

1. Introduction

On Wednesday, April 4, 2001, the Secretary of Veterans Affairs testified before the House Veterans' Affairs Subcommittee on Investigations and Oversight and promised to reform the current out-of-date information technology architecture in use at Veterans Affairs (VA). He pledged to identify a new Enterprise Architecture that will end the current practice of maintaining "stovepipe" systems designs that use incompatible systems development, and he pledged to end the collection of data that does not yield useful information.

To achieve the Secretary's vision, the VA Enterprise Architecture Innovation Team developed an Enterprise Architecture strategy that identified and adopted the Zachman Enterprise Architecture framework to organize the One-VA Enterprise Architecture (EA). The resulting strategy, "Enterprise Architecture: Strategy, Governance, and Implementation," published in August 2001, provided the governance system based on decentralized implementation of IT and centralized management of the enterprise architecture.

Subsequently in April 2002, VA published the "One-VA Enterprise Architecture Implementation Plan: FY 2002." The One-VA EA Implementation Plan serves as the critical reference tool for VA enterprise architects, executives, program/business managers, and information technology managers and workers involved in the development and execution of the One-VA EA. In addition, the plan details how the Department will evolve its One-VA EA on an incremental basis each fiscal year.

This version 1.0 of the One-VA EA document represents the initial effort in a continuing process of establishing and maintaining the One-VA EA. The purpose and motivation of the One-VA EA are identified and described below. The general approach to developing the One-VA EA and VA's use of the Zachman Framework are also discussed.

1.1 Purpose: One-VA Information Technology Architecture Aligned with Business Goals.

VA is committed to functioning as a unified department providing One-VA customer service to our nation's veterans and their beneficiaries. The effective and efficient use of current and emerging technology in support of VA's business operations will ensure that we meet the One-VA goal. The primary purpose of the One-VA EA is to *inform, guide* and *manage* the decisions of the enterprise, especially as they pertain to IT investments. VA's EA mission is to "develop and implement an evolutionary, high-performance One-VA information technology architecture aligned with our program/business goals that enables enterprise-wide data integration."¹

¹ Department of Veterans Affairs Enterprise Architecture Strategy, Governance and Implementation, August 2001.

When the One-VA EA is fully operational, veterans will observe some of the following changes:

- Veterans will feel that we know who they are.
- VA will be able to fully answer their questions about their specific issues.
- VA will effectively provide end-to-end services without frustrating them.
- Veterans will have access to our systems for their own needs.
- Veterans will believe that VA staff and systems are here to serve and honor them.

VA will implement a One-VA information framework supporting cost effective data integration and information sharing across program/business lines to provide a “single” source of consistent, reliable, accurate, timely, and secure information to veterans and their families, employees, and other stakeholders. VA information systems will be high-performance systems that meet or exceed exemplary standards in businesses and government agencies.

The One-VA EA is strategic. It provides guidelines and directions on what needs to be done, who will do it, and when it is to be completed. It contains sufficient detail to demonstrate that VA can and will, implement and use Enterprise Architecture in an effective manner to drive cross-functional integration across the Department. The One-VA EA will be institutionalized as the way in which information assets are planned, developed and managed at VA.

The One-VA EA is the “blueprint” for systematically defining and documenting the organization’s desired (target) environment. Development of the One-VA EA is an evolutionary process that spans multiple years. As a result, this Enterprise Architecture provides the overarching architectural guidance for this evolutionary process and the near term opportunities for incrementally evolving the baseline “as is” architecture to the target “to be” architecture.

Architectural principles for the One-VA EA establish the first tenets and related decision making guidance for designing and developing information systems. The Chief Enterprise Architect, in conjunction with the Chief Information Officer (CIO), the Information Technology Board (ITB) and the Enterprise Architecture Council (EAC), defined the following architectural principles that map to the organization’s IT vision and strategic plans. The One-VA EA must:

- be appropriately scoped, planned, and defined based on the intended use of the architecture.
- comply with the law as expressed in legislative mandates, executive orders, Federal regulations, and other Federal guidelines.
- facilitate technology change.
- support the VA Strategic Plan.
- facilitate architectural change.
- support a three-to-five year planning horizon.

