Department of Veterans Affairs

FY 2013-2015 Enterprise Roadmap

Office of Information and Technology

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EXECUTIVE SUMMARY

VA is in the midst of transforming itself into a high-performing 21st century organization—one that adapts to new realities, leverages new technologies, and serves a changing population of Veterans with renewed commitment. VA is transforming into a Veteran-centric environment focused on serving Veterans in a comprehensive, proactive manner and providing Veterans with high quality and efficiently delivered benefits and services. To achieve this transformation, VA is eliminating disparate stovepiped processes and systems and building a unified enterprise of integrated, interoperable business processes and technical services. Initially, VA will begin making improvements by coordinating and integrating across programs and organizations. The Veteran will be in greater control of how, when, and where they wish to be served and VA performance will be measured by the ultimate outcome for the Veteran.

This *VA Enterprise Roadmap* provides an integrated view of the mission and IT capabilities across VA that support this transformation. The Roadmap advances enterprise integration by collecting and aligning the strategic goals, objectives, and transformation plans of VA's Administrations—the Veterans Health Administration (VHA), Veterans Benefits Administration (VBA), and National Cemetery Administration (NCA)—along with the Office of Information and Technology (OIT). It describes the "as-is" and the "to-be" states of the business and technical layers of the VA architecture, as well as the transition strategies for achieving the "to-be" state.

This iteration of the *VA Enterprise Roadmap* reflects the evolution and progress of VA's Enterprise Architecture (EA) program over the past year. Further, this *VA Enterprise Roadmap* is coupled with the *VA Information Resources Management (IRM) Strategic Plan*, providing a much fuller picture not only of the EA program, but also of the IT and enterprise governance mechanisms it influences.

The *VA Enterprise Roadmap* is a living document. As the IT-driven transformations described herein mature and evolve, the Department will continue to refine the document and increase its level of insight into VA enterprise transformation. By making this information available to our Veterans, stakeholders, partners, and the public, VA hopes to improve its ability to serve better our nation's Veterans.

The VA Enterprise Roadmap proceeds in three major sections. Section I introduces the document purpose and use. Section II discusses VA's IT-driven transformation strategies, including enterprise-wide initiatives, health care and benefits delivery transformation efforts, and IT infrastructure support. Section III describes VA's enterprise architecture, the OneVA EA. Finally, a set of three appendices contain completed EA templates and an IT asset inventory required by OMB.

I INTRODUCTION

In response to changes in Veteran trends, the U.S. Department of Veterans Affairs (VA) is in the midst of a deliberate, long-term transformation. The Veteran population is increasing in diversity, and irrespective of where they live, they expect communications via the Internet and on mobile devices. Advances in technology, weaponry, and protective gear allow more Servicemembers to return from conflict with more complex injuries both physical and emotional. Fiscal constraints are driving a focus on new forms of partnership with other federal agencies and the public sector.[1]

To adapt to these realities, VA is leveraging new technologies to better serve a changing population of Veterans and their changing expectations. To guide this transformation, as stated in the *VA FY 2014-2020 Strategic Plan*, VA has established three strategic goals.[2] Many aspects of the transformation to achieve these goals are cultural challenges as VA seeks to build an organization that is *people-centric, results-driven,* and *forward-looking*.

These goals focus the Department on opportunities to directly improve the lives of our Veterans through the alignment and improvement of VA-provided services resulting in greater overall Veteran satisfaction with VA. At the heart of this transformational vision is an alignment of strategic direction, business process operations, technology, and data. Achievement of that alignment will enable VA to better meet Veterans needs by delivering the right information to the right people, at the right place, at the right time.

The *VA Enterprise Roadmap* is an appendix to both the *VA FY 2014-2020 Strategic Plan* and the *VA Information Resources Management (IRM) Strategic Plan*.

- The ***VA Strategic Plan*** communicates to agency managers, employees, delivery partners, suppliers, Congress, and the public a vision for VA's future. VA's strategic goals and objectives guide decision-making to improve VA in the short-term while positioning the Department to be able to respond to the challenges and opportunities it may face in the next 15-20 years. The plan is a critical input into the Department's Planning, Programming, Budgeting and Execution process (PPBE), which informs decision-making about the need for major new acquisitions, information technology, strategic human capital planning, evaluations, and other evidence-building investments. The VA Strategic Plan supports planning across organizational operating units.

[1] *Department of Veterans Affairs FY 2014-2020 Strategic Plan*, March 06, 2014
[2] Ibid

- The ***VA IRM Strategic Plan***, together with the ***VA Enterprise Roadmap***, describes how VA IRM activities align to and support VA's transformation to accomplish VA's mission more efficiently and effectively. The *VA IRM Strategic Plan* describes how it supports the VA Strategic Plan and how VA governs IT investments and aligns information resources to deliver a world-class, event-driven architecture that supports proactive administration of VA benefits. In addition, the *VA IRM Strategic Plan* documents how VA's IRM activities help accomplish VA's mission and ensure that IRM decisions are integrated with organizational planning, programming, budgeting, and execution (PPBE); procurement; financial management; human resources management; and program decisions to provide continuous improvement in value.

Figure illustrates the relationship among key strategic planning documents and provides summary descriptions of the *VA Strategic Plan*, the *VA IRM Strategic Plan*, and the *VA Enterprise Roadmap*. The reader will find clear traceability between the *VA Strategic Plan* and the *VA Enterprise Roadmap*.

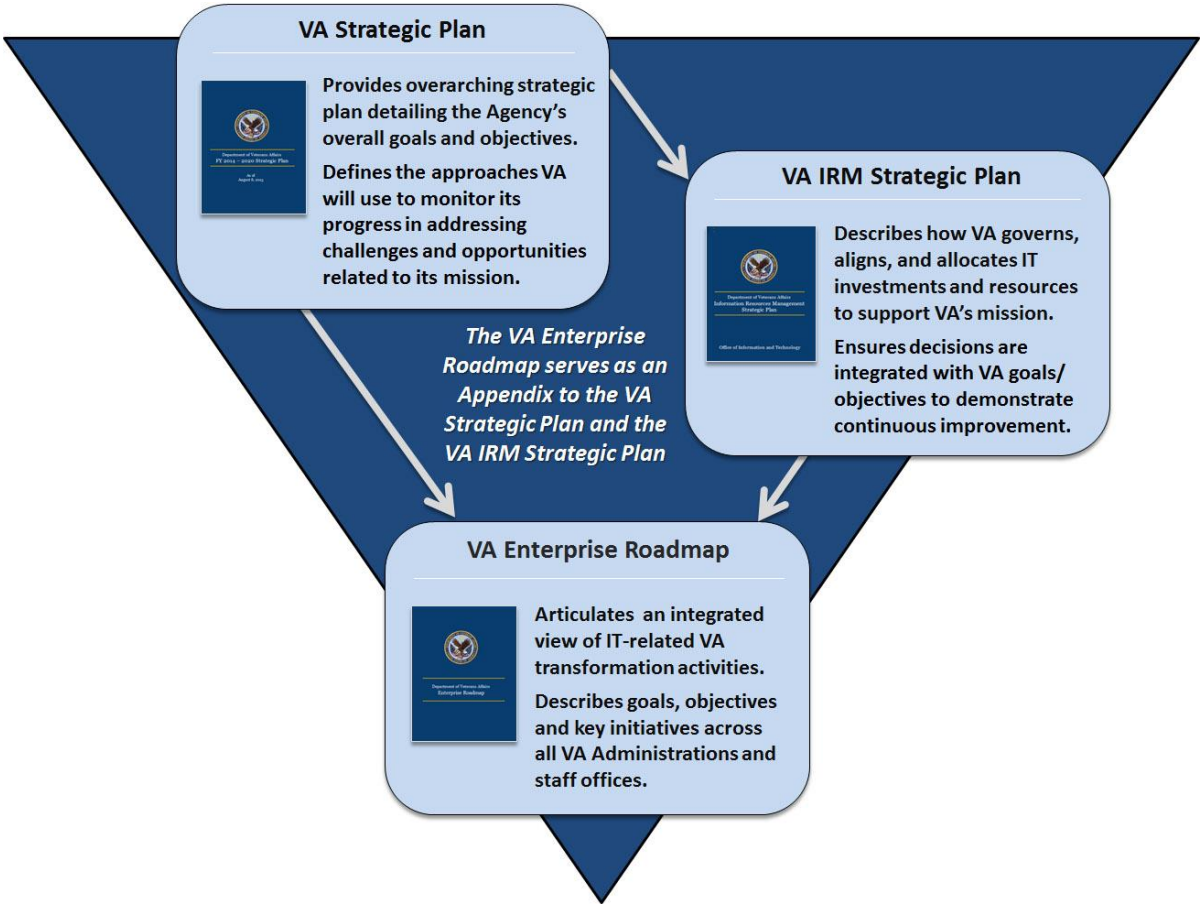

Figure – Relationship among Key Strategic Planning Documents

The *VA Enterprise Roadmap* provides an integrated view of Department transformation plans to support decision making among the most senior levels of Administration leadership. This integrated view supports a shift from a siloed culture of redundant processes, data, systems, and infrastructure to optimally-integrated processes, data, systems, and infrastructure. The result of this intended shift will help improve delivery of services to Veterans and make more effective use of taxpayer dollars. In addition, the *VA Enterprise Roadmap* facilitates communication across the Administrations and staff offices and affirms their strategic and operational commitments.

The *VA Enterprise Roadmap* is structured to cover transformational plans that cut across the enterprise as well as plans that focus on Health Care and Benefits Delivery, and the supporting plans for IT Infrastructure and Enterprise Architecture. Additionally, the Roadmap is designed to dovetail with individual program and project plans in all these areas. As VA evolves to a greater level of integration over time, the Roadmap will reflect that trajectory for greater integration, as well as facilitate establishment of additional VA capabilities and provide a more complete view of VA transformation.

This iteration of the *VA Enterprise Roadmap* is the Department's first effort to construct a consolidated view of transformation efforts across VA in the same way that enterprise architecture is constructed around current state ("as-is" view) and future vision ("to-be" view). It describes the status of VA's Enterprise Architecture (EA) program and details for the Department's most critical segments. This Roadmap also details how VA is beginning to formalize enterprise architecture and understand how it can effectively guide and constrain transformation. VA's EA program, the OneVA EA—itself an enterprise-wide initiative—is a critical tool in documenting the alignment across transformation efforts and providing critical decision-support information to VA leadership and process owners tasked with driving those transformation efforts.

> *Only an enterprise-wide architecture can provide an integrated view of strategic, business, and technology domains across all lines of business, services, and systems – which is key to optimizing mission capabilities and resource utilization. At present, there is no other management best practice, other than EA, that can serve as a context for enterprise-wide planning and decision making.*[3]

[3] *Common Approach to Federal Enterprise Architecture*, OMB, May 2, 2012, *Document Link*

How to Use the *VA Enterprise Roadmap*

The *VA Enterprise Roadmap* provides a consolidated, comprehensive picture of VA's current IT-driven transformation plans and serves as an internal check on the efficacy of our efforts. It captures what is currently "on the books." As such, it is more a reflection of cumulative multi-year efforts [the results of the planning process] than any specific year's plan. The *VA Enterprise Roadmap* is also the primary external vehicle available to Congress, the Office of Management and Budget (OMB), the General Accountability Office (GAO), and the public providing visibility and context into the Department's IT transformation. The Roadmap is a key strategic artifact that contains valuable information for use by leadership at multiple levels across VA. Table contains a short description of the possible use of the *VA Enterprise Roadmap* for specific VA roles.

Table – Purpose and Use of the *VA Enterprise Roadmap* by VA Position

Position	Enterprise Roadmap Purpose and Use
Deputy Secretary	Provide to VA a comprehensive view of the Department's enterprise transformation and report on progress to OMB
Administrations' Leaders	Reflect their participation in business capability transformation, within the context of change across the full agency, through Administration-specific and enterprise-wide IT activities
CIO	Demonstrate alignment of transformational IT programs and initiatives to VA strategic goals and objectives (transformation programs and initiatives encompass both mission applications and the supporting infrastructure)
Administrations' Architects	Ensure integration of Administrations' architectures to the OneVA EA Represent the Administrations' current and future views of its business and technology environment from an architecture perspective Present a transition plan to show the sequence of actions needed to implement the *IRM Strategic Plan*
Administrations' Program Managers	Reflect Administration program information to verify alignment to VA strategic goals and objectives Increase awareness of programs and initiatives across the enterprise to leverage existing capabilities, identify gaps, and avoid overlaps
VA Chief Enterprise Architect	Increase awareness of the value of Enterprise Architecture—through its linkage of strategy, business, and IT—for the sake of advancing service to the Veteran Integrate and streamline Department reporting

The *VA Enterprise Roadmap* addresses OMB's requirement that federal agency[4] Chief Information Officers (CIOs) submit an annual Enterprise Roadmap that provides insight into the state of agency transformation.

[4] Note that when used in the context of OMB, the term "agency" refers to the Department of Veterans Affairs as a whole.

1 VA Strategic Goals and Objectives

VA's FY 2014-2020 strategic goals and strategic objectives shift the focus from improvements within a service or benefit delivery program to coordination and integration across programs and organizations, measuring performance by the ultimate outcome for the Veteran, and putting the Veteran in control of how, when, and where they wish to be served. This will result in a more Veteran-centric VA. The FY 2014-2020 strategic goals are statements of what VA wants to achieve to advance its mission and address challenges and opportunities. Each strategic goal is reinforced by a set of strategic objectives to express more specifically how each strategic goal will be achieved. Table provides the *VA FY 2014-2020 Strategic Plan*[5] goals and a brief description of each.

Table – VA FY 2014-2020 Strategic Plan Goals

Strategic Plan Goal	Brief Description
Empowering Veterans to Improve Their Well-being	VA will work to ensure Veterans are empowered, independent, self-sustaining, and well equipped for civilian life
Enhance and Develop Trusted Partnerships	VA recognizes the importance of, and embraces, the opportunities to work with other Federal agencies, state and local governments, tribal organizations, Veterans Service Organizations (VSOs), Military Service Organizations (MSOs), labor unions, nonprofits, and private industry to better serve Veterans and eligible beneficiaries
Manage and Improve VA Operations to Deliver Seamless and Integrated Support	Demonstrate alignment of transformational IT programs and initiatives to VA strategic goals and objectives (transformation programs and initiatives encompass both mission applications and the supporting infrastructure)

All the transformational efforts in the Department align to one or more strategic goals and objectives. Graphical figures are provided throughout the VA Enterprise Roadmap indicating where a transformational program addresses a specific strategic objective or objectives.

Figure presents the VA Strategic Plan Framework. The graphic depicts the Department's Strategic Goals along with their corresponding Strategic Objectives, the Agency Priority Goals (APGs), Guiding Principles, Trends, and the Department's Core Values.

[5] *Department of Veterans Affairs FY 2014-2020 Strategic Plan*, March 06, 2014

Figure – Department of Veterans Affairs Strategic Plan Framework[6]

[6] *VA Strategic Plan Framework*, 14 January 2014

1.1 Agency Priority Goals

Agency Priority Goals (APGs) support VA's Strategic Plan by focusing on near-term targets for Agency execution that advance VA's comprehensive Strategic Goals and objectives. OMB defines an APG as supporting "improvements in near-term outcomes, customer service, or efficiencies, and advances progress toward longer-term, outcome-focused strategic goals and objectives in the agency's Strategic Plan. It is a near-term result or achievement that VA leadership wants to accomplish within approximately 24 months that relies predominantly on agency execution to be accomplished, not new legislation or additional funding. Agency Priority Goals reflect the top implementation-focused, performance improvement priorities of agency leadership and the Administration, and therefore do not reflect the full scope of the agency mission."[7]

The *VA FY 2014-2020 Strategic Plan* reaffirms the Department's commitment to achieve the three APGs for FY 2014-2015 that represent the Secretary's highest priorities for short–term and high-impact improvement in VA mission performance. Each of the APGs is focused upon improving direct service delivery to Veterans and eligible beneficiaries. Specific programs that support achievement of these APGs are discussed in Chapter 2, Enterprise-wide Initiatives. The APGs for FY 2014-2015 are described below in Table .

