of uncertainty grows, either in the geographical region in which your Enterprise plays or in the industry, there may be a need to carry multiple candidate target architectures to address uncertainty in alternative scenarios.

Keep in mind that if most of the time spent by the EA Capability is improving the immediate next 12 months, the ability of your EA Capability to deliver value is impaired. Consider carefully the purpose and effectiveness of your EA Capability.

The planning horizon, refresh cycle, need to meet multiple scenarios, and fidelity demands of content provides an indication of release cadence for EA work and the workload for the team providing the EA Capability. We will discuss some of the strategies on evolving the EA Capability balancing the effort on planning horizon later in this paper.

EA Principles

Our experience shows that a complete greenfield EA Capability is unlikely. Most Enterprises have undertaken the initiative to establish an EA Capability more than once. In the event yours is greenfield, revisit this section after you have read Business Objectives for the EA Capability (on page 34). In this case, and where an EA Capability is being evolved, one of the enduring deliverables is a set of EA principles.

Existing EA principles provide a special context for prior activity performed by an EA Capability. Review the existing principles for two reasons. First, for the context they provide about previous efforts to establish a successful EA Capability – they inform how the EA Capability was viewed. Second, to ensure that they align to the actual Enterprise context. This review provides you with insights on how the EA Capability has been framed in terms of purpose, role, and engagement.

Review questions to ask include:

- Do the existing architecture principles represent the Enterprise context?
- Do they represent all organizational elements of the Enterprise such as domestic and overseas, primary activities and supporting activities?
- Do they represent the preferences of the primary organization – the organization to which EA Capability team is aligned?

When an EA Capability has been IT-centric it is common to have architecture principles with a heavy technology-centricity across business, data, application, and technology domains. In other EA Capability models, the principles will balance the Enterprise context and purpose of the Enterprise. Care must be taken to ensure that the principles used to inform the development of EA and change projects align to the organizational context.

Where the existing architecture principles do not reflect the current Enterprise context and all organizational elements of the Enterprise, additional work will have to be performed in the roadmap to establish the EA Capability. At a minimum, a new set of architecture principles will have to be developed. Further, existing target architecture, compliance assessments, and roadmaps should to be revisited and assessed against the new architecture principles.

Where the existing architecture principles represent the organizational preferences of a previous team performing the EA Capability, you are likely performing a re-boot. Re-boots typically require substantive damage control and transformation in the team delivering the EA Capability. In this case it is likely that the work of the previous team has damaged the concept of EA. Additional work is required to understand the organizational and personal factors that led to the re-boot. Then additional work is needed to structure the organization model, process model, and architecture governance framework to avoid previous failures. Lastly, you may need to establish a strong break with the past.

In either case, where existing architecture principles do not reflect the current Enterprise context you will need to place a work package early in your roadmap to establish new architecture principles.

A primary function of an EA Capability is to improve understanding, simplify complexity, and improve informed consistent decision-making. By extension, architectural principles should be tied to the Enterprise's values, goals, purpose, and strategies. These should inform, enable, and ground the Enterprise on how to operate, transform, and grow. As a starting point, it is imperative that the team providing the EA Capability identify and define the situations when the consensus preference of the Enterprise is to lean towards one trade-off. For example, when the voice of the business outweighs the voice of customer. Likewise, most decisions made in the context of EA are very difficult trade-off choices among two or more competing best, worst, or opposing options. A good set of architecture principles guides these choices and trade-offs.

The understanding you have gained about your Enterprise up until now should have given you the relevant foundation to create new principles, if needed. Depending upon the scope of the current team providing the EA Capability, principles relevant to the context may have to be created. To do so, identify and articulate the upper and lower limits of scope of responsibility the team providing the EA Capability is likely (or defined) to have. Within the broad domain of Enterprise principles, it is common to have subsidiary principles within a business or organizational unit. Examples include IT, HR, domestic operations, or overseas operations. When the EA Capability is IT-centric, it is common to have subsidiary principles by IT domains – business, data, application, and technology. Care must be taken to ensure that the principles used to inform architecture development align to the organizational context

There are four purposes for EA principles:

- **Enable decision-making** – it is all about setting an order of precedence during trade-off discussions and who breaks the tie, if it should occur.
- **Align the Enterprise** – principles take subjectivity and bias out of the equation and drive critical conversations that are objective and aligned to the Enterprise's values.
- **Governance** – How will the Enterprise ensure that right decisions are surfaced at the right time and with the right decision-makers? And how to monitor the decisions and approach taken to arrive at the decision?
- Provide a better understanding about the Enterprise's culture and values; provide an approach and insight into how well the Enterprise react to changes.

As Len Fehskens in his 2008 article on Rethinking Architecture says: "the most effective way to assess that a principle is not meaningless generalities is to ask whether the opposite of a principle would also be a meaningful principle". Anything your Enterprise would perform during the normal course of business is not a principle. "Conformance to law" is not a principle, as it is something that will have to be performed for the Enterprise to be involved in any economic activity. When the principle says "Information is a valued asset", the opposite check "When information is not treated as valued asset, informed decisions and progress cannot be made" also drives home the point why information should be treated as an asset.

Business Objectives for the EA Capability

In many regards the two most important activities in establishing a successful EA Capability are understanding the Enterprise context and the objective of the EA Capability. Far too much advice on EA implicitly assumes an Enterprise context and a set of objectives. Successful evolution of an EA Capability happens only when explicit alignment is continuously established and validated.

The purpose and objectives of the EA Capability will directly shape the EA organization model, the governance framework, the architecture contents, and the process model. Further, they will define whether your EA Capability is successful, or will follow the recurrent path of try, fail, and re-boot.

Previously we identified research from a 2014 survey found that spend on executive compensation and EA Capability are comparable. We rarely see a new executive brought onboard to maintain *status quo*. Likewise we rarely see new Leaders brought onboard to sustain the *status quo* of the EA Capability. With a new executive, objectives and expectations are clearly set, even though they may not be made very public. Successful executives know what is expected. Successful Leaders know what is expected of their EA Capability.

In order to have common understanding of the objectives and expectations, the following questions need to be answered:

- What is the EA Capability expected to achieve and why?
- What is the usage and application of the EA produced? For example, EA to support strategy, program, segment, capability, project, or third party.
- How is success going to be measured?
- Is the EA Capability doing the right thing for the Enterprise context?
- What is the depth and breadth of EA?
- What is the Organizational Model of the EA Capability?

With these questions the purpose of the EA Capability and what it needs to be successful are framed. The Leader is in a position to separate the wheat from the chaff and focus on what is expected and what will be successful. Challenges in terms of process integration and governance can be addressed. Challenges in terms of organizational model and existing resources are placed in stark relief.

Most sponsors for an EA Capability speak in terms of financial goals or broad objectives (decrease cost of doing business, improve speed to market). Suyog Mahendra Shah[6] identifies that stakeholders may have different motivations and perspectives. The unaddressed gap between the sponsor's objectives and the

[6] Enterprise Architecture – Critical to Large Transformation Programs, Suyog Mahendra Shah, AEA Journal, December, 2011.

stakeholder perspective results in failure. The thought process of stakeholders will have to be shifted from task-based or project-based to thinking in terms of systems and Enterprise level.

A key first step for the EA Capability Leader is to play back the executive talk in explicit capabilities, go-to market approaches, or operational requirements. Be specific to get alignment with the Enterprise's values, goals, and strategies to have a common understanding of the objectives and expectations of your EA Capability.

What is Expected? Where will you be Engaged? Are you doing the Right Thing?

A quick perusal of the literature on EA will leave no understanding of the role. At the extremes it will be classified as an enabler of Enterprise transformation and responsible for the selection of technical IT standards. This wide variance is responsible for most failures for an EA Capability. A mixed bag of expectations will result in improper scoping for work product and planning the evolution and development of the EA Capability.

Research done by CEB, Forrester, and Forbes shows that the spend on CxO and the budget of successful EA teams as a percentage of revenue is the same or comparable. This shows the importance and value delivered by EA Capability.

> The difference between executive compensation and EA investment is individual success and vision *versus* team; direction setting *versus* strategic and operational execution; externally visible leadership *versus* advocacy and mentorship. Both parties work for operational efficiency and long-term viability of the Enterprise. One may be open for risks while the other strives to minimize the impact.

Hence, the focus for the EA Capability Leader is to align with the business objectives and motivations to create and operate this function. The Leader should share the ambition of the sponsor, but not be in competition with those they are oriented to support.

In its simplest terms, EA is used to describe the future state of an Enterprise in order to guide the change to reach the future state. The description of the future state enables key people to understand what must be in their Enterprise to meet the Enterprise's goals, objective, mission, and vision in the context within which the Enterprise operates.

The gap between the Enterprise's current state and future state highlights what must change within the Enterprise. This gap is a function of the Enterprise context and the scope of changes the Enterprise sees.

What is the Depth and Breadth of EA?

The World-Class Enterprise Architecture White Paper frames four broad purposes of an EA Capability. These four purposes are explained in detail in What is an EA Capability and EA? (on Page 13). These four broad purposes frame what is expected from an EA Capability:

- EA to support Strategy
- EA to support Portfolio
- EA to support Project
- EA to support Third Parties

Building upon these purposes are a set of important questions.

- Where in this hierarchy is the EA Capability expected to support decision-making?
- Where in this hierarchy is the EA Capability expected to support governing change activity?
- Is there a priority of focus, say, third parties over strategy?
- Where are current change initiatives failing?

While the first and second questions are linked, they are deliberately separated.

> Governance is about setting the right direction, clear articulation, and the best controls for ensuring that the right things are done, aligned to the will of the owner, or interest groups that manage the Enterprise. Translating the vision of the Enterprise by doing things right is management. Management is all about making decisions to implement the policies or continuously course-correcting to meet with the will of the owner.

Consider that one EA Capability may support a strategist or functional Leader defining where the Enterprise is going. Another EA Capability may take the strategist's output and support governance activity to realize the changes specified by the strategist. Take time to understand the nuances of the purposes mentioned above.

What is the Organizational Model?

Most Enterprises have some functioning EA Capability. The EA Capability is either being purposefully evolved or re-booted. In either case the existing EA Capability needs to be assessed against expected purpose and objectives.

Questions to ask include:

- Does the existing EA Capability deliver recommendations before the required type of decision (budget, charter/business case, etc.)?
- Does the existing EA Capability provide support for governing follow-on activity against the decision?
- Does the existing EA Capability support all the desired decision and governance support? When an EA Capability has been IT-centric it is common to have its support for decision and governance constrained to the IT domain and its involvement in decision-making artificially elevated.

The outputs of these questions will directly impact the process alignment, governance framework, and architecture contents. The gap between the existing EA Capability and the desired EA Capability will directly feed the roadmap to evolve the EA Capability into what the Enterprise desires.

The following tables, derived from the World-Class Enterprise Architecture White Paper, provide an indication of the engagement of different stakeholders with support for decision-making and governance. These tables can be used diagnostically: does the EA Capability engage with and support the right stakeholders, given the expectation?

Table 1: EA Capability to Stakeholder Decision-Making Needs

Stakeholder Group	Relevance of EA Capability to the Stakeholder Group decision-making for the …			
	Strategy Purpose	Portfolio Purpose	Project Purpose	Third-Party Purpose
CEO	High	Low	Low	Low
Heads of Change	High	Medium	Low	Medium
Operational Executives	High	High	Low	Medium
CIO	High	High	Medium	High
Project Governance Bodies	Low	Medium	High	High
Program & Project Management	Low	Medium	High	High
Commercial & Financial Executives	Low	Medium	Low	High
Subject Matter Experts & Project Teams	Low	Low	Medium	Low
Chief Risk Officer	High	Medium	Medium	Low
Chief Compliance Officer	High	Medium	Medium	Low

Table 2: EA Capability to Stakeholder Governance Needs

Stakeholder Group	Relevance of EA Capability to the Governance activity for the …			
	Strategy Purpose	Portfolio Purpose	Project Purpose	Third-Party Purpose
CEO	High	Medium	Low	Medium
Heads of Change	High	Medium	Medium	Medium
Operational Executives	High	High	Medium	Medium
CIO	High	High	High	High
Project Governance Bodies	Low	Low	High	High
Program & Project Management	Low	High	High	High
Commercial & Financial Executives	Low	Low	High	High
Subject Matter Experts & Project Teams	Low	Low	Medium	Low
Chief Risk Officer	High	Medium	Medium	Medium
Chief Compliance Officer	High	Medium	Medium	Medium

As a rule, stakeholders will require different support for decision-making than governance activity. An EA Capability that is not engaged in architecture to support strategy decision-making, but is engaged at the portfolio level, may provide support for governance activity against the strategy level. Let us discuss the alignment of the EA Capability team, given the expectations of outcomes at strategy, portfolio, project, and/or third-party engagement levels.

Alignment of EA Capability Team in Organizational Model

Most teams delivering an EA Capability today fall under one of the three variants – function-centric, strategy-centric, or IT-centric as shown in Figure 7. As with all conceptual models, there will be variations or hybrids specific to an Enterprise. For example, participants in the team may be aligned to one team and the contributing members may be aligned with line of business (function-centric) teams.

The initial scope and impact of the EA Capability varies based on the model that is being followed in your Enterprise. This alignment will impact the constitution of the architecture review board, governance model, and time to realize value.

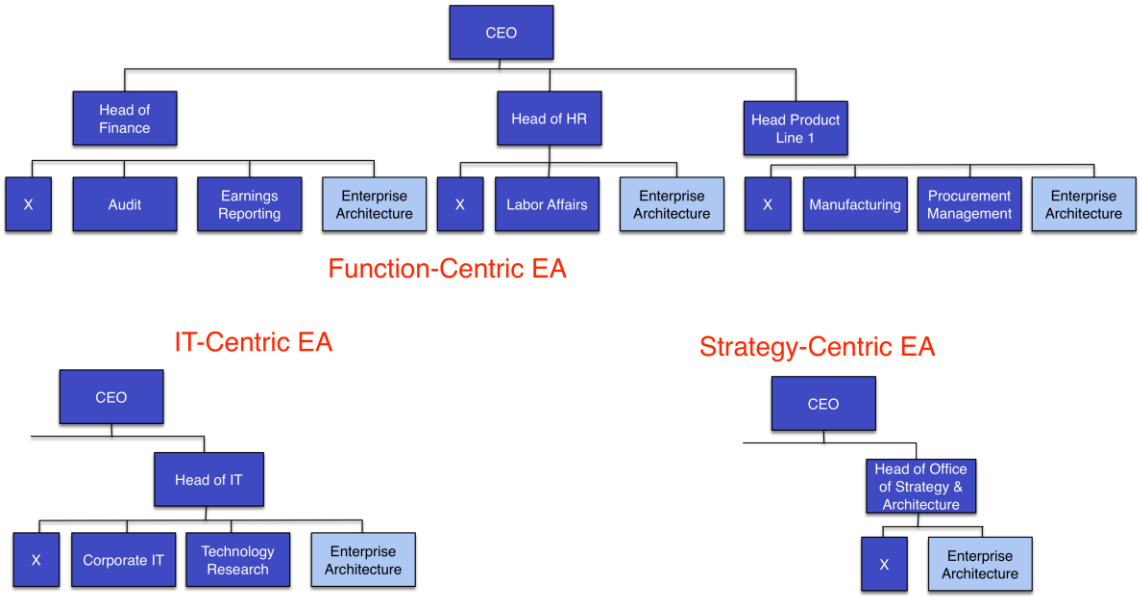

Figure 7: EA Team Common Organizational Placements

Each model supports a different set of objectives, empowerment, and constraints for the EA Capability team, as they are reflections of the outcome expectations from the EA. Having such a model does not preclude the charter for a team providing the EA Capability from addressing other aspects. When the expectation is such, there exists a possibility for alignment hierarchy for the EA Capability team to shift from one model to another, as objectives and strategies change. The Leader must be cognizant of pure or mixed bag expectations and charter to define appropriate execution methods.

A high-functioning EA Capability requires cross-discipline function behavior and engagement in other processes of the Enterprise. These processes include corporate governance, fiscal control, customer and stakeholder engagement, and project management. Further, M. van den Berg, and M. van Steenbergen[7] highlight the need to cover individualistic architect functions like consulting, mentoring, commitment, motivation, and persistence. The EA Capability team must have sufficient capacity and diversity of domain knowledge, soft skills, and context to be successful.

How is Success Going to be Measured?

The Enterprise's objectives directly translate into metrics for the EA Capability and are directly derived from the purpose of the EA Capability. Some metrics will be operational health, while many will be derived from the Enterprise's scorecard or strategy.

Recognize that not all EA Capability objectives are tangible and readily measurable. Consider an insurance company that says: "we need an architecture to make all of our customers be our promoters". This statement applies to the entire Enterprise. Though it appears measurable, dimensions like type of customer (Enterprise *versus* single human), neutrality, or cultural differences should be accounted for to arrive at specific measures. Likewise, it is possible that folks in the team providing the EA Capability, including you, have some ideas that could appear relevant, immediately actionable, and common sense. Including such ideas in the list of objectives without validation is one of the several death traps for EA Capability. Be prepared to embrace such objectives and classify them accordingly, before converting them into measures.

Some of the objectives may have to be met by other functions in the Enterprise. Having a charter that is highly fluid or open to interpretation will draw cultural and operational conflicts. Given the objectives and purpose, care must be taken to align process, organizational model, and governance. One of the many death traps for an EA Capability is confusing "supporting decision-making" with "decision-making". Consider an EA Capability that supports strategy: a team member lobbying to defund an effort that they considered risky (financial, brand reputation, capability duplication, etc.) has confused their role of sound advice with ownership of the decision.

This conflict is most common in IT-centric EA Capability and played out in efforts to achieve elevated decision-making power without commensurate outcome responsibility. Confusing supporting a decision with empowerment and governance is simply wishful thinking. Define your success measures that reflect the level of empowerment, quality of outcome delivered, and impact expectations of the sponsor. For example, Gartner says EA Capability should present leadership with "signature-ready" recommendations. What kind of measure will you attach to such an execution model?

Some of the questions that could yield a wealth of insights and data to define the measures are:

- What would you do if the EA Capability did not exist?

[7] Martin van den Berg, Marlies van Steenbergen: Building an Enterprise Architecture Practice: Tools, Tips, Best Practices, Ready-to-Use Insights, The Enterprise Series, ISBN:1402056052.

- How will the Enterprise track benefits realized at a given level of decision?
- Executive management is a directive function and EA Capability is an advisory function. How do we measure the value of good advice?

Further, is the EA Capability being set up in response to a problem? Your success measures will vary with the nature of the problem to be solved. Common examples of problems to solve include:

- Struggling expansion via Mergers and Acquisitions (M&A) and divestitures
- Stalled strategic growth in a specific market segment
- Impact of disruption
- Restructuring or retooling the Enterprise
- Investor confidence problems from operational cost or unrealized R&D spend
- Inability to decide through information, communication, and technology complexity
- Inability to decide the balance of future gains against compromising business-as-usual
- Fear of recurrence of latest fiasco (fill in supply chain, security, or IT project)
- Perceived disruptive changes in operational practice (automation, cloud, outsourcing)

Revivalist and Bottom-Up EA Capability

When attempting to re-boot an EA Capability you may feel like Sisyphus. In Greek mythology, Sisyphus was given an assignment that could not be completed. In a re-boot or bottom-up scenario for EA Capability, often it may seem that you are given the luxury of obtaining answers to the questions identified by the sponsors, but without budgetary support. Sometimes with the explicit sponsorship of a change Leader or with a good intention to make the Enterprise a better place, a bottom-up effort to stand up an EA Capability is initiated.

Bottom-up, the challenge is identifying and stating the value proposition to the key decision-makers with a passion to change the organization. If you can't get this right, it is better to wait for an opportune time in the future. The rest of the section is key to your success – dig deeper for the reasons that made you initiate the effort. Bottom-up and self-initiation are common occurrences, where the Leader must act upon interpretation and assumption. Consider the questions and consider the answers very carefully. Most of all assume you have been asked to make the Enterprise a better place.

Here are some additional considerations to deliver value and make the charter clear:

- Theme of "*foundations for future scale*": Creating an implementable effort – like integrating disparate systems or enabling flexibility to update systems and applications independent of each other with a well-defined investment and timeline.
- Theme of "*function clarity*": EA is about enablement and realization of alignment of business and technology functions. EA is not about monopolizing any one function. It is about collaborative success. Create a charter and communicate terms of collaboration and collective success.
- Theme of "*risk reduction*": The very act of involvement in an economic activity is risky. The probability of occurrence and its impact is what makes the difference. Building a story from a recent "incident" that

could have been avoided with the EA Capability, articulating a pattern providing cost avoidance, and minimizing of impact on future occurrence.