- encourage standardized business processes and a common operating environment.
- develop and validate accurate architectural information.
- facilitate future data collection, storage and access.
- control incongruous technology.

1.2 Motivation: The Need for a One-VA Enterprise Architecture

VA, like many enterprises, has historically approached information technology and systems development vertically along program and organizational lines. This vertical focus within VA resulted in significant disconnects across the enterprise and hindered the presentation of a One-VA face to the Veterans in its business processes, data consistency and accessibility, efficiency and effectiveness.

These issues have become magnified in recent years as organizations rely more heavily on the use of Internet technology, experience high degrees of network interconnection, and increasingly shift to a more customer-centric focus. Although the World Wide Web (WWW) makes obvious the process and information discontinuities across the enterprise due to vertical implementations, it also provides a vehicle for presenting One-VA and streamlining support to Veterans.

The One-VA EA directly targets these issues for resolution, spanning organizational and programmatic boundaries to consider the implications of information technology to best support our business. Mandated by the 1996 Clinger-Cohen Act, Federal agency CIOs are charged with developing, maintaining and facilitating the implementation of an integrated Enterprise Architecture across their Department.

The One-VA EA presents a planned approach to the development of information technology horizontally across the enterprise, which fosters coordination and integration, and is fundamentally driven by the business needs of the enterprise. It fosters the evolution to a component orientation; an approach that facilitates easier, quicker responsiveness to changing business needs and advances in technology. This architecture identifies integration points and interdependencies between components that are driven by cross-functional business needs and executive management objectives. The One-VA EA is not a product or activity with a specific arbitrary end date; it is an ongoing activity intended to keep VA's IT contemporaneous with the critical needs of the Department's mission.

1.3 VA's Approach to Development of the One-VA Enterprise Architecture

Organization: The One-VA EA is a formal program initiated and endorsed by the Secretary of the Department of Veterans Affairs. As such, the program warrants a formal management structure, within the Office of VA's CIO, consisting of information technology experts, program/business experts, and technologists. The major component of this management structure is the Office of Chief Enterprise Architect led by the Chief Enterprise Architect. The Chief Enterprise Architect provides management and support

of the One-VA EA and reviews proposed projects for EA compliance. The term “compliance” when applied to One-VA EA is not binary but represents different degrees of alignment to the One-VA EA in terms of program/business objectives and technical standards.

The Chief Enterprise Architect reports to VA’s CIO. The Chief Enterprise Architect is responsible for leading the development of the One-VA EA and ensuring the integrity of the architectural development processes and the content of the EA products. The Chief Enterprise Architect is the ombudsman to the information technology and program/business line units, and ensures that program/business unit processes are emphasized in the One-VA EA. The Chief Enterprise Architect is also responsible for ensuring that the EA provides the best possible information and guidance to information technology projects and stakeholders, and that systems development efforts are properly aligned with program/business unit requirements.

The Chief Enterprise Architect is also the manager of the One-VA EA. In this role, the Chief Enterprise Architect has management responsibility for the EA program, with the authority, responsibility, and accountability for the overall EA effort. In this regard, the Chief Enterprise Architect is responsible for the planning, staffing, and the ultimate success of the EA program, including acquisition of sustaining funding, negotiating schedules, and the timely and accurate delivery of the EA products (or "artifacts").

Top Down Business Focused Approach: A fundamental tenet of VA’s approach to enterprise architecture is that it is top down and business focused. The One-VA EA is rooted in the needs of the major Enterprise Business Functions (EBFs) of the Department and of the needs of the Key Enabling Functions (KEFs) that are required to support those EBFs. EBFs are typically externally focused functions, involving direct interactions with Veterans across the enterprise, such as providing Medical Care, or Vocational Rehabilitation and Employment Benefits. KEFs, such as Finance and Accounting, are functions necessary to support the EBFs, and enable smooth operation of the overall enterprise, both internally and externally. The specific EBFs and KEFs addressed in this One-VA EA are presented in Chapter 2.