Table – APGs for FY 2014-2015[8]

Agency Priority Goal	Brief Description
Improve Veteran Access to VA Benefits and Services	Improve client and stakeholder awareness of, and access to, VA benefits and health care services. By September 30, 2015, VA will maximize the use of virtual service options by increasing the number of claims received electronically and by increasing the number of accredited Veterans service officers registered on the Stakeholder Enterprise Portal. By increasing the number of registered eBenefits users and by increasing the percent of patients who access VA health care using a virtual format such as video telehealth or online services, VA will continue its progress toward virtualization of claims processing.
Eliminate the Disability Claims Backlog	Improve accuracy and reduce the time it takes to complete disability benefit claims. Eliminate the disability claims backlog and process all claims within 125 days with 98% accuracy in 2015.
Eliminate Veteran Homelessness	VA, in partnership with the Department of Housing and Urban Development (HUD), has reduced the homeless Veteran population from an estimated 75,600 in 2009 to approximately 57,849 by latest count in January 2013, a 23 percent improvement.[9]

[7] OMB Circular No. A–11 (2013), *Section 250 – Agency Priority Goals*
[8] *VA FY 2014-2020 Strategic Plan*, March 6, 2014
[9] The 2013 "Point-in-Time Estimates of Homelessness", Volume I of the 2013 Annual Homeless Assessment Report

1.2 OIT Strategic Goals, Objectives and Priorities

As defined in the VA Functional Organizational Manual,[10] the VA Office of Information and Technology (OIT) is responsible for providing IT support across the Department. IT plays a key role in VA's transformation; therefore, it is crucial for OIT's strategic goals and objectives, presented in Figure , to support VA's strategic goals and objectives.

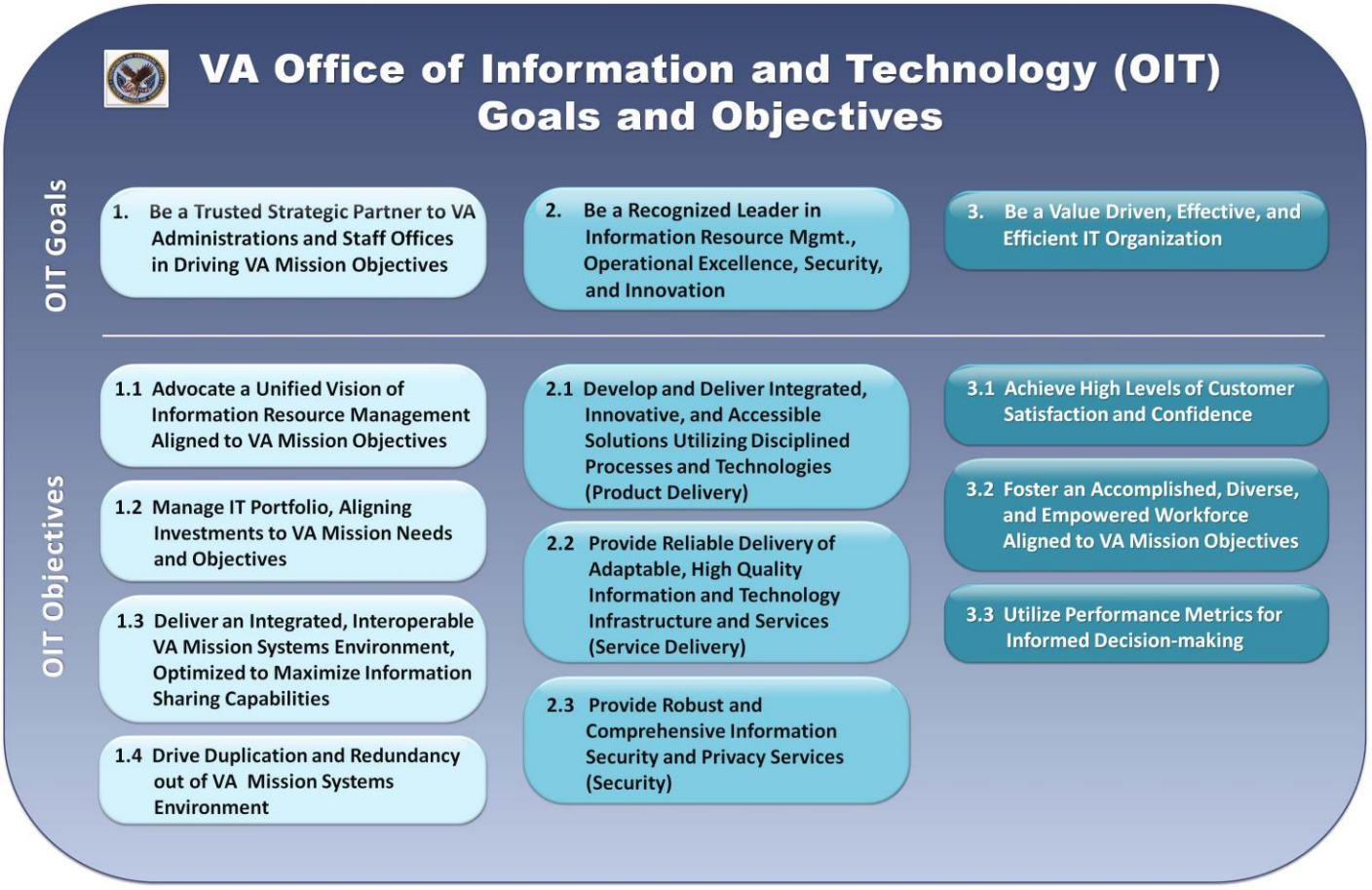

Figure – OIT Goals and Objectives

These goals and objectives focus OIT on serving the Veteran (i.e., Veteran-centric) as a provider of available, adaptable, secure, and cost-effective technology services. These goals and objectives are driven by the CIO's five strategic priorities that mirror the Secretary's vision to transform VA into an organization that is people-centric, results-driven, and forward thinking. Table provides a summary of those priorities.

[10] *VA Functional Organization Manual*, version 1.2, December 2013

Table – CIO Strategic Priorities

Priority	Description
Customer Service	Customer service is OIT's number one organizational priority and is crucial to maintaining and improving OIT's relationships with its clients. Ensuring a high-level of committed and responsive IT support, keeping VA's IT systems secure, and furnishing employees with access to high performing IT products are key to sustaining OIT's mission to provide and protect the information necessary to enable excellence through client and customer service.
Next Generation Information Security	Through next generation information security, OIT is committed to meeting the highest standards in protecting sensitive Veteran and employee information. VA is executing several projects to enhance information services to Veterans, improve compliance with legislation and regulations, and increase security awareness for the user community.
Product Delivery	Product delivery concerns proactively managing VA's IT projects. To this end, OIT established a formal process for project management. OIT's Project Management and Accountability System (PMAS) was created to ensure delivery of functionality that meets IT business needs and improves VA's ability to provide benefits and services to our Nation's Veterans.
Transparent Operational Metrics	Transparent operational metrics focus on system availability and response times, which are key indicators to VA's customers in quantifying how OIT is performing and where improvement is needed.
Fiscal Management	To help meet the rising demand for IT services despite budget constraints, OIT is leveraging some tools that will help manage all IT assets and projects with full transparency and efficiency. The Budget Tracking Tool (BTT) is an integrated, enterprise-wide budget management and reporting system that supports OIT's current and future spending plans. PMAS, discussed above, allows for the recognition of insufficient resources and, therefore, stops failing IT projects in the beginning stages.

II VA Enterprise Transformation

Throughout its history, VA has been organized and optimized to administer specific benefits that have been authorized by Congress to eligible Veterans and their dependents. Today, VA has three separate Administrations delivering services and benefits to Veterans and their beneficiaries. VHA is responsible for delivery of health care. VBA is responsible for delivery of cash benefits for programs that include insurance, education, home loans, disability compensation, pension, and vocational rehabilitation services. NCA is responsible for delivery of burial and memorial benefits. The challenge facing VA is one of building necessary integration between the services and capabilities provided to Veterans. This integration will provide better, more seamless service delivery to Veterans (thus meeting their expectations in today's information technology-driven consumer environment). It will also improve the Department's internal operations.

VA has started taking major steps to integrate service and capability delivery across the Department. In FY 2007, VA went from decentralized information technology services to centralized information technology services. In FY 2010, the Department focused transformation activities around a series of major initiatives—many of which cut across Administration boundaries to deliver enterprise-wide capabilities. In FY 2012, the VA's enterprise architecture program was revived with the re-establishment of the OneVA EA. Each of these activities has resulted in significant improvement in VA's ability to understand and address the Department's challenges from an enterprise-wide perspective.

This *VA Enterprise Roadmap* is VA's first complete description of the status of all VA IT-driven transformations in a single document. This section (II) presents that transformation organized as follows:

- **Chapter 2** presents the enterprise-wide initiatives that are driving integrated capabilities across VA.
- **Chapter 3** presents IT supported transformation of health care delivery. This chapter largely presents mission-specific activities of VHA.
- **Chapter 4** presents IT supported transformation of benefits delivery provided by VBA and NCA.
- **Chapter 5** details the transformation of VA's underlying IT infrastructure that supports delivery of all VA capabilities and services.

2 Enterprise-wide Initiatives[11]

To achieve VA transformation objectives and continue to provide new and improved capabilities, the supporting information environment must move from a disparate environment of stove-piped systems to a unified environment. VA information technology capabilities will evolve to satisfy emerging customer service/customer empowerment expectations of both VA customers and its employees to produce the following outcomes:

1. An ability to leverage technology advances in the way data is created, shared, and used, thereby enhancing the speed of decision-making, improving effectiveness and the information security posture
2. More transparency of cost and value, and a related effort to minimize cost risk while maximizing value and technical capability
3. Greater flexibility to quickly respond to business demand
4. A clear set of objectives for integration and interoperability within VA

Within VA, there was significant diversity in the implementation of initiatives across the various Administrations, which continues to affect the IT computing environment inherited by the consolidated CIO organization in 2006. Due to the capital-intensive nature of a major re-design of the IT computing environment, VA has had to be very selective in choosing where to drive commonality across the IT information environment. The first iteration of enterprise capabilities was driven by the 16 Major Initiatives (MIs), instituted in FY 2010. Many of these initiatives had VA-wide, cross-Administration implications. These MIs have evolved into a smaller set of initiatives aligned to larger, more mission-focused portfolios.

Today, a variety of enterprise-wide initiatives (EWIs) are in place driving VA-wide capabilities that serve to integrate service delivery to Veterans, supported by seamless information sharing amongst trusted partners across the service delivery. These initiatives span the breadth of VA tackling the underlying causes of both poor interoperability and slow response to key technological challenges. A number of initiatives were initially built upon existing programs and offerings specific to an Administration, but have recently been adopted on an enterprise-wide level. The EWIs described in this chapter enhance coherence across several areas—making data visible, accessible, and understandable to all involved parties. In addition, the EWIs support VA moving beyond “point-to-point” exchanges of information and strict interoperability across systems, to the broader need to share information on the “many-to-many” front, regardless of systems and organizational boundaries. The EWIs promise to foster cross-fertilization not only within the program but also across the VA enterprise.

[11] For the purpose of the VA Enterprise Roadmap, an enterprise-wide initiative addresses significant issues or develops new capabilities or solutions that affect the entire Department by integrating across programs. Enterprise-wide initiatives address specific significant problems at the Department level, across a well-bounded set of customers and stakeholders.

2.1 Introduction

Currently, VA has a number of enterprise-wide initiatives designed to improve the quality of services it provides to Veterans. The Enterprise-wide initiatives exemplify the transformation of VA from building monolithic systems-based operations and technology transfer programs to an organization that is enterprise focused and market driven.

The enterprise-wide initiatives discussed in the following sections are:

- Veterans Relationship Management (VRM)
- Eliminate Veteran Homelessness (EVH)
- Integrated Electronic Health Record (iEHR)
- Customer Data Integration (CDI)
- Identity and Access Management (IAM)
- Enterprise Shared Services (ESS)
- Enterprise Mobility Strategy (EMS)
- Federal Initiatives:
  - Open Government Initiative
  - Federal Digital Government Strategy
  - Open Data Initiative

Each enterprise-wide initiative supports VA as a department and impacts people, processes, and technology.

2.2 Veterans Relationship Management (VRM)

The VRM program was established as an enterprise-wide, multi-year initiative to improve Veterans' secure access to benefits and services delivered through the VBA, in partnership with the VHA and the NCA. A key VRM priority is to enhance compensation delivery and pension claims processing, supporting VA's goal to reduce the claims backlog. VRM provides consistent, user-centric access that will improve Veterans', their families', and their agents' self-service experience through a multi-channel customer relationship management approach. VRM is designed to improve the speed, accuracy, and efficiency in which information is exchanged between Veterans and VA, regardless of the communications method (phone, web, email). VRM focuses on modernization of voice telephony, unification of public contact representative desktops (Unified Desktop), implementation of Identity Access Management (IAM), development of cross VA knowledge management systems, implementation of Customer Relationship Management systems (CRM), and integration of self-service capabilities with multiple communication channels.

During FY 2013, VRM continued to expand VA's ability to "know the Veteran." These efforts led to enhancements to minimize the number of instances where a Veteran must identify and authenticate themselves, both in person and in the self-service (online and telephonically) space, as well as increased the Veterans' capability to access and update their data. In addition, VRM implemented integrated electronic claim processing for compensation, streamlined e-

claims processing for Veterans Service Organizations (VSOs) and third party Medical Examiners, and streamlined call center capabilities.

For FY 2014 and FY 2015, it is intended for VRM to continue to expand self-service capabilities and improved authorization and authentication, while continuing to stretch across business line, enabling an enterprise approach to service delivery to the Veteran. VRM has dependencies and or relationships with two additional enterprise-wide initiatives, IAM and CDI.

2.3 Eliminate Veteran Homelessness (EVH)[12]

The focus of the Eliminate Veteran Homelessness initiative is on acquiring safe housing, needed treatment services, opportunities to return to employment, and benefits assistance. The EVH initiative is built upon six pillars, where each pillar represents a level of integrated services provided by VA directly to, or through cooperative partnerships for, Veterans and their families who are homeless or at risk of being homeless. The six pillars include: (1) outreach and education, (2) treatment, (3) prevention, (4) housing and supportive services, (5) income, employment, and benefits, and (6) community partnership. These six pillars encompass a wide continuum of interventions and services.

Homeless Veterans will benefit from the expansion of existing programs and treatment services, as well as the implementation of new programs such as Supportive Services for Veteran Families that are focused on homelessness prevention and increased access to permanent housing with supportive services.

In October 2012, a clinical reminder to assess homelessness vulnerability was launched to the field. Additionally, Homeless Management Information Service (HMIS) Repository enhancements were delivered in FY 2013 that improved data quality, streamlined the process for uploading documents, and created a more user-friendly process for uploading documents and managing passwords. The Veteran Re-Entry Search Service (VRSS) increment delivered in July 2013 added the capability of court systems to inquire about a Veteran's status. Support to Veterans also includes mental health stabilization, substance abuse disorder treatment services, enhancement of independent living skills, vocational and employment services, and assistance with permanent housing searches and placements. Because of VA's multifaceted efforts, Veteran homelessness has declined by 23 percent since 2009[13]. The EVH initiative has an association with the CDI enterprise-wide initiative.

[12] *VA Strategic Plan to Eliminate the Compensation Claims Backlog*, VBA, 25 January 2013
[13] Homeless Research Institute, *The State of Homelessness in America 2012*, National Alliance to End Homelessness sponsored research report.

2.4 Integrated Electronic Health Record (iEHR)[14]

In 2009, President Barack Obama charged the Departments of Veterans Affairs (VA) and Defense (DoD) to establish a concurrent method by which active and retired Servicemembers could access their health records. Specifically, VA and DoD were called upon to "work together to define and build a seamless system of integration so that when a member of the Armed Forces separates from the military, he or she will no longer have to walk paperwork from a DoD duty station to a local VA health center. Their electronic records will transition along with them and remain with them forever." The Interagency Program Office (IPO) was established in October 2011 to lead both departments in this effort and to develop and implement an integrated electronic health record capability.