Your Enterprise's executives are just like customers – they would like to buy because they identify with what the Enterprise stands for, not what or how it does it. You should articulate purpose and ethos, and avoid discussion and measurement based upon what the EA Capability will do (what outcome the EA Capability will deliver). Articulate the change event or triggers, and extrapolate to make the future real (why the EA Capability is needed). It is difficult for most human beings to predict their future self and invest in it. However, an imminent challenge is highly relatable. What we have discussed in this paper so far is more than sufficient for you to build a case. Unless you get sponsorship to build an EA Capability, do not attempt to build even a draft view of what is discussed later in this paper. Even for an IT-centric EA capability, having an IT architecture is not a foundation to build the case for an EA Capability. It is a common pitfall and a bad assumption that leads to failure (measure how something is done or what will be built).

The first two themes, foundations for future scale and function clarity, discussed above can be used for starting a new EA Capability effort. Gain acceptance of the concept, build a draft roadmap, and then garner investment and sponsorship to build the capability.

It is imperative that you validate the Enterprise context and objectives of the EA Capability periodically. Every Enterprise exists in a dynamic environment. Consider checking your purpose inside every planning cycle you support. It is essential that you check the objectives and context once in the planning cycle and once at the middle of the cycle. Best practice EA is a continuous, adaptive, incremental, and iterative process.

As you complete this exercise you will refine your understanding of the Enterprise context and the objectives of your EA Capability. This is unlikely to be a one-shot exercise. It is something that you will evolve. Understanding of the business objectives also informs you what to focus upon first, what kind of skill sets are required three to six months from now *versus* those you will need in two to three years; and the kind of interactions required with other functions like planning, program management, project management, operational change management, and benefits realization.

Carve out an EA Capability that can succeed and thrive in your organization. Use the knowledge from understanding the context for the Enterprise. If you happen to fail in the first attempt to make the business case, consider rebuilding your case after reading through Linking the EA Value Map to the Enterprise Value Map (on page 86) and Establishing the EA Capability (on page 91).

Part 2: Guidance on Structure

Architecture Governance

The development and use of EA must be governed.

In this activity we are going to look at the Enterprise's approach to decision-making, direction, and control. We will discuss the process of governance, roles, and responsibilities when we discuss the architecture process model in Process Model (on page 74). You may wonder why governance (decision-making, direction setting, and control) is addressed so early in this paper. You have clarity on the objectives. From this point onward, every action you take should be validated against this objective to stay relevant and focused on the outcome – not the ceremony of activities to be performed. You should be very clear on what to report out and to whom (your sponsor – everyone else is an interested party at this time).

It is likely that the existing governance and support models of an Enterprise will need to change to obtain the most value from the EA Capability. Understanding your Enterprise's required architecture governance requires answering the following questions:

- What is the reporting framework?
- What is the decision-making approach?
- What is the risk management approach?
- What is the Enterprise's approach to governance?

It is important to understand that governance applies to the development of a target architecture and how that target architecture governs change.

Introduction to Governance

ISO/IEC 38500:2015[8] defines governance as: "a system that directs and controls the current and future state". The process by which direction and control is provided should imbibe equality of concern and transparency, protecting the rights and interests of the business.

Governance is a decision-making process, with a defined structure of relationships to direct and control the Enterprise in order to achieve stated goals. The key difference between governance and management rests on the cornerstone of fiduciary and sustainable responsibility. To define a customized governance approach, let us start to define the following:

- What is to be governed?
- Why should something be governed?

[8] ISO/IEC 38500:2015: Information Technology – Governance of IT for the Organization; refer to: www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=62816.

- When and who should decide on the recommended alternatives?
- How does this link to the EA process discussed in Process Model (on page 74)?

Extending these, common mistakes to avoid are "fixing the blame" and "warned you before" processes and allowing weak policies that are focused on parochial interests instead of securing the interests of the Enterprise.

Key Characteristics

The following characteristics have been adapted from Corporate Governance by Ramani Naidoo[9] and are positioned here to highlight both the value and necessity for governance as an approach to be adopted within organizations and their dealings with all involved parties:

- **Discipline**: All involved parties will have a commitment to adhere to procedures, processes, and authority structures established by the Enterprise.
- **Transparency**: All actions implemented and their decision support will be available for inspection by authorized Enterprise and provider parties.
- **Independence**: All processes, decision-making, and mechanisms used will be established so as to minimize or avoid potential conflicts of interest.
- **Accountability**: Identifiable groups within the Enterprise – e.g., governance boards who take actions or make decisions – are authorized and accountable for their actions.
- **Responsibility**: Each contracted party is required to act responsibly to the Enterprise and its stakeholders.
- **Fairness**: All decisions taken, processes used, and their implementation will not be allowed to create unfair advantage to any one particular party.

Governance is about fostering a sense of compliance to benefit the Enterprise. It is about a hierarchy of decision-making to which everyone commits. Governance can be used to drive "a" behavior. The act of observation by the governance team should not change the fact or how something is done. An observation results in some form of measurement. Define a set of measurements and metrics that can be used to achieve organizational objectives. When a comparison or mitigation action cannot be performed on a measurement, do not demand the measurement itself. Being transparent about why the measurement is being made and what mitigation options are available will drive positive behavior. Go back to the previous chapter to revisit and fine tune what to measure and why you need that measurement.

Organizations operate in a dynamic environment and governance processes may take time to catch up, to be consistent, and equitable. Hence, a relief or exception mechanism is needed. As you design the process and approach, factor in a time-bound exception option. The relief mechanism can be exceptions, escalation – both

[9] Ramani Naidoo: Corporate Governance: An Essential Guide for South African Companies, April 2007.

formal and informal. At times, it could be about initiating a new line of work to be performed – say adoption of cloud storage strategy instead of physical printed and electronic media storage. Design and document the process for different kinds of relief mechanisms from the norm. A robust governance process can only organically evolve from situations that lead to exception mechanisms being effectively exercised.

Figure 8: Potential Governance Tiers

Identify and define appropriate governance tiers to align what gets escalated for relief, how and when, to which higher tier. Absence of relief within each tier will result in loss of effective control and local autonomy. In general, lower tiers tend to be tactical in scope. Cross-cutting or higher tiers tend to address strategic issues. Depending on the organizational culture, you may want to limit the number of governance bodies.

It is likely that your organization already has processes defined for some or all of the tiers shown in Figure 8. For now, just document the existence and source of these processes.

What is the Current Reporting Framework?

Redrawing the existing processes to showcase various interactions happening in an Enterprise will help us identify what should be governed. Figure 9 shows possible governance boards that could exist in an Enterprise to manage the internal and external interactions. These interactions impact the business and hence EA. These interactions result in exchange of information within and outside the Enterprise, brokered via different mediums. Each kind of information dissemination or consumption could enable value or pose risk. The governance framework defines who will direct and control what kind of information exchange and when.

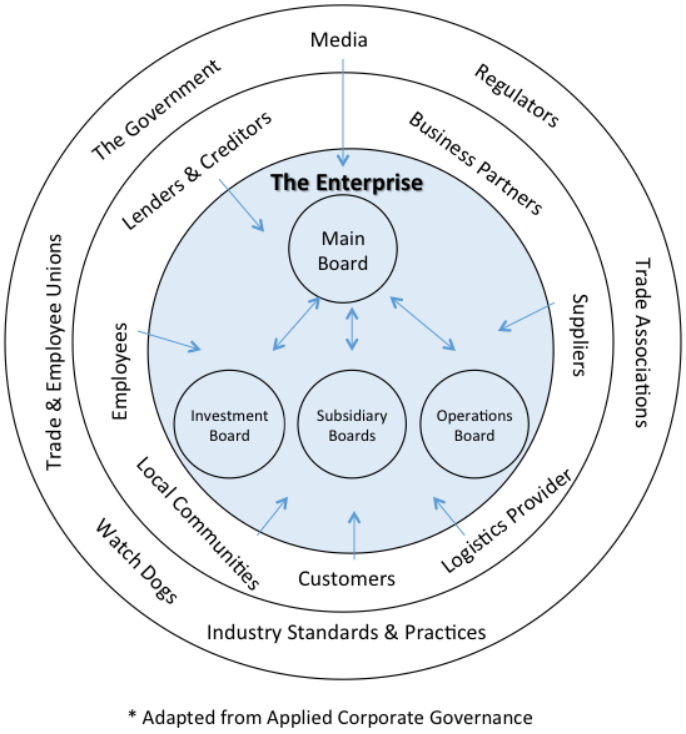

Figure 9: External and Internal interactions Affecting Governance

The governance framework should balance the needs of tactical and strategic operations of the Enterprise. Enforcement responsibility and organizational level where enforcement happens will vary based on the charter for your EA Capability. The first step is to confirm the existence of existing governance mechanisms as shown in Figure 9, and determine which can be leveraged to include EA governance. At times, it may be possible to change the charter of an existing governance body to include architecture governance. In TOGAF terms, the architecture governance body is called the architecture board. The rest of the discussion in this section applies whether you are creating a new or leveraging an existing body.

Governance comprises of mechanisms, processes, and teams, through which architects and stakeholders articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences. The objective is to create a sustaining environment for inclusive and responsive processes to achieve the goals of your Enterprise, mitigating all risks. In order to govern effectively and efficiently, basic policies, principles, and rules should be identified, created, and published. Have a set of architecture principles, standards, reference architectures, and best practice defined. The principles defined should be commensurate with the size, complexity, structure, economic significance, and risk profile of your Enterprise's operations.

What is the Current Risk Management Approach?

A central role of the EA Capability is to facilitate creation of an environment where operational risk can be optimized for maximum business benefit and minimum business loss. This requires close integration with the Enterprise' risk management approach, and an understanding of the scope and interests of Enterprise Risk

Management (ERM). Tight integration with ERM facilitates tilting the EA to improve realization of objectives, and the reduction of uncertainty.

within our governance discussion is driven by the foundation of governance as a decision-making process, with a defined structure of relationships to direct and control the Enterprise in order to achieve stated goals. The process by which direction and control is provided should imbibe equality of concern and transparency, protecting the rights and interests of the business.

The most common understanding of risk is derived from Information Security Management (ISM), which is largely focused on mitigating threat and vulnerability. While ISM is important, we recommend a broad understanding of ERM.

If you are unclear on ERM we recommend starting with two Open Group publications: the TOGAF® and SABSA® Integration White Paper and The Open Group Guide to Integrating Risk and Security within a TOGAF® Enterprise Architecture. These publications explore a broad understanding of risk and risk management.

Central questions that need to be answered are:

- What is the Enterprise's risk appetite?
- Who agrees to a risk assessment?
- Who agrees to a risk treatment plan?

What is Risk?

The heart of effective risk management is managing to the expected objective. Every activity, operational activity, and change activity has an element of risk that needs to be managed and every outcome is uncertain. Risk management is about reducing uncertainty. The ISO 31000 standard definition of risk is the "effect of uncertainty on objectives". The effect of uncertainty is any deviation from what is expected – positive and negative.

Uncertainty typically involves a deficiency of information and leads to inadequate or incomplete knowledge or understanding. In the context of risk management, uncertainty exists whenever the knowledge or understanding of an event, consequence, or likelihood is inadequate or incomplete.

The EA Capability is focused on where the Enterprise is going, and its path to change. A different future, and the changes to realize a future, are intertwined with the "effect of uncertainty on objectives". This requires close integration with the Enterprise's ERM approach. Inherent in strong risk management is striking the balance between positive and negative outcomes resulting from the realization of either.

Core Concepts of Enterprise Risk Management (ERM)

The definitive standard for Enterprise Risk Management, the ISO 31000 standard, outlines a risk management approach to aiding decision-making by taking account of uncertainty and the effect of this uncertainty reaching the Enterprise's objectives. Following the ISO 31000 standard approach ensures that risk management is embedded deeply and firmly in all business activities. It also states that it is a continuous lifecycle rather than an isolated activity.

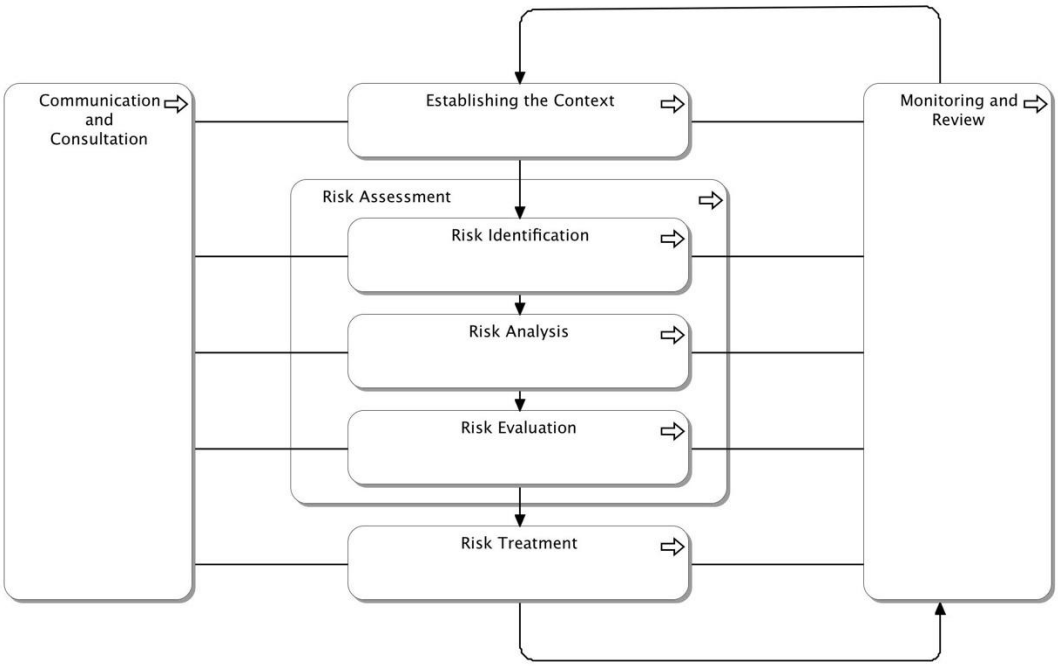

Figure 10: The ISO 31000 Standard Model for Risk Management [Derived from: ISO 31000]

The following concepts are important for ERM.

- Key Risk Areas
- Risk Appetite
- Business Impact Analysis
- Risk Assessment
- Business Risk Model/Risk Register
- Risk Treatment Plan

Existing Governance Process

The process should be documented in such a way that information about what enforcement mechanism and relief mechanism and when are self-explanatory, transparent, and effective. In selecting an existing governance body, consider the simplicity of process and its effectiveness. Successful teams providing the EA Capability make sure that even for the lowest tier (technology architecture governance), business stakeholders constitute the governance body.

At all levels of the governance process, it is essential that measurements, metrics, and rationale for relief are defined business terms. Governing a portfolio by number of machines eliminated does not relate itself to a business outcome; translate to something like cost optimization for the same operational capacity.

Imagine opening your faucet for hot water in the morning. Opening of the faucet is sensed by other control mechanisms and it takes a while for the hot water to start flowing out of the faucet – flushing out the cold water in the line. Governance is very similar at times, and the process should account for long lead times for corrective actions to take effect.

It is possible for a perception to exist in your Enterprise that EA is an ivory tower, nay-sayer, and overhead organization, especially when EA is being re-booted after a failure. Not following the rules in the first paragraph of this section probably provides the reason for this perception. It is OK to go to market with full awareness of the risk and a plan for mitigation within the Enterprise's risk appetite and risk tolerance instead of recommending "stoppage" of work against a theoretical risk-free approach. It is better to be ahead of the curve and influence selection of better and viable alternates during the feasibility study or initiation of an effort. Define your governance process that can achieve such approaches.

Governance often results in a change, either to current effort or future efforts. Organizational and architecture change management should account for triggers and a timeline to implement the change from governance decisions. All governance decisions and scope will not be the same – for example, business architecture decisions will impact operational processes and cost. Also the level of decision-making – operational to strategic – will impact the scope of change.

Definition of Roles

Who gets to participate in which tier and their span of control should be identified and defined. Just like the differences in skill set and approach to developing architecture and managing architecture, there are differences in execution style between architecture management and governance. Architecture management involves development of policies, standards, and recommending the scenarios under which they should be applied; this keeps the governance body informed of impact of architecture with context and in a concise format. Personnel in the governance team should be able to seek precise alternatives and impact to make a judgment evaluating the alternatives presented to them to align with the objectives of the Enterprise.

There is an important distinction in practice. The governance body also approves the policies, standards, and rules recommended by the architecture management team for the EA Capability, but does not approve the architecture. An architecture and roadmap can only be approved by the set of stakeholders. An EA Capability governance body will be focused on ensuring the process was followed, the appropriate stakeholders were engaged, and the materials produced are internally consistent. As an EA Capability Leader, it is your responsibility to differentiate the role of these functions, and identify qualified personnel. It is common that the functional head of an EA Capability will not be the head of the architecture governance body.

Alignment with Other Frameworks

The TOGAF framework is one of several major frameworks used by most Enterprises for Architecture Development. Alignment and interaction with other major enterprise frameworks is required for assurance of outcome and governance. These enterprise frameworks approach the Enterprise with different focus, purpose, and terminology.

This step requires answering the following questions:

- Is there a precedence of enterprise frameworks?
- What is the depth of commitment to different enterprise frameworks?
- How does the TOGAF framework fit in?

We strongly recommend not getting stuck on language at this point – trying to determine what a framework is, what is a method is, and what a technique is. The purpose of this activity is to identify how your Enterprise approaches planning, execution, and governance functions, how committed your Enterprise is to these approaches, how established the approaches are, and how it thinks about itself.

Create a Catalog of Frameworks

The first step would be to create a catalog of such frameworks and their area of focus. This catalog should focus on planning and execution (Project Management Institute (PMI), PRINCE2, Six Sigma, etc.), information systems governance and operation (Lean, COBIT, ITIL), and management and measurement frameworks (Balanced Scorecard, SABSA Enterprise Risk). Also include industry-specific frameworks like SCOR, eTOM, and industry-specific architecture contents frameworks (BIAN, DoDAF, etc.) that provide a view of business process, capability, and architecture description.

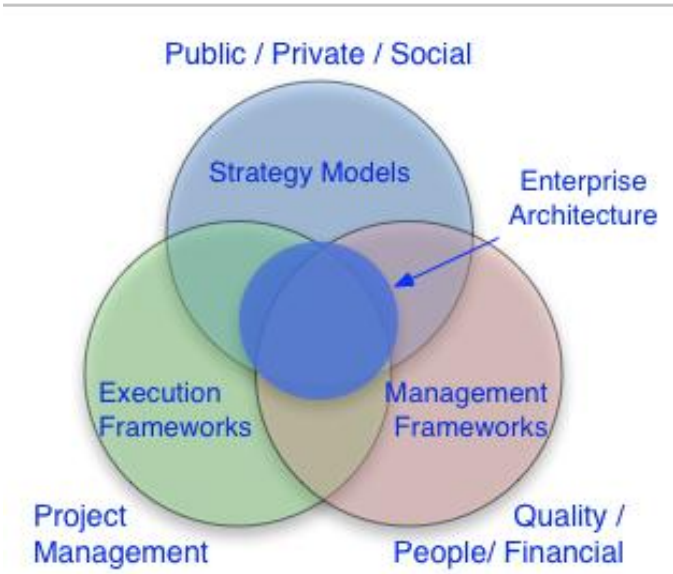

Figure 11: Relationships Across Framework Families

Group the frameworks against the econometric model, accountability model, and execution models like risk, accounting, and planning. You will get to a grouping similar to Figure 11. This view will help to identify what is needed from each of these frameworks for effective operationalization of the Enterprise.

All mapping exercises require understanding an Enterprise's depth of commitment to an approach. Many Enterprises pay lip-service to a framework, adopting a few terminology elements and skipping substantive change. Focus all analysis and alignment on frameworks to which your Enterprise is committed.

Intersection with EA Capability

Once the frameworks are listed, align the aspects of each framework to the objectives and outcomes defined for your EA Capability.

EA provides value in planning, change governance, and purposeful benefits realization. The depth of commitment to different frameworks will define how you adapt your EA Capability and the TOGAF framework.

This is an important concept. All of the outcomes different frameworks provide in terms of planning, change management, and benefits realization are required for a high-functioning EA Capability. Where they are provided, your EA Capability must fit in. Should you perceive a gap, you need to expand your EA Capability to fill in. Adjust your roadmap to success accordingly.

The next step would be to understand the organizational dynamics to sequence the steps – from one or more of these frameworks. As a starting point, The Open Group has published a set of mapping documents and White Papers that can help you map the frameworks, methods, and techniques (see under "TOGAF" at www.opengroup.org/whitepapers).

The scope of describing detailed fitting-in and filling-out options is beyond the scope of any reasonable exercise as it will vary dramatically across organizations. Further, the level of work explodes exponentially as differences in purpose and Enterprise context are considered. This exercise provides an understanding of where your Enterprise has gaps in best practice change. As you read through the section on process modeling and developing the roadmap, you will get an idea of what touch-points across these frameworks you focus on and influence the target model for your Enterprise.

