SCIENCE OF COMPUTERS VISUAL ARCHITECTURE FOR ENTERPRISE

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ABSTRACT

Enterprise architecture, often known as EA, refers to the process of doing enterprise analysis as well as creating, planning, and executing enterprise analysis in order to effectively carry out corporate plans. Using architecture principles and practices, which is a process that is also known as enterprise architectural planning (EAP), EA helps organization's structure IT projects and policies to achieve the desired business results, to remain agile and resilient in the face of rapid change, and to stay on top of industry trends and disruptions. EA is a form of enterprise architecture. Enterprise architecture, often known as EA, refers to the process of doing enterprise analysis as well as creating, planning, and executing enterprise analysis in order to effectively carry out corporate plans Gartner defines Enterprise architecture as a well-controlled practice for leading the Enterprise needs in a whole-some and pre-emptive manner by ascertaining and evaluation of effecting of change toward desired, futuristic business goals and outcomes. There are several definitions given for the term Enterprise Architecture The Visual Enterprise would offer the same kinds of advantages to the administration of land as the Aadhaar number (which is the unique id that is being suggested for every resident of India) will provide to the administration of identity.

Keyword : organization Architecture, knowledge, software

INTRODUCTION

The process that companies go through to standardize and organize their IT infrastructure so that it is in line with their business objectives is known as enterprise architecture. The digital transformation, the expansion of IT, and the modernization of IT are all supported by these initiatives. With the assistance of organization Architecture (EA), a wide variety of information technology (IT) initiatives might be better adapted to the organization. According to research conducted by Gartner Inc., "IT project failures in industry and Government account for an astounding billion in losses each year." In addition, top executives of businesses report.

- Less than percent of IT projects were successful in accomplishing specific, project-level objectives;

- Less than percent of IT initiatives fundamentally advanced the business-strategic goals of the firm.

A significant number of unsuccessful IT initiatives may be attributed to a lack of knowledge. The needs of the company are met by the information technology department, despite the fact that the requirements description is

too simplistic. EA is becoming the answer, for an increasing number of businesses, to the problem of aligning business and IT. EA lends a hand in locating the individuals who are interested, not just in describing the needs that they have, but also in analyzing those requirements and figuring out how they fit into the larger picture of the organization. Following that, EA lends a hand in converting the requirements into IT specifications. EA is not just about analysis, but also about the process that individuals go through to get at a common understanding of something.

The alignment of business and information technology is not the sole reason to implement an EA. EA makes it possible to improve the governance of an organization or the method in which processes are reorganized inside an organization. In these kinds of circumstances, EA helps to improve one's comprehension of the company and the circumstances around it. The workflows may be reorganized in such a manner that they provide enhanced support for the enterprise's business objectives or the needs of the company's customers. Because they are aware of the circumstances and how their choices will be affected, management is in a better position to exercise governance over the whole organization, including all of its operations.

A clear vision may be constructed with the assistance of EA, which is based on the many interpretations of reality that had previously resulted in a Babel-like jumble. On the basis of this unmistakable picture, superior choices are possible.

INFORMATION SYSTEMS

In the software architecture, which will be discussed in software systems, it is common practice to regard software systems to be systems that contain a countable collection of states. These systems, which are referred to as transition systems, change their states at distinct periods during their operation. State-maintaining systems, also known as goal-seeking systems, are what transition systems are. The term "information system" refers to a sort of system that is particularly significant. A collection of information items is what determines the status of this particular system.

To understand a system there are three things that have to be examined:

Structure: the manner in which the work is distributed among the various components of the system as well as the interactions that the components have with one another. Only through seeing how the system works can its structure ever be comprehended; this is a prerequisite for any attempt to comprehend the system. In order to accomplish this goal, analytical thinking is required to comprehend each component on its own, and synthetic reasoning is required to comprehend the components in the context of the overall system;

Processes: Figuring out which aspects of the system react to their surroundings requires knowledge of those aspects. The future states of the system and the outputs that the system generates are both the responsibility of the processes;

Functions: According to Singer, a cause-and-effect link is insufficient to comprehend the operation of a social system; instead, one has to focus on a producer-product connection. A producer is essential for the success of their product but is not enough on its own. Because of this, he does not describe the product in its entirety. This opens up the possibility of treating choice, and by extension purpose, as an objectively observable aspect of the behavior

of the system. In addition, since the producer alone is not enough to describe the product, it is necessary to make reference to the environment in which the manufacturer operates. Therefore, an explanation of a social system should take into account the surrounding environment rather than ignore it.