The Secretary of the Department of Veterans Affairs and the Secretary of the Department of Defense, in accordance with Section 713 of the FY 2014 National Defense Authorization Act (Public Law No: 113-66), are jointly collaborating to ensure that the electronic health record systems of the departments are interoperable with an integrated display of data, or single electronic health record, that complies with the national standards and architectural requirements identified by the IPO. Additionally, the departments are planning to deploy modernized electronic health record software supporting clinicians no later than December 31, 2016.[15] Therefore, the departments will apply the following design principles to this interoperable electronic health record solution:

- Transition the current data exchanges to modern, open-architecture frameworks
- Application of national data standards or adoption of data articulation from the Health Data Dictionary
- Use of enterprise investment strategies that ensure robust competition and best value
- Application of aggressive life-cycle sustainment planning
- Enforcement of system design transparency, continuous design disclosure and peer reviews that align with the Federal Acquisition Regulation (FAR)
- Application of data management rights and strategies to ensure a level playing field
- Achieve generation 3 level or better health information technology by system deployment
- Provide a health data authoritative source accessible by multiple providers with standardized data input
- Ensure patients' ability to receive their medical records electronically

[14] *VistA Evolution Program Plan*, version 1.20, October 24, 2013
[15] FY 2014 National Defense Authorization Act (Public Law No: 113-66), SEC. 713. *Electronic Health Records of the Department of Defense and the Department of Veterans Affairs*

- Establish a secure, remote, network-accessible computer storage system, accessible to medical providers of the Departments, where Armed Forces and Veteran personnel can upload their health care records as desired

In recognition of the increasing costs and risks emerging from the current implementation path to develop a single, joint, common, integrated Electronic Health Record (iEHR) by 2017, the Secretaries of VA and DoD announced on 5 February 2013 that the departments would accelerate the delivery of iEHR through focus on near-term interoperability goals. The IPO was directed to focus on three major interoperability accelerators:

1. Complete work on identity management (IdM), which was concluded in May 2013 with the decision to utilize a single joint identifier for interdepartmental interoperability, the DoD Electronic Data Interchange Personal Identifier (EDIPI), supported by joint business rules.
2. Deploy the JANUS graphical user interface (GUI) to seven additional locations and expand use at two existing locations by July 31, 2013 and develop a plan to incrementally deploy a common GUI to additional DoD and VA sites.
3. Federate VA and DoD health data including VA's mapping to clinically endorsed standards at the appropriate data level.

The Secretary of VA also announced that the Department would achieve the 2014 Initial Operational Capability (IOC) milestone by deploying an iEHR Core based on the Veterans Health Information Systems and Technology Architecture (VistA), the current VA EHR system. Subsequently, the Secretary of Defense announced the decision to move forward with a competitive acquisition to determine the iEHR Core product with the intent of replacing their current EHR.

These decisions resulted in a redirection in implementation for achieving the iEHR goals and objectives. Under this revised implementation direction, VA is programmatically responsible for managing and delivering enhancements to VistA under the VistA Evolution Program; DoD is programmatically responsible for managing and delivering its EHR modernization program named DoD Healthcare Management System Modernization (DHMSM); and IPO is programmatically responsible for managing and delivering the seamless sharing of interoperable health data between the departments. Both departments' future electronic health record systems are required to be consistent with the proposed iEHR technical architecture principles established by the IPO, to ensure seamless interoperability.

iEHR has dependencies and/or relationships with many Enterprise-wide initiatives, including Veterans Relationship Management, Customer Data Integration and Identity Access Management, and Enterprise Shared Services.

2.5 Customer Data Integration Initiative (CDI)

CDI is a new initiative designed to harmonize and sequence the exchange and use of digital information within VA's computing environment and between VA and its mission partners in the delivery of benefits to Veterans. Today, the ability of VA to integrate capabilities and services provided to Veterans is hindered by a legacy environment in which the same or similar information about Veterans is gathered and stored in multiple places. This data decentralization and lack of an authoritative common data source can require the Veteran to re-enter duplicate information in multiple applications.

While this redundancy and lack of data integration is often manifest as multiple overlapping databases, the root cause is typically business process-centric. Recognizing this, CDI efforts are focusing on the development of an enterprise-wide foundation—policies, governance, processes, and services—to manage customer data as a Department asset. These efforts are helping to lay the groundwork for establishing and sharing authoritative common data across the enterprise through: (1) development of policies that define how common information is collected, used, safeguarded, archived, and deleted; (2) institution of business and data integration processes; and (3) implementation of unified standards for data representation (leveraging unstructured data design elements and NoSQL (Not Only SQL) constructs).

Within the CDI initiative, leadership from across the Department's Administrations and staff offices have come together to first gain a clear picture of existing VA processes and data flows, as well as capabilities, and then to address them in a systematic manner. The EA team is playing a lead role in this effort, using this commitment as the mechanism to leverage leadership across VA to build out the Department's existing process and data architecture. This represents a huge opportunity to engage every organization within VA in both the development and use of EA while simultaneously addressing a critical need of the Department. CDI has a dependency on and/or relationship with all of the enterprise-wide initiatives.

2.6 Identity and Access Management (IAM)

The ability of VA to rapidly search, identify, and authenticate who is accessing its information systems is a critical aspect of meeting Department-wide and Federal Government information security mandates. The IAM supports key VA business services and capabilities to provide a longitudinal view of Veterans or beneficiaries electronic records for health and benefit delivery and services. VA has a responsibility to ensure that critical data is protected in both a secure and consumable manner. IAM services streamline the way VA manages and uses identity services to support our client population by consolidating, extending, and implementing the usage of credentials to control access to resources. This is crucial in order to enable trusted collaboration and secure information exchange across the enterprise, and with external partners and affiliates, thereby ensuring that all VA stakeholders provide the right information to the right person through appropriate access in a timely manner.

The VA Administrations are in the early stages of analyzing business rules to share Veteran identity, and the IAM is planned for inclusion in the CDI initiative. The IAM initiative has a relationship with and/or dependency on the VRM, CDI, and ESS enterprise-wide initiatives.

2.7 Enterprise Shared Services (ESS)

As VA transforms from system-specific solutions toward a unified environment that promotes integration of enterprise capabilities and information, the establishment of ESS will advance organizational interoperability and agility through the reuse, interoperability, and governance of services across internal and external organizational and program boundaries. This approach to shared services promotes the standardization, reuse, interoperability, and composition of the best available capabilities developed under the auspices of any system to meet business and mission requirements. Thus, the service can focus on solving business and mission problems. In addition, the accelerated retirement of outdated legacy systems and processes as required by *the Ruthless Reduction Task Force* (RRTF) is enabled and facilitated by ESS.

The ESS vision is for information exchanges crossing VA organizational boundaries to be leveraged through ESS conforming to open standards and vendor-agnostic principles to transition vertically integrated systems to reusable services and capabilities. A shared ESS/Service Oriented Architecture (SOA) infrastructure, which will support service federation with Mission Partners, will be established and foster common operation and uniformity of shared services across the enterprise.

ESS program scope includes all facets of program lifecycle, i.e., planning, programming, budgeting, requirements management, acquisition, development and testing, certification and accreditation, deployment, provisioning, and sustainment. ESS has dependencies on and/or relationships with the CDI and FDGS enterprise-wide initiatives.

2.8 Enterprise Mobility Strategy (EMS)

VA employees and Veterans must be connected to data and applications in order to collaborate and communicate when they are mobile. To support this Veteran-centric need, VA has released several mobile applications and application programming interfaces, and launched the va.gov/developer website, which is a hub for sharing resources with intra- and inter-agency developers as well as the public. Furthermore, VA has dozens of mobile applications in various states of production to provide fast, efficient delivery of services to Veterans, their caregivers, physicians, the VA workforce, and the American public.

VA mobile platforms are designed to the highest mobile security and privacy standards available. Accordingly, VA will incorporate new federal security requirements being developed by the Department of Homeland Security (DHS), DoD, and the National Institute of Standards and Technology (NIST) for mobile and wireless services into its enterprise policies and procedures. This includes the Mobile Application Reference Architecture (MARA) being developed by VA OIT.

Additionally, VA's Section 508 Compliance Office promotes efforts to provide accessibility for all VA digital services and VA's Customer Service Plan that supports improvements to delivery of services to Veterans. The VA workforce and external customers are inputs into VA's mobile strategy. For instance, Mobile Blue Button and MyHealth***e***Vet focus on providing Veterans with tools for reading, using, and sharing personal health information with their providers and others they whom trust.

2.9 Federal Initiatives

This section discusses White House-mandated initiatives intended to raise awareness of federal agency missions and promote collaboration with the public and among the agencies. These initiatives were designed to increase accountability, promote informed participation, and create economic opportunity across all cabinet-level departments. The Federal initiatives discussed in this section include: (1) Open Government, (2) Federal Digital Government Strategy Initiative, and (3) Open Data.

2.9.1 The Open Government Initiative[16]

The Federal Government is committed to creating an unprecedented level of openness across the federal agencies. VA has opened a window into its mission, which has fostered a greater understanding of VA data and the impact of that data on the Veteran. Creating a more transparent and collaborative VA is critical to achieving enterprise transformation and reinforcing VA's long-term success. Open Government empowers the Veteran to hold VA accountable and to participate in its improvement.

To fulfill the vision of the White House, VA developed an Open Government Plan.[17] The Plan outlined VA's strategy to become more transparent, Veteran-inclusive, and collaborative. VA made a wealth of information in open formats available online, participated in Data.gov, and fostered an atmosphere of openness that led to agency-wide successful ventures such as Open Government Employee Innovations and Open Government Employee Forums. VA is also improving its data collection and management processes to reduce a redundancy of efforts as well as the number of data repositories. VA regularly offers Veteran-centric information and datasets at VA Data Catalog. Currently, more than 470 datasets from VA reside on this site. A recent contribution included more than 50 datasets for Veterans' gravesite locations in the 50 states and U.S. territories, with the concurrent release of an Application Programming Interface, or API (the Nationwide Gravesite Locations API) on VA's developer hub.[18]

[16] OMB Memorandum M-10-06, *Open Government Directive*, December 8, 2009, Document Link
[17] Department of Veterans Affairs, *Open Government Plan*, June 2010, Document Link
[18] *Digital Government Strategy Report for the Department of Veterans Affairs*, 5 May 2013, Version 1.1, Web Link

2.9.2 Federal Digital Government Strategy Initiative

The President issued a Memorandum on May 23, 2012, entitled *Building a 21st Century Digital Government.* This Federal Digital Government Strategy (FDGS) sets out to accomplish three things (by May 2013): [19]

- Enable the American people and an increasingly mobile workforce to access high-quality digital government information and services anywhere, anytime, on any device
- Ensure that as the government adjusts to this new digital world, we seize the opportunity to procure and manage devices, applications, and data in smart, secure and affordable ways
- Unlock the power of government data to spur innovation across our Nation and improve the quality of services for the American people

In planning Veteran-centric services, VA implemented initial digital capabilities according to FDGS Milestones to deliver better digital services to Veterans, their families, and stakeholders as well as the VA workforce. Examples of the way that VA has responded to the FDGS are:

- Making high value services (such as the Veterans Affairs National Facilities Locator) available through open application programming interfaces (APIs)
- Making customer-facing mobile applications (such as the Move Coach Mobile application and Information application) publicly available
- Using social media (Facebook and Twitter) to inform Veterans and their beneficiaries
- Standardizing on recommended web performance analytic tools and customer satisfaction metrics tools for analysis and ease of aggregation
- Focusing Veterans' web experience increasingly through a single portal

To enhance the VA's ability to improve Veterans' access to VA services and capabilities via the Internet, VA has installed the General Services Administration (GSA)-provided Digital Analytics Program (DAP) tool, a custom version of Google Analytics Premier, which provides web performance metrics. The DAP tool provides customized dashboards to help VA track, compare, and analyze customer use of its websites and provide data to inform leadership decisions regarding improvements to VA sites and service delivery. The DAP tool has been implemented on all of VA's primary websites, with plans for phased expansion to secondary websites, as those sites are updated with the Department's new user interface in VA's content management system.

[19] OMB, *Digital Government: Building a 21st Century Platform to Better Serve the American People*, May 23, 2012, Web Link

VA uses the program Foresee to collect customer satisfaction metrics through online surveys. While the GSA provided DAP to agencies at no cost for use in gathering web performance metrics, there is not yet a government-wide tool for collecting and reporting the requested baseline customer satisfaction metrics.

Table outlines all of the milestone actions, from the FDGS milestone list, for which VA is responsible. VA's detailed response to each milestone is covered in the Digital Government Strategy Report for the Department of Veterans Affairs.[20]

The FDGS Initiative has a relationship and/or dependency with enterprise-wide initiatives, VRM, EVH, CDI, IAM, and ESS.

[20] VA Digital Strategy Home Page, April 04, 2014

Table – VA Digital Strategy Milestones

Milestone	Owner	Milestone Action Fulfillment	Due Date	Status		
				Not Started	In Progress	Completed
1. Make Open Data, Content, and Web APIs the New Default						
1.2	Agencies	Ensure all new IT systems follow the open data, content, and web API policy and operationalize agency.gov/developer pages.	5/23/2013		X	
2. Make Existing High-Value Data and Content Available through Web APIs						
2.1	Agencies	Engage with customers to identify at least two existing major customer-facing services that contain high-value data or content as first-move candidates to make compliant with new open data, content, and web API policy.	8/23/2012			X
2.2	Agencies	Make high-value data and content in at least two existing major customer-facing systems available through web APIs, apply metadata tagging and publish a plan to transition additional high-value systems.	5/23/2013			X
4. Establish Intra-Agency Governance to Improve Delivery of Digital Services						
4.2	Agencies	Establish an agency-wide governance structure for developing and delivering digital services.	11/23/2012			X
5. Shift to an Enterprise-Wide Asset Management and Procurement Model						
5.2	Agencies	Develop an enterprise-wide inventory of mobile devices and wireless service contracts.	11/23/2012			X
5.3	Agencies	Evaluate the government-wide contract vehicles in the alternatives analysis for all new mobile-related procurements.	5/23/2013			X
6. Deliver Better Digital Services Using Modern Tools and Technologies						
6.3	Agencies	Ensure all new digital services follow digital services and customer experience improvement guidelines.	5/23/2012			X
7. Improve Priority Customer-Facing Services for Mobile Use						
7.1	Agencies	Engage with customers to identify at least two existing priority customer-facing services to optimize for mobile use.	8/23/2012			X
7.2	Agencies	Optimize at least two existing priority customer-facing services for mobile use and publish a plan for improving additional existing services.	5/23/2013			X
8. Measure Performance and Customer Satisfaction to Improve Service Delivery						
8.2	Agencies	Implement performance and customer satisfaction measuring tools on all .gov websites.	1/22/2013			X

2.9.3 The Open Data Initiative

VA has made several non-sensitive public data sets available for download through its open data catalog at On-line VA Data Catalog in both machine-readable download formats as well as application programming interfaces for real-time consumption for developers. New data releases across the Department are coordinated by the Data Governance Council. A sampling of current data from VA includes:

- **Patient Satisfaction Surveys**: These survey results offer a snapshot of the quality of care provided at VA health care facilities. The report includes information about waiting times, staffing levels, infection rates, surgical volumes, quality measures, patient satisfaction, service availability and complexity, accreditation status, and patient safety. Multiple data sources from across VHA were used to create this data set.
- **Veterans Benefits and Compensation:** This data set provides a count of the number of Veterans receiving disability compensation or pension payments from the VA. The information is reported at the county level, by age group and by percent disability rating, for each state, plus recipients in Guam, the Philippines and Puerto Rico
- **Geographic Distribution of VA Expenditures:** This data set shows estimated VA expenditures for major programmatic areas by geographic area (state, county, and congressional district). The major programmatic areas are, Compensation and Pension, Readjustment (Education) and Vocational Rehabilitation, Insurance, Construction, Medical Care, and Administrative.
- **GI Bill Benefits Data:** This list of GI Bill schools, which contains additional details about each institution relevant to Veterans such as Yellow Ribbon Status, has already been "mashed up" with the Department of Education. Data on these same schools will power VA's open source GI Bill Comparison Tool.

VA is committed to meeting data transparency requirements and has a plan for data prioritization and release as well as quarterly milestones for implementation per *OMB M-13-13*, *Open Data Policy--Managing Information as an Asset.*[21] VA is committed to providing Veterans and the public with high priority data that is clear, concise and easy to use.