This initial population of the One-VA EA was completed under the guidance of the EAC and concentrated on several major activities:

- identifying business functions and data
- decomposing business functions and data
- identifying business processes
- integrating processes and data.

Products developed in these major activities are presented in the following chapters of the One-VA EA as outlined below.

Before presenting the results of the major EA development activities, Chapter 2 defines the scope of the One-VA EA as the primary authoritative resource within the Department

for enterprise Information Technology (IT). It details specifically how the One-VA EA will be used in key Department processes, defines mandatory compliance requirements for all IT projects throughout their life cycle, and discusses the One-VA EA correlation to project management oversight and project milestones.

Identify Business Functions and Data: This activity is aimed at identification and top-level definition of the EBFs and KEFs across the full scope of Department activities. To reduce ambiguity in interpretation of these EBFs and KEFs, definitions were developed for each function for the following reasons:

- to more easily identify duplication of activities.
- scope the breadth and responsibilities of these activities.
- provide sufficient understanding of the functions to recognize significant differences among and between apparently redundant functionalities.
- drive the decomposition to lower levels of detail where deemed necessary.

Chapter 3 describes VA's major EBFs and the KEFs with which these business functions are executed to carry out VA's primary mission 'to serve veterans and their families.' Major data classes were identified for each EBF and KEF along with motivation (e.g., internal and external business drivers, policies, law, regulations, performance measures), and location information.

Decompose Business Functions and Data: This activity further decomposed the EBFs and KEFs into sub functions and associated corporate data classes with each sub function. It further identified the manner in which each sub function utilized its associated data classes from the perspective of Create, Read, Update and Delete (CRUD). A refined list of EBFs and KEFs were decomposed to a sufficient level of detail to allow for identification of duplicate functions and data.

Chapter 4 presents the functional decomposition of each of the Department's EBFs and KEFs along with their associated data classes and the utilization of those data classes within the sub functions.

Identify Business Processes; Integrate Processes and Data: This activity identified business processes from the functional decompositions and descriptions of the EBFs and KEFs. In this context, a business process is identified as a thread through one or more sub functions to accomplish a specific task. In accomplishing this identification of business processes, a further refinement of sub functions and associated data classes is necessary to identify where redundancies exist in process, function or data classes. This also lends itself to the identification of redundant process and duplicate data across the baseline or "as is" state of the enterprise. This effort sets the stage to achieve VA goals of alignment, integration, change, and reduced time-to-market.

Based on the identification of redundant processes, functions or data an integration effort was undertaken to eliminate the redundancies wherever appropriate and establish integrated target or "to be" business processes and data. Ideally this effort would span

the entire breadth of the Departments processes. In this initial delivery of the One-VA EA however, priority was given to specific functional areas of strategic importance in the FY 2004 budget submission. These areas include both significant new initiatives and rebaselined existing efforts as follows; One-VA Registration and Eligibility (new initiative), Consolidated Contact Management (new initiative), Finance and Accounting (rebaselined), Telecommunications Modernization (rebaselined), Cyber Security Infrastructure (rebaselined), Corporate Data Center Integration with Continuity of Operations (COOP) (rebaselined), and the Health Data Repository (new initiative).

These selected key areas were subject to further refinement of the functional decomposition (with associated data classes) and process threads, and an integration effort to identify and eliminate redundancies. This allowed for an aggregation and regrouping of similar sub functions and associated data classes from a horizontal perspective across the Department to eliminate the redundancies and duplication. Refined process threads with their attendant sub functions and data classes were developed and comprise the allocated functional baseline. This allocated functional baseline is a precise functional definition of the scope to be addressed within new information systems. It provides the target horizontal perspective across the EBFs and KEFs integrating function, process and data. The results of this functional decomposition, the baseline or “as is” process identification, target or “to be” integrated process definition and the resulting functional allocation are presented in Chapter 4. The decomposition is presented enterprise wide and addresses all EBFs and KEFs. The functional allocation is also presented in the seven specific functional areas identified above as strategically important to the preparation of the FY 2004 budget submission. Subsequent updates to the One-VA EA will expand the scope of the allocated baseline to encompass more and more of the EBFs, KEFs and processes across the Department.