ENTERPRISE

It was said in the prior sentence that a business enterprise is an example of a system that serves a goal, and an enterprise itself is a system. A working definition of "enterprise" will be provided in this section. This term originates from the concept of a system.

Enterprise is defined as "A Whole of Organized People and Means intended to create, With the Help of Processes, Products and Services Where its Stakeholders are Willing to pay for." consumers of a company are also considered stakeholders in that enterprise since consumers have the ability to either directly or indirectly pay for the goods and services produced by that firm. However, the customer's willingness to pay is not always guaranteed. Other stakeholders, like as stockholders, are able to make payments for items or services. For instance, by putting money into a new company that hasn't even started selling its wares yet you may increase your chances of success. The concept of an enterprise may be understood in a variety of ways due to the vague nature of its definition.

- It is not necessary for there to be a profit motive in order for there to be a business;

- The government is also an enterprise, and the citizens of the country are the ones paying for it via taxes;

- A sports club is also an enterprise.

- A company might be regarded to be in operation even if it is just a branch of another company.

There is no question that Philips is an enterprise. However, its Production Divisions (PDs) are also independent businesses in their own right. They all generate goods that people are willing to pay for, and they all make goods. Customers of Philips are the ones who are ultimately responsible for footing the bill for the company's research section, which is an enterprise. The finished goods are what customers are paying for, but the price also accounts for the time and effort that went into the product's research and development.

ARCHITECTURE

The importance of architecture as a concept in business continues to grow. For a number of reasons:

- First, automation is spreading swiftly across society and businesses. Information systems now assist with, and in some cases completely replace, human labor in almost every industry;

- This proliferation of information systems has made the world more complicated, making it harder to appropriately establish security;

- Customers are growing more demanding. These issues need a structural method of solution;

- the planning and execution of changes to an existing intricate system. Enterprises are already complicated systems, making it challenging to make changes in a manner that ensures the organization will continue to work properly in the future.

- Using this kind of framework in building has been standard practice for generations. Over yonder, they call it "architecture."

- The article provides a definition of architecture. Business Architecture, Process Architecture, Information Architecture, Application Architecture, Software Architecture, Technical Architecture, and Infrastructure Architecture are just a few of the various types of architecture that play a part in businesses.

- The IEEE standard, developed over the course of many years, represents the most significant change in this time period. They have presented a generally agreed definition of architecture. The IEEE is widely recognized as a premier technical professional organization with members who are at the forefront of their respective fields in sectors as diverse as electrical power, aerospace, consumer electronics, and telecommunications.

As defined by the Oxford English Dictionary, architecture is "the fundamental organization of a system embodied in its components, their relationships to each other and the environment, and the principles guiding its design and evolution."

ENTERPRISE ARCHITECTURE FRAMEWORKS

This remark demonstrates how important it is to understand how a framework works. The most significant advancements in software architecture were discussed in this section. The first significant advance that took place was the establishment of architectural frameworks. In this paper, the phrase EA framework will be used where the word framework will more accurately describe what is intended. It was said at the beginning of this piece that the selection of a framework is the third stage in the process of putting together an EA. However, what precisely does it mean to have a framework, and why is having one necessary for an EA? The answers to these questions are going to be provided in this research, as well as a description of the IAF framework. A condensed explanation of the Zachman Framework will be presented first before proceeding to an explanation of the IAF framework. That was the first effort to design a blueprint that would define and manage the integration of systems and the components that make up such systems. In this, the laws, which have played a significant role in the evolution of frameworks, will also be considered for the reason that they have been mentioned. An example of how a formal description of the IAF framework should be written will be shown in the last section.