[21] OMB Memorandum M-13-13, *Open Data Policy—Managing Information as an Asset*, May 9, 2013, Document Link

2.10 Enterprise-wide Initiative Milestones

Figure provides an overview of the current milestones and projected schedules of the enterprise-wide initiatives described in Chapter 2.

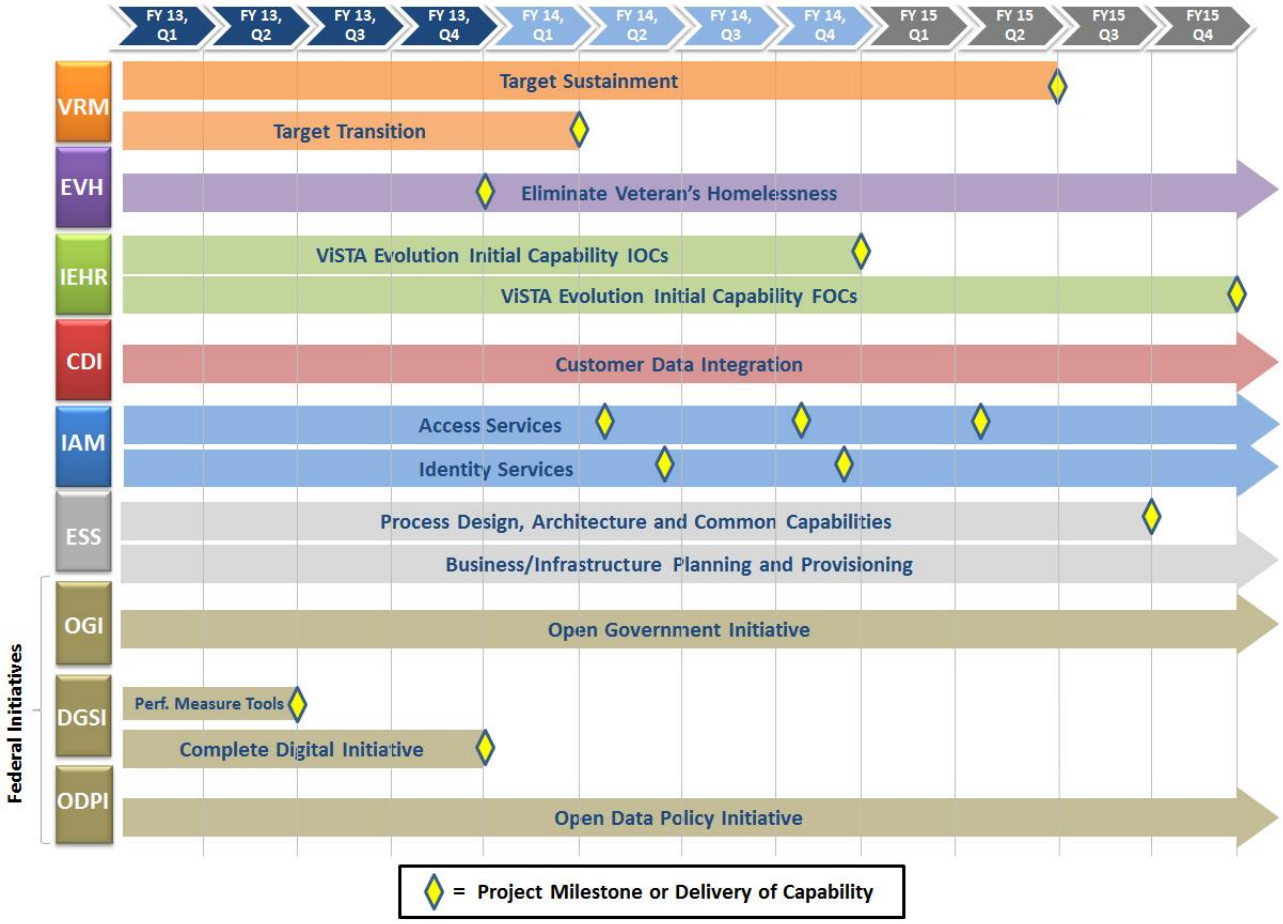

Figure – Enterprise-Wide Initiatives Milestones

2.11 Enterprise-Wide Initiatives Alignment to VA Strategic Goals and Objectives

Figure below shows the alignment of the Enterprise-wide initiatives to the VA FY 2014-2020 strategic goals and objectives. A checked box in the table reflects where an initiative is providing or developing a capability that will advance the achievement of that specific VA strategic objective. These initiatives support the achievement of VA's FY 2014 – 2020 strategic goals and APGs that serve as a platform to transform VA into a 21st century organization.

VA Strategic Plan Goals and Objectives	Enterprise-Wide Initiatives									
	VRM	EVH	iEHR	CDI	IAM	ESS	OPEN GOVERNMENT	FDGS	OPEN DATA	EMS
Goal 1 *Empower Veterans to Improve their Well-being*										
Obj. 1.1 Improve Veteran Wellness and Economic Security		✓								
Obj. 1.2 Increase Customer Satisfaction Through Improvements in Benefits and Services Delivery Policies, Procedures, and Interfaces	✓			✓	✓			✓		✓
Goal 2 *Enhance and Develop Trusted Partnerships*										
Obj. 2.1 Enhance VA's Partnership with DoD	✓		✓				✓			
Obj. 2.2 Enhance VA's Partnerships with Federal, State, Private Sector, Academic Affiliates, and Non-Profit Organizations			✓	✓			✓			
Obj. 2.3 Amplify Awareness of Services and Benefits Available to Veterans Through Improved Communications and Outreach							✓			✓
Goal 3 *Manage and Improve VA Operations to Deliver Seamless and Integrated Support*										
Obj. 3.1 Make VA a Place People Want to Serve										
Obj. 3.2 Evolve VA IT Capabilities to Meet Emerging Customer Service/Empowerment Expectations of Both VA Customers and Employees				✓		✓	✓	✓	✓	✓
Obj. 3.3 Build a Flexible and Scalable Infrastructure through Improved Organizational Design and Enhanced Capital Planning								✓	✓	
Obj. 3.4 Enhance Productivity and Improve the Efficiency of the Provision of Veteran Benefits and Services			✓							
Obj. 3.5 Ensure Preparedness to Provide Services and Protect People and Assets Continuously in Time of Crisis										

Figure – Enterprise-Wide Initiatives and Programs Alignment to VA Goals and Objectives

3 Health Care Delivery

3.1 Introduction

Through the health care services provided by the Veterans Health Administration (VHA), backed by the claims evaluation and processing capabilities provided by other organizations in the Department, VA strives to provide Veterans with "the best care anywhere." [22] To accomplish this, VA's VHA maintains and manages a comprehensive, integrated portfolio that provides patient-centered care, team care, and the highest quality care to all Veterans using a data-driven, evidence-based approach. VHA is increasingly focused on health promotion, disease prevention, public health, and creating health care value by reducing cost while maintaining and improving quality. Finally, the Administration is committed to continuous improvement as a core operating principle.

In order to meet the expectations of Veterans and their families and to provide business leaders the information needed to keep up with the growing demand for its services, VHA has been undergoing a major transformation that is people-centric, results-oriented, and forward-looking and will ensure total lifelong engagement with Servicemembers, Veterans, and their families and survivors.

3.1.1 Mission and Vision[23]

The mission of the VHA is to "Honor America's Veterans by providing exceptional health care that improves their health and well-being." VHA's vision of how to achieve this mission is "…to continue to be the benchmark of excellence and value in health care and benefits by providing exemplary services that are both patient-centered and evidence-based." These services "…will be delivered by engaged, collaborative teams in an integrated environment that supports learning and discovery." The VHA vision "emphasizes prevention and population health" and "contributes to the Nation's well-being through education, research, and service in national emergencies."

3.1.2 VHA Strategic Goals

VHA goals serve as the primary guide for planning, budgeting, performance management, and alignment and address VA's strategic imperatives. VHA Strategic Planning Guidance for FY 2013-2018 is produced by the VHA Office of Policy and Planning, which continues to work with partners throughout VHA and VA to achieve greater alignment among the various planning activities across the organization.[24]

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[22] Longman, Phillip, *Best Care Anywhere: Why VA Health Care is Better Than Yours*, March 2012, 3rd Edition
[23] *VHA Strategic Plan FY 2013-2018*
[24] Signed Under Secretary for Health Cover Memorandum, *Strategic Planning Guidance FY13-18*, October 31, 2012

VHA's goals are:

1. Provide Veterans personalized, proactive, patient-driven health care
2. Achieve measurable improvements in health outcomes
3. Align resources to deliver sustained value to Veterans

VHA goals and objectives are designed to advance VA's APG to improve Veteran access to VA benefits and services. Figure below shows the relationship between the Business Functional Framework (BFF) Lines of Business (LOB), VHA Goals and Objectives, and VA Strategic Goals.

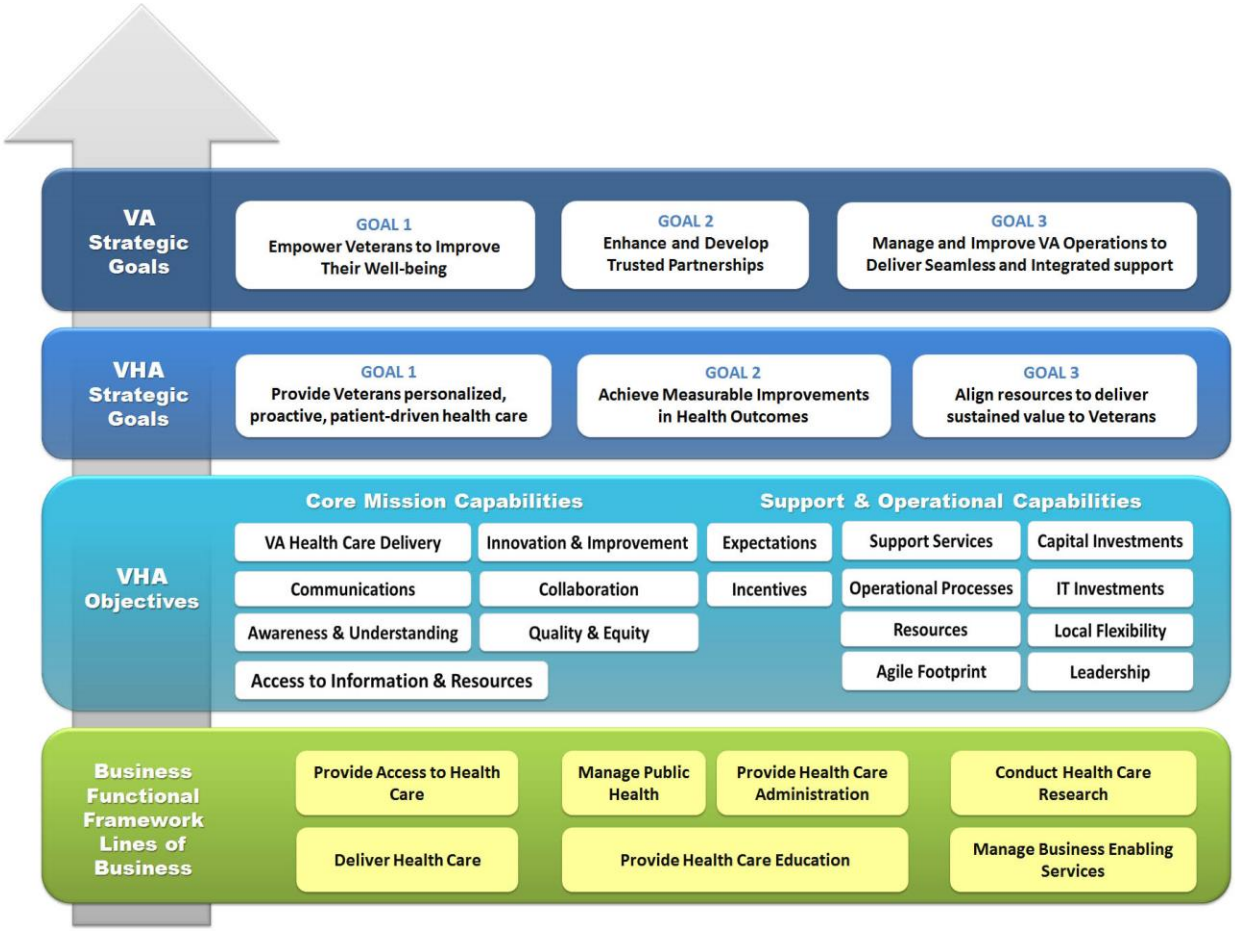

Figure – VHA Strategic Functional Alignment

In support of the Department's strategic goals, VHA continues to develop strategic forward-looking approaches that align with the Department. A summary of VHA's objectives and their alignment with VA strategic goals and objectives is illustrated in Figure .

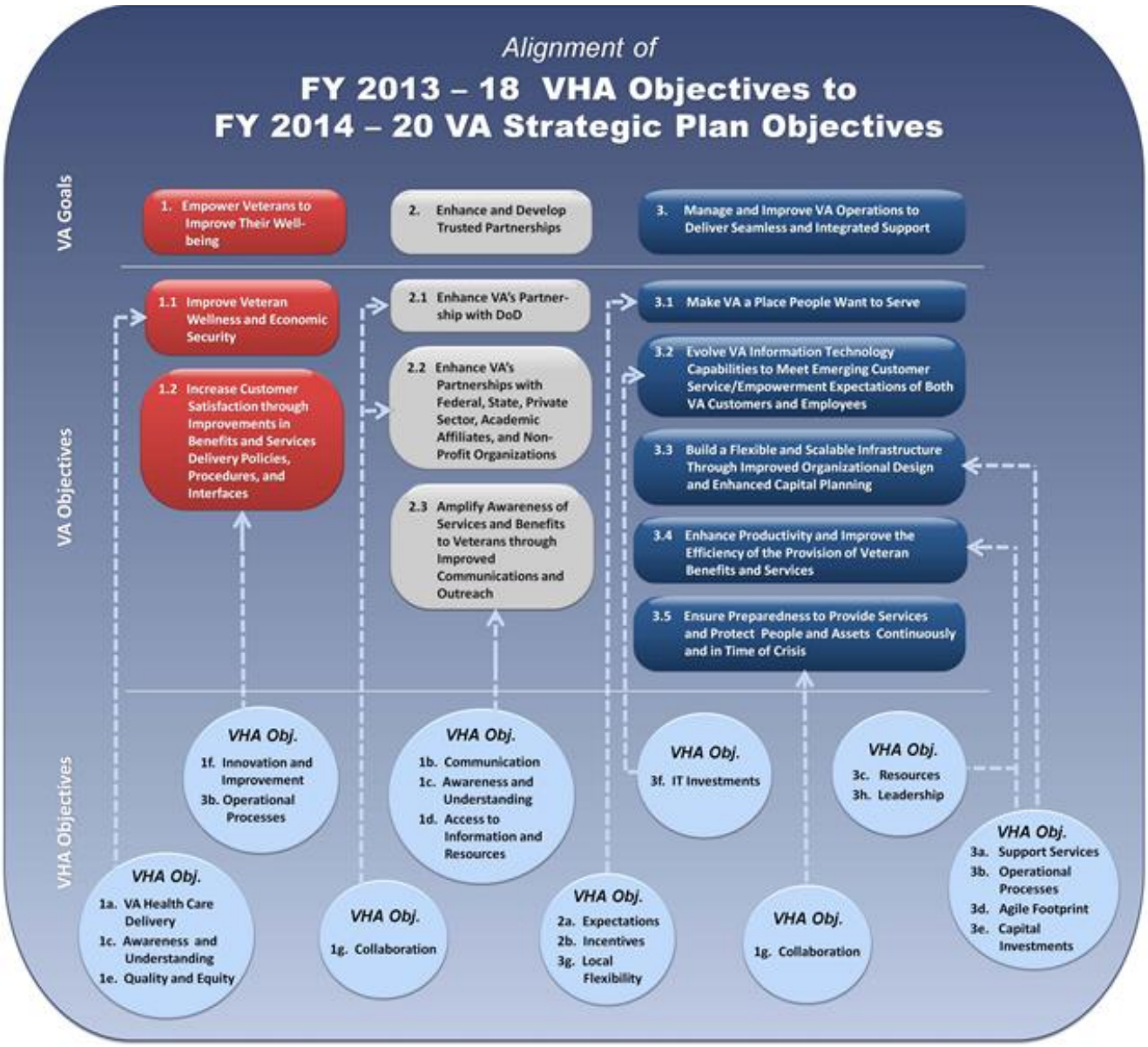

Figure – VHA Strategic Plan Objectives Alignment with VA Strategic Goals and Objectives

The VHA Health Information Strategic Plan (HISP) describes the strategic direction for health information technology (HIT) within VHA as a whole, rather than the strategic direction of a particular organization within the Administration. The HISP identifies and aligns strategic and tactical drivers, as well as priorities for the Under Secretary for Health. Furthermore, it allows VHA to look at trends emerging in the HIT space, identifies opportunities to leverage evolving technologies, serves to guide the VHA and Health Segment Architecture, and informs the

Health Care Transformation Roadmap as illustrated in Figure .[25] The VHA Office of Informatics and Analytics, Strategic Investment Management, Business Architecture (BA) Service is responsible for the development and maintenance of the VHA Strategic Architecture, a comprehensive series of artifacts that describe "why VHA does what it does," including developing and maintaining the HISP.

