Revision History

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Introduction - Setting the Scene

Over the past few decades we have seen a major transformation in the technology landscape of organizations, which in essence has been driven by some, if not all, of the following factors:

- The need to support new ways of working—the *anytime, anyplace, anywhere* workforce.
- The need of systems departments to provision real-time, 24*7 system services to support new business operating models.
- The need to support a move towards distributed-systems architectures, geographically dispersed systems, and users who require a “follow the sun” support model.
- The need to rapidly provide new business capabilities.
- The need to meet shorter time-to-market for new systems, resulting in a move towards more agile and responsive system-designs.

All of these factors have contributed to the rise in system complexity; while this is manageable for small organizations, it is not always for larger organizations that often have several hundreds, if not thousands, of applications to support. Increased system complexity presents a daunting challenge for these larger organizations, in the form of control, management, and provisioning.

As a direct response to these factors, we have seen the emergence and prominence of Enterprise Architecture (EA) as a function with the goal of ensuring that the technology landscape is aligned, and that it delivers capabilities that meet both the strategic and tactical business needs of today and tomorrow.

With direct benefits difficult to quantify, the EA function, positioned as an IT-support function, can often cost organizations several hundreds of thousands, even millions, of dollars to maintain.

Effects of Operating Conditions

Organizations operating in buoyant conditions i.e. profitable or growing organically will not question this investment, however when the opposite occurs i.e. a turbulent business operating environment arises and IT Departments are focused on 'keeping the lights on' activities, then we see EA being both questioned and challenged.

It is at this point where organizational stakeholders question the value and maturity of this function in meeting its original objectives.

The Question...

A common question asked by many stakeholders across many organizations is the following: "our organization has invested several hundreds of thousands of dollars in building up an Enterprise Architecture function and capability—how are we doing?" This question is the focus of this paper.

Maturity assessments allow stakeholders to establish, at a minimum, the following:

- How are we performing against the original business mandate for EA and the investment in this function—are we making a impact on the bottom line?
- How are we doing as a function with respect to industry best practices?
- How are we doing in relation to our other organizations that have adopted EA?
- What are the gaps?
- Where should we focus our future attention?

Overview

This short overview presents an approach to addressing the above issues, and is structured as follows:

- A brief introduction to EA—a short primer to describe the function and its purpose.
- A cursory view of the popular approaches to maturity assessment.
- A quick discussion on the reusable pattern found across various approaches to maturity assessments.
- A presentation of a best-of-breed approach.
- Our simple conclusion.
Enterprise Architecture (EA) - a short primer

Before we can discuss if a function is mature, we first need to define the role and objectives of that function.

It is often stated by systems professionals that "Enterprise Architecture seeks to align the business with the technology," a rather vague statement that is, however, essentially correct: the degrees to which this 'alignment,' together with entry points for analysis and coverage, will vary between organizations, thus resulting in a lack of consistency in approach.

These variations are exposed when comparing EA frameworks; have a look at two popular frameworks TOGAF [1] and Zachman's framework [2] and one can see the variations in approach and views. However common patterns do exist with the target aim and objective remains the same. However fundamental common patterns and targets remain the same. Fig 1 below highlights an EA stack which encapsulates layers that EA must consider. The visualisation of the Stack highlights the EA coverage into multi-layers that allow the presentation of a simplified single view, these layers interact in both directions, both horizontally and vertically, where components in one layer can consume and produce services for the layers below and above. These layers are:

The Business Operating Model (BOM) Highlights both how the organization is structured, and how it interacts (internally and externally) to achieve its mission, goals, and objectives. BOM's can be multi-dimensional in that one dimension may seek to present at a high level of abstraction how the organisation pulls, consumes and pushes 'things' and at another level may want to capture and present forces e.g. external organisational impacts, tactical strategies, other business drivers etc. BOM's highlight organisational structures and impact on the lines of business. Fundamentally the BOM will not change unless the organisation wishes to exit a particular market and thus the target state can remain static.

The Business Process Captures and represents the various processes, workflows, and collaborations, both formal and informal, which support the BOM layer. Business Processes are usually derived using tools that present a visual representation of the process models and use a standard notational sets to show how both flow and execution are triggered, managed and flow.

Capabilities and Services Provides the contextual groupings and structures that deliver the ability to orchestrate a business or systems process, and to execute the relevant systems function. One can argue that clear demarcations exist between both capability and a service. However, the two are tightly coupled in that a capability may exploit one or many services (business or IT) and a service can deliver one or more capabilities....it goes on!

Applications layer is the actual computer programs which provide instructions to deliver a specific capability or a service.

The application layer may have many components e.g. the grouping of Common of the Shelf (COTS) systems / products may be one sector and bespoke developed applications can be another—two different product sets that require two different approaches to control, management and delivery.
**Data/Information Services** Relates to the activities around the management of the information that is ultimately utilized by applications to ensure accuracy, consistency, and single views of the data.