Customization of Architecture Contents and Metamodel

The TOGAF framework identifies two central concepts: a Content Framework and Content Metamodel. The TOGAF Content Framework describes the types of work products that will be consumed and produced by an EA Capability. A subset of these will be a formal description, or architecture description of a system including the components and their inter-relationships. This subset is the Content Metamodel. Both must be customized based upon the purpose of your EA Capability and your Enterprise context.

An EA Capability focused on supporting decision-making for strategy will use a different set of work products than an EA Capability chartered to support governance of projects. *This is a critical distinction*. The content metamodel should be adjusted to align with the charter of the EA Capability. Further, the links between an EA Capability and other functions within an Enterprise, such as finance, compliance, and operations aspects, require the EA Capability to fit in and fill out.

The TOGAF Content Framework identifies two sets of work products. First, work products that are used by others that impact planning, change governance, and purposeful benefits realization. Second, work products that are used within the EA Capability to produce the first set. An EA Capability produces value in direct relation to the consumed work products that improve planning, change governance, and purposeful benefits realization.

Understanding your EA Capability's information requirements requires answering the following questions:

- What is your EA Capability's purpose supporting decision-making and governance?
- What is your Enterprise content metamodel?
- What is the structure of the architecture repository?
- Are there any other considerations pertinent to your Enterprise?
- What are the authority, access, and planning divisions in our EA Capability?
- How formal do we need to be?

For Leaders working for an Enterprise that has a well-established content framework, such as defense with DoDAF, frankly skip this section. Apart from the question of formality, all of your decisions have been made.

What is your EA Capability's Purpose Supporting Decision-Making and Governance?

With the understanding of the outcomes expected from the EA Capability, consider the information your EA Capability requires.

As a rule-of-thumb, the more high-level decision-making your EA Capability supports the less detail and consistency in documentation and supporting information is required. The more it focuses on governance of the change project and third-party activity, the more it needs detail and consistency in supporting information and documentation.

The level of detail required will directly impact your choices on the structure of the architecture repository and how formal your team needs to be. The need for detail and consistency drives formal architecture modeling techniques for traceability and consistent documentation stored in a well-structured repository.

Consider that detail and consistency come at a price in terms of tooling, process integration, and skill within the team that delivers the EA Capability.

Must you Answer Specific Questions?

We have stressed that an EA Capability is established for a purpose. That purpose helps define the questions that the EA Capability is expected to answer.

Keep in mind that this paper deliberately does not refer to an EA team, or organization. It is very common that many of the questions asked of an EA Capability are answered by organizationally associated resources.

Let's turn our attention to typical types of questions for an EA Capability expected to support decision-making at a portfolio level. They include:

- In order to execute on strategy "A", do we know the size and scope of impact – organizational changes, process, procedures, and technologies?
- What if we switched our service provider from "A" to "B"? How soon can we change? Who should be involved? And so on.
- One of our technology suppliers is changing their product. What should we do?
- One of our key suppliers has identified a vulnerability in what they supplied to us. They have also given us an approach to mitigate it. What is our exposure, how soon should we fix it, and what would be our impact during and after the mitigation process has been operationalized, etc.?
- Our customers are complaining about "A" with us. What are the possible root causes?
- How should we align delivery of our portfolio, so that our operational costs are optimized?
- How should we align delivery of our portfolio, so that our differentiation is maximized?
- How should we align delivery of our portfolio, so that our time-to-market is minimized?
- How should we align delivery of our portfolio, so that our innovation efforts and their outcome is maximized?
- Are our suppliers communicating well amongst each other and us, so that the temperature of our operations is warm and smooth?
- Is there any wasteful work done or latency introduced with any process flow – delivering products and services to our customers?

Each of these questions requires the EA Capability to have different facets of information. The different expectations of your EA Capability will shape the information that is required and the different work products your EA Capability is expected to produce. In short, these questions will identify the concerns that your EA Capability must address.

Successful high-functioning EA Capability will maintain a viewpoint library that identifies the questions they are expected to have answers for, and the information they must have to answer these questions. The information they must have, and the information they should have ready access to, will define your content metamodel and repository approach.

One of the steps in establishing a high-functioning EA Capability is defining the viewpoint library. Crisply understanding who the stakeholders in the EA are, what their concerns are, how you will address their concerns, and what information you must know to answer their concerns.

What is your Content Metamodel?

An EA Capability is established for a purpose. In terms of information management, the purpose defines what information the EA Capability must have at hand. In practical terms information needs are derived from your viewpoint library and the information that supports the viewpoints. Consider what information is required to answer these two questions:

- How should we align delivery of our portfolio, so that our differentiation is maximized?
- One of our technology suppliers is changing their product. What should we do?

There are two approaches to defining your content metamodel. Our most successful practice ensures that the central questions your EA Capability is established to address are the focus. In this case you look at the questions your EA Capability is established to answer, and identify the concerns and the viewpoints that address these concerns. Your viewpoint library will define your content metamodel. We cannot state this anymore succinctly, nor state it any more emphatically.

Following this approach leads to smaller information demands and helps focus your EA Capability on expected value. Any expansion in the range of critical questions your EA Capability is expected to answer will expand the information you require. Be aware that many Enterprise Architects are uncomfortable with this approach; they will want to have more information at hand just-in-case.

An alternative practice is to use an established content metamodel. This approach enables your EA Capability to potentially address a broader set of questions. However, it leads to a great deal of superfluous model development and information management. In either case keep in mind that the information you might need is infinite and your resources are finite. Minimize the information your EA Capability must maintain, focus on the purpose of your EA Capability, and address your key questions. Take comfort in the fact that development of the content metamodel and viewpoint library will feed the evolution of each other.

The TOGAF Content Metamodel identifies a range of elements that you may want to keep track of (motivation, role, event, activity, location, resource, platform services, etc.) and a set of relationships. Every component you add to your metamodel comes with relationships that must be maintained, and comes with attributes that must be tracked. The more interim architecture states and options you maintain multiplies the amount of information you must maintain. In order to succeed you need to define the absolute minimum information the EA Capability must maintain to deliver on your purpose.

The content metamodel is used to structure architectural information in an orderly way so that it can be processed to meet the stakeholder needs. The majority of architecture stakeholders do not actually need to know what the architecture metamodel is and are only concerned with specific issues, such as: "How should we align delivery of our portfolio, so that our differentiation is maximized?".

The difficulty comes when, in order to answer this question, your EA Capability may need to answer:

- What functionality does this application support?
- Which processes will be impacted by an application change?
- Which processes are orchestrated by the differentiating capability?

In order to answer these stakeholder questions, you will have to employ more than one technique and approach, to collate, classify, and represent back visually, verbally, and with appropriate context. To answer these questions requires understanding and maintenance of a capability model, process model, application functionality model, and roadmap with appropriate intersections.

If you are very lucky and have a narrow scope to your EA Capability you could use a narrow-domain approach like UML and BPMN or a pre-packaged content metamodel. Keep in mind that value questions supporting decision-making for strategy and portfolio require understanding cross-domain and across multiple dimensions. They preclude use of narrow domain and pre-packaged metamodels.

We strongly recommend to start with the questions you will be asked based upon the Enterprise context and purpose of your EA Capability. Start with a viewpoint library and then chose the modeling notation to employ.

Use the TOGAF Content Metamodel as a starting point. It provides a list of common components and common possible relationships. Explore the alternative content frameworks listed in Appendix A: Partial List of EA Frameworks (on page 103). They are designed to address different purposes that may better align with your EA Capability's purpose.

Explore the minimum information you need to answer the most pressing recurrent questions. When you reach hard questions refer to other models used in your Enterprise like strategy development, operating model, business capability, process model, project management model, and Systems Development Lifecycle (SDLC) model to cover all required aspects of your Enterprise.

Consider what minimum information your EA Capability must have at hand, and what information it will need to gather upon need. The information required at hand is your mandatory minimum, for the other information ensure that you have a consistent way of gathering it and relating it to the mandatory minimum. This allows for traceability across more aspects of your Enterprise.

The exercise is not to fill all the information you might need, but rather to identify the information you must have to describe an EA to address your stakeholders' questions. Test the kind of catalogs, matrices, and diagrams required to capture, analyze, and answer the questions asked of your EA Capability. Before you embark on the effort, define acceptance criteria for the model and content in terms of completeness, integrity, flexibility, understandability, and ease of sustainment.

Information Managed by the EA Capability

Managing an EA repository is often performed with EA model tools. The extent to which such data should be collected and managed depends upon the set of questions that are likely to be asked. Each item that is being produced should have a lineage to the question that demands a response.

The more detail that is required the more likely that formal modeling techniques are required. One of the key pitfalls to avoid is assuming that a well specified content framework is complete and answers the questions your Enterprise is asking of your EA Capability.

Pragmatism suggests you may need to compromise on the questions your EA Capability can readily answer. Likewise, the needs of the data collated and the decisions to be taken dictate the needs and approach of the repository and analytic tools. In order to manage and analyze large volumes of complex sets of data requires automation. It is prudent to have the content framework and content metamodel and then look for formal tools that support your EA Capability. A high-functioning EA Capability requires automation tools. Before you introduce a tool, determine the content metamodel and tailor the architecture method to your needs. Use the tools to provide defendable analytics to support decision-making and traceability to support governance.

Your EA Capability will not manage all of the information required to support your purpose. Rely on your information governance board to interlink all the information. The EA Capability team need to maintain the catalog and taxonomy only. Using this common taxonomy and catalog of items, analysis about the landscape of processes and technology can be performed consistently, providing consistent and rich insights.

Detailed data like project financials and technical specification of a robotic arm are managed by respective disciplines. In order to operationalize the ability to mine such varied, in-depth data, it may be necessary to automate the capturing, management, and visualization of insights.

In most cases assumptions and constraints are time-bound. Depending on your organizational structure, EA may hold the entire repository of data required for analysis or it may just be linking the structures enabling business operations effectiveness analysis.

The EA Capability should ensure that the notations, vocabulary, and concepts reflected in the work products can be employed to communicate within and outside the Enterprise. The demand for alignment to a common vocabulary and framework arises from a need to promptly answer decision-making questions and support governance decision-making.

See Mapping EA Content, EA Leader's Approach, and Metamodel (on page 99) to understand how answering questions raised in this paper results in population of the TOGAF Content Metamodel and the broader content framework. This mapping is provided as an example of both the types of information required and how iteration of the TOGAF ADM can be structured.

Managing your Enterprise Repository

Information management is a critical task for an EA Capability. It is all too easy for an EA Capability to drown in a flood of unintegrated information, usually separated into divergent documents. Effectively managing your EA repository is dependent on effectively limiting the information you need to manage, applying appropriate standardization and automation.

The first priority is minimizing the information collected and maintained. We strongly recommend configuring your work products and content metamodel based upon the purpose of your EA Capability and working backwards from the questions you must answer and the associated viewpoint library. Every component, attribute, and association you add to your content metamodel increases the information your EA Capability must collect and maintain; see Must you Answer Specific Questions? (on page 53), and What is your Content Metamodel? (on page 54).

Including nice-to-have information in your repository only creates a substantive sustainability burden. This burden is particularly troublesome for an EA Capability that is IT-oriented and structured for the purpose of supporting projects. For these, a common pitfall is attempting to include design and operational information as part of the EA repository.

Eliminating nice-to-have information and distraction is the primary reason to develop the content metamodel from the questions that must be addressed, and the purpose of the EA Capability. When a content framework is optimized to support IT implementation or operation questions, or a tool was acquired before customizing the method or metamodel, the EA Capability team invariably collects more information than needed. If the information is not required to support the purpose, the essential questions, and any mandatory viewpoints, what is the value in collecting it?

The second priority is determining the level of standardization and automation. Standardization is distinct from automation. Standardization can be performed with appropriate templates and a document repository. Automation requires implementation of an EA modeling tool.

Key factors to consider are the purpose, size, and geographic and organizational distribution of your EA Capability. The purpose of your EA Capability will drive the required level of repeatability of process, analysis, and representation, which in turn drives the level of standardization of your content framework. The geographic and organizational distribution of your EA Capability has the largest impact on your need for automation. A co-located organizationally unified EA Capability can rely far more upon informal collaboration than those who are organizationally and geographically diversified. Distribution, federation, and size of the team delivering will drive the need for automation. The need for automation drives deployment of multi-user model management and analytic tools.

Table 3: EA Repository Standardization Factors (Process *versus* Presentation)

EA Content Framework Standardization Factors			
	Required Process Repeatability	**Required Analysis Repeatability**	**Required Presentation Repeatability**
EA to Support Third Party	Very High	High	Very High
EA to Support Project	High	High	Very High
EA to Support Portfolio	Medium	Medium	Medium
EA to Support Strategy	Low	Low	Low

It is common to assume a high-functioning EA Capability requires a high level of repeatability. Repeatability is heavily impacted by purpose. Architecture to support strategy and portfolio has a strong tendency to be addressing unique questions, using divergent information, and not be tightly tied to predictable execution patterns. This is especially true for EA supporting portfolio. Where there is a low need for repeatability, high levels of standardization are a barrier to value creation.

Conversely, an EA Capability supporting third-party engagement requires an extremely high level of standardization. Effective engagement with a third party must be predictable to the third party. Repeatability will not be possible without a consistently used viewpoint library, information gathering and analysis, and mandated use of reference models and reference architecture.

Table 4: EA Repository Standardization Factors (Team Model *versus* Analysis Needs)

EA Repository Standardization Factors			
	Geographic Distribution Impact	**Federated Organization Impact**	**Level of Complex Analysis**
EA to Support Third Party	Significant Impact	Massive Impact	Limited
EA to Support Project	Significant Impact	Significant Impact	Low
EA to Support Portfolio	Some Impact	Significant Impact	Very High
EA to Support Strategy	Limited Impact	Very Limited Impact	Very High

We have come across scenarios where the EA Capability team is serving the entire spectrum – from supporting strategy to engaging with a third party. Mostly, such teams are federated. These teams may be responding to financial planning questions, alignment with organizational goals, lifecycle tracking (project and operational management), and asset inventory tracking. Federated EA teams as well as full spectrum EA teams have a significant need to standardize on taxonomy, data flow, and integrated across all toolsets (financial planning, contract management, project management, Configuration Management Database (CMDB), and asset tracking). An IT-focused team may also require some level of continuity between portfolio planning and solution architecture development. Evaluate your charter and EA team model before embarking on automation of the EA repository. Consider the tax on team capacity due to lack of automation or limited automation, but do not over emphasize ease of governance. Automation should focus on productivity and collaboration, not control or decision-making.

In our experience a good practice is to focus formal modeling to supporting analysis. This drives the use of catalogs and matrices, with a very strong use of component attributes. We find that graphical modeling is often a barrier to strong analytics and the development of a strong architecture specification. In fact, often the current and target state have the same boxes and connections, with the difference being the attributes defining the characteristics of the components and relationships. Useful visualization routinely requires far more involved techniques than diagrams showing boxes and connections. We are finding interesting synergy between our data analytic work and work evolving the EA Capability.

We routinely utilize junior staff to maintain and manage the EA repository and utilize specialized graphic design resources to support the creation of effective diagram viewpoints. While considering composition of the EA team, include a set of analyst and design/modeling resources to manage the EA repository and development of infographics or visualizations.

Organization Model for the EA Team

Keep in mind this White Paper discusses establishing and evolving an EA Capability. We explicitly do not discuss an EA department or any other organizational element. This paper also does not suggest creation of such a team would guarantee a successful outcome from the EA Capability.

The required EA Capability must be supported by the correct organization, roles, and responsibilities. Of particular importance is the definition of boundaries between different EA practitioners and creating the organizational model that realizes the governance framework.

This step requires answering the following questions:

- How will the EA Capability be organized?
- What is the existing Enterprise capability, and EA Capability, with respect to change planning, and change execution?
- What are the organizational gaps?
- What are the budget requirements?
- What are the key roles and responsibilities?

This section is about considerations to create your team structure. This should not be confused with Organization Model of the Enterprise (on page 59), which is all about capturing the existing structure of your Enterprise as a whole. The rest of this section is about factors to consider while creating a new team that you are going to lead. At this point in time, if you think there is no EA Capability organization in your Enterprise, let us reset your thinking – it is now an organization of size one (1) – you the Leader. When initiated by an executive sponsor, it is a team of two. How should you go about building rest of the team?

- What skill set should be within the team providing the EA Capability?
- What skill sets can be shared?
- How to approach roles and responsibilities?
- Should sub-teams be created? If yes, how to align all teams?
- What should be the team size and factors influencing that?
- How do we measure success and promote the team?
- What is needed to build the team or the value delivered?

Shared Roles and Alignment

Developing, implementing, and managing an EA practice requires multi-discipline engagement. In order to define the structure and capacity for the EA Capability, involvement of personnel executing business strategy development, project, program and portfolio management (both operations and IT), quality management (process and product), governance (financial, legal, others), and IT delivery functions should be defined. Rationale and engagement levels with other disciplines will be discussed in Architecture Governance (on

page 43) and Process Model (on page 74). It is more than likely that your Enterprise already has either teams that perform these functions or folks who perform this function that are embedded in other broader functions. To build cross-team alignment, it is necessary to identify the teams or individuals who perform strategy development, program management, etc.

Alignment

Most likely, the sponsor of the EA Capability has already defined how the team interfaces with the rest of the Enterprise. Figures shown below are the variants of organizational alignment of a team providing the EA Capability in vogue. It is likely that your Enterprise is experimenting with EA and has chartered you to work with external consultants and service providers. For now, we are not talking about where the professionals come from.

An important part of the requirements and constraints on an EA Capability is provided by its context. In the case of the EA Capability, its interactions will be with the other management systems that support or govern the work of Enterprise transformation that are an important part of this.

Table 5: Examples of Management Systems Integrating/Interoperating with the EA Capability

Examples of Management Systems the EA Capability must Integrate and Interoperate with	
Business Strategy and Planning Solutions Delivery Business Intelligence Security Business Process Management	Application Portfolio Management Finance Technology Planning and Management Systems Planning, Management, Operations …

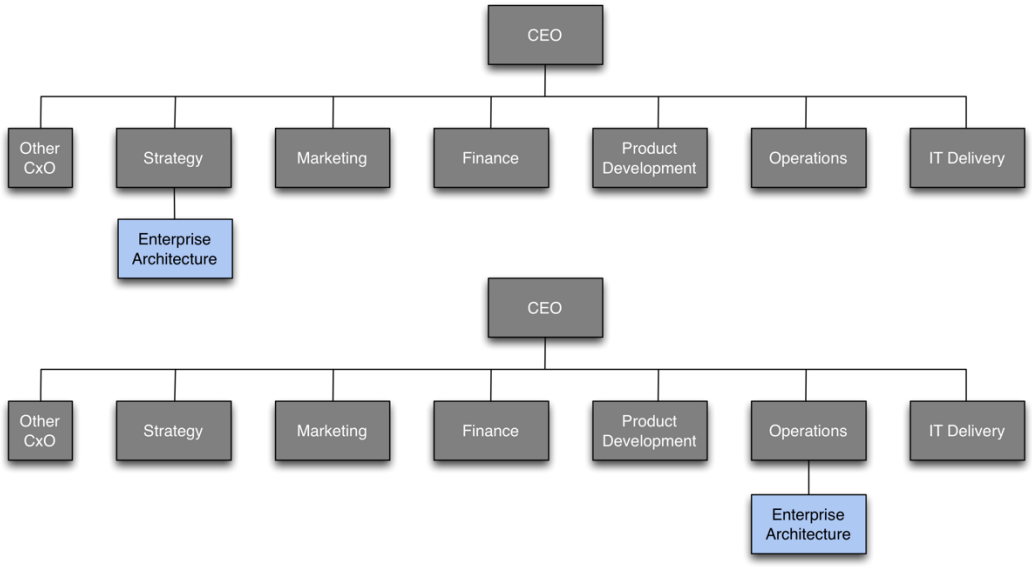

Figure 12: Possibilities for Strategy-Centric EA Team Alignment

In a strategy-centric EA model, it does not matter where the information-communication and technology team is positioned within the Enterprise. EA can be aligned with corporate strategy, overall operations, or

finance. The team providing the EA Capability extends its services to the rest of the Enterprise based on the charter – sustained growth, operational efficiency, cost and risk reduction, etc.

Organization structures shown below can be completely different, if the basic design is to align with customer segment or by country and geography. For this discussion, the structures shown below are for a functionally-aligned Enterprise.

However, in a function-centric model, it is possible to have a central IT delivery team and EA being contained within IT. Another variant is that EA is part of each of the functional verticals and there is one team that takes point to consolidate all EA activities. In this variant, it may be prudent to draw members of the team providing the EA Capability from each of the functional units having extended responsibility for a common goal, yet from a HR management perspective, reporting to respective functional or regional business leaders.