Figure – HISP Scope and Context

[25] *Health Information Strategic Plan Fiscal Year 2014 – 2018*, Version 2.2, December 2013

3.2 Current Environment

VHA is the Nation's largest integrated health care system, with 6.5 million unique patients (supporting a health care system with 8.8 million enrollees).[26] VHA is a recognized leader in providing high quality and cost-effective health care and serves as the largest direct-care provider for homeless citizens in the United States. VHA remains among the largest providers of health professional training in the world and operates one of the largest and most effective research organizations in the United States.

In the 1990s, VHA and the rest of the health care industry in America made a dramatic transformation from hospital-centered care to a system-emphasizing primary and aligned specialty care. Private health care providers everywhere realigned, restructured, and reduced operating costs to improve their competitive positions. Over the period from FY 2011 through FY 2013, VHA has made significant progress in transforming the delivery of health care in VA.[27]

As a public system, VHA faced increased demands for accountability, more readily demonstrable effectiveness, and greater efficiency. At the same time, it maintained its mission of health profession education, research, and emergency preparedness.

VA implemented new innovative practices to improve Veterans' access to health care and to provide care to more than 6 million unique patients, such as telemedicine and mobile clinics. The VHA commitment to delivering timely, high-quality health care to America's Veterans while controlling costs remains a top priority.[28]

Figure shows the locations of the original 23 regional Veterans Information Services Networks (VISNs), which include the 151 VA Medical Centers throughout the United States. More than 65 percent of all physicians in the U.S. currently practicing medicine have trained in VA facilities.[29]

[26] Volume II, Medical Programs & Information Technology Programs, Congressional Submission, FY 2014 Funding and FY 2015 Advance Appropriations Request
[27] Department of Veterans Affairs *FY13 Integrated Health Operating Plan*, August 15, 2012
[28] *VistA 4 Product Plan DRAFT v1.5*, October 24, 2013
[29] Volume II, Medical Programs & Information Technology Programs, Congressional Submission, FY 2014 Funding and FY 2015 Advance Appropriations Request

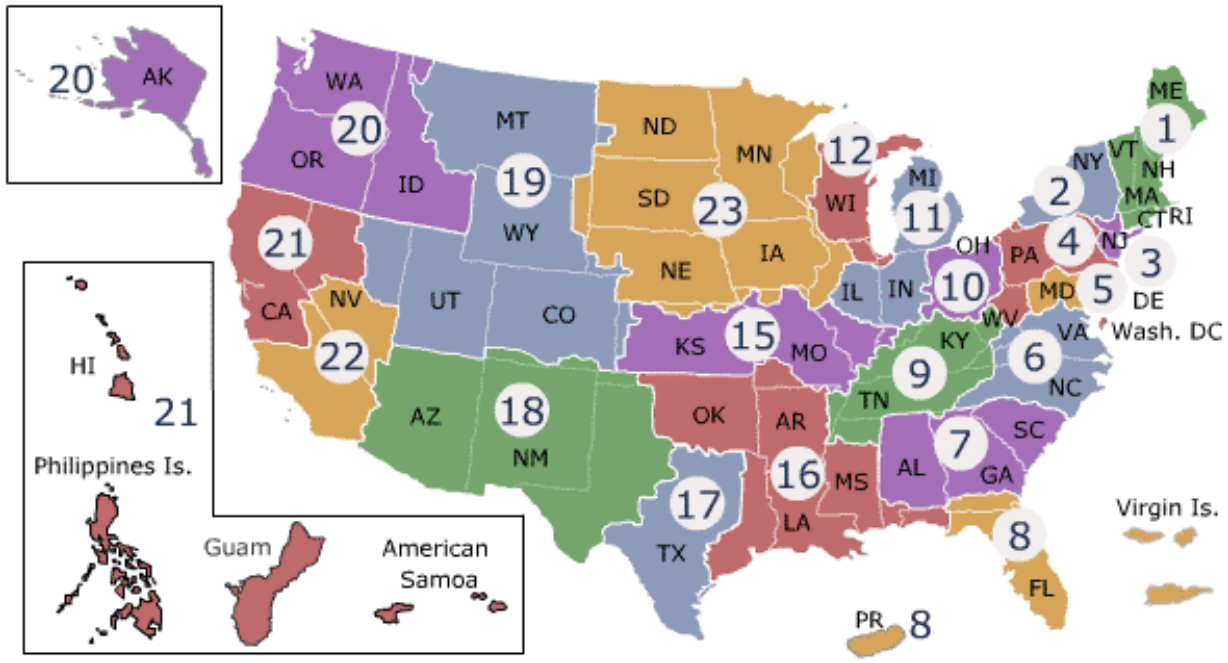

Figure – VHA VISNs

VHA's transformation began with fundamental changes to management and structure. In 1995, VHA established 23 regional networks and charged each one with conducting daily operations and decisions affecting hospitals, clinics, nursing homes, and Vet Centers located within their regions. These regional networks (called VISNs) remain the fundamental units for managing, funding, and ensuring accountability. Two VISNs were recently absorbed into others, reducing the total to 21.

3.2.1 Veterans Health Information Systems and Technology Architecture (VistA)

VistA is a single, integrated system for providers serving all VA hospitals, medical centers, community living centers, outpatient clinics, mobile clinics, and other VA venues. VA manages 130 instances of VistA to support health care. VistA supports the daily operations of one of the world's largest health care enterprises, encompassing:

- Over 6 million patients, with 75 million outpatient visits and 680,000 inpatient admissions
- More than 1,500 sites of care, including 151 Medical Centers, 820 Community-Based Outpatient Clinics (CBOCs), 135 Community Living Centers, and 300 Vet Centers[30]
- 244,000 employees including more than 20,000 physicians and 53,000 nurses

[30] *VA FY 2014 – 2020 Strategic Plan*, March 6, 2014

- Affiliations with more than 1,200 educational institutions with more than 100,000 health care students receiving clinical training from VA each year[31]

Every clinical encounter is tracked and supported by the VistA Electronic Health Record (EHR). Large VA Medical Centers (such as those in San Francisco, Houston, and Tampa) each maintain databases of more than 80 million orders and handle approximately 25,000 new orders each weekday. VistA also has other non-EHR functions including email and other capabilities running at VA facilities across the U.S. and in the Philippines, Guam, and Puerto Rico. For Veterans who receive care at multiple VA facilities, medical data can be aggregated and reviewed. VistA supports this scalability without modifications to its software.

VA is the nation's largest provider of graduate medical education and a major contributor to medical and scientific research. VA medical centers are affiliated with more than 152 medical and dental schools, training more than 80,000 health-related students and residents each year. More than half of the U.S. practicing physicians receive training in VA hospitals and are familiar with VistA. Through its internal research and its academic affiliations, VA supports significant clinical and scientific research and VA provides more public data about quality and safety than any other health care system (see, for example, VA Hospital Comparison site). The data that VistA captures and organizes is the platform that supports this broad spectrum of work.

In 1996, VistA was significantly enhanced with a new graphical user interface (GUI) called Computerized Patient Record System (CPRS). CPRS is VistA's flagship clinical user interface that allows providers to update a patient's medical history, review test results, submit orders, and access patient health information from any VA medical center or clinic. In addition to providing a presentation layer in step with the needs of its users, CPRS serves as an umbrella program that integrates numerous existing programs for the clinical user. The system is the core of VA's current EHR and is accessible across all settings—inpatient, outpatient, operating rooms, emergency rooms, long-term care, and even in patients' homes.

In the 1990s, VA began to reduce the number of its VistA instances by integrating multiple VistA instances, thus reducing the number of disparate EHR databases. As a result, a Veteran could receive care at more than one location, and the content of his EHR—including clinical reminders and other clinical alerts—would be available at facilities served by this new single, integrated VistA instance.

A 2010 VistA Modernization Working Group Report of the American Council on Technology, Industry Advisory Council found that VistA is the "best health information system in the world, bar none."[32] At the same time, the report found that VistA is very old, hard to manage and

[31] *VistA as an EHR System Core*, A whitepaper prepared in response to the Department of Defense Medical Electronic DoD Integrated Core System (MEDICS) Request for Information (HT0012-RFI-0008), February 27, 2013
[32] American Council on Technology, Industry Advisory Council, *VistA Modernization Working Group Report*, May 4, 2010

manipulate, and expensive to maintain. An October 2010 report by Carnegie Mellon University, entitled *The VistA Ecosystem: Current Status and Future Directions*, states that "it is possible for VA to meet its unique needs, reduce costs, and support HIT adoption nationally, and create business opportunities to forward-looking firms by pursuing an open source ecosystem strategy."[33] The report also outlines several issues for evolving the technical architecture, establishing governance, and creating an effective collaborative infrastructure.

The current VA health-related IT system has grown substantially over the years, and has created a highly distributed software architecture with complex integration points between VistA and the external systems including those of DoD, federal, and industry partners. The current VistA architecture is an n-tiered (multi-tiered) architecture that directly supports clinical operations. VistA is based on the Massachusetts General Hospital Utility-Multiprogramming System (MUMPS) language, which is a procedural programming language, combined with a multidimensional database. VistA's foundation is built on KERNAL, a VA-created portability layer over the operating system, which provides shared services such as sign-on, menu management, and error processing. VistA supports Health Level Seven (HL7), an international standard for exchanging health data, allowing data to be exchanged between VA and DoD and among VA and its other external partners.

In addition, there are about 133 instances of VistA in operation, making it expensive to maintain and difficult to deploy new applications. Applying a common SOA infrastructure will allow for these services to be reconciled into a single set of services, thus reducing service redundancy and cost allowing VistA to serve caregivers, Veterans, and their family members better.

In 2012, VA established mandatory department-wide policies to pilot Open Source VistA[34] for implementing local software modifications to VistA National Software. The Open Source VistA Gold Project is a component of the VistA Open Source initiative. The tenets of VistA Open Source are that all Medical Centers will install and run the National Software located on the Gold Disk that has been certified by the Open Source Electronic Health Record Agent (OSEHRA). Once standardization is achieved, VA Medical Centers will adhere to the policies outlined within VA Policy Directive 6042[35] to implement local modifications to National Software. In this way, VA will move forward maintaining a single VistA.

[33] Institute for Software Research, School of Computer Science, Carnegie Mellon University, *The VistA Ecosystem: Current Status and Future Directions*, October 2010
[34] Open Source VistA Deployment (VAIQ #7256522, August 31, 2012 CIO Memo, Department of Veteran Affairs
[35] VA Directive 6402, *Modifications to Standardized National Software*, December 2012

There is very high user satisfaction with VistA in the clinical environment, but today's VistA leverages multiple and sometimes duplicate applications to fulfill different business objectives. This duplication is a result of the point–to-point nature of the applications, shown in Figure .[36]

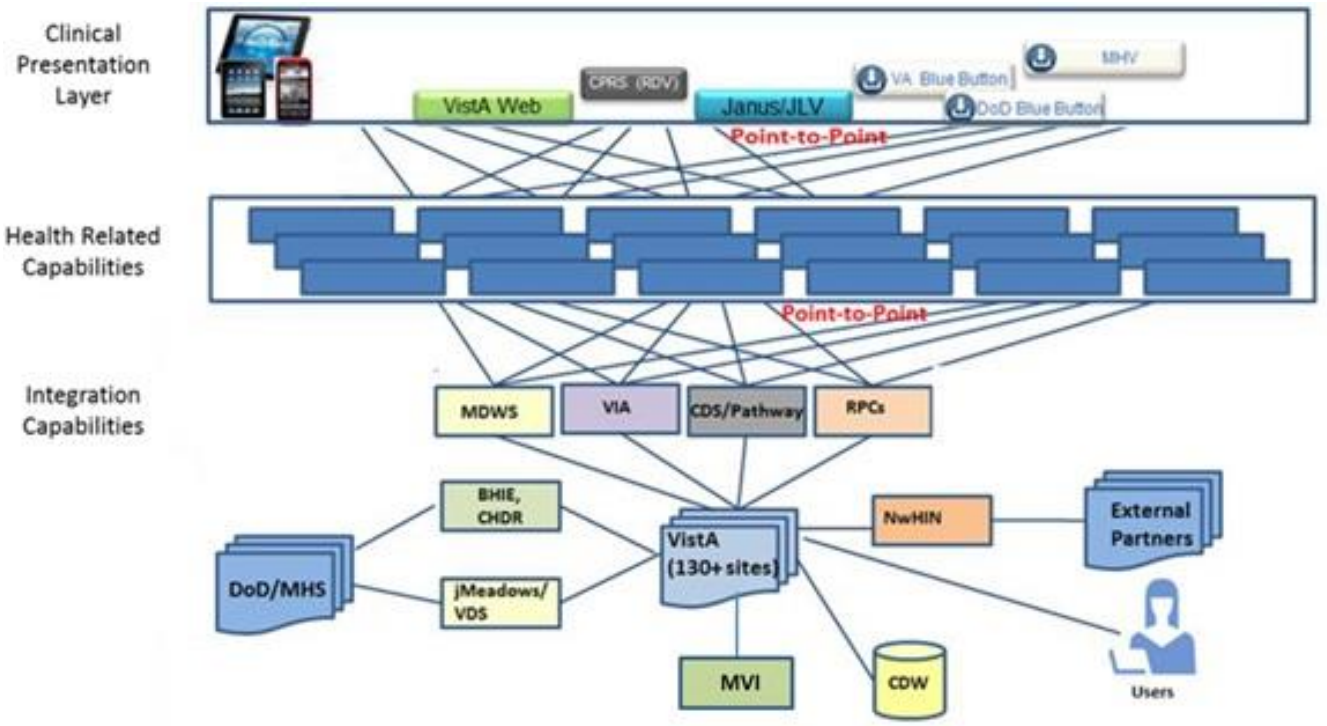

Figure –Current VistA Point-to-Point Applications

The data contained in these legacy systems are of great value to VA for analytics and decision-making. VHA plans to codify all data, including free text, so that state-of-the-art, analytic technologies may be applied to the complete data set. The codification of free text data, specifically clinical progress notes, would open a new source of data that currently is not computable. The knowledge contained in this un-mined data is expected to change Clinical Decision Support dramatically as well predictive analytics in determining the Veteran population's health care needs.