OBJECTIVE OF THE STUDY

1. Conceive of a long-term, high-level vision of the capabilities and commercial value that would be developed as a direct result of the proposed Enterprise Architecture.

2. Obtain approval for a Statement of Architecture Work that specifies a planned of works to build and execute

the architecture that is described in the Architecture Vision.

RESEARCH METHODOLOGY

According to the website Visual Enterprise.ap.gov.in (2011), Visual Enterprise is a significant initiative that falls within the Andhra Pradesh government's e-Pragati Program. Andhra Pradesh's Department of Revenue is to be commended for spearheading this noteworthy endeavor on behalf of the state government. The Visual Enterprise would offer the same kinds of advantages to the administration of land as the Aadhaar number (which is the unique id that is being suggested for every resident of India) will provide to the administration of identity. By assigning a Unique Identification Number to every land parcel in the state, the initiative intends to achieve its goal of unifying all of the different kinds of land parcels that exist within the state and creating a Single Source of Truth for information pertaining to land. A comprehensive digital map of Andhra Pradesh's topography is another objective of this project. This will be accomplished by assigning georeferenced coordinates to each land unit in the state. Additionally, all government offices that deal with land will be able to deliver integrated services in relation to land via the use of a centralized platform known as "Visual Enterprise"

DATA ANALYSIS

Need for Visual Enterprise

Despite the critical need for collaboration across the various land management systems, land departments have, historically, worked independently in their own "silos." Even the software programs that have been built for these departments have been intended to cater only to the requirements of those departments, leaving little to no room for integration with the software used by the other departments in the organization. It is anticipated that the Visual Enterprise system will provide solutions to a number of the structural issues listed below.

- The departments that are responsible for land services are working in isolation.

- The processes that are followed in citizen servicing are based on statutes and procedures that are decades old.

- Due to the fact that many land services are provided by many departments, it is necessary for citizens to go to multiple departments in order to get the same service.

- There is a need and an opportunity for process re-engineering, which will result in a decrease in the amount of time wasted waiting for processes and an improvement in service standards.

- The absence of a single view gateway through which unified information may be seen about land

- Because of this, Visual Enterprise has been conceptualized as a solution to these difficulties and offers extra value-added advantages.

E-Pragati is an effort of the Government of Andhra Pradesh that is focused on the development of a state enterprise

architecture (e-Pragati Enterprise Architecture, 2010). Visual Enterprise is one of the main initiatives that have been envisioned as part of e-Pragati. Its goal is to provide an integrated platform for all land-related services under one hub, which will enable interoperability across all agencies concerned with land transactions. The Visual Enterprise initiative will offer the same kinds of advantages to the management of land that Aadhaar would provide to the administration of identities. The objective of the initiative is to assign a one-of-a-kind identifying number known as a VEA to each individual piece of land, as well as to tag it with geo coordinates. It is anticipated that participation in this activity will result in a governance system that does not need residents to provide certificates in order to access land services.

The Visual Enterprise Software application's development process is governed by the methodology that is defined by the Visual Enterprise Enterprise Architecture for Andhra Pradesh. The method intends to facilitate the placement of all of the stakeholder-departmental information technology systems so that they can cater to the re-imagination of government processes, hence assisting in the delivery of seamless citizen services.

The Vision of Visual Enterprise

The mission of Visual Enterprise is to become the "Single Source of Truth" for information on any piece of land or property that is designated by VEA in a certain manner and to provide integrated land services to users.

Visual Enterprise Architecture

TOGAF Framework approach to architect Visual Enterprise

Table1.1 provides an illustration of an overview of the Visual Enterprise Architectural artefacts in comparison to each of the Togaf Reference models that have been constructed. (Gayatri Pandurangi, Krishnaiah V.S.R., Nagalakshmi V., 2009). These artifacts form the central part of Visual Enterprise's architecture. They are also crucial in the process of developing Solution Architecture, which ultimately results in guided software development.