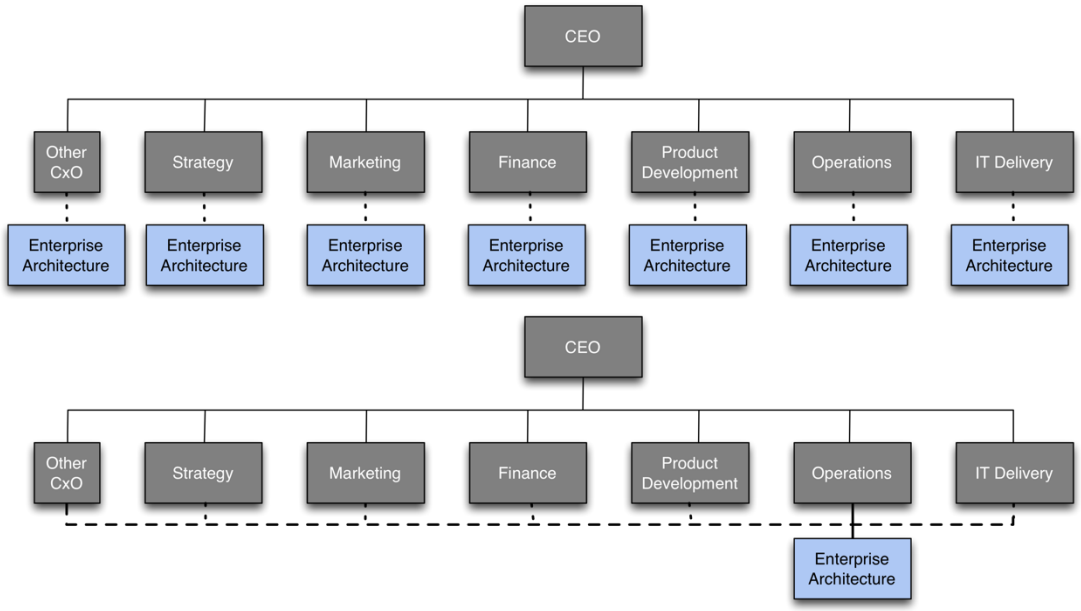

Figure 13: Possibilities for Function-Centric EA Team Alignment

In order to keep the visualizations simple, teams like project management and quality are not called out explicitly. As they are also shared functions like EA, it is fair to assume they will also follow a model very similar to EA. The charter of the EA Capability will determine the coordination and reporting structure these shared teams will have. Business objectives and empowerment provided by the sponsor should draw you to one of these models. Revisit either objectives or degree of sponsorship provided in the case of mismatch.

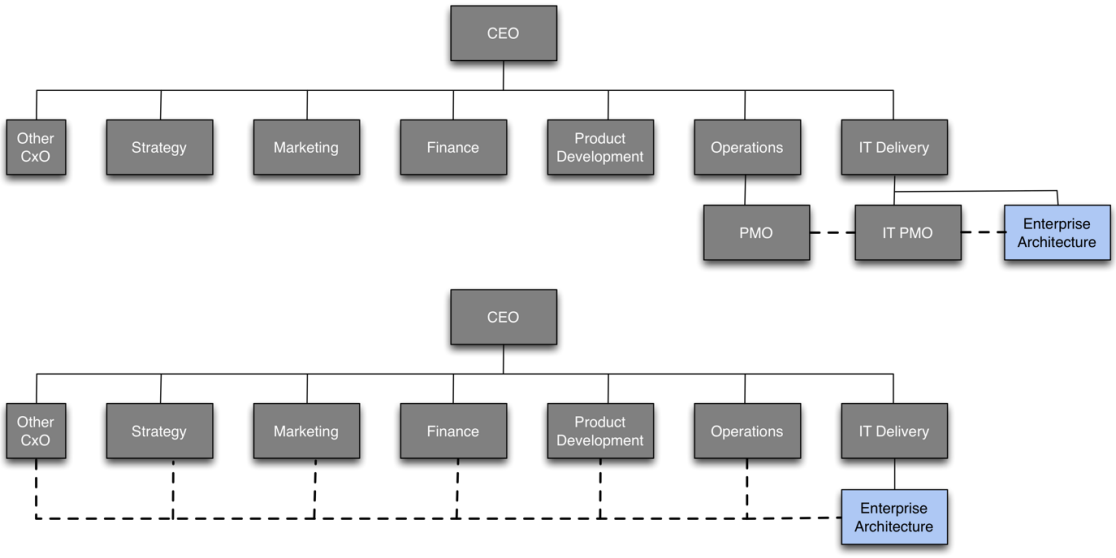

Figure 14: Possibilities for IT-Centric EA Team Alignment

When there are multiple EA teams, there should always be one Leader. All teams should work under the guidance of this Leader and collaborate. The reporting and funding hierarchy of the teams should be separated from alignment and execution against EA Capability objectives. Further, these diagrams are not intended to suggest that all activities within an EA Capability should exist within one functional unit.

Structure

Before we define the structure of the team, we will take a quick look at the activities the team providing the EA Capability is expected to perform. Figure 15 summarizes a high-level view of activities, and suggests some of their relationships to each other. Skills required to build and use have different requirements with few overlaps.

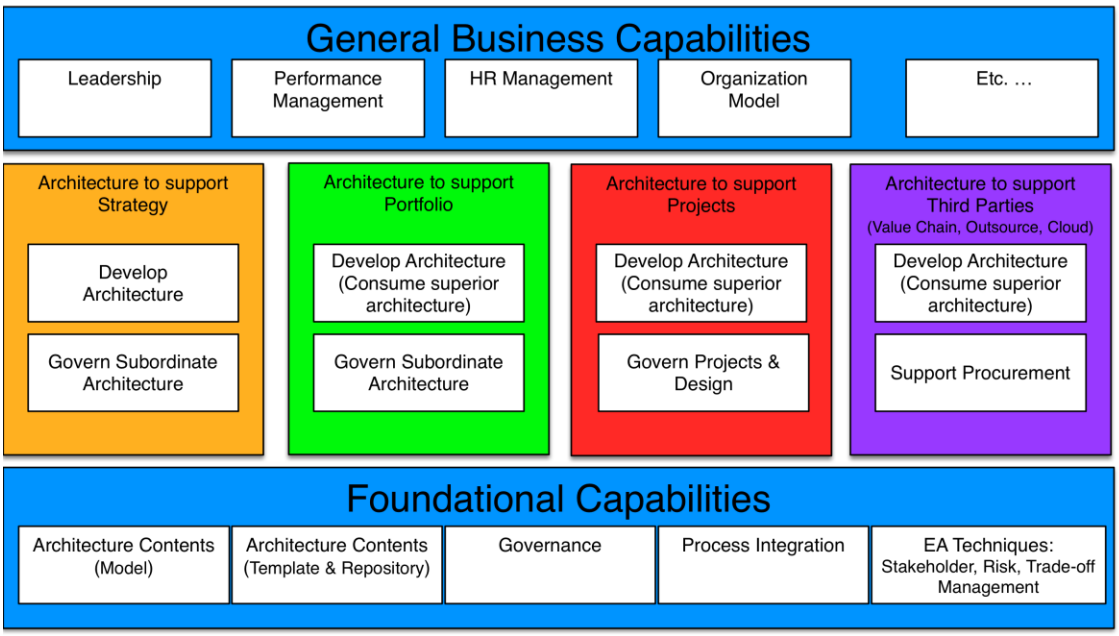

Figure 15: Activities Performed by EA Capability

The EA Capability must run efficiently, effectively, and in line with changing operational and financial practices. It is conceptually similar to operating any function in the organization. It consists of EA-specific activities, and activities that are general to any business.

EA-specific activities are either foundational, or purpose-specific. The nature of work done by the team providing the EA Capability invariably places them as a shared function. The team needs continuous input from impacted teams on relevance, efficiency, effectiveness, and growth – it is imperative to have common foundational elements of the EA Capability.

An interesting aspect of leading an EA Capability is the need to apply your services to your capability. This paper is based upon the premise that a properly architected EA Capability out-performs an *ad hoc* organizational design. The EA Capability will create and revise a unified EA strategy and accompanying EA plans, and will produce an integrated EA roadmap. This activity must grasp the current state and future direction of the business and of its supporting systems, and have ongoing interactions with the people who are responsible for these areas in several Enterprise functions.

A certain amount of the EA Capability must be in place before architecture work can start; consequently, boot-strapping is necessary. A key element of the roadmap is the development of the EA Capability, both in terms of its ability to produce an effective architecture and the ability of the Enterprise to use the architecture. Evolution of the EA Capability will involve additional architecture and implementation projects.

It is ideal to have specialists who can provide coverage for the domain shown in Figure 17. Depending on organizational alignment, sponsorship, and funding, the team providing the EA Capability may employ specialists to cover each of the layers shown in Figure 16 or per suite of solution areas like Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Sales Force Automation (SFA), Core Banking, and Treasury. Other cross-disciplines to consider are strategic planners, financial and market analysts, line of business leaders or Subject Matter Experts (SMEs), and service or support personnel.

Figure 16: Teams Executing the EA Capability

The EA Capability, like any other business, must carry out a basic set of general actions. This includes things like finance and budgeting, team development, risk management, and performance management. All of these must be adapted to the specific EA Capability and Enterprise. In most Enterprises these functions are shared, and EA should benefit from tapping into these teams. Occasionally, to scale the reach of the EA functions, it may be necessary to franchise some of the activities to teams outside the team providing the EA Capability.

Finally, the architecture board or the governance council. We discussed more about the governance aspect in Architecture Governance (on page 43). For now, let us define the purpose and approach to staffing the board. The architecture board is equivalent to the "board of directors" of the EA Capability's business-in-a-business. It is not a successful pattern to embed decision rights for certain classes of architecture decisions in this body. For example, defining the constitution of an architecture building block or solution building block is better decided at the extended EA team or a trade-off decision around directory services or assembly line layouts. This pattern confuses the governance body with stakeholders and inevitably leads to an artificial extension of decision-making.

Roles and Responsibilities

There is sufficient literature in organization theory and design. Some quick pointers:

- Carver's Policy Governance Model (ownership, accountability, authority, delegation)[10]

[10] John Carver: Reinventing your Board: A Step-by-Step Guide to Implementing Policy Governance, Jossey-Bass, 2006.

- Jay Galbraith's Star Model (strategy, people, structure, processes, and rewards – driving behavior, culture, performance)[11]
- Marvin Weisbord's Six Box Model (purpose, structure, rewards, helpful mechanisms, relationships, and leadership)[12]
- Nadler et al.'s Congruence Model (inputs, outputs, informal and formal organizations, people and work)[13]
- Burke and Litwin's Multi-Relation Model[14]

Every Enterprise has a predefined set of roles and responsibilities. If one already exists, use it, test waters, and refine it. While refining, start with defining roles and then think of titles. From a simple people portability and recruitment point of view, it is imperative that you keep the functional titles and roles in common with industry standard titles.

It is likely that your Enterprise may not have one specifically for EA or any architecture role. In such a case, consider the catalog of models (organization, process, information flow, infrastructure topography, etc.) to be created for the Enterprise. If no one has been formally building and maintaining them to date, the team providing the EA Capability should assume the responsibility.

As mentioned earlier in this paper, care must be taken to provide clarity on roles relating to architecture management and architecture development. The chief architect is not the same as the manager of the architecture function and the skill set required to play the roles are distinct and different for the same person to play both roles.

When forward-looking technology research is not conducted by anyone (or it is being performed, but not operationalized), it is the responsibility of the team providing the EA Capability to perform these duties. These activities may include on-demand vendor supplied solutions; component design to be deployed on-board an automobile; or as complex as joint development of a tamper-proof credit card and Point of Sale (POS) solution.

Consider these: context, charter, culture, clarity of expectations, collaboration, communication and co-ordination, separation of concerns, control, competence, and creative innovation while defining each of the roles and responsibilities.

Skills Framework

When it comes to competence and creative innovation, you should consider the skills required for an architect to produce and maintain the models, documents, and other communication aids. Government and private

[11] Jay R. Galbraith: Organization Design, Reading MA, Addison-Wesley, 1977.

[12] Marvin R. Weisbord: Organizational Diagnosis: Six Places to Look for Trouble With or Without a Theory, Group & Organization Studies 1, 4, pp.430-447, December 1976.

[13] David A. Nadler, Michael Tushman, Nina Hatvany: Managing Organizations, Organizational Dynamics, Autumn 1980.

[14] Burke and Litwin: A Causal Model of Organization Performance and Change, Journal of Management, Vol. 18, No. 3, pp 523-545, 1992.

forums like the US Department of Labor (Occupational Outlook Handbook), the SFIA Foundation's Skills Framework for the Information Age (www.sfia-online.org), and The Open Group Certified Architect (Open CA) Program Conformance Requirements have defined detailed expectations. Some of these frameworks also provide a career and certification progression from beginner level architect to industry leaders. As you build your Enterprise, create a progression and transition path within the EA Capability, including all lateral entry and exit paths.

One of the main engagements you need to have is with your Enterprise's HR team. As the structure is defined, it is likely that you will define new career paths and performance evaluation criteria. There could be a need to establish policy changes to drive job rotation to build cross-domain expertise, including minimum number of months to stay in a role before rotation. Some skills can be acquired by learning and some hands-on while executing the job. As you slot individuals into roles and hierarchy levels, take into account the effectiveness of an experienced architect what has been in the same role and that of an architect who has been moved from another domain. You may have to extend a softer version of this differentiation when evaluating performance as well. Such differentiation requires management and HR buy-in.

Performance Evaluation (of the EA Capability)

Next to the lack of clear objectives being the biggest contributor to failure for EA Capability is the absence of clarity on how to evaluate architects and the impact they bring to the Enterprise. In most organizations, the existing HR framework is likely to have value measurement and communication approaches. When something exists, it is invariably a measure of models, documents, and visualizations produced (local to efficiency of building the EA Capability) rather than impact delivered by the architects.

Some of the major categories to consider for defining value metrics are: financial, risk reduction, benefit realization, growth and innovation, proactive readiness, development of organizational capability, and ease of change management. To be specific, consider how the professionals:

- Identify, define, and apply alternatives
- Tailor the basis for estimation of risk, controlling factors and assumptions, and extrapolations
- Eliminate waste; balance agility with innovation, operational stability, and sustainability
- Direct capital expenses planning
- Create a health map and propose corrective actions
- How well they perform the role of trusted advisor, mentor, or a sales person who expands the scope of the engagement
- Ability to consistently perform Enterprise impact assessments

Capacity

Architect skill growth invariably starts with domain-level specialization and then grows into cross-domain expertise. Organizational structure, dynamics, or funding level may force you to create capacity via federated or virtual teams. If the scenario is that you are resurrecting a previous EA effort, it would be difficult to discern qualified and semi-qualified architects embedded in various parts of the Enterprise. As you consider building the EA process and solution assurance approaches, driving higher weight to quality (impact

delivered) over quantity (number of people in the organization) will help differentiate the architects who should be retained.

Refer to the sample EA Capability models shown in Figure 24 and Figure 25. Develop a model to assess how many architects would be required to cover development of these EA capabilities or apply parts of these EA capabilities to achieve the business outcome in one or more business capabilities or value chains (see page 68). Keeping the architecture repository current and managing changes to the EA Capability and the rest of the Enterprise will also take away time from members of the team. In addition to the skills framework, consider the talent mix to perform these activities while maintaining deep engagement with all stakeholders. As required, add more head counts and separation of duties to provide clarity and coordination amongst the members of the team providing the EA Capability.

One of the most common mistakes in building capacity is around time to coach and mentor. The architecture discipline is partly about delivery. Executive leadership and line management should be walked through to think of trade-off between short-term delivery and flexibility for scaling. Such coaching requires investment in time, and random disruptions to meet their schedule. Likewise, it takes time to mentor aspiring candidates. Mentors may be mostly productive, but mentee time should not be accounted as "available".

As a Leader you should be able to identify the maturity level of individuals required to deliver against the business objectives and timelines. Factor in the organizational maturity to assess time to succeed (coaching and mentoring). Like performance criteria, define capacity assessment criteria – time, specialization, and maturity. If there is no measurement, there is no way to identify need to add more or adjust focus.

As mentioned in the previous section, it is advisable to have a set of analyst resources who can manage and curate the EA repository. You may not need a full-time graphic design resource; however, account for paying for such a resource on-demand.

Recruiting to Build Capacity

When the EA Capability is being re-booted or the team providing the EA Capability is federated, it is likely that you will have to accept some existing pool of architects. Sometimes you may have to build a completely new team. There is definitely value to institutional knowledge and rapport – only when balanced against tenure, awareness, and institutional bias. Irrespective of the latitude given to you to build the team, a good approach to recruiting members of your team is to follow the knowledge, skill, and talent framework. In addition, pay attention to the personal growth path desire of the individual and balance it against the financial accounting model of the team providing the EA Capability. As much as the architect is required to present all facets of a problem or topic, the architect is required to take a stand and argue on the merits and metrics. Look beyond the daily activities; look for diversity of domains and transferrable skills across business domains and problem patterns.

EA is not all about definition of trade-off criteria to reduce risk or cost and to improve sustainability over a period of time. Having understood the organization's objectives, legal environment, financial model, and operating model, trade-off decisions normally cover more than one dimension. A retractable road barrier is a clear example of innovative design to avoid trading off security concerns against emergency and usability concerns. Enterprise Architects will have to look across the functional and departmental barriers of the Enterprise, so that innovative alternatives or trade-off can be taken into account before presenting decision-ready options. It is recommended to have people of varying skills, but with a common thread in thought process – how to set and follow trade-off analysis to deliver decision-ready recommendations. A deductive reasoning process is not the same as belief and bias-oriented black-and-white thinking. As times change,

some of the concerns change as well. What used to be non-functional requirements – like visual appeal and performance – are becoming key functional differentiators (as of 2015-2016). It is not a cliché when we say the necessity to keep current and being imaginative are prerequisites to be an Enterprise Architect.

Scoping the Depth and Breadth of Business Impact with the EA Capability

Let us get some things out of the way. Just like getting ready to make a dinner, we need to handle the entire business in parts. Different vegetables and fruits bring out flavor and visual appeal when handled appropriately. However, there is no simple set of rules to slide-and-dice the business to land the expected outcomes from the EA Capability. The EA Capability delivers results when different aspects (like environment, strategy, internal and external interactions, automation, etc.) are handled the way they should be.

This section will aid in answering these questions:

- What are the possible approaches to understanding the Enterprise (or the charter for the EA Capability)?
- Which method to partition the scope of work would be best for my industry or Enterprise?
- Are there reference architectures and models that could be leveraged?
- What potential trade-off could result due to time dimension impact on scope?
- What if the scope is confined to IT only?

Earlier in this paper, we discussed Enterprise, segment, and capability-based approach for separation and scoping. These are other natural mechanisms, if already available in your Enterprise, that could be leveraged.

In order to deliver value, any business should have three scoping statements – customer demography or segment being addressed, products (vertical integration) delivered, and geography being covered. Likewise, EA should also address three dimensions – capabilities, domains, and spread. You will have to follow at least one variant for each of the dimension to complete the scope for EA activity, to arrive at the right size, and to articulate the value being delivered. Unless the variant chosen is proving to be a deterrent to deliver value, it is prudent to stick to one approach.

Value Chains, Value Streams, and Capabilities

Capability-based, process and value stream-based segmentation of the business are the major approaches. In a capability-based system, you focus on what sets your Enterprise apart from the competition. In a value-centric system, the focus is on how to deliver your products and services to the customers. It is possible for your Enterprise to follow value-based or capability-based models in two different business units or the same business unit in different geographies. For example, customer center operations may be managed as a capability whereas sales may be handled as a process.

In some businesses, terms like front-office, middle-office, and back-office are commonly used to describe the way operations are managed. Front-office means customer-facing operations – like branches, counters, or vending machines where customers walk in and interact. Back-office would imply capabilities like logistics, infrastructure, legal, and finance. Middle-office may indicate pretty much everything else. Even though capabilities and value streams are named differently, this is a valid variation as well.

In the event your Enterprise does not have a value chain, value stream map, or capability map, but prefers to anchor on one of them, a good place to start would be the American Productivity and Quality Center (APQC)[15] capability map or value chain or value stream map.

There are businesses like telecom or technology and the scope may be a country; for example, China, Vietnam, and Thailand where local regulations and market behavior are so different that they demand special treatment. Likewise, nuances in the mining industry demand that each mine be scoped differently for operational purposes, but the entire business has to be handled as one unit for strategy purposes.

In the event of managing a merger, acquisition (M&A), and divestiture activity, the scope may just be that – land the transition from two entities to one. When performing business as part of alliances, scoping should be handled carefully to treat independent entities within the alliance and the alliance itself with their rightful legal boundaries.

Some businesses prefer to handle segmentation based on portfolio of efforts – like growth market and emerging market. Such marketing taxonomy indicates geographical boundaries and a set of processes or capabilities to achieve business goals. From the EA Capability standpoint, care must be taken to clarify the set of processes, capabilities, and geography that is in scope.

Domains and Layers

Domains and layers are typical words in the dictionary of a technologist. The TOGAF framework suggested use is that the word "domain" should always be prefixed by a noun to provide context – like architecture domain, business domain, and security domain.