Chapter 5 describes the distributed systems architecture of the One-VA EA. It presents both the logical and physical distributed systems architecture beginning with the infrastructure layers of telecommunications, cyber security and corporate and regional data processing centers with intrinsic COOP capability. It then identifies the top level logical and physical perspectives of the applications and data layer for the major business lines of the Department. For both the infrastructure and the business-focused applications and data layer discussions in Chapter 5, the baseline or “as is” view and the target or “to be” view is presented.

Chapter 6 presents a sequencing plan for IT projects to implement the One-VA EA across the entire Department. It is developed not only from an architectural perspective but also reflects prioritization of efforts by the ITB and the Strategic Management Council (SMC).

In parallel with the activities focused on population of the Framework described above, a Technical Reference Model (TRM) and Standards Profile were also developed. This effort not only considered interoperation requirements within the Department, but also considered interoperation across other government Departments with which VA will routinely share information to include the Department of Treasury, the Department of

Defense, the Social Security Administration (SSA), and the Internal Revenue Service (IRS). The TRM and Standards Profile are provided as Appendices C and D of this document, respectively.

The allocated functional baseline, TRM and Standards Profile comprises a necessary and sufficient set of guidelines to achieve the goal of “an evolutionary, high-performance One-VA information technology architecture aligned with our program/business goals that enables enterprise-wide data integration.” Together they provide the architectural artifacts to define projects and their integration points with other elements in the overall architecture to achieve actual alignment, integration, change, reduced time-to-market, and convergence. These key products will be used to support Project Milestone Reviews for key new start projects contained within the Department’s FY 2004 Budget submission.

This One-VA EA will be evolved in multiple iterations. During these iterations specific functional areas will be prioritized for more in depth treatment based on the sequencing plan and on the evolving priorities of the Department. Initial focus is placed on the functional areas that have repeatedly been identified as strategically important to the Department.

1.4 The Zachman Framework for Enterprise Architecture

The VA Enterprise Architecture Innovation Team, established by the Secretary of Veterans Affairs and made up of VA senior management business line and information technology professionals, identified and adopted the Zachman Enterprise Architecture framework (Figure 1.4-1), to organize the One-VA EA. Consideration was given to the currently popular frameworks used to construct Enterprise Architectures. Several frameworks available were found to be robust enough to support the complexity inherent in the Department of Veterans Affairs and given strong consideration. The Zachman Framework was selected over all of the other frameworks considered for the following reasons.

- use of the Zachman Framework ensures compliance with the Office of Management and Budget (OMB) requirement that federal enterprise architecture frameworks document the linkages between the mission and goals of the organization, information, content, and information technology capabilities.
- the Zachman Framework also identifies and documents the program/business process, information flow and relationships, applications, data descriptions and relationships, and technology infrastructure as required by OMB.
- the Zachman Framework was found to be the most advanced, best understood, easiest to use, most supported, most accepted, as well as offering the most granularity, completeness, and flexibility; it was the unanimous choice of the VA Enterprise Architecture Innovation Team.

VA will derive the following benefits from using the Zachman Framework:

- improved information technology budget management/efficiencies.
- increased responsiveness to changing program/business and information technology conditions.
- improved communication between program/business and information technology that contributes to alignment necessary to achieve VA's mission.
- improved data sharing to those who have a need.
- fully documented and effective corporate repository.
- standardized technology and data across VA.