**Technology Services** The digital services that support all of the above; can include executable services such as collaboration, communication, messaging, workflow, and so on.

**Enabling Technology** Represents the actual physical, "tangible" technology: mainframes, mid-range systems, servers routers, and so on.

**VAS/Hygiene services** Represents services that the organization needs as a foundation for all of the above: security, incident management, disaster recovery, and so on.

Enterprise Architects seek to map the business operating model—lines of business through the stack to the enabling technology—to show synergies across business functions and technologies. This enables attention to be focused on the reuse of systems efficiency gains and the reduction of system touch-points.

A core function of a successful EA practice is to show an understanding of the current technology landscape, and to extrapolate based on the various drivers about future possible states, allowing for smarter business investment portfolios.
The EA Role
As you have probably gathered, the role of Enterprise Architects is a somewhat complex one. They must have both the technical attributes to understand the technology landscape, and the business acumen to capture, analyze, and understand the impact of any external business forces, drivers, and decisions (both strategic and tactical). These impacts must be understood in terms of both risk, and in the gaps in the capabilities of the organization to deliver system solutions.

So the short summary of EA, previously presented in this paper, should highlight the fact that EA performs two different roles:
- As an art, it can be seen to ‘align the organizational business needs, activities, and drivers with cost effective technology capabilities for today and tomorrow.’
- As a function, it can be seen, at a minimum, to:
  - Control the introduction of new technology capabilities and services into the organization and the technology estate.
  - Facilitate and promote the use of technology, to add value to the organization and ensure alignment and governance of the technology estate.
  - Enable the business to meet both strategic and tactical goals, while simultaneously ensuring the promotion of technical opportunities for cost reductions and efficiency gains.

Approaches to Maturity Assessment: How Do Our Competitors and Peers Do It?
Maturity assessment is not a new science, and has been used as a standard business tool in mergers and acquisitions for several decades. In the IT domain, many organizations have successfully used ‘home grown’ techniques, both to establish the level of maturity of the function and to derive some value add from establishing the gaps. In most cases, it is common to benchmark against both best practices and industry competitors.

In the following section, two popular industry practices for maturity assessment—Control Objectives for Information and Related Technology (COBIT) and Capability Maturity Model Integration (CMM, formerly CMMI)—are briefly discussed, in order to provide a flavour of the adopted approaches. You can find further information at the Web sites of the two organizations (see references); this information is recommended reading.

Control Objectives for Information and Related Technology
“Control Objectives for Information and related Technology (COBIT®) provides good practices across a domain and process framework and presents activities in a manageable and logical structure. COBIT’s good practices represent the consensus of experts. They are strongly focused more on control, less on execution. These practices will help optimize IT-enabled investments, ensure service delivery and provide a measure against which to judge when things do go wrong.”

The IT Governance Institute (ITGI).

COBIT maturity models are created as a baseline representing the generic qualitative model to which principles are added iteratively through the levels from the following attributes:
- Awareness and communication
- Policies, plans, and procedures
- Tools and automation
- Skills and expertise
- Responsibility and accountability

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<td>X</td>
<td>Y</td>
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<tr>
<td>1 Initial/ad hoc</td>
<td>Repeatable but intuitive</td>
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Figure 2. COBIT’s maturity levels
Maturity Assessment for the Enterprise Architecture Function

- Goal-setting and measurement

Figure 2 illustrates a macro perspective of COBIT’s maturity approach, with the five core weightings and the current (X) and proposed (Y) positions highlighted as part of the process. At its core, COBIT is strongly focused on control. This focus results in less effort exerted on execution and depth, and it opens COBIT up to criticism that the coverage is limited to a partial view, and thus is not strong in the domain of maturity assessment within some IT functions.

**Capability Maturity Model Integration**

The Software Engineering Institute at Carnegie Mellon University in Pittsburgh, Pennsylvania has successfully promoted the Capability Maturity Model® Integration (CMMI), with its focus on process improvement, as a popular approach in the IT industry. CMMI replaces CMM by adopting an approach that provides organizations with essential elements of effective processes and encapsulates the following aspects:

- **Maturity Levels**: A five-level maturity continuum:
  - Level 1—Ad hoc (Chaos)
  - Level 2—Repeatable
  - Level 3—Defined
  - Level 4—Managed
  - Level 5—Optimized

- **Key Process Areas (KPAs)**: A cluster of related activities that, when collectively performed, achieve a set of goals or outcomes.

- **Goals**: Summarize the states that must exist for the KPA to have been implemented in a structured, effective, and lasting way.