What we mean by (architecture) domains are: business, data (and information), application, technology (infrastructure and integration), and security. This view is based on the meaning for the word domain – "a field of thought, action, influence, etc.". These are very similar to terms defined in the TOGAF framework. See Figure 17 for details on the scope of each of these architectural sub-domains.

Domain is defined in a different context as well. The Mitre Corporation,[16] Kevlin Henney's 97 Things,[17] and a few others classify things like banking, finance, insurance, government, energy, chemical, and manufacturing as "business domains". This context of industry is already defined for your Enterprise. Hence, we have discussed the domains and layers in the context of "industry segment" or "business domain" you are already in.

Just as the word "capability" should be prefixed with a noun to convey the context, the words "domain" and "layer" should be prefixed with a noun. Architectural layers are an IT concept.

A security architecture is a structure of organizational, conceptual, logical, and physical components that interact in a coherent fashion in order to achieve and maintain a state of managed risk. It is an enabler of

[15] American Productivity and Quality Center (APQC); refer to: www.apqc.org.
[16] Refer to: http://cwe.mitre.org/cwraf/modeling_the_env.html.
[17] Kevlin Henney: 97 Things Every Programmer Should Know, O'Reilly, 2010.

secure behavior, safe behavior, resilient behavior, reliable behavior, and upholding of privacy at risk areas throughout the whole Enterprise.

Security architecture components always have a relationship with other elements in the architecture. Thus, although the security architecture might be viewed as one architecture, it can never be an isolated architecture. That would be meaningless. After all, security is not the problem of the security guy: it is a concern for the Enterprise.

The risks managed by the security architecture are of various kinds. Two important ones are business risk and operational risk. The security architecture contains a balanced view on risk: negative consequences are kept to an acceptable level and positive opportunities are exploited to their maximum. The business-driven approach is key for the security architecture: business drivers offer the context for risk assessments; they define whether compliance with any control framework is necessary, and they justify the need for security measures.

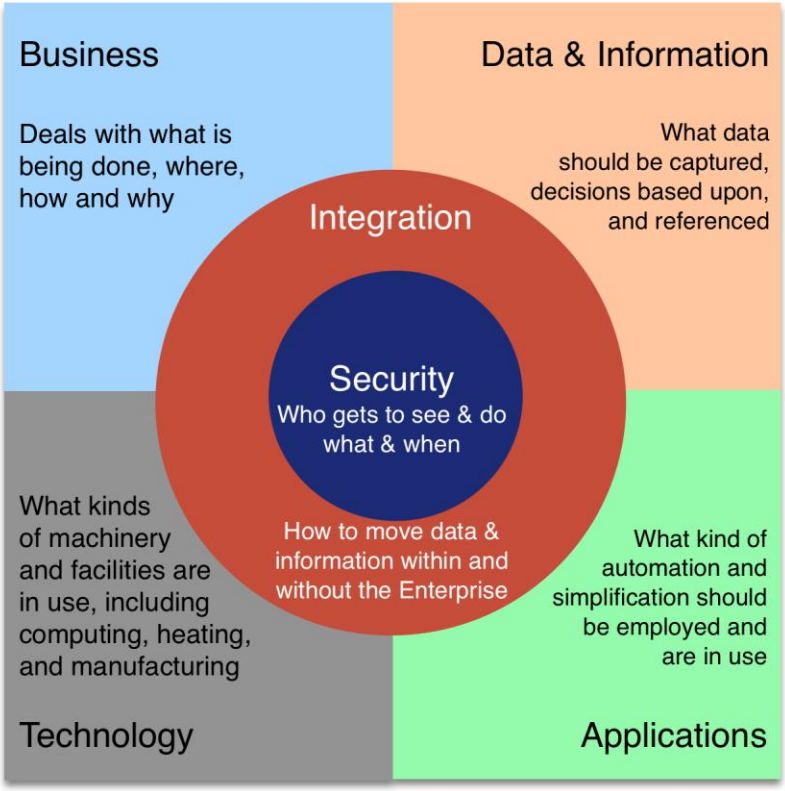

Figure 17: Commonly Accepted Domains

In Figure 17 the visualization does not convey that one domain is a subset of the other. The idea is that integration and security domains touch business, data, application, and technology domains. Security architecture is a cross-cutting concern, pervasive through the whole EA. The security architecture is more than a dataset; it is based on the ISM process and the ERM process.

As a cross-cutting concern, the security architecture impacts and informs the business, application, data, and technology architectures. The security architecture may often be organized outside of the architecture scope, yet parts of it need to be developed in an integrated fashion with the architecture.

When dealing with function or strategy-specific EA efforts, it is preferable to consider domains first and, as needed, include consideration for introducing the concept of (architecture) layers. Layers are normally based on man-machine or machine-to-machine interactions. When EA is IT-centric, use of layers to define standard guides may be useful for the Enterprise. Commonly accepted layers are presentation or user experience (or client tier), service (end-points) (or front tier), business rule and logic (middle tier), integration and workflow (middle tier), and storage (data tier). As transitions happen to cloud, mobility, and the Internet of Things (IoT), the architectural layers in the IT landscape will change significantly. You may have to create more nuanced layers than what is shown in Figure 18. See Figure 18 for a view of how the layers interact with each other.

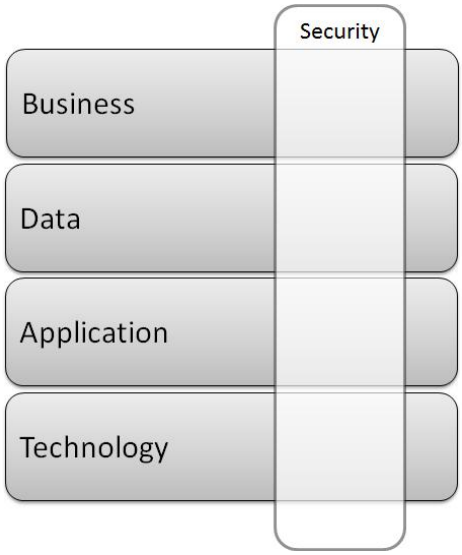

Figure 18: Security as a Cross-Cutting Concern through the Architecture

There are instances where the middle tier is referenced as the application tier and storage is referenced as the domain or object model. We would like to avoid nomenclature clash and hence calling out the layers by "what happens" in each of the layers. Note that such a reference is based on business functions. For a manufacturing shop floor automation system not all layers would apply and they may all be housed in the same unit or machinery.

The Open Group SOA Reference Architecture[18] provides a logical solution view, which talks about consumers and providers who are brought together via consumer interfaces, business processes, services, service components, and operational systems. Consumers' loyalty, usability, and consumption are governed and assured by quality of the service, enabling information exchange between participating members. The

[18] SOA Reference Architecture, Open Group Standard (C119), December 2011, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/c119.htm.

OSGi model,[19] the OSI model based on the ISO/IEC 7498-1:1994 standard, or Functions, Flows (Processes), Layers, and Views (FFLV) are other concepts on technology or architecture layers that can be leveraged.

Occasionally references are made about conceptual, logical, and physical layers. Likewise, architecture layer or segmentation discussions sometimes talk about strategic, segment, and capability architectures. Such a classification is useful to provide context for the level of generalization or specificity of detail. For sake of clarity in communication, we suggest not to mix the terms for purpose and intent. Domains and layers convey the purpose. Conceptual, logical, physical or strategic, segment, or capability are meant to convey intent. Scope should be defined both by purpose and intent – be specific and clear. It may be necessary to have both domain definitions and layer definitions to provide clarity on the scope of work the team providing the EA Capability is going to perform.

Depth and Breadth

Clarity in business objectives would provide hints for what to focus on first – the entire breadth of the Enterprise scoped or specific areas. Building on the discussion about scoping the EA effort (on page 24), consideration of the context in M&A or organic expansion should be included. Objectives like due diligence for M&A would start with understanding all capabilities (breadth) and then go into each unit or capability stack (depth). Objectives like cost and incident reduction would start with a specific capability (depth) and then replicate the process across the business (breadth).

Sometimes, the size of the Enterprise or the "span of control" decided by the sponsor may call for partitioning. The constraint is either capacity of the team providing the EA Capability or value proposition perceived by the sponsors. Either way, the only trade-off that can be made is time to cover the entire Enterprise (or delivering value) against the ability to keep the architecture documentation current. When dealing with an Enterprise structure where the EA lead is a coordinator across architects from various business units, a need for unification, standardization, or replication of standards, reference models, and reference architecture arise. As much as this provides scale to cover the breadth, principles to select, classify, and avoid duplication of architectural work for unification *vis-à-vis* local use should be defined. In these scenarios, there is a need to consider carving out a separate integration architecture effort.

Irrespective of going depth-first or breadth-first, the level of detail across domains and layers should be consistent for each cycle (set of capabilities or value stream).

The approach to scope the EA work is also called "partitioning" and each scoped slice is called an architecture partition. Architectures that are created to address a subset of issues within an Enterprise require a consistent frame of reference so that they can be considered as a group as well as point deliverables. The dimensions that are used to define the scope boundary of a single architecture (e.g., level of detail, architecture domain, etc.) are typically the same dimensions used to integrate the subset of architectures.

[19] Refer to: www.osgi.org/Technology/WhatIsOSGi.

Impact of Time Dimension on Scope

The capability or value stream provides a pivot to build the end-to-end view of the Enterprise. The level of detail to which they are explored depends on the scope. In earlier sections we discussed that strategy and operations of the business change with time. The impact could be in the partition you are currently working on, or a backlog item, or those pending elaboration in the future. It is also possible that concurrent elaboration activities can occur, based on the EA team capacity. You could have taken any of the several techniques available to isolate the impact of such changes. A side-effect of such isolations or concurrent development is architecture in silos.

Having scoped the architecture effort (like drawing a boundary), the territory within (production and nurturing of architecture work) should be explored differently. One of the common mistakes is to scope the project efforts in isolation with each of these boundaries. The key principle that should never be compromised or traded-off is that EA is about a system of systems. Cross-system dependency and interaction management should take precedence over the needs of the project or success of the "scoped effort". Care must be taken to define the criteria for optimizing or sub-optimizing a particular area for the overall benefit of the Enterprise.

Note: A sub-optimal design is a result of architectural trade-off for a greater good. For example, in designing a grid computing environment, biasing for high signal strength on a mobile device, with average to acceptance latency biases the design for continuity of service at the cost of performance. Business principles and value should be the source of information for you to define when and how to sign-off on sub-optimal architectures.

To begin with, it may be acceptable to sub-optimize to deliver value – this is a natural evolution problem, as the Enterprise may not be mature or scoping and the timeline may force you to sub-optimize.

With this, you would have arrived at key architecture principles that are derived from organizational values, culture, and strategy to inform your approach to trade-off and effective change management. You should be in a position to have an idea of the number of iterations it would take to build the EA for the scope of the Enterprise defined by the sponsor. Having understood the magnitude of effort and approximate duration to complete, let us explore the people, process, information, techniques, and technology you would need.

Process Model

Engaging your EA Capability to your Enterprise requires transforming the generic TOGAF methods to processes integrated with the Enterprise's operations. In particular, the logical model of the TOGAF Architecture Development Method (ADM) must be transformed to an actionable process model.

To provide an actionable process model the following questions must be answered:

- What are the touch-points with existing Enterprise processes?
- What are the strategy development processes?
- What are the portfolio and program management processes?
- What are the project initiation and management processes?
- What are the budgeting processes?
- What are the operational management processes?
- What are the change management processes?
- What are the governance processes?
- ERM processes?
- How is ADM iteration realized in practice (minimum or first time, by layer)?

What are the Touch-Points with Existing Enterprise Processes?

Enterprise planning, budgeting, operational, and change processes all have connections with the EA Capability. The nature of this connection will depend upon the purpose of the EA Capability identified in Business Objectives for the EA Capability (on page 34).

This paper uses a simple model for considering process integration – all planning and budgeting processes are considered decision-making. Change and operational processes are considered execution processes. This simple model highlights the basic interaction. The type of decision-making and execution process will direct the form of interaction.

In all cases the critical process alignment is to have the EA Capability work products provided before a decision and before the beginning of change execution activity.

Decision-Making Process Integration Model

EA Capability provides advice and illuminates constraints to support the decision-making process of the Enterprise. Advice is usually in the form of trade-off analysis, views, and an architecture roadmap. This advice leads to decisions, usually in the form of approval of a candidate architecture. Constraints are prior decisions, usually in the form of an architecture requirements specification.

Supporting governance activity, the EA Capability provides reporting within the scope of the target architecture on decisions made by the appropriate process. This reporting is used to confirm execution, drive change to the target architecture, or changes to execution.

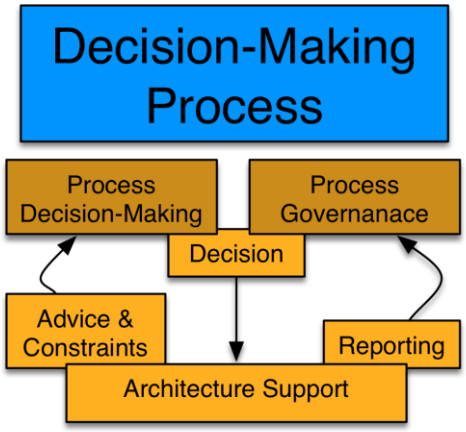

Figure 19: Decision-Making Process Integration

The World-Class Enterprise Architecture White Paper classifies four decision-making processes with which an EA Capability can connect. The nature of this connection will depend upon the purpose of the EA Capability identified in Business Objectives for the EA Capability (on page 34):

- Strategy development
- Portfolio/program planning
- Project planning
- Procurement

Execution Process Integration Model

For execution processes the EA Capability provides advice, direction, and constraints. Direction is provided in the form of what needs to be done – like gaps to be filled and work packages. Constraints are defined in the form of an architecture requirements specifications. Advice in the form of trade-off and compliance recommendations. The set of advice, direction, and constraints is used in the execution of change and operations.

Supporting the governance processes, the EA Capability provides reporting within the scope of the target architecture on changes made by the process. This reporting is used to confirm execution, identify potential need to change the target architecture, or introduce early changes to execution. The reporting is also provided to the appropriate decision-making processes.

The World-Class Enterprise Architecture White Paper classifies four decision-making processes with which an EA Capability can connect. The nature of this connection will depend upon the purpose of the EA Capability identified in Business Objectives for the EA Capability (on page 34):

- Portfolio/program management

- Project execution
- Operational change
- Operations

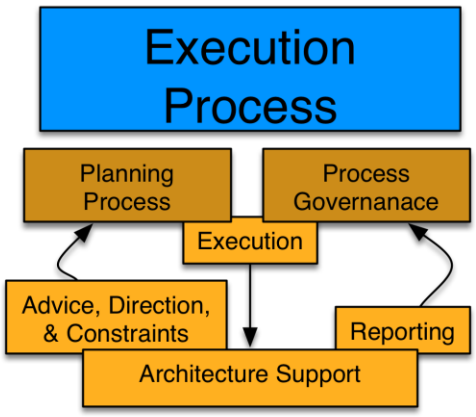

Figure 20: Execution Process Integration

Strategy Development Process

An EA Capability that is chartered to support strategy will be tightly integrated with strategic planning processes. Strategic decision-making tends not to closely follow fixed cycles – this requires the EA Capability to be nimble.

Predictable deliverables will be required before the budget planning process. Supporting the decision-making would be insights into impact of changes to existing initiatives and portfolios, and extension of roadmaps. When the roadmap is extended, identify and recommend key work packages that deliver value.

Supporting governance will be reporting on execution against the roadmap and value realization embedded within the target architecture supported by the roadmap.

Portfolio and Program Management Processes

An EA Capability chartered to support portfolio and program will be tightly integrated with portfolio and program planning and budget cycles. This requires the EA Capability to be working well ahead of the decision-making cycle to ensure that necessary advice is available during and throughout the budget process.

Ad hoc work will be required to support portfolio and program management activity. Central activity is support for ongoing alignment of approach, jockeying the Enterprise roadmap to ensure that all dependency is addressed and synergy maximized.

Governance of the portfolio and program execution is split between ensuring projects deliver on expected work packages and fill necessary gaps, and reporting on success, creating the conditions for value realization.

Project Initiation, Project Management, and Change Management Processes

An EA Capability chartered to support projects must be tightly integrated with the Enterprise's project initiation process and change process. A common problem for Enterprises embarking on EA Capability

initiatives is aligning the EA Capability after project initiation. Performing high-value work after decisions is impossible.

The second challenge is aligning with the change processes at the right level of detail. Many Enterprises have change processes that are variable based upon the scope, objective, and sponsorship of the project. Best practice requires the EA Capability to engage ahead of decisions. Where the EA Capability supports strategy, portfolio, and program there is an additional governance activity. This activity is focused on highlighting misalignment of any change activity with the work packages and roadmap.

Two key elements of advice must be provided before initiation. First, the final definition of the project, or the solution architecture. Second, integration and alignment between projects within the context of their portfolio and program.

Alignment with the project requires a high level of *ad hoc* work to support project initiation and governance activity within a project. Smaller organizations can use a sparser architecture requirements specification and rely on *ad hoc* advice from the EA Capability. This is not an option for a larger team. The larger the organization that performs projects, its geographic distribution and use of third parties to perform change activity, the higher the level of detail required in the architecture requirements specification. The introduction of geographic distribution and third parties requires a far more detailed architecture requirements specification. The time and resource to perform this additional documentation must be built into the project initiation process.

Governance of the project execution is split between ensuring projects deliver on expected work packages and fill necessary gaps, conformance with the architecture requirements specification, and reporting on success creating the conditions for value realization.

Governance activity should be integrated within the project reporting and control scope. Best practice governance requires EA Capability personnel assigned to the project to remain neutral and not report to the project. Performing effective governance requires independence from the pressures of project delivery.

Keep in mind that all change activity, whether a capital project or operational change, needs to be governed by the architecture requirements specification.

Budgeting Processes

Budgeting integration will be a function of the purpose the EA Capability is chartered to support. As always the EA Capability will be operating before decisions with advice and supporting governance. Best practice support requires the EA Capability to deliver the initial version of their advice before the start of any budget conversations.

Operational Management Processes

The EA Capability requires connections with any operational processes that are within the scope of the EA Capability. The primary connection is gathering value realization metrics; for example, is the specified architecture generating the value expected by the stakeholders? This can be a difficult relationship with an operational team when the architecture is specifying a value that does not align with the parochial preferences of an operational team.

A secondary connection is operational change, and ensuring this change aligns with the architecture requirements specification.

Governance Processes

A high-functioning EA Capability is dependent upon engagement with the Enterprise's governance processes. The EA Capability requires engagement at all points in the lifecycle of a target architecture.

Governance is required for both the focus of the EA Capability and the architecture projects undertaken. How you direct and control the focus of the EA Capability is critical to realizing the available value. A high-functioning EA Capability works on the optimal mix of architecture projects.

Approval of the target is one of the most important governance functions. IT-oriented teams routinely create an architecture board that is positioned with a decision-making role on both the target architecture and conformance of change projects. This pattern is unlikely to succeed, unless the EA Capability is restricted to IT functions, and specifically to infrastructure.

At the core of good architecture is the set of preferences expressed by stakeholders. The target architecture must address the optimal set of stakeholder requirements – this optimal set requires trade-off between stakeholder requirements. When the EA Capability is chartered to support strategy and portfolio, the decision-making body to perform the trade-off will constantly face the breadth and variety of cross-domain stakeholder requirements.

The most successful architecture boards work to control the process. A high-functioning architecture board will be structured to confirm that:

1. The EA Capability is working on the highest value architecture projects.
2. The EA Capability addressed the correct stakeholders for a given architecture project.
3. The architecture description, supporting model, views, and architecture requirements specification are internally consistent.
4. The implementation and migration plans conform to the roadmap.
5. The architecture contract associates the gap, work package, and appropriate architecture requirements specification to programs and projects.
6. Conformance reviews are reviewed by appropriate stakeholders.
7. Decisions taken by a stakeholder based upon a non-conformance result in a change to the target architecture or the change initiative's execution approach, or an exception.

One of the most important activities of governance is reporting to appropriate stakeholders. This reporting needs to include:

- Conformance of baseline to target and expected value
- Conformance of implementation and migration plan to roadmap
- Conformance of execution activity to target architecture
- Conformance to architecture principles

Consider using summary reporting with a high visual impact. Below is an example of reporting against architecture principles. The same summary can be used for value, roadmap, and execution activity.

Table 6: Example of Summary Governance Reporting

	Principle 1	Principle 2	Principle 3
Portfolio: Assess the Enterprise within the scope of a portfolio.	Conforms	Violates	Not Applicable
Project: Assess the Enterprise within the scope of a project.	Violates	Not Applicable	Conforms
Component: Assess the components within the baseline architecture.	Not Applicable	Conforms	Violates

Enterprise Risk Management (ERM) Process

A central role of the EA Capability is to facilitate creation of an environment where operational risk can be optimized for maximum business benefit and minimum business loss. This requires close integration with the Enterprise' risk management approach, and an understanding of the scope and interests of ERM. Tight integration with ERM facilitates tilting the EA to improve realization of objectives, and the reduction of uncertainty.