Table 3. 1 : Visual Enterprise Architectural Artefacts

Architecture	Artefacts
Business Architecture (With Performance metrics)	Organization Chart Vision, Mission, Goals & KPIs Service Matrix (mapped to KPIs)
Architecture	Artefacts
	Services Vs. Stakeholder Matrix Heat Maps (for Gap Analysis) Business Process Modelling

	Use Cases defined through Unified Modeling Language (UML)
Data Architecture	Data Steward (Ownership of Data) Data Assets E-R Models Master data Meta data description
Application Architecture and Integration Architecture	Matrix of Business Processes Vs. Application Modules API Description Matrix
Technology Architecture	Technology Stack based on open standards
Security Architecture	BSIS (Visual Enterprise Information Security) Policy
Governance Architecture	Architectural Governance Board IT Governance Board Identification of Stakeholder Roles and Responsibilities

3.1.3 Visual Enterprise Stakeholder Departments

The current situation of the Visual Enterprise Enterprise may be deduced from the whole commercial environment that falls within the purview of Visual Enterprise. The organogram, the stakeholders, and the business operations that they do are all recorded, and a Gap Analysis is performed to see where there is room for improvement in the delivery of services to citizens. The architecture of the TO-BE system is developed using the gap analysis and the current status of the AS-IS system.

Visual Enterprise works with a total of eight different land departments. Table 3.2 provides an in-depth look at the various categories of property as well as the amount of land that is staked against each of these departments. The first four departments listed in Table 3.2 are the ones that have authority over the land record for their respective jurisdictions. The remaining four departments are the ones that provide assistance.

Table 2 Land Departments interacting with Visual Enterprise

S.No	Department	Land Types & the stake in the State
1	Revenue	Agricultural Lands -2.4 crore parcels
S.No	Department	Land Types & the stake in the State

2	Panchayat Raj	Rural House-hold Properties-84 lakh properties
3	Municipal Administration & Urban Development	Urban House-hold Properties-32 lakh properties
4	Forests	Forest Blocks- 1701 blocks
5	Registration and Stamps	Registry of transactions/ Deeds on lands and properties
6	Survey Settlement and Land Records	Cadastral Survey of lands
7	Endowments	Management of Temple lands
8	WAQF Institutions	Management of Lands/Assets for religious and charitable purposes under Muslim Law

Visual Enterprise Business Architecture

The business structure of the Visual Enterprise Enterprise, together with its business capabilities, functions, processes, and operational level procedures, make up the components that make up the Visual Enterprise Business Architecture. (Visual Enterprise Enterprise Architecture, 2008b). In the parts that follow, we will discuss the significant architectural artifacts of the business layer. These will include the stakeholders, the citizen services, and a description of the gap analysis that will be used when developing a TO-BE model. All of these will be discussed.

Stakeholders of Visual Enterprise

The table 3.3 provides a list of the stakeholders in Visual Enterprise, together with the business functions that they are responsible for as department heads. The nodal accountable officer that has been selected by the department specifically for the purpose of the Visual Enterprise system is also included in the table.

Table 3 Stakeholders of Visual Enterprise

Stakeholder Department and the Designation of the HoD	Roles and Responsibilities of the Stakeholder
Revenue Department CCLA (Chief Commissioner of Land Administration)	Maintenance of land records Issue of Pass books, title deeds Assignment of land for agriculture and house sites Protection of Government lands

IGRS (Inspector General of Registration & Stamps)Commissioner &Inspector General	Registration of documents related to movable and immovable assets Issuance of encumbrance certificate Collection of stamp duty Registrations of societies formed for charitable, educational and religious purposes Registration of marriages under various Acts Registration of chit funds
SSLR (Survey Settlement & Land Records) Commissioner	Conducting survey on the land across the state at village level Digitization of all the records Collation of maps available from other departments and service providers Management of all the records and archiving old records with indexing
MAUD (Municipal Administration & Urban Department) Director	Management of all immovable urban properties Assessment and levy of various taxes such as property tax, vacant land tax Collection and monitoring of the taxes Formulation of building rules, master plan rules and zonal regulation Implementation of master plans Issuance of permission for buildings and layout Regularization and demolition of unauthorized construction
Stakeholder Department and the Designation of the HoD	**Roles and Responsibilities of the Stakeholder**
	Maintenance of public spaces, roads Executing all civil works
Panchayati Raj Commissioner	Provide all essential services and facilities to the rural population Implementation of schemes for the development of agriculture and infrastructure Establishment of health centers and educational institutions Development of small scale industries and cooperative societies Construction of local infrastructure like roads, bridges, buildings
Forest PCCF (Principal Chief Conservator of Forests)	Proposals related to forest lands Overseeing and management of Mining leases Prohibiting Encroachment of forest lands Management of forest settlement, Conducting forest survey and mapping.