	DATA	What	FUNCTION	How	NETWORK	Where	PEOPLE	Who	TIME	When	MOTIVATION	Why	
SCOPE (CONTEXTUAL)	List of Things Important to the Business 		List of Processes the Business Performs 		List of Locations in which the Business Operates 		List of Organizations Important to the Business 		List of Business Goals/Strat 				SCOPE (CONTEXTUAL)
Planner	Entity = Class of Business Thing		Function = Class of Business Process		Node = Major Business Location		People = Major Organization		Time = Major Business Event		End Measure = Major Bus. Goal/ Critical Success Factor		Planner
ENTERPRISE MODEL (CONCEPTUAL)	e.g. Semantic Model 		e.g. Business Process Model 		e.g. Logical Network 		e.g. Work Flow Model 		e.g. Master Schedule 		e.g. Business Plan 		ENTERPRISE MODEL (CONCEPTUAL)
Owner	Ent = Business Entity Rel = Business Relationship		Proc = Business Process IO = Business Resource		Node = Business Location Link = Business Linkage		People = Organization Unit Work = Work Product		Time = Business Event Cycle = Business Cycle		Ent = Business Objective Measure = Business Strategy		Owner
SYSTEM MODEL (LOGICAL)	e.g. Logical Data Model 		e.g. "Application Architecture" 		e.g. "Database System Architecture" 		e.g. Human Interface Architecture 		e.g. Processing Structure 		e.g. Business Rule Model 		SYSTEM MODEL (LOGICAL)
Designer	Ent = Data Entity Rel = Data Relationship		Proc = Application Function IO = User Views		Node = DB Function / Resource / Process Link = Data Characteristics		People = Role Work = Deliverable		Time = System Event Cycle = Time Interval		Ent = Structural Assertion Measure = Assertion		Designer
TECHNOLOGY MODEL (PHYSICAL)	e.g. Physical Data Model 		e.g. "System Design" 		e.g. "System Architecture" 		e.g. Presentation Architecture 		e.g. Control Structure 		e.g. Rule Design 		TECHNOLOGY MODEL (PHYSICAL)
Builder	Ent = Signal/Value/Attr. Rel = Position/Type		Proc = Computer Function IO = Screen/Device Format		Node = Hardware/Software/OS/Obj Link = Line Specifications		People = User Work = Screen Format		Time = Event Cycle = Component Cycle		Ent = Condition Measure = Action		Builder
DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)	e.g. Data Definition 		e.g. "Program" 		e.g. "Network Architecture" 		e.g. Security Architecture 		e.g. Timing Definition 		e.g. Rule Specification 		DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)
Sub-Constructor	Ent = Field Rel = Attribute		Proc = Language Stmt IO = Control Block		Node = Address Link = Parameter		People = Quality Work = Job		Time = Interval Cycle = Execution Cycle		Ent = Sub-condition Measure = Step		Sub-Constructor
FUNCTIONING ENTERPRISE	e.g. DATA		e.g. FUNCTION		e.g. NETWORK		e.g. ORGANIZATION		e.g. SCHEDULE		e.g. STRATEGY		FUNCTIONING ENTERPRISE

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Figure 1.4-1 Zachman Framework

The Zachman Framework was derived from analogous structures found in the disciplines of Architecture and Construction of buildings, and in Engineering and Manufacturing. It classifies and organizes design artifacts created over the process of designing and producing complex physical products (e.g., buildings or airplanes.) The utility of such a classification scheme is to enable focused concentration on selected aspects of an object without losing a sense of the contextual, or holistic, perspective. In designing and building complex objects, there are simply too many details and relationships to consider simultaneously. However, at the same time, isolating single variables and making design

decisions out of context results in sub-optimization with all its attendant costs and dissipation of energy. The Zachman Framework as applied to Information Technology architectures seeks to manage this complexity and permit focus on key aspects of design, construction, deployment and operations without losing the broader context of the overall enterprise-wide IT perspective.

A balance between the holistic, contextual view and the pragmatic, implementation view can be facilitated by a framework with the characteristics of any good classification scheme that allows for abstractions intended to:

- Simplify for understanding and communication, and
- Clearly focus on independent variables for analytical purposes, but at the same time,
- Maintain a disciplined awareness of contextual relationships that are significant to preserve the integrity of the object.