The purpose the EA Capability is chartered to support and the scope of the ERM process will specify the integration. Both EA Capability and ERM are important functions within an Enterprise. The gap between normal practice and what best practice can realize is very wide.

In all cases, the EA Capability needs to test the candidate architecture, roadmap, and value against the ERM. While close interaction with a robust ERM process should be undertaken, Table 7 identifies key areas to test.

Table 7: Key Touch-Points with Enterprise Risk Management (ERM)

	Candidate Architecture	Roadmap	Value Realized
Key Risk Areas	Flags areas of special concern	Flags areas of special concern	Perform more detailed value assessment
Risk Appetite	Aligns with risk appetite	Aligns with risk appetite	Aligns with risk appetite
Business Impact Analysis	Not applicable	Roadmap aligns with & informs impact analysis	Not applicable
Risk Assessment	Performs as appropriate	Performs as appropriate	Value aligns with risk assessment

How is ADM Iteration Realized in Practice?

An often-misunderstood element of the TOGAF framework is actioning the ADM and the concept of iteration. The TOGAF ADM graphic provides a stylized representation that is often interpreted as a linear waterfall. In an effort to demonstrate the flexibility inherent in good practice, diagrams showing levels and fish-ladders up the waterfall have been used. The key point is that the ADM graphic is a stylized representation showing essential information flows and is not a representation of activity sequence.

The important thing to realize is every time your EA Capability is undertaking any roadmap development, it is exercising the steps in the TOGAF ADM Phase E (Opportunities and Solutions). It is expected to consume the mandatory inputs and produce the mandatory outputs. This applies to all ADM phases. Simply don't worry about activity sequence; worry about information inputs and outputs.

Consider this stylized Gantt chart. The inter-dependent nature of EA requires all ADM phases that develop a candidate architecture and test it for acceptance against the stakeholders' requirements to be open simultaneously. They close in order allowing specific elements of supporting domains to be completed. This provides a process-oriented view of ADM iteration.

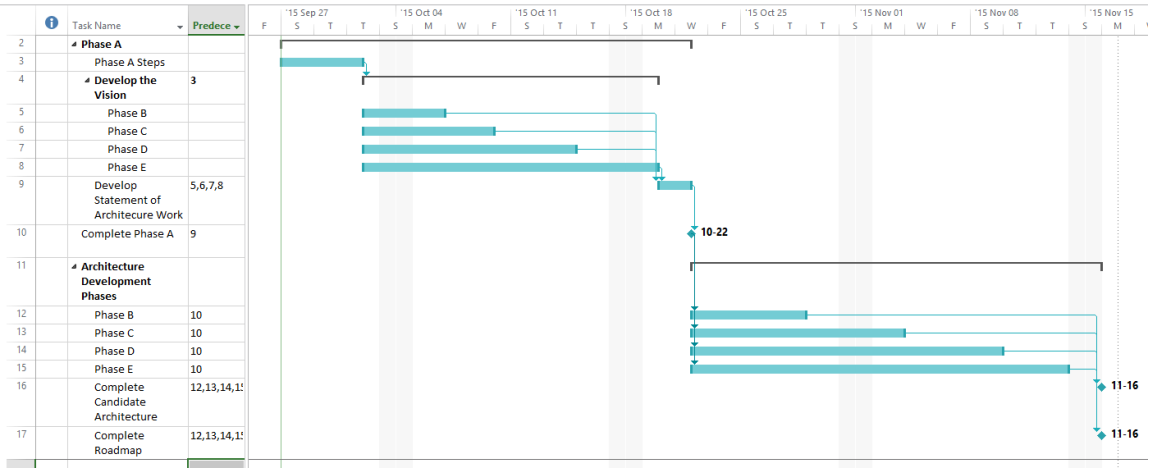

Figure 21: Stylized Architecture Development Gantt Chart

Keep in mind this is a simple stylized example. The real world is always more complex.

The process created is not dependent upon the work your EA Capability undertakes to produce, but upon the timing of completion. The essential question is when an EA Capability must deliver specific work products. Table 8 provides a summary of work products that are actively consumed by key Enterprise processes.

Table 8: Work Product Alignment with Key Processes

Practice Supports	Phase A Work Product: Vision	Phase E Work Product: Candidate Architecture	Roadmap	Phase F Work Product: Architecture Contract & Architecture Requirements Specification	Implementation & Migration Plan	Phase G Work Product: Conformance Assessment	Phase H Work Product: Value Assessment
Strategy	Key deliverable Prior to framing of a strategic planning session Refresh prior to initiation of program budgeting	During strategic planning session Refresh as required in program budgeting	During strategic planning session Refresh as required in program budgeting	Likely not used	Likely not used	Likely not used	Prior to governance review, framing a strategic planning session and program budgeting
Portfolio/ Program	Key deliverable Prior to start of budget planning	Key deliverable Prior to start of budget planning Primary use is stakeholder acceptance of target and definition of gap	Prior to start of budget planning Refresh as required to support budgeting and program mgmt.	Limited use	During portfolio budgeting Refresh as required to support budgeting and program mgmt.	Likely not used	Key deliverable Prior to governance review and program budgeting Refresh as required to support program mgmt.

Practice Supports	Phase A Work Product: Vision	Phase E Work Product: Candidate Architecture	Roadmap	Phase F Work Product: Architecture Contract & Architecture Requirements Specification	Implementation & Migration Plan	Phase G Work Product: Conformance Assessment	Phase H Work Product: Value Assessment
Project	Often not used Activity to produce a vision overlaps with portfolio/ program candidate architecture and roadmap Technique may be used at initiation of business case	Prior to project initiation and finalization of business case Primary use is creation of architecture reqmts. specification	Limited use Can be used as an input to projects with multiple interactive changes	Key deliverable Prior to completion of project initiation	Key deliverable Prior to project start	Key deliverable At key points in project that allows reporting to stake-holders and obtaining decisions for non-con-formance	Limited use Scope of significant architecture change and value often does not cleanly align to projects
Third Party	Limited use Primary use is early in procurement cycle	Prior to engagement of execution partners Primary use is creation of architecture reqmts. specification	Prior to engagement of execution partners Primary use is identification of required change to manage third-party preferences and engagement	Key deliverable Prior to engagement and contracting	No clear pattern of use	Key deliverable At key points in project that allows reporting to stake-holders and obtaining decisions for non-con-formance	Limited use Scope of significant architecture change and value often does not cleanly align to projects

You should use the following checklist to validate completeness of the customized EA method and a framework for related functions in the organization:

- Have we addressed the documentation approach to architecture development, change, and communication?
- Are the operational processes mapped to the strategy?
- Is the process self-healing – that is, can it identify opportunities for improvement and does it have

mechanisms to address them?

- Does the taxonomy support the process catalogs and all possible external stimuli – from regulatory changes to technology changes; social issues to economic conditions; and supplier management to logistics?
- Does the process have sufficient receptors to identify and react to external stimuli?
- When responding to external stimuli, does it have steps to prioritize, sequence, and deliver either updated reference architectures or a new target state?
- What is the level of rigor built into the process to evaluate the alternative candidate architectures as well as execution method?
- How well does the process account for alignment and integration with other processes discussed in this section?
- How does the process provide insights into the progress path to achieve selected target state, course correct, or assure quality?

Part 3: Realizing your EA Capability

Create the EA Capability Roadmap

In State of EA (on page 8) we saw that a key success factor for EA Capability is to create a roadmap. Structured analysis and strategic thinking will result in creation of current state and target state architectures. We also discussed that the time dimension could change several assumptions and result in continuous modification of the target state. A roadmap provides navigational alternatives and a preferred path to achieve the target state from the current state. The preferred path is arrived at by consensus considering the organizational maturity and needs resulting from the gap between current and future state. The process model created using activities in Process Model (on page 74) is a tactical tool whereas the roadmap is a communication tool. The roadmap should help answer:

- What is to be communicated to whom?
- What kind of planning and decisions should be driven?
- How often should it be updated and why?

Activities to Create a Roadmap

In short, we will discuss approaches that will not result in a scenario where such a reasoning may have to be presented for falling short on the objectives. A summary of the approach in no particular order is:

- Create a communication plan with cadence on what to communicate to whom.
- Create a set of metrics, standards, and value proposition documents.
- Create an engagement model with Leaders of each functional unit.
- Build a team.
- Collaborate for technology research, business, and operating model innovations.
- Create a multi-year project plan for three distinct efforts – EA Capability management, project engagement for delivery of solutions, and maturity assessment and quality of EA Capability.
- Manage the interaction with architecture domains (business, data, application, technology, and security).
- Execute on the governance model with tighter alignment with the operating model of the business.

Until now, we have discussed data collection, organizational design, and governance design. In order to deliver value, a structured plan is needed – just like a work breakdown structure. An architecture capability implementation should be treated like any other project. The plan will have milestones, deliverables, and measures. The objective is to have a plan to sell value not metrics, build organizational maturity not just EA Capability, and align with the rhythm of the business.

The next step is to make sure the plan has sub-project plans – as EA Capability is a multi-year initiative. A single plan that spans several years may sound like an operational management plan, but with a set objective, set time period, and cost. One of the common mistakes EA managers make is not realizing that they need a project manager to keep them close to plans, manage change, and ensure quality and timely delivery. The word "roadmap" can also give a sense that we are marching toward a moving target – which is true in a

sense. EA should respond to dynamic changes in the business environment. However, lack of ability to quantify change (the new target due to change in environment) and hence delivering value B instead of A should be trackable and communicated with clarity.

One of the common mistakes to avoid is not creating a dependency matrix of the organization that takes into account Table 6– as it controls the availability of funds to initiate projects or organizational changes; and Table 7 as it defines the effort required to achieve results. Other dependencies are internal to architecture capability – detail of which business process, software and applications architecture, master data (customers, partners, suppliers, inventory, pricing, etc.) are available.

Linking the EA Value Map to the Enterprise Value Map

The value of EA is realized over a period of time – via cost reduction or revenue maximization or both. See the sample value driver document for business (Figure 22) and EA (Figure 23) below. Either a pictorial or verbal description of the value delivered by the EA Capability and the personnel constituting the EA Capability team along a timeline will be handy in creating the plan.

Sir Norman Foster of Foster + Partners says: "Everything we design is a response to a specific climate and culture of a particular place … you design for the present, with an awareness of the past, for a future which is essentially unknown … it is not my place to tell people what to dream of, but a path to realize their dreams". As an EA Capability Leader, a tight engagement is needed with business Leaders to understand, anticipate, and provide a path to deliver on their vision. Create a structure that defines periodic engagement at the strategic level and tactical level – so that plans could be adjusted, and the workload of your team could be balanced or rearranged. Track the depth of engagement and depth of detail, completion of architecture artifacts, and value. Remember that the EA Capability or the value delivery process cannot be completed in one go. Forrester research on EA value summarizes this better:

"Your progress tracker should be able to quantify what is needed (gaps), prescribe where we should be by what timeline, why this prescription is better and how it can be put to practice, and finally how to collaborate with other architects to translate these 'prescription' into reality. Complement these with an innovation and 'get ahead' plan."

It is the communication plan that demonstrates all the detailed work undertaken by the architects. EA value realization communication should follow both the project release and planning horizon cadence. Say, for example, your Enterprise has a quarterly project release schedule and follows January to December for fiscal funding plans, then align your communications so it is exactly between the release dates of the quarter – to communicate cost eliminated and revenue or value increase. Line up the future plan adjustments by at least 30 days before the beginning of the annual planning cycle.

Communicating EA Capability maturity may sound like an academic communication. However, a metric to show the value improvement over the previous communication period would suddenly make the maturity communication more attractive and meaningful. Complement the cadence of business leader engagement by communicating how the maturity of the capability improved the efficiency of the initiatives.

You might have realized that we are talking about two different day jobs for the architects – one to produce the artifacts and another is active engagement with technology and business leaders. It is the reality. Hence, the roadmap should consider the capacity of the team, articulate milestone dates to deliver on the objectives, and define appropriate checks and balances for the EA Capability and the projects it influences.

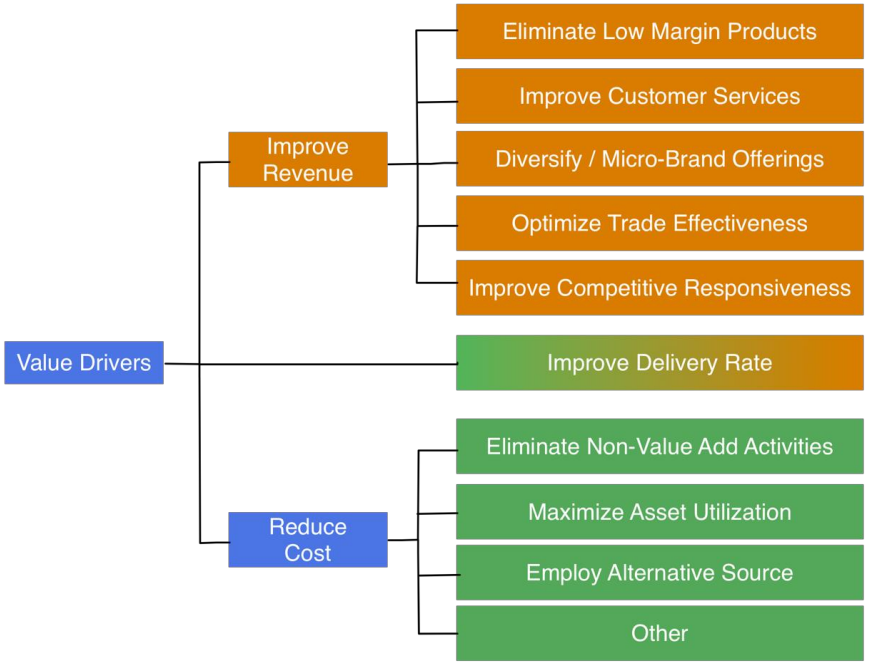

Figure 22: Sample Business Objective Diagram

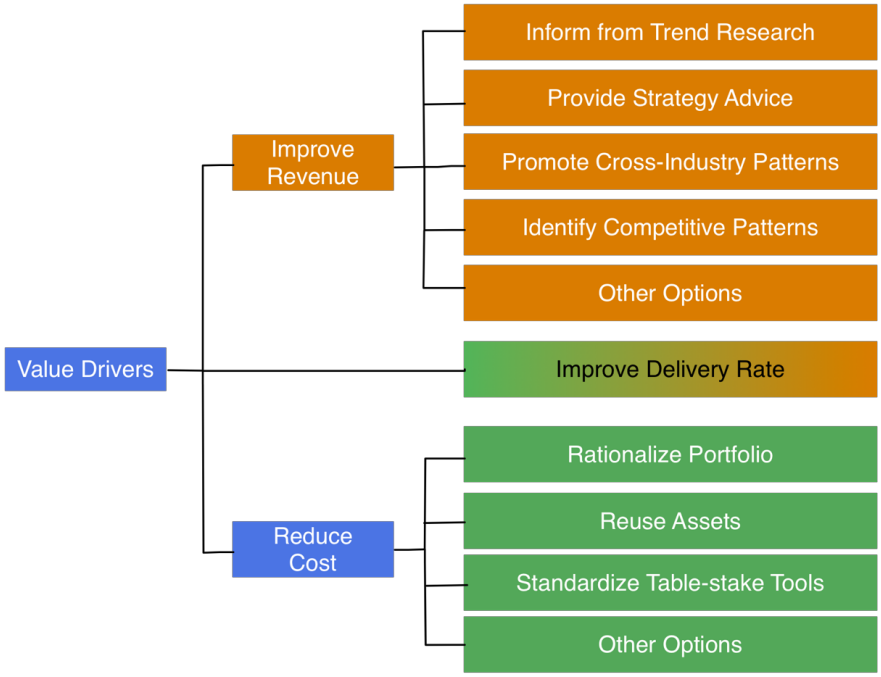

Figure 23: Modified Version of Business Value Diagram to Represent EA Value

A strategic Enterprise roadmap links go-to market strategy milestones to business capability maturity milestones along with its related technology development and learning of personnel involved in the realization of the strategy. It is ideal if the team providing the EA Capability helped create this roadmap and supports all the data behind it. In situations where go-to market and business capability maturity milestones are predefined, having access to this view will inform the EA Capability team to create its roadmap for technology research and delivery.

Other dimensions to address on the roadmap are as follows:

- When each version of gap analysis findings and recommendations will be published.
- When each version of the decision framework along with decision-ready recommendations will be published. It is preferable to align this with the planning horizon and project initiation or ideation cycles.
- EA Capability improvement (recruitment, training, etc.).
- A tactical plan to gain visibility into awareness zones within and outside the Enterprise.
- A plan to acquire the right tools to use for EA.
- A plan to use modern tools to be collaborative and communicative – wikis to tweets.

EA Capability Model

The ratio of projects or resources employed in the Enterprise is normally several magnitudes higher than the capacity of the team providing the EA Capability. In order to replicate key efforts of the team providing the EA Capability, a capability model provides the template with which the EA function can be scaled to cover the entire Enterprise.

While there are some publicly available EA Capability models, such as NASCIO or the World-Class Enterprise Architecture White Paper, none of them can be directly applied to an Enterprise. The context they were developed under never matches an Enterprise, but they provide an excellent foundation. A common challenge is an implicit assumption of purpose, and an over-developed focus on the development of architecture and IT architecture. We recommend using existing capability models in your Enterprise; use the publicly available models as a starting point. Analyze them in terms of your EA Capability context and purpose. An effective analytical technique is using the TOGAF ADM steps as a starting point for capabilities – manage business architecture, manage data architecture, identify architectural opportunities, identify alternate viable options, etc.

Extending the discussion we have had about EA being a cross-discipline function, it is necessary that engagement with functions like HR, marketing, and product research should be called out as a capability – for the EA function and the individual architects. In the earlier sections of this paper we discussed an engagement model with all stakeholders of the EA Capability – including when and how initiatives will be spun off. To complete addressing all aspects for managing EA as a capability, you should:

- Define and measure the team's ability to respond to changes in business environment, based on what has been learnt from collective experience of the team.
- Define practices for planning, developing, collaboration, governing, and managing architecture knowledge for the Enterprise.

- Identity, specify, and rollout an approach to training, infrastructure (tools and equipment), and support needs for the team providing the EA Capability.
- Establish an environment to handle errors, reflect on efforts to improve continuously, and an ability to use data insights for decision-making.

While addressing the above dimensions, care must be taken to balance processes becoming shackles that anchor EA efforts and future-proofing the agility and culture needed to respond to business stimuli. The measurement of success should be about assuring quality of work (providing decision-ready recommendations) with cost optimized processes.

Here are some of the sample models that could help:

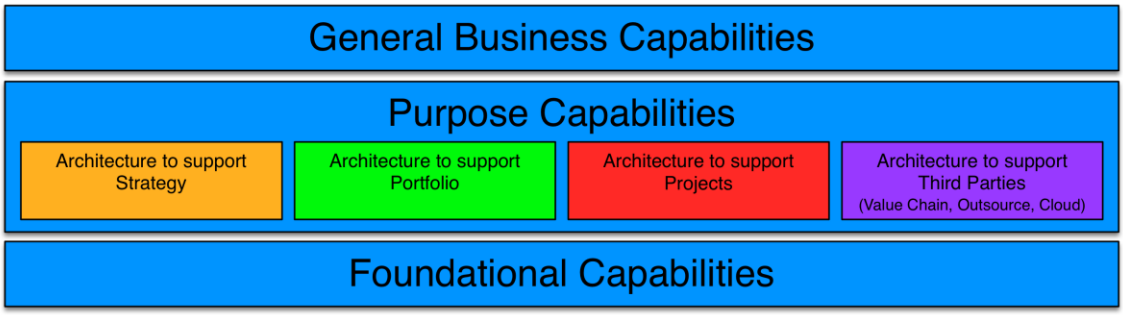

Figure 24: Sample EA Capability Model – I (Derived from World-Class Enterprise Architecture)

This model aligns to purpose. It highlights that the operation capabilities with different purposes are different and separates common foundational capabilities from their purposeful use. It provides a good starting point for examining your EA Capability. The capabilities required to support different purposes are underdeveloped.

Figure 25: Sample EA Capability Model – II

The model shown in Figure 25 aligns to classic architecture domains and development of architecture to support strategy. When applied to a company that manufactures packaging material for food products, "monitor future trends" would mean how to improve the shelf life of products using techniques used by defense services. Inputs from such monitoring could call for changes to business and technology architecture – retooling the plants, scouting for new raw material suppliers, and new processes. Obsolescence of a product can arise from regulatory changes – like a ban on use of plastic bags or CFC-based coolants in air conditioners and refrigerators. In this connected world with distributed sourcing and just-in-time manufacturing, a focus on IT infrastructure is required to track any impacts arising from disruptions in the supply chain.