Endowments Commissioner	Maintenance of Temple Lands in the State
WAQF Board CEO	Maintenance of Lands allotted under Muslim law
NIC (National Informatics Centre) State Informatics Officer (Role of NIC is to partner in the Architecture development and IT development & Solution implementation)	Implementing e-governance agenda of the Governments, ICT plan/project formulation, consultancy and solutions Providing comprehensive data solutions Data mining, warehousing and analytics Handholding support to the Governments during project implementation

Visual Enterprise Application Architecture

Application Architecture lays up a structure for the Visual Enterprise application that takes into account the particular and precise business needs. All of the legacy and greenfield systems that are associated with the departments are included into the architecture via the application rules and methods that are defined by the architecture.

The Application Architecture of Visual Enterprise places an emphasis on application modules that are often needed and are intended to be Built-Once-Used-Many-Times throughout the Software applications used by the department as well as by other departments of the government. e-KYB, which stands for "Know Your," is the principal application programming interface (API) that ties together the many land departments that make up Visual Enterprise.

Visual Enterprise Technology Architecture

Since Visual Enterprise is a super layer that sits on top of legacy and greenfield applications, the technological architecture has been built to handle all of the technical standards necessary for the application to operate in an organized and seamless manner, all without causing any disruption to the legacy IT systems that are already in place.

According to the Open Standards standards of the TOGAF technological Reference Model, the technological stack for the Visual Enterprise super layer system has been defined. This includes both the hardware and the software.

Visual Enterprise Security Architecture

Designing the artifacts that explain the needs of the security measures and identifying how those requirements relate to the architecture at the enterprise level are both aspects of the Security Architecture process. The goal of these controls is to ensure that the company continues to uphold its quality characteristics, such as its Integrity, Confidentiality, and Availability.

The Visual Enterprise platform intends to interface with a number of different departmental apps in addition to a great number of other linked departments and agencies. The information that Visual Enterprise maintains is of a

highly confidential nature, and the organization has to adhere to more secure guidelines regarding the preservation and dissemination of this data. The normal data sharing and privacy rules as well as the security standards are adhered to in conjunction with the adoption of an improved security mechanism.   A policy has been developed and put into place to ensure that the integration will be secure and that there will be no problems with the interoperability.

Visual Enterprise Application Integration Architecture

The Application Integration Architecture is helpful in providing the legal and related guidelines for the smooth integration of all the legacy and greenfield applications with Visual Enterprise. This is accomplished via the provision of the legal and associated guidelines. The layers are determined by this architecture using the most effective integration approaches.

Application integration architecture is a term used to define the rules, levels, and procedures for the integration and interoperability of Visual Enterprise with all of the connected land departments in a simplified and organized manner.

CONCLUSION

The tabular analysis makes it clear that enterprise architecture is regarded as a useful or beneficial methodology for inter and intra-departmental communication, that it would help in the re-engineering of government processes, and that EA helps in better strategic planning and decision making in government enterprises. All of these conclusions can be drawn from the findings of the analysis. In a similar vein, the accomplishment of Standards in the Application of Technology is also selected as one of the leading advantages of EA in Government. Access to information throughout the whole enterprise and the creation of a single source of truth for all data are also regarded to be essential requirements for the purpose of preserving the consistency and integrity of the data artifacts held inside government enterprises. The survey's findings also indicated that EA would be responsible for bringing in total improvement in the business' overall success. The other benefits though ranked later, are well in the bracket of Strongly Agree and Agree options. For Certain questions though the top optionis a need to identify and address problems related to it.

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