

Architecture as a Problem Solving Tool

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INTRODUCTION

Architecture can give structure to problem investigation, solution development and formality of presentation to the solution plan. An architectural reference model will allow the planners guidance in their investigations and in their development of the plan. An architectural blueprint of the solution will allow implementers to better understand the intentions of the planners.

Architecture is essential for any large building or urban planning proposal, why should this architectural discipline not help in designing solutions for other types of large scale problems? The architecture discipline would not only aid the development of the solution but allow the project plan to become a better communication document. There is therefore a need for a generalized discussion on the basic architectural principles that can guide the development of architectures for different problem areas.

A key argument for architecture versus design is that design solves the functional requirements of the specification whereas architecture is in *addition*, about the long term sustainability of the solution and in the process takes into account more environmental factors (marketplace, competitors, etc.). A definition of IS architecture given by Bass, Clements, and Kazman (1998) allows a clear distinction between architecture and design. They write that architecture begins the task of envisioning the central function of a system looking for those influences that persist beyond the lifetime of the system, whereas design is just about ensuring the system will function as expected.

In other words, architecture is concerned with a need to explore beyond the immediate description of functionality and is required to also stretch the boundaries, looking at any environmental factors that surround the objective. The architecture gives much more knowledge about the structure and integration of the entire system being described. The sustainability is

due to lower cost and risk associated with development changes because of that knowledge.

There are various descriptions of enterprise architecture used by the IT profession, a very detailed description is given on the web site for TOGAF (2013), Koontz (2000) gives a very clear layout of the different levels in the enterprise architecture and Harmon (2004) also shows a detailed description of the hierarchy of levels in enterprise architecture; all these descriptions of architecture are essentially intended to improve the design of IT systems.

Architecture provides a look at the entire enterprise at the top level of abstraction with navigating links to all the component parts and their definition at descending levels of abstraction and with descriptions of any interactions between component parts. This blueprint, if correctly done, can be a powerful management tool for determining where efficiencies can be made and choosing effective strategic directions.

BACKGROUND: CONCEPT OF ARCHITECTURE IN COMMERCE

Architecture is often considered as just the aesthetics of the building design but there are entire undergraduate and post graduate courses on building architecture. The study of building architecture does give a background in classic proportions for a building but also has a great deal of formal definitions, formulas and tables on the structural loads for foundations and support walls as well as the requirements for the building services such as electricity and water supply and sewage disposal. A great many technical issues are pre-solved for use in the design and development of a new building.

The idea of architecture has now been extended to the area of information technology although this is fairly recent say within the last 25 years; two of the most influential authors in the early years were Brancheau,

and Martin. Brancheau and Wetherbie (1986) wrote “an information architecture is a high level map of the information requirements of an organization,” however, I believe the use of the term ‘map’ diminishes the amount of structure inherent in an architecture. Martin in 1990 drove the emphasis for *information* with his books on Information Engineering and his depiction of an architecture to describe the enterprise. Following this there was a focus on standard processes by the management consulting and software development world and the concept of service oriented architectures (SOA). I believe the emphasis is changing again with the requirement to determine the structure of the enterprise architecture before reviewing the processes required.

An information architecture has been proposed for strategic planning, to pick up after the creative determination of the strategic objectives and to focus on the implementation plan. The architecture included determining the planning information components, their interaction and the overall structure of the plan, and to aid the presentation of this information a reference model was developed (McKee, 2013). The reference model is explained in more detail in a later section.

There are discussions about the need for business architecture; a white paper entitled “The Evolution of Business Architecture” was written by a business consultant (Cochlin, 2012). Cochlin defines business architecture as: “Transforming corporate strategy into business designs, structures and aligned delivery capabilities that enable corporations to increase market share, return on investment and agility in the face of change, whilst at the same time reducing risk.” However the use of architectural design in the business world needs a lot more definition of frameworks and reference models than is currently available. A comment from some management consultants is to say that it is a specialist function to interpret the business processes and requirements into an architecture and it may not be appropriate to have generic models available for the business person to use themselves.

One definition of enterprise architecture is that it is “a conceptual blueprint that defines the structure and operation of an organisation. The intent of an enterprise architecture is to determine how an organisation can most effectively achieve its current and future objectives. Purported advantages of having an enterprise architecture include “improved decision making, improved adaptability to changing demands or market conditions, eliminating redundant processes,

optimization of the use of organisational assets and minimization of employee turnover” (Rouse, 2007).

The enterprise architecture is supposed to contain both the business architecture and the IT architecture, however in many enterprise architecture models they both appear merely as subsets of the enterprise architecture. In these models there are no relationship mechanisms shown between the two architectures and therefore no impact statements to say the amount of effect of the IT component on each of the of the business architecture components. It is well understood today that an effective software system package that is well aligned to the business processes of a particular department can drive up the profitability of that department.

ARCHITECTURE USE IN COMMERCE IS LIMITED

Zachman was very concerned that “[t]he credibility of IS is in a steep decline.” And that “[t]he issues of quality, timeliness and change are the conditions that are forcing us to face up to the issues of Enterprise Architecture” (Zachman, 1996, p.1). If these issues were thought to be very relevant to the development of effective IT systems, how much more relevant can they be to developing a modern effective business organisation and in fact one could extrapolate to saying any large complex operation.

James as the Asia-Pacific Architecture Research Director for Gartner (a company of IT industry analysts), and in an article for the newspaper *The Australian* writes about the need for a business to respond ever faster to the changing environment, and this diversity must be managed effectively to get good business results. That Enterprise architecture is important is largely because there are more applications today than ever before. And those applications are managing more data on a diverse range of platforms, written in many languages and running in a variety of environments and this diversity can be chaotic to manage (James, 2001). A similar argument can be made for the modern global business competing worldwide in rapidly changing environments (political and marketplace).

James is clear that for business success there needs to be understanding of enterprise architecture: “Within the control of the enterprise are the technologies that are employed (IT architecture), the business processes,

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