- **Common Features**: Include practices that, when implemented, initialize a KPA. There are five types of common features:
  - Commitment to perform
  - Ability to perform
  - Activities performed
  - Measurement and analysis
  - Verifying implementation

- **Key Practices**: Describe the elements of infrastructure and practice that contribute most effectively to the implementation and institutionalization of the KPAs.

**The Pattern: Process Reuse**

A pattern seeks to describe a problem so that it can be repeated over and over, providing a consistent outcome. Patterns provide the springboard to kick-start effort, but should not be viewed as the final destination.

A common pattern for maturity assessment is built on the establishment of contrasting two questions: ‘where are we today’ against ‘where we would like to be.’ The true value comes in the analysis of the gaps between these two questions.

Figure 3 sketches out the pattern for maturity assessment and is broken into five key stages, each contributing a substantial input into delivering value from the exercise.

These stages are:

1. Define criteria and both the associated and relevant weightings.
2. Group and then decompose the criteria. These criteria should realistically reflect attributes that are required to realize the function.
3. Weigh each attribute of the criteria in a standard way after decomposing it. This reflects the priority and importance of the attribute.

![Figure 3. Maturity assessment pattern](Image)
4. Collect information for each attribute; it's a good idea to ensure that the collection of information is undertaken by subject matter experts (SMEs).
5. Score the collected information and weight it accordingly.
6. Validate both the information collected and the scorings. You may also need to confirm the scoring through alternative sources.
7. Ensure that both the information and data presented meets the stakeholders' needs, and that they are presented in such a way that they 'add value,' and thus can be acted upon.

Some Additional Questions
This simple pattern does not seek to introduce any complex thinking, but when you seek to exploit the pattern you should also consider the following questions:

- Have all permutations been taken into account?
- Are the Scoring values relevant? That is, are the upper and lower values appropriate, and can any alternative values exist? For example, -5 ~ +5, 0 ~ 10, and so on.
- Are the Criteria Weightings ranked accordingly? No two variables have the same level of input into the macro view—how do we weight these variables appropriately, and is their view consistent among the stakeholders on these weightings?
- How can we reproduce the results consistently, without forcing a burden on both costs and on our team?
- How can we realistically reuse this information to add value to our customers or stakeholders?
- When the effort in producing the maturity model exceeds the perceived value, why not just ask our customers and stakeholders if they are happy?

A Best of Breed Approach: How Could/Would We Do It?
As you can see from the previous discussion, the criteria for the evaluation and weightings are two key success factors for deriving a maturity model that delivers value.

A criterion that we have found useful to exploit is known as the ‘5 Ps’: Principles, Practices, Process, Patterns, and Portfolio Management. On its own, each P criteria adds value, but alone it is not a true representation; when combined and consolidated, however, they can provide sufficient coverage for the maturity assessment.

Principles
Architectural principles are both the foundation and core of the design and realization of architectural components, and can easily be decomposed and represented by the individual layers in the stack to ensure sufficient coverage.

Architectural principles are simple statements, which adopted by the enterprise and which seek to exploit both common sense and good practice to deliver a unified view for technology choices.

Examining the Principles
When examining principles as a factor of maturity, you should at a minimum establish:

- If principles exist for the individual layers in the architectural stack.
- If these principles are used by the IT function to deliver its capabilities.
- If these principles are part of the overall governance process.
- If these principles require an excess of effort in relation to the cost for deriving and managing their portfolio.

Processes
We can classify processes as a set of defined activities, having both a start and end position that can be executed either in parallel or sequentially.

In the stack representation (figure 1) we touched on the fact that processes have bi-directional flows, which produce services and products for the enterprise to push or consume.

Looking at the Processes
When examining processes as a factor of a maturity assessment, you should include the following factors:
Maturity Assessment for the Enterprise Architecture Function

- The notational standards used to capture and represent information and process flows—*adoption, enforcement, and management*.
- The coverage by the EA function to control, manage, and promote the reuse of process components, both manual and automated, factoring in the touch and integration points.
- The maintenance of a single unified view of the process layer, and the inclusion of this into the overall governance process.

Patterns

Many definitions exist for the use of the term pattern in the architectural context, so we will use the following definition: ‘a standard reusable representation, component, and/or solution to a common reoccurring problem’. In software design, patterns can greatly reduce the time to market for software components.

About Patterns

When examining the use and exploitation of patterns as a factor of a maturity assessment, you should consider the following factors, both in criteria and weighting:

- The representation and maintenance of a patterns catalogue or library.
- The reuse and promotion by the EA function to the projects to ensure reuse of these patterns.
- The reduction in real effort through the use of the patterns presented by EA.

Practices

We can define an architectural practice as an accepted method or systems-related activity that you perform routinely, regardless of whether it is a formal policy or is specified in a given set of organizational procedures.

In terms of EA, maturity practices would be difficult to quantify; however, a quantification would focus around capability realization, in the terms of the management and delivery of solution and technical designs.