As you can see from the samples shown here, depending upon the scope defined for your team, the capability model may be biased towards the functional vertical to which the team providing the EA Capability is aligned, or biased towards IT operations. At this point we have not found a strong publicly available EA Capability model. Use the models shown above to create something specific to your Enterprise or scout for a commercial model.

While a capability model makes it easy to establish an approach to measure the efficiency and outcome of the EA efforts, alternative approaches like process control or balanced scorecard are equally effective.

Establishing the EA Capability

By defining the process to implement the EA Capability framework, governance framework, and a roadmap to implement and manage EA initiatives, we have created a blueprint to assure the outcome expected from the team providing the EA Capability. By defining the organization model for the EA Capability team and building the structure to capture and manage architectural contents, the team's ability to execute on the specified course of action (roadmap) is assured as well. It might appear that discussions so far are nuggets of related topics, but a picture of cohesiveness is still blurry. It is better to use proven methods like capability model or value chain model to stitch the pieces together and formulate a management approach.

Capability is a feature or a faculty capable of development; something that has the potential to be used to achieve an outcome. Capabilities communicate what is being done and do not provide any information about where, why, or how something is being done. A capability is a management concept that enables innovative ways to redeploy in new areas of the organization to maximize the "outcomes" enabled by the capability.

An EA Capability team is the collection of people (architects, analysts, etc.) who employ a set of common processes to manage the set of information about the organization to enable achievement of the Enterprise's stated purpose. The EA Capability is the ability to develop, use, and sustain EA.

In this section we will deal with the capability in the context of a management concept that allows for innovative applications and redeployment across the Enterprise.

Recap of Concepts

We discussed generic leadership and management concepts relative to the EA Capability, including the incarnations it could have had in the past. Some of the key takeaways from that discussion were span of control, developing architecture and managing architecture, the relationship of EA with other disciplines within the Enterprise, and, finally, we discussed that it may be necessary to refer to this paper and the TOGAF ADM more than once to deliver the value the team providing the EA Capability promised and to cover the breadth-depth of the Enterprise.

Next we understood the organizational context and the need for EA practice. During this conversation, we differentiated the organizational outcomes and team structure between the Enterprise and the team providing the EA Capability. We walked through a process of identifying key organizational cycles and operating models – annual ceremonies to implementation controls. We also touched upon the concept of assessing the organizational readiness to absorb deliverables from the team providing the EA Capability.

Having gained a knowledge about the organization and its intent to engage in economic activity (values and motivations of business), we discussed the objectives and need for setting up an EA Capability. One of the key principles is to focus on what you need the value delivered to be and iterate the ADM to that extent only. Scope the depth and breadth of the EA work commensurate with time and objectives. We will discuss in Sustaining and Maturing (on page 94) how to leverage your line of sight to expand your span of control, thereby iterating the ADM cycle to keep adding value.

It may be a reality that there are folks in the Enterprise performing development of architecture without carrying appropriate titles or following the career path. Just like following the money to create a forensic map of cash flow and value addition, follow the artifacts to trace where the work gets done and who performs

them. Map the diverse role titles to appropriate architecture domain roles to build your team or the community. We discussed how to think about structuring the EA Capability team, and the capabilities and capacity required to meet the demand. Engage the HR team of your Enterprise to create a career path, irrespective of how the personnel of the EA Capability team are distributed across your Enterprise.

Then we discussed selection, customization, and use of EA and related delivery assurance frameworks. It is important to identify and define the interaction points between product and service delivery strategy to the TOGAF ADM (or the customized architecture method). This can also be evolved as the breadth and depth of the mandate for EA work evolves. Develop the process to link the findings and recommendations from all architecture domains and how to inject them into the overall rhythm of business (planning cycle, funding cycle, and release management cycle). We also discussed the need to have a governance model that balances how the team providing the EA Capability goes about development of architecture artifacts and how it engages with rest of the Enterprise.

Finally, for the data that EA manages, we need a structure, the content framework and content metamodel, and an automation tool. Organizations are highly dynamic with several moving parts. It might appear the opening of an office or physical store is a well-planned, long-drawn process. However, one of the major telecommunications providers in the US has on average 25 store opening and closings each month. Infrastructure management covering network connectivity, coverage, and asset movement are some of the few aspects to think about.

Start with Purpose

In a world of multi-point competition, ease of availability of substitutes, and continuous pressure of quarterly fiscal results, organizations are forced to create waves of revenue models via new products and services or contractual commitments or expansion of customer base.

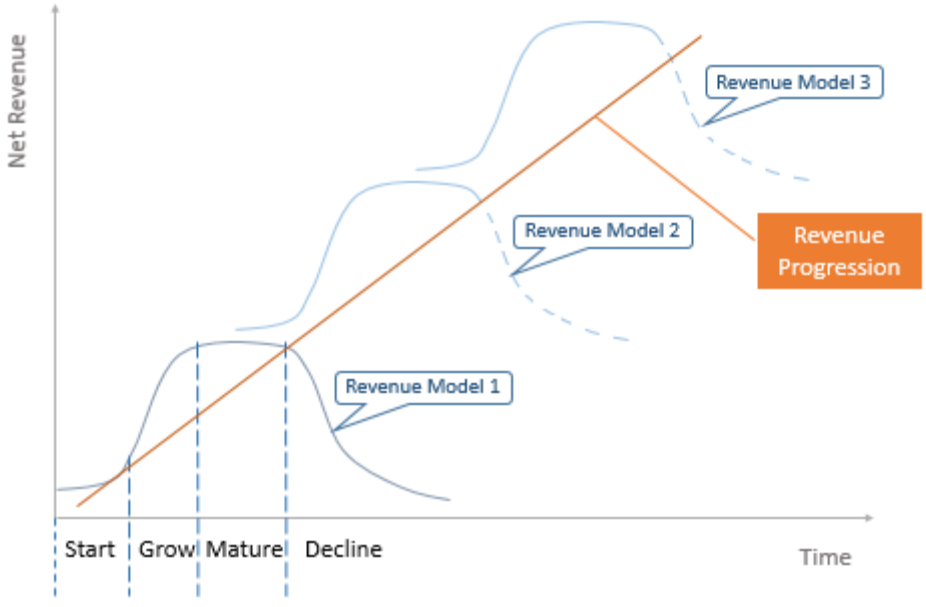

Figure 26: Waves of Revenue Models of an Organization

Based on the alignment of the EA Capability team, the purpose for EA could be cost control, risk optimization, strategy development, or variants of these factors. Even if the charter evolves, expectation to deliver on the primary intent and focus generally does not go away. This assessment and grounding is based on the purpose for which your Enterprise is engaged in the economic activity as well as why the team providing the EA Capability is formed.

Just like your Enterprise identifies new models to generate revenue, suppliers of products and services to your Enterprise also come up with different methods, models, or versions of their products to force changes in the ecosystem. Gartner research publishes a hype-cycle for various themes of technologies and business models each year. Based on the assessment of your Enterprise, you will have to identify and project out when your Enterprise will have to start engagement with these emergent technologies and concepts. *The architecture point of view document* is one of the key artifacts you should consider. It should be grounded on the purpose for which the team providing the EA Capability was created and the progressive maturity outlook you are plotting for the team providing the EA Capability.

Continuously create an assessment of readiness the Enterprise has for adopting EA practices – the next leap of value delivery. This assessment helps the team providing the EA Capability to time the case for expansion of the charter. Ambitions for growth in charter as well as maturity aside, the goal of the technology adoption assessment and evolution of the revenue model is to ensure that the team providing the EA Capability stays relevant and current with the ecosystem and business needs.

Trusted Advisor and Instigator of Change

One of the key advantages an Enterprise Architect has is the ability to look at the system under discussion without any bias to technology and time as well as from the views of executive to implementer; customer to support personnel; and security or compliance officer to developer. When an Enterprise Architect presents a balanced view, supported with rationale addressing future needs, trade-off conditions applied, accounting for culture of the company, teams generally gravitate towards common goals setting aside emotional favorites. Stakeholders invariably want this insight from the Enterprise Architects to validate that they are on the right path or to fail fast and course correct with least sunk cost. The expectation is also that the Enterprise Architect provides an honest impact assessment and risk mitigation alternatives. From experience, the authors have found that raising what could normally be perceived as the most uncomfortable set of questions instigates a chain of positive changes in the Enterprise.

Most of the organizations today are not starting a blue ocean project. Several initiatives are the n+1th initiative to solve a business problem. In such scenarios, when solution alternative evaluation or solution development efforts begin, modern lean methodologies do not lend themselves to view the broader context of the Enterprise. An Enterprise Architect understands inter-dependencies within and outside the Enterprise and can guide the teams to create appropriate points of isolation. Gartner alludes to the fact that an EA team should communicate clearly and continuously the shared vision for the Enterprise and how all stakeholder groups are coming together behind that vision. Moving the focus of the vision from the typical inside-out view to an outside-in view elevates the thinking of key decision-makers. Instilling the thinking for points of isolation to manage change and to manage rapid response to market dynamics brings trust in the people, and hence, the team providing the EA Capability.

EA Capability teams that land key organizational transformations are statistically more successful than teams that focuses on standards, reference architectures, processes, and governance structures. Such a demand at times has caused scale issues for the team providing the EA Capability. Well thought out plans to franchise

some of the typical work the team providing the EA Capability performs, like impact assessment questions and trade-off considerations, have worked well.

When engagement opportunities to land organizational changes or to franchise are not directly available, development and publication of point of view documents has proved to be a successful technique to influence change. Monitoring and assessing which point of views get read and by whom presents the stakeholder interest. Tracking the changes those stakeholders initiate results in peer-level acceptance – communicate and share the credits of initiatives to establish the team as agents of change.

Change Management

As the business dynamics change, organizations undergo change – informed by the team providing the EA Capability or otherwise. It is necessary for the EA Capability team to track changes in the external ecosystem and create point of view documents. In order to sustain and grow the EA Capability, the Leader prepares the decision-makers to plan for a transformation to keep the Enterprise abreast or ahead of ecosystem changes. Some transformations may require a change in operating model and some just an alteration in product mix. The range of coverage in the point of view documents includes changes in operating model, technology adoption, nature of services offered, or trade-off criteria to mitigate and reduce risk. Key information the EA Leader should provide to the decision is about the moment in time when a hype becomes necessity or cost of adoption and risk of failure are balanced appropriately.

The trend since the millennium is increased complexity of products and services that require specialized skills that uniquely differentiate from potential current and future competitors. Also, several of the products and services are developed with deep collaboration with niche partners. The cost of collaboration has been falling and diversity of service providers has been growing. Organizations have been shrinking the core and expanding at the edges. In such an era, success factor and competence drives the strategy based on how well the set of activities performed by the Enterprise dovetails with each other. When EA creates an Enterprise map – that has the depth of capabilities, processes, technologies, training, investment flows – operational fit across teams, themes of strategy realization come to light. Once again, just like the advice provided to business, create a need for change document for the EA Capability – that is updated periodically.

In general Enterprise plans do not question the assumptions made for an effort nor do they justify clearly why something has to be done now. Most of the business cases are based on the affordability of the Enterprise to spend its resources. EA roadmaps present the reason for something to be done and present the alternatives – each with implications – tracing assumptions to predictive outcomes. In this approach, ease of change, validating change as time passes, and an assessment of "what the end looks like" can be painted clearly to guide organizational, product, or process change. For each of the scenarios presented, it is good to have an action plan – training to practice; concept to delivery; and promotion to support. Owing to the organizational alignment of the team providing the EA Capability, EA may be uniquely positioned to present the end game as well as paint the path to achieve success.

Sustaining and Maturing

Let us address the capacity to execute against the challenges or demands the team providing the EA Capability is likely to face. For an IT-centric team, the challenges are going to be pivoted on CIO priorities – reducing cost of operations, agility to meet the business needs, keeping the ecosystem current with technological updates, and the like. For a function-centric EA, focus would be on appropriate business and

process architecture, technology sourcing, cost of operations, etc. For a strategy-centric EA Capability, enablement of sustainable strategic advantage, leveraging technology as a business accelerator, balancing inside-out and outside-in perspectives, etc. Irrespective of the nature of alignment, there is clear mix of styles in thinking and execution is foundational, and those are: star gazers, anthropologists, and planners.

The styles of these people complement the Enterprise capabilities at strategic (executive engagement), value addition (managing composition of the Enterprise), and coordination (common services). As one of the former CEOs of Shell Oil puts it: "people are the difference". EA – as much as it is about business strategy and technology business – is a people business. In order to grow the capability, as a Leader you need to be grounded on the people engagement. It is the responsibility of the Leader to keep these three styles and people pegged on a set of common principles and beliefs, namely: connectedness, inclusivity, and relevance.

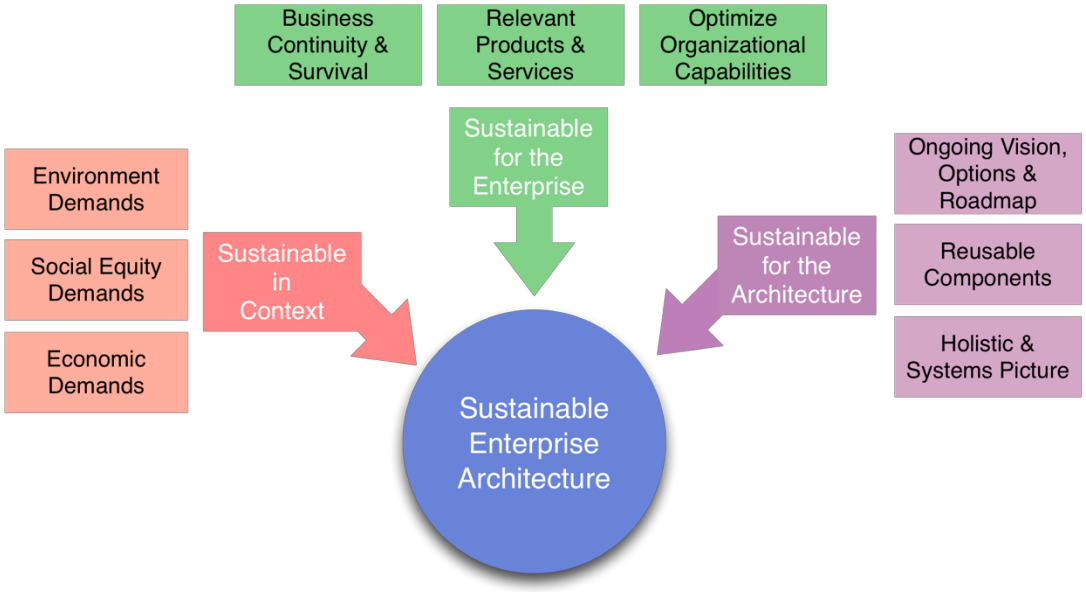

Figure 27: Sustainable EA – Adapted from United Nations EA Guide

How to Persuade the Value to Internal Stakeholders and Keep them Engaged?

A team providing the EA Capability with adequate sponsorship has no cost of acquiring new engagements. The challenge is that the buyer base of the EA Capability is predefined – unless the Enterprise decides to broaden its footprint. In this case, the focus should be all about retention and repeat business from the same set of customers. Several techniques can be employed from the public relations and project management playbook to achieve this. Measure quantitatively and qualitatively to communicate every small improvement and value addition the EA Capability team has delivered in terms that are close to the primary and secondary consumer of the EA services. In order to sustain EA Capability, you need to focus on why, when, and how EA activities are performed and how the output produced by the team providing the EA Capability is being consumed and by whom.

When the sponsorship is challenging, the focus should be on soft-selling, like communicating the need to subscribe to a retirement plan or insurance plan. There is heavy cost on acquiring sponsors. In a reboot scenario, the cost is multifold higher.

In EA, there is no right, wrong, or singularity of approach. EA forces itself and its consumers to think of trade-offs almost always; it forces them to look at data to help navigate the chaos. What it achieves is removing the bias for repeatable process and cost optimization, over considerations for viable alternatives. The change in organizational leadership thinking is an example of qualitative value addition. All architects in the team should think of developing a set of trade-off criteria that is current with the strategic and operational challenges. Gartner says providing decision-ready alternatives should be one of the operating principles of the team providing the EA Capability.

Depending on the organizational culture, question a few basic premises:

- What kind of financial control should the team providing the EA Capability have? There are differences in views – from managing just EA's operational cost (or considering the team providing the EA Capability as capital expense) to sponsoring technology research effort, all the way to validating every initiative for relevance and alignment to organizational goals.
- Should governance be used as a feedback mechanism for both architecture output and project conformance?
- Even though it is suggested earlier in this paper to use the TOGAF ADM to the extent that immediate value can be realized and iterated from there, is it the right approach, given the culture of the Enterprise?
- Given the internal and external forces, should the EA operating model be target architecture and target operating model-driven?
- Should the planning be based on capabilities or process efficiencies and differentiation offered to customers?
- Depending on the charging model in the Enterprise, what is the extent to which each of the project execution teams can be taxed for EA engagement?

One of the necessary periodic exercises to move the focus of the Enterprise and the team providing the EA Capability from rigor of documentation and static analysis to operational and strategic business outcomes, results in sustaining the EA effort.

Building Community and Mentoring

There are a few things in the Enterprise that are everybody's business – customer-centricity, quality-centricity, and EA. Every manager or product developer's decision has an impact on the goals of the Enterprise. Procuring services or products from a supplier introduces friction between objectives and the operating model of your Enterprise and that of the service provider. In addition to the risk of engaging in an economic activity, the Enterprise is now compounding its risk factors. Given the premise that EA is to reduce the impact of risk, this scenario needs additional attention.

Spreading the knowledge and practice of EA and analysis as relevant to your Enterprise's culture and environment drives alignment on outcomes. As the TOGAF ADM cycle is explored in iterations to achieve maturity, develop a playbook to replicate the success with new sets of players, not directly under the team providing the EA Capability's control. Success and sustainability of the team providing the EA Capability is determined by the belief of the next generation of personnel in the EA Capability team – your mentees and that of your sponsor.

That brings us to mentoring. Mentoring is one of the techniques to employ to achieve maturity and replication of EA efforts in other parts of the Enterprise. Being a trusted advisor is a form of mentoring. Care must be taken to differentiate grooming budding architects and coaching organizational Leaders. It is likely that architecture work happens in different parts of the Enterprise, with folks not carrying the title of an architect as well as external to the Enterprise. Develop deep and continuous engagement with such enthusiasts. Identify what aspects of the architecture work would become differentiators and intellectual property of your Enterprise. Promote the differentiators and those who are developing and curating those assets. This is also mentoring.

Identify the annual training cycles or online courses that your Enterprise employs to build talent. Build targeted 20 to 30-minute talks on specific topics to create a pipeline of learning and, depending on the size of the Enterprise, augment with periodic architecture summits. Another approach is consideration for individuals going through technical specialist or architect certifications. Gaining a familiarity or certification in a methodology should not be mistaken for conversance or thought leadership in architecture development.

Tools and Techniques

In simple terms, create a standard operating procedure and execution process for the EA Capability. Tools without interoperability or seamless integration leave room for manual efforts and out-of-sync versions. Out-of-sync versions result in effort cleansing the information instead of effort delivering insights and intelligence.

Take care to differentiate a project document repository and an Enterprise repository. EA artifacts and project artifacts feed each other. Any tool or process that requires part of the work to be recreated in different tools will lead to failure of adoption.

Categories of documents and repositories to consider are:

- Diagram and visualizing tools for architecture
- Diagram and visualizing tools for solution and technology design
- Standards catalog (industry, business domain, Enterprise) and look-up tool to understand the details of the standard
- Readiness and maturity assessment and progression management
- Roadmap management tools, potentially with time series analysis capability

Part 4: Mapping to the TOGAF Framework

Mapping the EA Leader's Approach to the TOGAF Framework

The EA Leader's approach described in this White Paper can be mapped to two central elements in the TOGAF framework: the Architecture Development Method (ADM) and the TOGAF Content Framework.

The activity described in this paper is derived from a customized journey through the TOGAF ADM. This approach provides a practical example of iteration, answering the correct question at the right level of detail in order to inform the next question and decision.

The answers to the questions represent information that may be aligned with the contents of the TOGAF Content Framework and Content Metamodel, which is a subset of the Content Framework. How this information is rendered is dependent upon how you have structured your approach to information management in your EA Capability.

High functioning teams will take a more rigorous approach to information management (EA content framework) and employ a more formal architecture description discipline (EA content metamodel). For more detail see Information Managed by the EA Capability (on page 55).