It makes little difference whether the object is physical, like an airplane, or conceptual, like an enterprise. The challenges are the same. How do you design, build and change it piece-by-piece so that it achieves its purpose without dissipating its value and raising its cost by optimizing the pieces yet sub-optimizing the object?

The Zachman Framework (Figure 1.4-1) is a six-by-six matrix of perspectives and contains 36 cells describing aspects of any enterprise. Concerning the One-VA EA, each row of the Zachman Framework was used to capture the perspectives of different stakeholders in the architecture. The rows of the Zachman Framework can be mapped to the Operational, Systems and Technical Views of the C4ISR Architecture Framework as noted in the following paragraphs.

Row 1 of the Framework is titled Planner. It describes VA's vision and mission from the perspective of the VA Secretary in terms of the EBFs and KEFs that define the work of the Department. It is both motivated and constrained by legislation and other external and internal drivers. In completing Row 1 of the Framework, VA identified and defined the EBFs and KEFs and characterized them in terms of their major data classes, internal and external motivations, where they are performed and by whom, and any associated business cycle (schedule). Chapter 3 of the One-VA EA directly corresponds with the Planner's Top Level Scope as defined in the Framework. In this initial delivery of the One-VA EA, the *data*, *function*, *network* and *motivation* columns of the Planner's View were addressed for all EBFs and KEFs. These four columns were prioritized to support the FY 2004 budget submission as discussed earlier. *People* and *time* information will be added in subsequent updates.

Row 2 of the Framework is titled Owner. It describes VA's business processes from the perspective of VA line and staff managers. It is constrained by the planner's view in Row 1 and driven by VA business plans. In completing row 2 of the Framework, VA identified processes through the functions/subfunctions and associated data developed in row 1. Duplication and redundancy in subfunctions, processes and associated data were

identified. Through an allocation process duplication and redundancy were resolved to arrive at new definitions for the “to-be” subfunctions, processes and data from a horizontally integrated perspective. This formed the allocated functional baseline for new Information Technology systems. The Planner and Owner Views of the Zachman Framework map to the Operational View of the C4ISR Architecture Framework. Chapter 4 of the One-VA EA directly corresponds with the Business Owner’s View including the functional decomposition and functional allocation. In this initial delivery of the One-VA EA, the *data*, and *function* columns of the Business Owner’s View were addressed for all EBFs and KEFs. These two columns were prioritized to support the FY 2004 budget submission as discussed earlier. *Network, people, time* and *motivation* information at this level will be added in subsequent updates.

Row 3 of the Framework is titled Designer. It describes VA’s enterprise-wide logical information systems from the perspective of individual VA PMs. It is constrained by VA line and staff managers’ views in Row 2, driven by the VA’s ITB, and integrated by the Chief Enterprise Architect. In completing row 3 of the Framework, candidate projects from the Secretary’s Strategic Plan and the Under Secretaries and Assistant Secretaries will be identified and prioritized. The Designer’s View covers aspects of both the C4ISR Framework’s Operational and Systems Views. Chapter 5 of the One-VA EA presents a top-level logical view of the Distributed Systems architecture (both baseline “as is” and target “to be”), which corresponds directly to the Network column of row 3 in the Framework. Other elements of the Designer’s view will be added to the One-VA EA as projects proceed through execution and develop the appropriate architectural artifacts as will be discussed in Chapter 2.

Row 4 of the Framework is titled Builder. It describes VA’s information systems from the perspective of Information Technology and is the responsibility of VA PMs. It is constrained by VA PMs’ detailed functional and technical requirements baseline view and driven by industry ‘best-practices’ as documented in the VA TRM and Standards Profile. Chapter 5 of the One-VA EA presents a top-level physical view of the Distributed Systems architecture (both baseline “as is” and target “to be”), which corresponds directly to the Network column of row 4 in the Framework. Other elements of the Designer’s view will be added to the One-VA EA as projects proceed through execution and develop the appropriate architectural artifacts as will be discussed in Chapter 2.

Row 5 of the Framework is titled Subcontractor. It describes VA’s information systems from the perspective of information technology integrators and is the responsibility of VA PMs. The Builder and Subcontractor Views provide the technical detail that correlates to the C4ISR Framework’s Technical View.