Practices adopted within the IT function are usually based on customized methodologies, but the real questions we should measure in the maturity assessment process are the following: ‘how efficiently has the organization adopted the practices of the approach, and are we meeting the business demands based on this adoption?’

Looking at Practices

When examining practices, it will be difficult to weight the criteria; however, you should consider the following questions:

- Are we realizing our formal practices, or are the informal practices taking control?
- Do we capture the formal and informal practices, and are they approved and published?
- Can we both control and manage the deliverables of the practices?

Portfolio Management

Portfolios are groupings of associated objects that are classified, ranked, controlled, and managed to meet the needs of the organization (*today and tomorrow*). This consolidation approach of abstraction can and should occur in all architectural domains: applications, infrastructure, or even policies (such as security policies).

Portfolios as groupings allow individual domain experts to focus on their area of expertise: for example, the Enterprise Application architects can manage their ‘portfolios,’ and further decompose applicable criteria to ensure they are aware of all changes that will affect the portfolio.

Looking at the Portfolio Approach

When examining the portfolio approach as a way to manage the technology estate in the assessment of maturity, you should consider some of the following questions:

- Do we have portfolios for the main architectural domains (service, application, information, data, infrastructure, and so on)?
- Have we created the appropriate level of abstraction in our portfolios, classified in a way that the stakeholders understand and are comfortable with?
- How do we manage our portfolios when factors change? For example, when new technology enters the estate or when a system is upgraded.

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More on the 5Ps

The 5Ps mentioned previously should not be seen as fixed; they provide a baseline or ‘starting point’ to kick-start the maturity assessment work. They could and should, however, be modified to meet the needs of your enterprise; for example, you may wish to create a new variable, such as ‘People.’

While coverage is fundamental to the success of the delivery of value from a maturity model, it is equally important to highlight scoring, ranking, and weighting.

Figure 4 elaborates on the 5Ps.

The 5Ps Model

Figure 4 represents the 5Ps, with examples of the key attribute maps that can be used when criteria are decomposed, which are also the criteria used in the WKM EAM software.
Conclusion: A Final Message

We have tried to present a simplified view of the maturity assessment for an EA; this view is based first on an analysis of where we are at a given point in time in relation to where we would like to be, and then on an understanding of the risks and rewards of these gaps. Figure 5 presents a visual representation of this view.

Maturity assessment can aid in answering some fundamental questions around what is acceptable industry good practice, and how an organization is placed with regard to those practices.

The key ‘take away’ message should be that maturity assessment, in terms of EA, is clearly not a science and, when viewed as an art, should be structured to remain flexible and to answer the key questions asked by the stakeholders.

The results of any effort are only as strong and as good as the criteria and the weightings used. The 5Ps are a good start, and are easily expandable with results if they are captured and presented effectively. The 5Ps provide a powerful tool for the provisioning of resources and effort.

Key Points
As a final note, consider the following key points from this paper:

- Use third-party consultant framework wisely, to ensure that you capture variables that are relevant to:
  - Your organisation/enterprise
  - Your industry
  - Your operations

- Understand the variables found in standards—COBIT, WKM EAM—and use where appropriate

- Use common sense.

- Ensure that the cost justifies the benefits.

Maturity assessments are normally conducted when the business is questioning the value from a function—they should be executed rapidly, and should not consume many resources in delivery, as represented in figure 6.

![Figure 5. Maturity assessment](image1)

![Figure 6. Effort versus value](image2)
### References: Some Useful URLs

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<td>Enterprise Architecture Maturity (EAM) Software</td>
<td>EAM Software, through consultation and collaboration, allows users to capture, in its simplistic form, a cursory view of the level of maturity of their EA function and some of the associated artefact products produced by this function. Once captured, this information is visually presented and exported to a document that can be modified according to the needs of the user's target audience.</td>
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<td><strong>3</strong> <a href="www.zifa.org">www.zifa.org</a></td>
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<td><strong>4</strong> The IT Governance Institute (ITGITM) <a href="www.itgi.org">www.itgi.org</a></td>
<td>The IT Governance Institute (ITGI) exists to assist enterprise leaders in their responsibility to ensure that IT is aligned with the business and delivers value, its performance is measured, its resources are properly allocated, and its risks are mitigated.</td>
<td>The group was established in 1998 and their primary research publication is Control Objectives for Information and Related Technology (COBIT).</td>
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<td><strong>6</strong> <a href="www.whiteknight.it">www.whiteknight.it</a></td>
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This document is distributed free of charge to both our customers and potential partners to facilitate this goal.
Maturity Assessment can aid in answering some fundamental questions around how the organization is placed with regard to industry good practices. This short document presents a simplified view of the maturity assessment for Enterprise Architecture, based on the analysis of where we are at a given point in time in relation where we would like to; understand the risks and rewards of these gaps.