Mapping the EA Leader's Approach to TOGAF ADM Phases

Table 9: Activity and Key Deliverables

Topic	Mapping to TOGAF ADM Phase
Enterprise Context and EA Context (see page 18)	Partial Strategic Level Phase B Enterprise context: • Goals, objectives, initiatives, competitive and tactic analysis • Operating model (partners, suppliers, etc.) • Explore what-if scenarios and scorecards EA context specific for the EA Capability: • Goals
Business Objectives for the EA Capability (see page 34)	Capability Level Phase A For the EA Capability: • Provide initial goals and objectives • Select a reference EA Capability and maturity model • Candidate EA Capability • Candidate operating model • EA Capability gap and priority roadmap

Topic	Mapping to TOGAF ADM Phase
Architecture Governance (see page 43)	Partial Segment/Capability Level Phase B For the Enterprise: • Enterprise Risk Management Model • Governance Model For the EA Capability: • Risk Management Model • Governance Model • Extend candidate operating model to include EA governance • Initial Architecture Partition Model • Trace to EA Capability goals
Alignment with Other Frameworks (see page 50)	Partial Capability Level Phase B & Partial Phase C (Data) For the Enterprise: • Reference models for key frameworks • Capability assessment of key frameworks For the EA Capability: • Framework touch-points • Extend candidate operating model to include other frameworks • Extend EA governance and EA risk management • Initial EA content framework aligned to other frameworks and EA governance • Candidate architecture partition model • Trace to EA Capability goals • EA Capability and key framework gap and priority roadmap
Customization of Architecture Contents and Metamodel (see page 52)	Capability Level Phase C (Data) For the EA Capability: • EA Content Framework • EA Content Metamodel • Viewpoint Library • Architecture Repository Model • Trace to EA Capability goals • Initial EA content framework and architecture repository gap
Organization Model for the EA Team (see page 59)	Partial Capability Level Phase B For the EA Capability: • EA organizational model • Select reference EA skills framework • Initial alignment with Enterprise job titles and roles • Initial accountability matrix for EA Content Framework and initial architecture repository • Organizational gap and priority roadmap

Topic	Mapping to TOGAF ADM Phase
Process Model (see page 74)	Partial Capability Level Phase B Capability Level Phase C (App) and Capability Level Phase D For the Enterprise: • Process model highlighting touch-points between EA Capability and Enterprise processes the EA Capability supports[20] • Performance matrix for key processes and organization • Accountability matrix for EA Content Framework and organization For the EA Capability: • Process model • Architecture repository application model • Matrix for EA Content Framework and architecture repository application architecture • Process and architecture repository gap and priority roadmap
Create the EA Capability Roadmap (see page 85)	Capability Level Phase E Create a roadmap highlighting development of the EA Capability by changes in the: • Organizational model • Process model • EA Content Framework • Architecture repository For the EA Capability: • Trace roadmap to EA Capability goals
Establishing the EA Capability (see page 91)	Capability Level Phase F and Capability Level Phase G For the Enterprise: • Transition the EA Capability Roadmap to an Implementation & Migration Plan For the EA Capability: • Execute the Implementation & Migration Plan to build the EA Capability your Enterprise desires

[20] While this has been stressed in the paper, align to processes the EA Capability is expected to support based upon its purpose. Do not align to those it could support. Worst practice is to fret over linkage to processes the EA Capability *could* support.

Mapping EA Content, EA Leader's Approach, and Metamodel

None of the questions or concerns raised in this paper are purely technical or isolated to a single field or dimension. There is a need for several frameworks and best practices that should play together. Customizing and building a model/framework that is conducive to your Enterprise's environment, roles, and responsibilities is the key to success.

Based on the activities discussed in this paper, here is a sample mapping of information and where it maps to the generic TOGAF Content Metamodel.

Table 10: Mapping to TOGAF 9 Content Metamodel

Topic	Content	TOGAF Content Metamodel Grouping
Enterprise Context and EA Context (see page 18)	Goals, strategies, objectives, Initiatives, success measures Plans (business, strategy, workforce, cash flow, etc.) Competitive and tactic analysis, operating model, what-if scenarios, scorecards Locations, partners, suppliers, etc.	Business Architecture Portfolio Management Project Management Financial Management
Business Objectives for the EA Capability (see page 34)	Strategies, objectives, initiatives, success measures	EA Capability and Maturity Model
Scoping the Depth and Breadth of Business Impact with the EA Capability	Process diagrams and models, service and servicing models, portfolio and investments, demand/need descriptions People, skills, organizational charts	Business Architecture EA Capability and Maturity Model Reference Architectures and Standards
Business Objectives for the EA Capability (see page 34) Alignment with Other Frameworks (see page 50) Organization Model for the EA Team (see page 59) Process Model (see page 74)	People, skills, organizational charts Customer interaction options, types/modes, tools, demands, security/privacy management plans, operational continuity plans Information system data – requirements, applications, tools, solutions, defects, methods/methodology Geospatial data IT networks and their connectivity/interaction maps, etc.	EA Capability and Maturity Model Requirement Management Operating Models Change Management Maturity Management Information Technology Lifecycle Management
Architecture Governance (see page 43) Process Model (see page 74)	Knowledge management plans, information exchange matrix, events and interactions list, roles, responsibilities, escalation plans	Risk Management Governance Model

Part 5: Appendices

Appendix A: Partial List of EA Frameworks

Table 11 provides a list of alternative EA content frameworks. Specific mapping papers exist between the TOGAF standard and BIAN, DoDAF, Frameworx, and SABSA (see References).

Table 11: List of EA Content Frameworks

Framework	Framework Description
AGATE	The France DGA Architecture Framework
BIAN	Banking Industry Architecture Network
Deloitte EAF	Deloitte Consulting Enterprise Architecture Framework
DNDAF	The Department of National Defence Architecture Framework (Canada)
DoDAF	The US Department of Defense Architecture Framework
FDIC-EAF	FDIC Enterprise Architecture Framework (US)
FEAF	Federal Enterprise Architecture Framework (US)
Frameworx	TM Forum
GEA	Government Enterprise Architecture – Queensland Government
MoDAF	The UK Ministry of Defense Architecture Framework
NAF	The NATO Architecture Framework
Navigate	Conexiam Enterprise Architecture Content Framework
NIST EA	NIST Enterprise Architecture framework (US)
NORA	Nederlandse Overheid Referentie Architectuur (The Netherlands)
OBASHI	The OBASHI Business & IT Methodology and Framework
OEAF	Oracle Enterprise Architecture Framework
PEAF	Pragmatic Enterprise Architecture Framework
PERA	Purdue Enterprise Reference Architecture Framework
SABSA	The SABSA Institute Enterprise Security Architecture
TEAF	Treasury Enterprise Architecture Framework (US)
UAF	United Architecture Framework (replacement for UPDM)
UPDM	United Profile for DoDAF and MoDAF
Zachman	Zachman Framework

Appendix B: Maturity Models

Note that most maturity models use the term "maturity" to measure the ability of an organization to control change of a capability or process; common usage associates maturity with quality of delivery. We recommend you are very clear on your usage and objective when referencing a maturity model.

- US Department of Commerce (DoC) has developed an IT Architecture Capability Maturity Model (ACMM) to aid in conducting internal assessments.
- Software Engineering Institute (SEI) Capability Maturity Model (CMM); refer to: http://cmmiinstitute.com/.
- US Government's Office of the CIO Maturity Models; refer to: http://ocio.os.doc.gov/s/groups/public/@doc/@os/@ocio/@oitpp/documents/content/prod01_002340.pdf and http://ocio.os.doc.gov/ITPolicyandPrograms/Enterprise_Architecture/PROD01_004935.
- National Association of State Chief Information Officers (NASCIO) EA Maturity Model; refer to: www.nascio.org/publications/documents/nascio-eamm.pdf.
- Innovation Value Institute; refer to: http://ivi.nuim.ie/understanding-it-cmf and http://ivi.nuim.ie/service-management-capability-assessment.
- US Government Office of Management and Budget's Enterprise Architecture Assessment Framework; refer to: www.whitehouse.gov/omb/e-gov/eaaf/.

Appendix C: Suggested Reading

- Cuypers Ataya: Enterprise Value: Governance of IT Investments, The Business Case, IT Governance Institute, 2006.
- Curtis R. Carlson, William W. Wilmot: Innovation: The Five Disciplines for Creating What Customers Want, Crown Business, 2006.
- J. Carver, M. Carver: A Carver Policy Governance Guide, Ends and the Ownership: Volume 2, J-B Carver Board Governance Series.
- Robert B. Cialdini: The Science of Persuasion, Scientific American Mind, Vol. 14, Issue 1, January 1, 2004.
- Wayne Eckerson: Performance Dashboards: Measuring, Monitoring, and Managing your Business, Wiley, 2005.
- Gartner: Key Concepts in IT Financial Management: Funding, Costing, Pricing, and Chargeback, April 2012.
- Oliver Gassmann, Karolin Frankenbergerm Micheala Csik: The St. Gallen Business Model Navigator, University of St. Gallen, 2012.
- Raymond Green: Beyond Financial Literacy: The Importance of Business Acumen Training for Managers and Employees, Paradigm Learning, 2009; refer to: www.paradigmlearning.com/documents/WP_Business%20Acumen.pdf.
- John Hagel III: Out of the Box: Strategies for Achieving Profits Today and Growth Tomorrow through Web Services, Harvard Business School Press, 2002.
- D. Hambrick, J. Fredrickson: Are you Sure you have a Strategy? The Academy of Management Executive; November 2001, 15, 4; ABI/INFORM Global.
- Robert S. Kaplan, David P. Norton: Having Trouble with your Strategy? Then Map It, Harvard Business Review, September 2000; refer to: http://harvardbusinessonline.hbsp.harvard.edu/b02/en/common/item_detail.jhtml?id=5165.
- Robert S. Kaplan, David P. Norton: Strategy Maps: Converting Intangible Assets into Tangible Outcomes, Harvard Business School Press, Boston, 2004.
- Robert S. Kaplan, David P. Norton: The Balanced Scorecard: Translating Strategy into Action, Harvard Business School Press, Boston, 1996.
- Robert S. Kaplan, David P. Norton: The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment, Harvard Business School Press, Boston, 2011.
- Nigel Kendall, Arthur Kendall: Applied Corporate Governance; refer to: www.applied-corporate-governance.com/definition-of-corporate-governance.html.
- Chan W. Kim, Renée Mauborgne: Blue Ocean Strategy: How to Create Uncontested Marketspace and

Make the Competition Irrelevant, Harvard Business School Press, 2005; refer to: www.amazon.com/Blue-Ocean-Strategy-Uncontested-Competition/dp/1591396190.

- Mart Rovers: Framework for IT Management, 2006; refer to: www.itsmf-houston.org/Meeting_2006-08-30/Frameworks-for-IT-Management_by-InterProm-USA.pdf.
- R.A. Mashelkar: The Gandhian Engineering; refer to: www.worldacademy.org/files/Gandhian%20Engineering%20by%20RA%20Mashelkar.pdf.
- Henry Mintzberg: Managing, Berrett-Koehler Publishers, 2011.
- H. Mintzberg, J. Lampel, B. Ahlstrand: Strategy Safari: A Guided Tour through the Wilds of Strategic Management, 2005.
- H. Mintzberg, R. Molz, E. Raufflet, P. Sloan, C. Abdallah, R. Bercuvitz, C.H. Tzeng: The Invisible World of Association, Leader to Leader, pp.37-45, 2005.
- Henry Mintzberg: http://www.mintzberg.org/books/structuring-organizations-synthesis-research.
- Cynthia Montgomery: Putting Leadership Back into Strategy, Harvard Business Review, January 2008.
- Richard Nolan, Warren F. McFarlan: Information Technology and the Board of Directors, Harvard Business Review, October 2005.
- M.E. Porter: The Competitive Advantage: Creating and Sustaining Superior Performance, NY, Free Press, 1985 (republished with a new introduction, 1998); refer to: www.hbs.edu/faculty/product/193.
- Eric Ries: The Lean Startup: How Today's Entrepreneurs use Continuous Innovation to Create Radically Successful Businesses, p.103, Crown Publishing, 2014.
- E.M. Rogers: Diffusion of Innovations, New York Free Press, 1962.
- Jaap Schekkerman: Enterprise Architecture Validation, White Paper; refer to: www.serc.nl/lac/2003/papers/EnterpriseArchitectureValidationFullversion.pdf.
- Stephen H. Spewak: Enterprise Architecture Planning: Developing a Blueprint for Data, Applications, and Technology, QED Publishing Group, 1993.
  A 2002 presentation by Spewak on Enterprise Architecture planning can be found at: http://apps.adcom.uci.edu/EnterpriseArch/PresentationsConferences/EAWorkshop12172002.ppt.
- Peter Swartz: The Art of the Long View: Planning for the Future in an Uncertain World, Currency Doubleday, 1996.
- Mike Turner: Practical Project Delivery, Project Management Office (PMO) webcast series; refer to: www.brightwork.com/webcasts/pmo_series.htm.
- Simon Wardley Blog; refer to: http://blog.gardeviance.org/2015/09/somethings-are-different-some-remain.html.
- Peter Weill, Jeanne W. Ross: IT Governance: How Top Performers Manage IT Decision Rights for Superior Results, Harvard Business School Press, 2004.
- World-Class EA: Business Reference Model, White Paper (W146), May 2014, published by The Open

Group; refer to: www.opengroup.org/bookstore/catalog/w146.htm.

- Kees van der Heijden: Scenarios: The Art of Strategic Conversation, 2nd Edition, Wiley, 2005.

References

The following documents are referenced directly in various sections of this paper or the concepts discussed in this paper are derived from these works.

Note: The web links mentioned below are good at the time of writing but cannot be guaranteed for the future.

- Eric Brynjolfsson, Andrew McAfee: The Second Machine Age; refer to: http://secondmachineage.com.
- Burke and Litwin: A Causal Model of Organization Performance and Change, Journal of Management, Vol. 18, No. 3, pp 523-545, 1992.
- John Carver: Reinventing your Board: A Step-by-Step Guide to Implementing Policy Governance, Jossey-Bass, 2006.
- Arie De Geus: The Living Company; refer to: https://hbr.org/1997/03/the-living-company.
- Enterprise Architecture – Critical to Large Transformation Programs, Suyog Mahendra Shah, AEA Journal, December, 2011.
- Enterprise Transformation – An Architecture-Based Approach, William B. Rouse, The Open Group Conference, January 2012.
- Exploring Synergies between TOGAF® and Frameworx, White Paper (W114), May 2011, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/w114.htm.
- Len Fehskens: Re-thinking Architecture; refer to: http://is.gd/g55wp.
- Jay R. Galbraith: Organization Design, Reading MA, Addison-Wesley, 1977.
- Kevlin Henney: 97 Things Every Programmer Should Know, O'Reilly, 2010.
- Integrating Risk and Security within a TOGAF® Enterprise Architecture, Open Group Guide (G152), January 2016, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/g152.htm.
- Integrating the TOGAF® Standard with the BIAN Service Landscape, White Paper (W135), October 2013, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/w135.htm.
- ISO 31000: Risk Management; refer to: www.iso.org/iso/home/standards/iso31000.htm.
- ISO/IEC 7498-1:1994: Information Technology – Open Systems Interconnection – Basic Reference Model: The Basic Model; refer to: www.iso.org/iso/catalogue_detail.htm?csnumber=20269.
- ISO/IEC 38500:2015: Information Technology – Governance of IT for the Organization; refer to: www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=62816.
- Robert S. Kaplan, David P. Norton: The Balanced Scorecard – Measures that Drive Performance, Harvard Business Review, pp.71-79, January-February 1992.
- James Lapalme: Three Schools of Thought on Enterprise Architecture, IT Professional, Vol.14, No. 6, pp.37-43, November-December 2012.

- Henry Mintzberg: The Structuring of Organizations, Prentice Hall, January, 1979; refer to: www.mintzberg.org/books/structuring-organizations-synthesis-research.
- Ramani Naidoo: Corporate Governance: An Essential Guide for South African Companies, April 2007.
- Alexander Osterwalder: The Business Model Canvas; refer to: http://businessmodelalchemist.com/blog/2005/11/what-is-business-model.html.
- Michael E. Porter: How Competitive Forces Shape Strategy, Harvard Business Review 57, No. 2, March-April, 1979, pp.137-145; refer to: www.hbs.edu/faculty/Pages/item.aspx?num=10692.
- C.K. Prahalad, Allen Hammond, Stuart L. Hart: The Core Competencies; refer to: https://hbr.org/1990/05/the-core-competence-of-the-corporation/ar/1.
- C.K. Prahalad, Stuart L. Hart: The Fortune at the Bottom of the Pyramid; refer to: www.strategy-business.com/article/11518.
- Jeanne W. Ross, Peter Weill, David C. Robertson: Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, Harvard Business School Press, 2006.
- SOA Reference Architecture, Open Group Standard (C119), December 2011, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/c119.htm.
- The Future and How to Think About It, Performance and Innovation Unit (PIU) Report, UK Government, 1999.
- TOGAF® 9 and DoDAF 2.0, White Paper (W105), July 2010, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/w105.htm.
- TOGAF® and SABSA® Integration, White Paper (W117), October 2011, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/w117.htm.
- TOGAF® Version 9.1, an Open Group Standard (G116), December 2011, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/g116.htm.
- Martin van den Berg, Marlies van Steenbergen: Building an Enterprise Architecture Practice: Tools, Tips, Best Practices, Ready-to-Use Insights, The Enterprise Series, ISBN:1402056052.
- Marvin R. Weisbord: Organizational Diagnosis: Six Places to Look for Trouble With or Without a Theory, Group & Organization Studies 1, 4, pp.430-447, December 1976.
- Dean L. Wilde II, Arnoldo C. Hax: The Delta Model; refer to: http://sloanreview.mit.edu/article/the-delta-model-adaptive-management-for-a-changing-world/.
- World-Class Enterprise Architecture, White Paper (W102), April 2010, published by The Open Group; refer to: www.opengroup.org/bookstore/catalog/w102.htm.

About the Authors

Sriram Sabesan, Conexiam

Sriram Sabesan is an Open Group Certified Distinguished Architect. Based in North America, he specializes in technology, manufacturing, telecommunication, and financial services industries. Sriram helps clients to develop and execute strategies in response to digital or economic disruptions. He is actively involved in development of different Open Group standards.

Dave Hornford, Conexiam

Dave Hornford is the former Chair of The Open Group Architecture Forum. He is a key developer of Conexiam's Navigate Roadmap Atlas and was a key contributor to the TOGAF 9 standard. Dave serves on the board of trustees of The SABSA Institute. Based in North America, he leads Conexiam's Boston practice and works in a variety of industries including financial services, oil and gas, and capital-intensive industry. Typically, he helps clients develop and execute a roadmap to transform.

Samantha Toder, Conexiam

Samantha Toder is an Enterprise Architect and ABACUS Certified Architect and Designer, who is actively involved in shaping the next version of the TOGAF standard. Sam is a member of Conexiam's Boston practice and is based in the US. She helps clients to develop in-house EA Capability and execute complex transformation programs in the financial services industry.

Ken Street, Conexiam

Ken Street is the current Vice-Chair of the Big Data project and is active within The Open Group IT4IT™ and Open Platform 3.0™ Forums. Based in Canada, he lead's Conexiam's Governance and Big Data practices. He works primarily in financial services and oil and gas, helping clients to develop their EA Capability, improve their IT organization, and execute architecture-driven change programs.

Taylor Hornford, Conexiam

Taylor Hornford is an Enterprise Architect and ABACUS Certified Architect and Designer. Taylor is based in Canada and is a member of Conexiam's Boston practice. Taylor specializes in formal modeling and supports the option analysis and roadmap development. Taylor works with all of Conexiam's practices to provide consistent architecture methods and tools and address the client's change needs.

Acknowledgements

The authors gratefully acknowledge the contribution of the authors of the World-Class Enterprise Architecture White Paper (The Open Group): Mick Adams, John Arnold, Tim Davey, Laura Harris, Peter Haviland, Richard Heward, Ian Hughes, Navdeep Panaich, Michael Pearson, Joseph Sherry, Mike Turner, Martin Van Den Berg, and Jane Varnus.

The authors gratefully acknowledge the contribution on enterprise risk by The SABSA Institute, specifically John Sherwood and Pascal de Konig.

The authors gratefully acknowledge the contribution of the following people in the development of this document:

- Atila Belloquim, Gnosis, Brazil
- Jim Clendon, The Department of Internal Affairs, New Zealand
- Mats Gejnevall, Combitech AB, Sweden
- Sonia Gonzalez, The Open Group
- Kirk Hansen, Kirk Hansen Consulting, Canada
- Stephen Marshall, IBM, NZ
- Tejpal Virdi, Boeing
- Robert Weisman, Build the Vision, Inc.

About The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through IT standards. With more than 500 member organizations, The Open Group has a diverse membership that spans all sectors of the IT community – customers, systems and solutions suppliers, tool vendors, integrators, and consultants, as well as academics and researchers – to:

- Capture, understand, and address current and emerging requirements, and establish policies and share best practices
- Facilitate interoperability, develop consensus, and evolve and integrate specifications and open source technologies
- Offer a comprehensive set of services to enhance the operational efficiency of consortia
- Operate the industry's premier certification service

Further information on The Open Group is available at www.opengroup.org.