[36] *VistA 4 Product Plan Draft*, v1.5, October 24, 2013

A joint VHA – VA OIT VistA Evolution Program is responsible for delivering IOC in FY 2014 and includes:

- Delivery to at least two sites – Hampton Roads and San Antonio
  - IOC infrastructure and functionality including: VistA Standardization
- Certify standardization of 74 VistA application routines in production
- Modernize VistA immunization file
- Read/write/exchange clinical decision support
- Bidirectional immunization sharing
- Potential sources of adoption: VA Innovations, OpenCDS, IHS Resource and Patient Management System (RPMS)
  - Laboratory Information System Acquisition
  - Clinical User Experience Tools
- Google-like search
- HL7 Context-Aware InfoButtons
- Medication Review 'widget'
  - Integration with iEHR Interoperability Platform

3.2.1.1 Interoperability

Interoperability refers to the relationships between systems, information, and people required to provide outstanding health care and benefits for our Servicemembers and Veterans.[37]

- **Systems** include the infrastructure and equipment needed to store information and move it from place to place
- **Information** includes all the data, from all useful sources, needed for providing and receiving care and benefits
- **People** include clinicians and other providers, claims processors, and transition coordinators, as well as the Veterans and Servicemembers providing or receiving care and benefits

[37] Where Interoperability is Between DoD and VA and VistA Evolution, Briefing to the Open Health Tools Board, Chief Medical Information Officer VHA, 27 September 2013

VA and DoD redefined integrated EHR (iEHR) as seamless sharing of interoperable health data between the departments' EHR systems. Under this new iEHR framework, the IPO is programmatically responsible for interoperability, and each agency is responsible for its own EHR system. DoD will undertake a competitive acquisition to replace its existing systems through the DoD Healthcare Management System Modernization (DHMSM) program. VA will use its VistA enterprise capability and incrementally deliver new functionality through the VistA Evolution Program. Both Departments' future EHR systems will comply with the proposed iEHR technical architecture principles established by the IPO to ensure seamless interoperability.

Although the HISP goes beyond DoD sharing in scope, this VA/DoD agreement is the primary impetus driving VistA development.

The three key interoperability relationships that will be implemented in an interactive fashion for Full Operational Capability (FOC) include:

Relationship #1 – **Technical** Interoperability

- Information must be reliably exchanged between multiple systems so people in different places and organizations can see it, use it, and add to it

Relationship #2 – **Semantic** Interoperability

- Information exchanged between systems must have shared meaning in order for people (assisted by computers) to use it for making care and benefits decisions

Relationship #3 – **Process** Interoperability

- People (assisted by computers) must be able to make use of shared Information in their local workflows and processes for providing and receiving care and benefits

3.2.1.2 VistA Stakeholders

Designed by clinicians for clinicians, VistA is patient-centric as well as facility-centric, and embodies the clinical workflow processes that support VA's models of care. It enables measurable improvements in health outcomes and is central to VHA's ability to deliver high quality lifetime care to a large and varied Veteran population.

The Office of Informatics and Analytics (OIA) establishes the business requirements to connect the informatics at VHA facilities' workstations with nationally mandated and locally adapted software applications that are accessed by end users through the Computerized Patient Record System (CPRS) graphical user interface.

OIA works closely with frontline VA doctors, nurses, other health care providers, non-clinical staff, and associated IT system professionals to provide the tools needed to get the most out of VA's health care system to care for its patients. OIA develops and manages requirements, working closely with OIT partners to turn requirements into IT solutions. Figure identifies VHA partners and internal customers, including clinicians, other health care providers, VHA's Chief Finance Officer (CFO), and other VHA program offices.

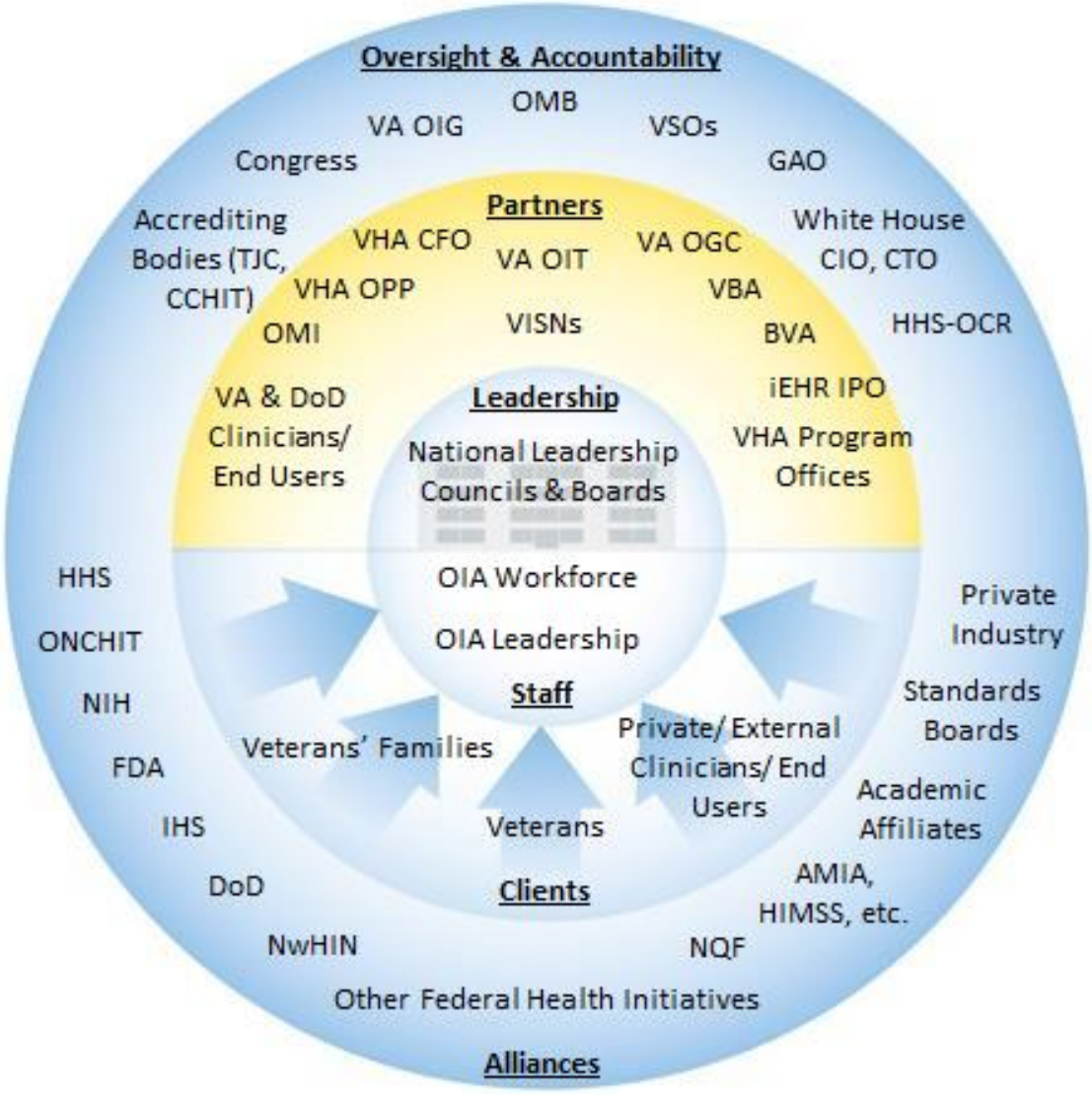

Figure – VA VistA Stakeholders

Outside of VA, VistA has been implemented by dozens of health care providers[38] and is supported by multiple companies and organizations. Within government, the Indian Health Service supports a version of VistA called RPMS throughout its entire Indian Health system.

[38] VISTA Adopters Worldwide

Commercial companies such as Medsphere and DSS, Inc. support open source versions of VistA for their customers. Non-profit organizations such as World Vista and the VistA Expertise Network provide VistA expertise to new adopters. Moreover, new companies, such as iCare and its cloud-based VistA, continue to emerge.

OSEHRA serves as an open source custodial agent and convenes the community of VistA users and developers to support innovation.

3.2.2 Open Source Electronic Health Record Agent (OSEHRA)

OSEHRA was established as a not-for-profit, independent organization responsible for supporting the rapid introduction of innovation to VA's EHR through an "open, collaborative community of users, developers, and companies engaged in advancing EHR software and health information technology."[39] This objective is to be achieved by harnessing the open source innovations taking place in the greater community of open source developers, users, and policy makers in government, industry, and academia in the U.S. and around the globe. The basic concepts of a custodial agent are represented in Figure .

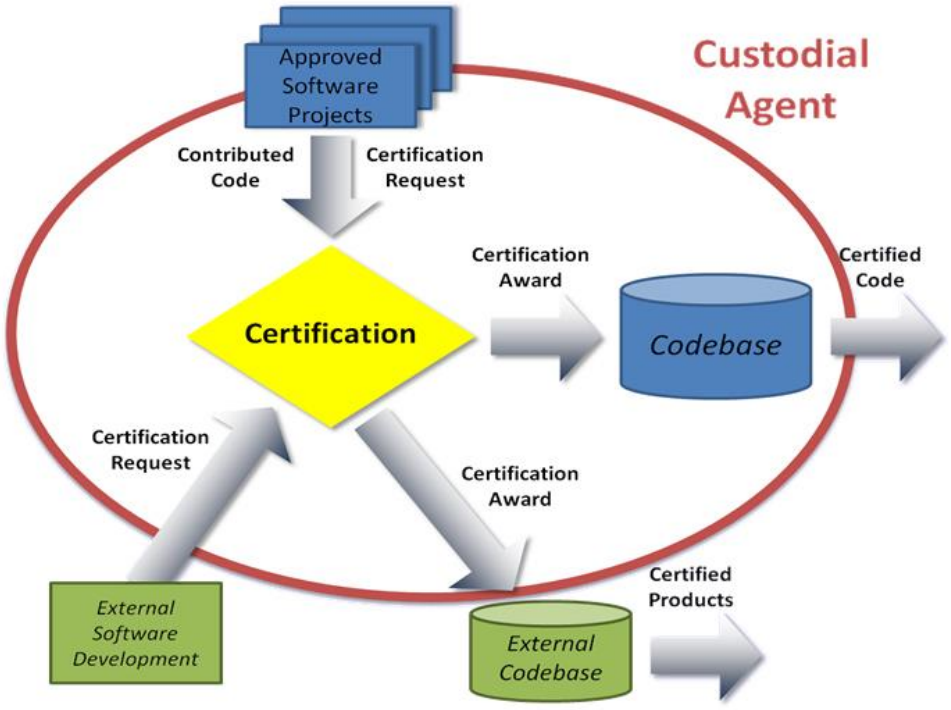

Figure – Custodial Agent Concepts

[39] OSEHRA Homepage

The potential impact of using an open source model for the national Health IT community is vast. VA could be the model for future electronic health records and personal health record capabilities and already intends to replace the current medical scheduling[40] package with one that is standards-based, modular, extensible, scalable, and certified to work with the production version of VistA now held by the OSEHRA. Eventually, VA's cost of VistA maintenance and development could be shared with a wider community of VistA users.

3.2.3 Business Architecture

Business Architecture (BA) is an integral part of the OIA, and its functions are crosscutting to portfolios. It represents the VHA strategy and business information, which supports and integrates with VA and Federal Enterprise Architectures. BA bridges the gap between VHA Business and Information Technology stakeholders by establishing a common language to describe the business.

The Business Function Framework (BFF) allows VHA to look at trends emerging in the Health IT space and identify opportunities to leverage evolving technologies through the lens of the full inventory of business functions provided by VHA. The BFF is a hierarchical construct that describes VHA business functions, as shown in Figure .

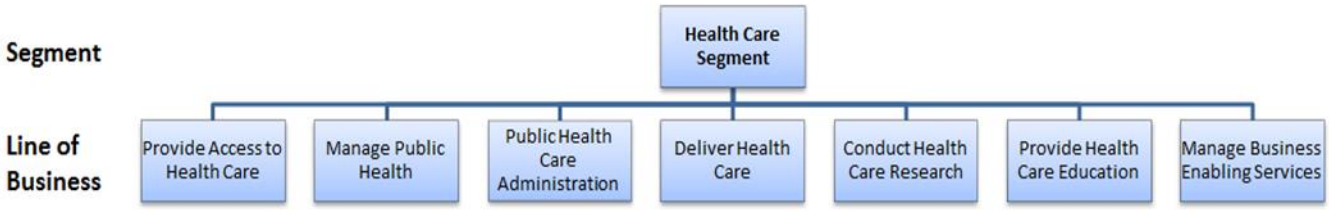

Figure – Health Care Business Function Framework

Business functions represent major service areas within each core mission Line of Business (LoB) and serve as logical groupings of activities. Business sub-functions represent logical groupings of sub-activities needed to fulfill each VHA business function.

Business Process Architecture (BPA) strives to improve VHA business processes covered under this framework, by leveraging knowledge from stakeholders, Data Stewards, Subject Matter Experts (SMEs), Standard Operating Procedures, policies, standards and related process documentation. BPA creates business process models from the information gathered to communicate a visual understanding of processes used to support our Veterans. BPA provides process modeling standards and expertise, and works with stakeholders to model their business processes to facilitate and support the creation of strategic business architectures.

[40] VA contest seeks VistA appointment scheduling tools - Homepage

3.2.4 Performance Results

Key performance results published in the 2013 VA Performance and Accountability Report (PAR)[41] show that VA has met its overall performance targets. VHA leadership uses measurement results to build on areas of strong performance, address challenges such as developing and integrating programs to improve efficiencies, and make resource decisions. Results are compared across medical centers and clinics. If a facility is performing poorly, VHA takes action to improve performance.

One of the ways VHA drives improvements is by identifying high performers and sharing their best practices with other facilities. Some of the measures that VHA exceeded include the strategic targets for Patient Access and the Prevention Index – Quality of Health Care measures. The key measure for Patient Access is the percentage of primary care appointments that were completed within 14 days of a desired appointment date. On the key measure for Prevention Index – Quality of Health Care, VA continues to improve performance on nationally recognized industry standards, such as the Clinical Practice Guidelines Index and the Prevention Index (PI).

Monitoring and tracking PI results helps VHA medical staff with early identification of disease risk and intervention for risky behaviors. In addition, as a matter of policy and practice, VA targets all outpatients for its prevention measures with the goal of promoting and maintaining a healthy population.

3.3 Analysis

VHA is guided by numerous business drivers such as health care regulation, cost, reform, and Veteran demographics. In addition, technology trends are heavily influencing how VA delivers health care. These drivers and trends combined with the challenges of interoperability and fiscal constraints are key factors shaping VA's transformation plans for the future of health delivery.

3.3.1 Business Drivers

As the largest health care provider in America, VHA is guided by many business drivers, as described below in Table .[42]

[41] *FY 2013 VA Performance and Accountability Report*
[42] Department of Veterans Affairs *FY13 Integrated Health Operating Plan*, August 15, 2012; *Health Information Strategic Plan 2014 – 2018*, version 2.2, December 2013

Table – Business Drivers

Drivers	Description
Health Care Costs	Health care costs in America are accelerating rapidly. The Centers for Medicare & Medicaid Services (CMS) predict that national health care expenditures will consume 19.3% of GDP by 2016. One in five families experience financial hardship because of unanticipated medical expenses. The cost of health care is borne by taxpayers and passed on to consumers through higher prices for goods and services. Much of the increase is due to health care cost inflation with two significant associated trends: increased utilization and the rising intensity of health care services. While these factors may improve clinical outcomes, they also increase the cost of providing services, and the health care industry has responded in numerous ways.
Health Care Reform	On March 23, 2010, President Obama signed into law the Patient Protection and Affordable Care Act (PPACA) (Public Law [PL] 111-148). Among the provisions to take effect over a four-year period are those prohibiting denial of coverage/claims based on pre-existing conditions, expanding Medicaid eligibility, subsidizing insurance premiums, providing incentives for businesses to provide health care benefits, establishing health insurance exchanges, and supporting medical research.
Changing Veteran Demographics	Demographics play an important role in the evolution of HIT in VHA. A 2010 Survey of Veteran Enrollees' Health and Reliance Upon VA[43] summarized trends: • Data interchange with external providers is essential. • Needs for specialized services geriatric care will increase. • Forty percent of the population of Veterans is from the Vietnam era and is beginning to face changing health risks as they age, increasing their needs for benefits and health care services. • The number of enrollees desiring treatment may increase quickly based on economic changes. • More care will have to be provided remotely or otherwise made available outside of traditional facilities. • Information flows within VA will change. • More women's health services will need to be made available. • More rehabilitation health services are needed. • Younger Veterans are accustomed to easy access to information and expect a greater degree of service convenience. • More than one-fifth of the Veterans currently seen have a mental health diagnosis.