Row 6 of the Framework is titled Functioning Enterprise. It is VA’s operating business functions and processes with their supporting information systems from the perspective of VA users, customers and other stakeholders. It is constrained by their roles and responsibilities and driven by VA objectives and performance measures. In completing row 6 of the Framework the in-service performance measures defined earlier in the

development and project management process will be captured throughout the operational life of the information system.

The columns in the Zachman Framework take the perspective of six foundational interrogatives or types of artifacts; what (*data*), how (*functions*), where (*network*), who (*people*), when (*time*) and why (*motivation*). From a theoretical perspective, John Zachman says, there is no underlying or cardinal order to the columns, but there are logical orders depending on purpose. Business and enabling functions are a point where many focuses converge. For example, the IDEF0 function modeling technique, a Federal Information Processing Standard (FIPS Publication 183) is frequently used in Rows 1 and 2 of the Framework. IDEF0 represents *data* (Column 1) as inputs to, controls of or outputs from *functions* (Column 2). It also represents *networks* (Column 3), especially in the information technology sense, as mechanisms to accomplish *functions*. Finally, it accommodates *motivation* (Column 6) as the purpose for function modeling and displays it prominently on an IDEF0 diagram. *Time* (Column 5) is intentionally not represented in the IDEF0 technique. Although *people* (Column 4) are represented as mechanisms, because organizations (like technology) are subject to frequent changes, they do not contribute significantly to stable models.

This approach embodied by IDEF0 as a modeling technique in Rows 1 and 2 illustrates a logical order of importance among the columns that is reflected in the VA approach. *Motivation* (Column 6) to accomplish the VA mission is a dominant focus along with *Function* (Column 2) as the means to accomplish it while *data* (Column 1) and *networks* (Column 3) follow in supporting roles. While *people* (Column 4) and *time* (Column 5) are important to the overall architecture, *motivation, function, data* and *network* (Columns 6, 2, 1 and 3) offer the greatest opportunities for the One-VA EA to positively affect VA's mission effectiveness in the near term and will therefore be the priority focus areas during initial One-VA EA efforts.

As the One-VA EA is developed through iterative, evolutionary updates, a significant body of information and knowledge will be amassed at multiple levels of detail. To be useful the appropriate subsets of this body of knowledge must be broadly accessible by the large body of people involved in each of the six rows of the Framework. EA tools will be needed to facilitate the development, maintenance, and communication of One-VA EA products; architectural artifacts. Since VA has selected the Zachman Framework for EA, the ideal tools or tool set needs to facilitate the development, maintenance and communication of all the products that VA may use to populate all 36 cells of the Zachman Framework. Preliminary evaluations of available products suggest that no one tool meets all these criteria.

The CIO Council² recommends that, "To increase the usefulness of any architecture, it is important to maintain the EA within an interactive architectural tool. Fortunately, there are many automated architecture tools available on the market today. The choice of tool should be predicated upon the organization's needs based on the size and complexity of

² CIO Council, A Practical Guide to Federal Enterprise Architecture, Version 1.0, February 2001,

its architecture. The Chief Enterprise Architect and architecture EAC core team may use tools (e.g., Microsoft's PowerPoint and Word) or high-tech tools (Rational Rose by Rational Corporation, Systems Architect by Popkin, or Framework by Ptech).”

While the One-VA EA team is conducting a tool evaluation, VA will use standard off-the-shelf products for these purposes. Development, maintenance and communication of the One-VA EA are all performed using Microsoft applications including Word, Excel, Access, PowerPoint, and Visio as recommended by the CIO Council. PowerPoint was used to quickly develop a Zachman Framework Portal that provides access to all VA architectural products for development, maintenance and communication. No existing EA products satisfied VA's need for a simple Zachman Framework interface to the architectural products. The Portal leverages our ability to manage One-VA EA artifacts produced in almost any tool in the short term while keeping our options open as new EA tools emerge and existing ones mature.