[43] 2010 Survey of Veteran Enrollee's Health and Reliance Upon VA

Drivers	Description
Regulatory Drivers and Mandates	Regulatory drivers and mandates for Health Care delivery include the following: • Health Insurance Portability and Accountability Act (HIPAA) • Patient Protection and Affordable Care Act of 2010 (PL 111-148) • Executive Order 13335 • Veterans Benefits, Health Care and IT Act of 2006 • Medicare Improvements for Patients and Providers Act of 2008 • Veterans Mental Health Act and other Care Improvements Act of 2008 • Caregiver legislation (PL 111-163) • Meaningful Use[44]

These business drivers provide a strategic context and business case for requirements for Health IT. The HISP defines a more complete set of business drivers and implications, which are depicted below in Figure .[45]

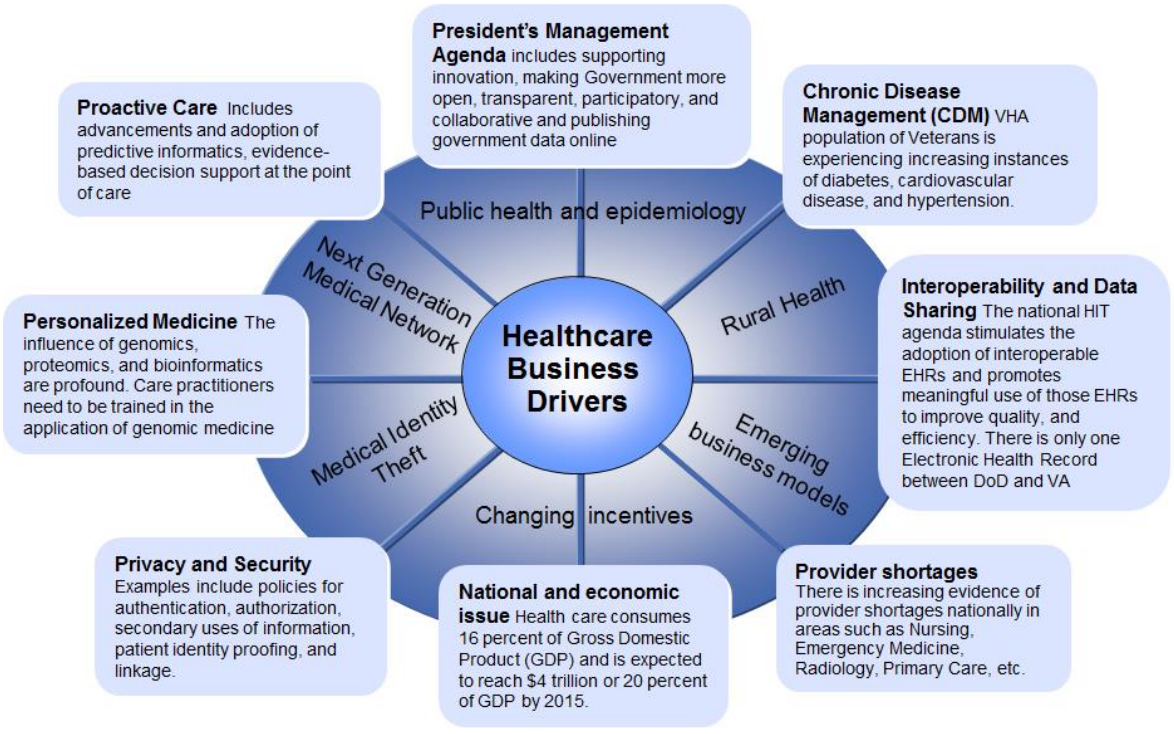

Figure – Health Care Delivery Business Drivers

[44] American Recovery and Reinvestment Act (ARRA) of 2009, and the provisions of Health Information Technology for Economic and Clinical Health Act (HITECH)

[45] *Health Information Strategic Plan*, *Fiscal Year 2014 – 2018*, Version 2.2, December 2013

3.3.2 Challenges

VA faces challenges in the area of health care delivery. The following summarizes key challenges from the perspective of the OIA:

- Interoperability of health care record data is a primary concern, especially with DoD. In early 2013, VA and DoD Secretaries made fundamental decisions on the direction of health care interoperability beginning in 2013; however, a multiyear program is required to establish data standards and security and to realize enterprise solutions. Interoperability and plans to achieve it are discussed in detail in Sections 3.2.1 (VistA) and 3.5 (Transition Strategy and Activities).
- Creativity is needed to foster innovation and growth while controlling costs. Efficiencies could be gained by using more standardized business practices. Enterprise Service Level Agreements (SLA) could also improve operations. As budgets are more heavily scrutinized, VHA must maintain awareness of IT funding levels.
- If OIT does not receive requested funding, the sustainment of existing Health IT systems could be jeopardized and the development of Health IT projects and systems could be limited.
- Changes to the iEHR program, including VA and DoD decisions to pursue their own EHR solutions, may negatively influence the availability of resources for any joint work
- Hiring and procurement actions do not always proceed expeditiously
- Creating a new, open source, open standards ecosystem within which the proven functional capabilities of VistA can be replicated, modernized, and enhanced in a sustainable, scalable, and secure environment[46]

The Federal HIT Strategic Plan Goals (2011- 2015)[47], from the Office of the National Coordinator (ONC) HIT, include the five challenges below that are relevant and impactful to VHA:

- Achieve adoption and information exchange through meaningful use of Health IT
- Improve care, improve population health, and reduce health care costs by leveraging Health IT
- Inspire confidence and trust in Health IT
- Empower individuals with Health IT to improve their health and the health care system
- Achieve rapid learning and technological advancement

[46] Ibid
[47] Office of the National Coordinator for Health Information Technology (ONC), *Federal HIT Strategic Plan*, November 10, 2012

The ONC also provides instruments such as the Standards and Interoperability (S&I) Framework to achieve some of these goals.

3.4 Enterprise-wide Initiatives

The Enterprise-wide initiatives related to VA Health Care delivery are listed below. Additional detail concerning each initiative is provided in Chapter 2 of this document. An alignment of these initiatives to VA Strategic Goals and Objectives is illustrated in Section 3.8.

- Veterans Relationship Management (VRM)
- Eliminate Veteran Homelessness (EVH) (also an APG)
- Integrated Electronic Health Record (iEHR)
- Customer Data Integration (CDI)
- Identity and Access Management (IAM)
- Enterprise Shared Services (ESS)

3.4.1 Technology Trends

VHA has produced a roadmap of planning guidance that looks out three to five years into the future. A key objective of this effort is to establish information interoperability among all partners in health care—for example, the Social Security Administration (SSA) and academic teaching hospitals/medical schools engaged in providing health care services. The associated technology trends and changes for FY 2014 and beyond have been projected, and the responding actions VHA will have to undertake are addressed in Table below. The table also describes potential implications for health care delivery.[48]

[48] *Health Information Strategic Plan*, *Fiscal Year 2014 – 2018*, v.2.2,December 2013

Table – Changes in Health Care Information Technology

Likely Change	Resulting Response and Discussion
Maturation and Broad Acceptance of Semantic Web	*The VA Health Care System will need to leverage Semantic Web to enhance and enable improved information understanding and sharing. A semantic web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries.*[49] The main purpose of Semantic Web is driving the evolution of the current World Wide Web by enabling users to find, share, and combine information more easily. Humans are capable of using the Web to carry out tasks such as finding the definition of an obscure medical condition, making an appointment for health care, and searching for the lowest price for a new medication. However, machines cannot accomplish all of these tasks without human direction, since web pages are designed for reading by people and not machines. Semantic Web (use of resource description framework) has profound implications in evolving Health Care business and information framework, medical terminologies, taxonomies, and ontologies.
Growth and Acceptance of Cloud Computing and Software as a Service	*The VA Health Care System will need to leverage Software as a Service and Cloud Computing to focus efforts and investments on Health Care specific IT and reduce concerns and investments in non-direct health care systems.* While cloud computing presents opportunities for VHA, it must be balanced with security, privacy, and reliability concerns relative to protecting Health Care information and providing efficient Veteran services. Cloud computing has the potential to increase EHR adoption among small medical practices. Aside from certain EHR implementations moving to a cloud, there is also some possibility within VHA that certain key ancillary systems may also move to cloud (e.g., Lab). Health Care institutions are exploring registries, RxHub Prescriptions, and storing and managing medical images in the cloud.
Advancements in Robotics	*The VA Health Care System will need to change processes and techniques to enable broader use of robotics in providing care and enabling system operations.* VHA has applied robots into clinical workflow to handle medical supplies. Additionally, they have been applied for therapy (e.g., physical therapy, dementia). Other applications include surgery and socially assistive robots that can coach, motivate, and monitor people with cognitive and physical disabilities.
Nanotechnology becomes mainstream	*The VA Health Care System will need to develop approaches and systems for dealing with nanoinfomatics and nanomedicine.* VHA will be influenced by the emerging role of nanotechnology and nanomedicine to such applications as cancer, drug delivery, tissue repair, surgery, imaging, genetic testing, etc. This will lead to the development of nanoinformatics (e.g., concepts, taxonomies, data, and standards utilized in nanotechnology and nanomedicine).

[49] The Semantic Web

Likely Change	Resulting Response and Discussion
Continued growth of Social Networks	*The VA Health Care System will need to utilize Social Media in enhancing transparency and two-way communications with Veterans.* *The VA Health Care System will need to develop ways to leverage social networks for care and disease surveillance.* Currently existing community-based and online collaborative environments are proliferating. Social software applications integrate collaborative features, such as mash-ups, blogging, Wiki tools, search, news feeds, Voice over IP, e-mail, ranking/feedback, podcasts, document management, and workflow management. Security implications need to be addressed with these new technologies as well. In addition, online communities have the potential to transform medical research (e.g., open source research). The convergence of wireless communications, social networking, and medicine is transforming health care. Social networking sites include VA's Facebook page (www.facebook.com/VeteransHealth) and www.curetogether.com. VA has established Facebook pages for all 151 of its Medical Centers.
Advancements in Radio Frequency Identification (RFID), wireless sensors, and implants	*The VA Health Care System will need to continue to enhance our workflows to exploit RTLS, RFID, and advanced sensors.* VHA is already piloting RFID applications for high-value medical asset tracking. Other applications may include lab specimen identification and tracking, and patient identification. VHA is also prototyping Real-Time Locator Systems (RTLS) for flow and simulation initiatives. Recently, the FCC has designated bandwidth for Medical Body Area Network (MBAN). These networks will transmit data from remote sensors attached to patients to control devices. Wireless devices that operate on MBAN spectrum can be used to actively monitor patient's health and vitals—e.g., blood glucose, ECG readings.
"Bring your own Device" becomes the expectation	*The VA Health Care System will need to adopt strategies for "bring your own device" to work.* Smart phones, tablets, and iPod-like devices will find their way into clinics and will significantly empower care providers, including location-aware services/interventions, Smart phone VistA, Computerized Patient Record System (CPRS), wireless health portal, and secure remote monitoring of patients.
Advances occur in analytics, clinical decision support, and training aids	*The VA Health Care System will need to increase the use and complexity of Clinical Decision support and Analytics tools.* This includes VHA's investment in corporate data warehousing, predictive analytics, text mining, cost and workload analyses, utilization management, mining social networks, and understanding patterns of care. VHA will establish a robust computing base to support research (e.g., biomedical research, clinical research, epidemiological research, Disease Modeling, Health Care policy, health economics, comparative effectiveness research, and public health informatics). VHA will seize "Big Data" technology trends and provide an environment for data innovation, experimentation, and advanced analytics to its diverse stakeholder base at lower price points. Because of the unique demographics, high quality, sustained (and longitudinal) care, and VHA's renowned EHR, VHA possesses a treasure trove of clinical trials data that may spur innovation in drugs and devices. VHA will lead Health Care optimization initiatives by applying predictive modeling and advanced simulation techniques (e.g., discrete events, agent-based). These predictive modeling and advanced simulation tools can be weaved into clinical decision support infrastructure (e.g., diabetes care), caregiver training aids (e.g., ophthalmology), modeling Patient-Aligned Care Teams (PACT), and flow management (e.g., emergency room). In addition, simulation tools can assist in medical training (e.g., virtual reality simulation in neurologic surgery).

Likely Change	Resulting Response and Discussion
Continued maturation and adoption of mobile platforms	*The VA Health Care System will need to ensure our IT systems are available on mobile platforms.* *The VA Health Care System will need to examine our health care delivery model for ways mobile platforms can improve our outcomes, efficiency, and patient satisfaction.* A sampling of capabilities enabled by mobile health applications include: wellness awareness, remote data collection, remote monitoring, disease and epidemic surveillance, diagnostic and treatment support, personal health records, clinical decision support, 3D images display and navigation, triage for ER settings, secure messaging, and home telehealth. VA's care coordination study has documented 25% reduction in bed-days, and 20-50% reduction in hospitalization. The PTSD Coach—a smartphone application—is another success story.
Advances in User Interface Technology	*The VA Health Care System needs to translate advances in user interface technology into improved outcomes and more efficient health care.* This includes advanced capabilities/features for medical documentation, including but not limited to voice/speech recognition, natural language processing, and digital pens. Computer assisted physician documentation may ease the transition to ICD-10. Clinical Documentation tools are also embedded with medical terminology.

3.5 Future Environment

> *"Patients are in control of their health care and the system is designed around the needs of the patient."*
>
> — Dr. Robert A. Petzel, M.D., Under Secretary for Health

Providing the level of patient control envisioned relies upon VA achieving the type of interoperability described in Section 3.2.1.1. That interoperability is essential to VHA fulfilling the principles that are the philosophical pillars embedded in VHA's vision. They are embodied in VHA's goals, objectives, and every initiative undertaken.

Patient-Centered Care

VHA is embracing patient-centered care, which means that VHA will design its extensive services around the individual needs, values, and preferences of our Veterans and their families. In order to be patient-centered, VHA will need to build an environment that is safe, secure, comfortable, and supportive of healing. VHA will become Veterans preferred provider of health care services.

Team Care

Teams are the means for providing care and services in VHA's Health Care System. Teams will map their processes and define the roles and responsibilities of each member; they will be trained and proficient in team skills; and they will develop a stronger culture of civility, respect, trust, and integrity and provide each team member opportunities to best shape how to do their work. VHA teams will involve Veterans families and internal customers as members of the team and collaborate with other teams to ensure fully coordinated care and services.

Data-Driven, Evidence-Based Approach

VHA will provide the highest quality of care to all Veterans using a data-driven, evidence-based approach. This means VHA will use sound measurement and analysis to identify successful practices and then methodically implement them across the organization and ensure high reliability in delivering evidence-based care. VHA will develop valid, useful metrics that cover all domains of health care quality, including effectiveness, safety, timeliness, patient-centeredness, cost effectiveness, and equity.

Population Health/Health Promotion

VHA is increasingly focused on health promotion, disease prevention, and population health. VHA will assist Veterans in achieving healthier life styles and focus on reducing health risks. VHA will develop a system that measures health outcomes for both individual Veterans and the Veteran community. VHA will develop systems to improve the health of the Veteran community, concentrating on those areas where supports outside VA are limited.

Health Care Value

VHA will create health care value by reducing cost while maintaining and improving quality. VHA will accomplish this by reducing wasteful variation in clinical delivery, business processes, and organizational structures; utilizing skills of all staff to the full extent of their training and professional licensure; using specialty care effectively; and reducing costs by leveraging health informatics to decrease medical errors and improve staff productivity.

Continuous Improvement

VHA is committed to continuous improvement as a core operating principle. This means that all levels of the organization will be involved from each employee to national programs in improvement efforts, understanding that "improving our work is our work."[50] VHA will bring the knowledge and skills of systems engineering to bear on all elements of the operation and promote a culture where every employee takes responsibility for the improvement of quality of

[50] *Health Information Strategic Plan*, *FY 2014 – 2018*, v.2.2,December 2013

care. VHA will ensure that continuous improvement efforts lead to results for immediate and long-term health outcomes for our Veterans.

Insights from the VHA System Redesign project and other quality management initiatives show that process improvement initiatives will result in streamlining clinical and administrative business processes (e.g., wait times and access issues, bed optimization). This will positively affect usability and workflow design. VHA will continue to leverage work emanating from collaborative and industry best practices, such as the Institute for Health Care Improvement.[51] VHA will adopt CMS methodology to estimate avoidable hospital admissions.

VistA Improvements

- **VistA Evolution** is the VHA program that will support this strategic plan through continual investment and delivery of scalable and modular EHR and HIT products
- **VistA 4** is the infrastructure and open and extensible platform on which tools and services can be integrated in support of our Veterans evolving needs and in pace with the technological landscape

3.6 Transition Strategy and Activities

The transition strategy for health care delivery used by VA leverages Enterprise-wide initiatives, an integrated Health Portfolio, VistA Evolution and the standardization, and OSEHRA. VA is resourcing major initiatives and programs to address what needs to be done to help support the transformation goals of increased efficiency, access, and quality care along with decreased costs and the adoption of EHRs and HIT.

VHA is working toward its initial EHR certification by September 30, 2015, in order to promote the adoption and Meaningful Use of certified EHR technology per the American Recovery and Reinvestment Act (ARRA) and the provisions of the Health Information Technology for Economic and Clinical Health Act (HITECH). VHA has numerous capability and policy gap implications to address to certify its EHR for Meaningful Use demonstration by VHA providers and hospitals—such as, electronic reporting of Meaningful Use clinical quality measures, interoperability and exchange, and submission to public health registries. The Office of the National Coordinator (ONC) for Health Information Technology and various Health IT committees, such as Standards and Policy, will continue to foster the development of standards, implementation specifications, and certification criteria. This accelerated implementation of EHRs will have a dramatic impact on data management. Many different technologies and databases are used to obtain, store, and analyze health care data. The health care industry must embrace new and innovative approaches in examining, understanding, and using the data flowing in and out and stored within HIT and EHRs to successfully transform the U.S. health care industry and meet reform goals.

[51] Institute for Health Care Improvement homepage

3.6.1 VistA Evolution

Today, VistA is the premier EHR in the world: the largest fully integrated patient health care software set deployed by the largest hospital system in the world.[52] In keeping up with medical advances, VistA will need to be enhanced to enable the accelerated delivery of improved clinical capabilities to Veterans and their family members. Desired capabilities focus on improving the overall EHR functionalities, including User Experience, Data Standardization, Immunization, Pharmacy, Laboratory, Activity Management, Office of National Coordinator for Health IT (ONC) 2014 Edition Certification, Security and Privacy. VA plans on rolling out these capabilities as part of IOC and FOC releases scheduled in 2014 and 2017, respectively. In addition, VistA Evolution will achieve ONC 2014 Edition Certification by September 30, 2015.

Currently, VA EHR and HIT systems are disconnected and fragmented, as illustrated in Figure , Conceptual Representation of Current EHR/HIT Landscape, which illustrates how these systems, which are strong capabilities in themselves, have limited or no interoperability with other systems in the Health Care Enterprise. This influences the ability to deliver on its mission to provide excellent quality, access, satisfaction, and value in health care. In addition, VA and DoD Secretaries made decisions related to a change in iEHR strategy: a key decision was that the VA core of iEHR would be VistA-based.

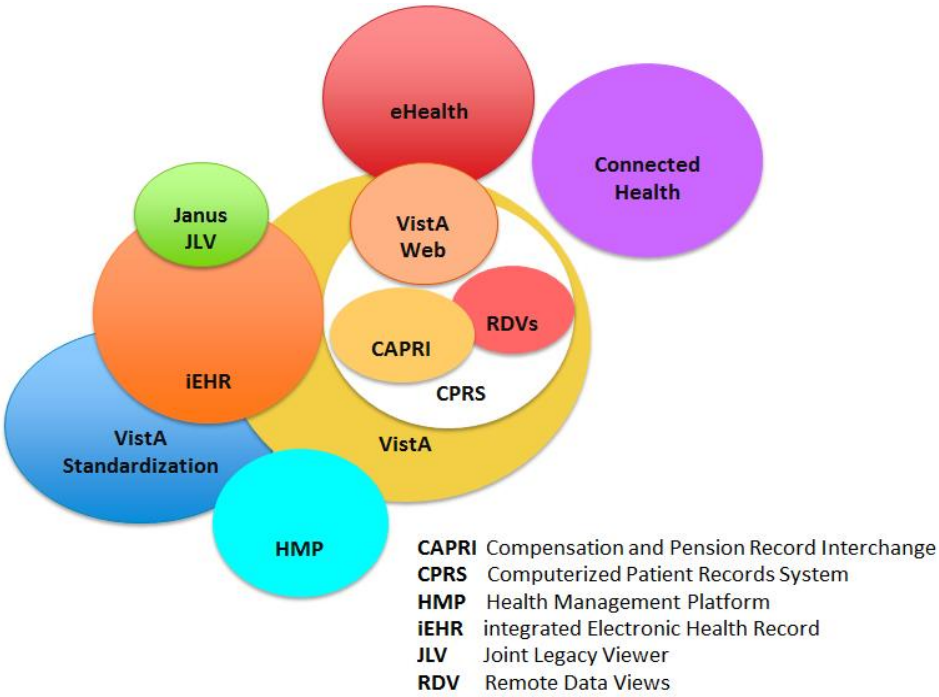

Figure – Conceptual Representation of Current EHR/HIT Landscape

[52] *VistA 4 Product Plan DRAFT v1.5*, October 24, 2013

Improvements to VistA are planned and managed under the VistA Evolution Program. This program is focused on advancing the VistA technical platform to integrate functionality more easily, to improve quality, safety, efficiency, and satisfaction in health care for Veterans and their family members. The VistA Evolution Program has been established and will execute implementation of best practice technology to support team-based care coordination, clinical decision making, medical device integration, and ancillary service integration. The initial phase of the VistA Evolution Program will deliver on the commitments made for IOC to have a core capability based on VistA, with at least two enhanced clinical functionalities deployed at two VHA sites by the end of FY14. These commitments include immunization enhancements, laboratory acquisition, the foundation for data interoperability, and new user-interface features for providers, as well as foundational work to deliver value rapidly in future years. Beginning in fall 2013, VA will be analyzing and synthesizing existing platforms into the new platform – VistA Evolution. A single viewer will become the starting point for a new user experience to support PACT, patients, and the user population, as shown in Figure , VistA Evolution Beginning in October 2014.

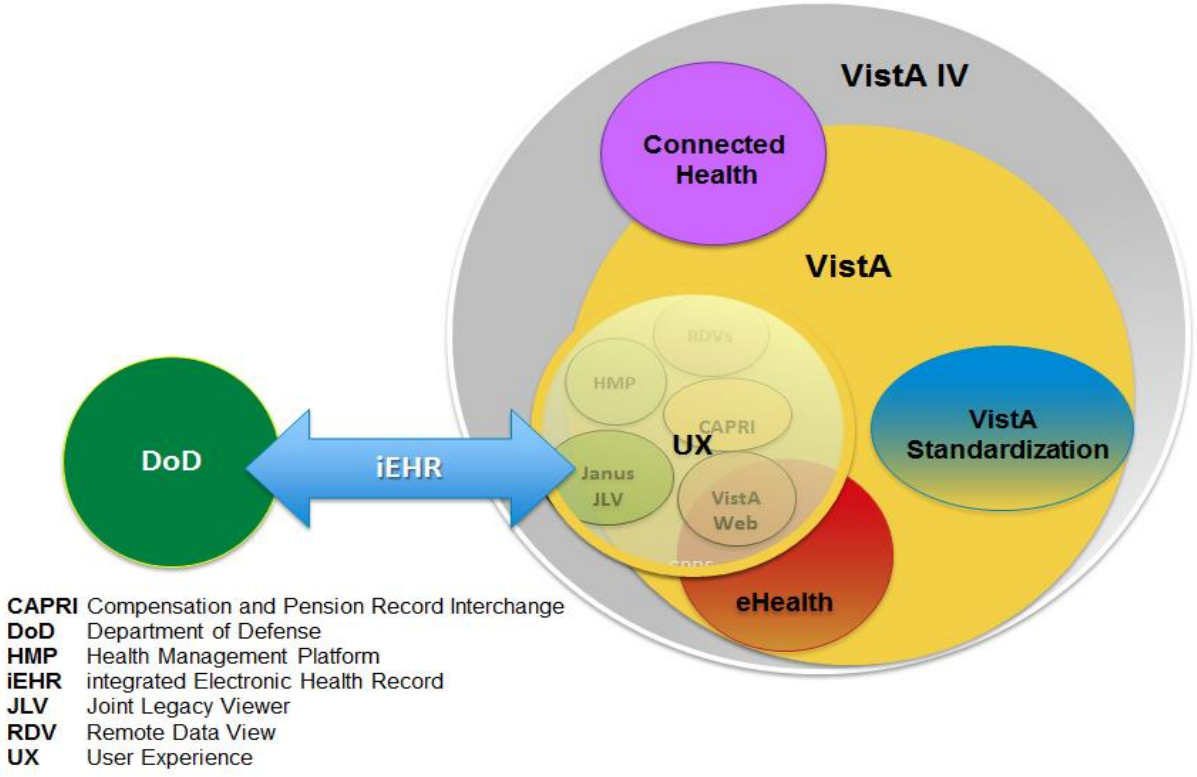

Figure – VistA Evolution Beginning in fall 2013

By 2017, VHA will have an architecture and framework that supports interoperability, care coordination, meaningful use and partnership, as illustrated in Figure , VistA Evolution 2017.

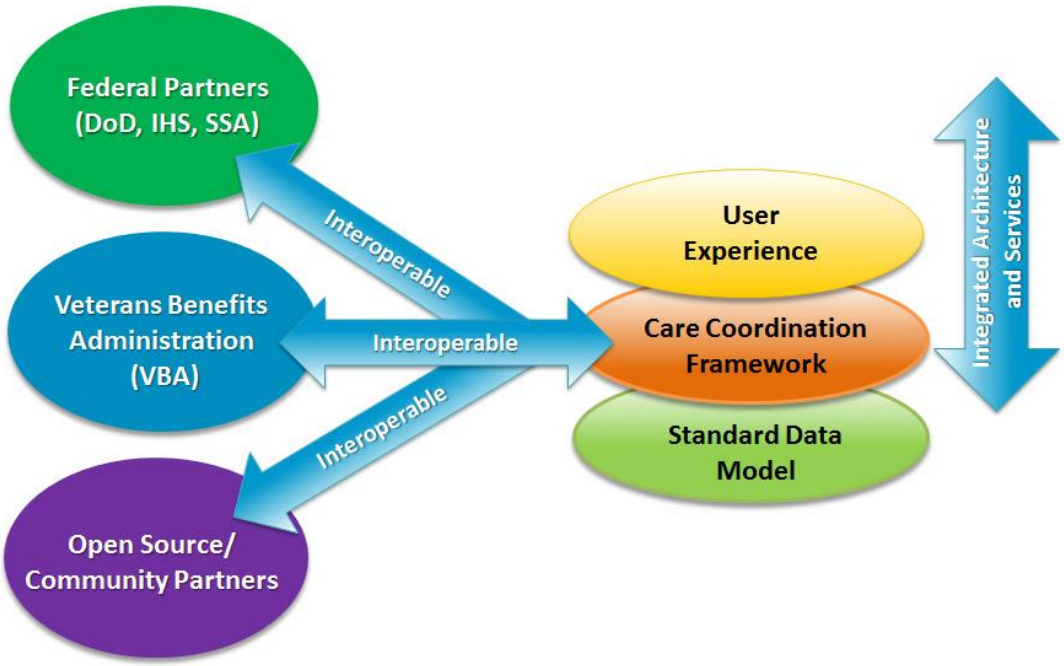

Figure – VistA Evolution 2017

Within VistA Evolution, Phase 2 is referred to as the FOC and will be implemented from the end of IOC (September 30, 2014) and completed by September 30, 2017. This second phase for VistA Evolution will leverage the foundation of the enhanced user experience, standards-based data, and core clinical applications laid during the IOC phase, with continued attention and commitment to the core principles. The functional focus areas for FOC will:

- Propagate the usability features and end-user experience throughout all VistA Evolution enhancements to improve user adoption, productivity and satisfaction
- Continue the adoption and implementation of interoperability standards for sharing clinical records across organizations
- Enable patient-centered care coordination as the care model woven throughout the design
- Finalize the enterprise deployment of state-of-the-art laboratory and pharmacy ancillary systems, while leveraging process re-engineering to ensure best practice operations for efficiencies, quality of care and patient safety

The resulting VistA Evolution FOC application suite and underlying technical architecture will represent a state-of-the-art enterprise EHR solution that is compliant with the ONC 2014 Edition and Certified EHR Technology (CEHRT) requirements. The FOC VistA Evolution platform will enable continued agile development of system enhancements deployed consistently across the enterprise, satisfying regulatory and statutory requirements.

3.6.1.1 Standardization of Open VistA

VA is embracing an open source development approach for VistA as evidenced by OIT's spearheading of the VistA Open Source initiative, an effort to ensure modernization of VA's EHR by "opening" VistA's software codebase so contributors external to VA may support its continued development. This will increase innovation and lower the cost to develop and maintain VistA. Other benefits include improved functionality and, for VA, easier integration across VistA modules and between VistA and other systems and products.

VistA's organization as a kernel of common functions with integrated applications and a clinician-facing graphical user interface (GUI) allows it to evolve as computing and networking technology advances, and enables the development and integration of new capabilities as the needs and requirements of the clinical community change over time. VA continues to enhance VistA, evolving clinical functions, building auxiliary applications, and improving internal architecture. For example:

Connected Health provides an Application Programming Interface (API) and developer toolkit for web and mobile access to health information, for capturing patient-recorded data, and for enabling mobile applications that increase the engagement of both patients and their at-home caregivers in health and wellness management.[53]

In FY 2012, thirteen packages were certified and deployed to seven pilot sites. In FY 2013, these same packages will be rolled out to the remaining 126 sites. In addition, work will continue toward standardization of more VistA modules with the goal of increasing the number of modules being certified and deployed into production.[54]

3.6.2 Integrated Health Portfolio

VHA's Integrated Health Portfolio consists of programs that fall below the Enterprise Initiative level in that they primarily or exclusively fulfill VHA's Health Care Delivery requirements. Five such VHA programs are identified, each comprising multiple projects. This portfolio funds parts of the sustainment and transition of VA major programs: Improving Veterans Mental Health, New Models of Health Care; Enhancing Veterans Experience and Access to Health Care; Research and Development; Health Care Efficiency, and Health Informatics Initiative.

3.6.2.1 Improving Veterans Mental Health (IVMH)

The goal of IVMH is to continue the transformation of mental health that began with the publication of the VHA Handbook on Uniform Mental Health Services in VA Medical Centers and Clinics (1160.01).

Each of the following sub-initiatives is a key element of VHA's transformation plan:

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[53] *VistA as an EHR System Core*, A whitepaper prepared in response to DoD February 27, 2013
[54] *OIT Service Delivery and Engineering (SD&E) Playbook*, FY 2013

a. Behavioral Health Lab (Increment 1)
b. Patient Record Flag Project (Increment 1)
c. Enhancements to Veterans Crisis Line Software (Increment 1)
d. My Recovery Plan (Increment 6)

3.6.2.2 New Models of Health Care (NMHC)

The NMHC portfolio is composed of programs designed to foster a new health care culture and paradigm shift by focusing on initiatives that improve access to primary and specialty care, enhance efficiency of the health care team, and boost patient satisfaction. Although each of the following sub-initiatives is composed of unique programs, significant interdependencies and relationships have been identified and nurtured:

a. Patient Aligned Care Team (PACT)
b. Prevention
c. Virtual Medicine Non-Telehealth (VMNTH)
d. Telehealth (TH)
e. Non-Institutional Long Term Care (NILTC)
f. Specialty Care (SC)
g. Women's Health (WH)
h. Mobile Applications (MA)
i. Patient Centered Care (PCC)

3.6.2.3 Enhancing the Veteran Experience and Access to Health Care (EVEAH)

This initiative seeks to satisfy the VA APG to improve Veteran access to VA benefits and services (see Section 1.1), and focuses on improving Veteran access to health care services, benefits, information, and education vital to VA's overall mission of providing exceptional health care to Veterans. It is VHA's commitment to provide clinically appropriate quality care for eligible Veterans when they want and need it. It is the goal to provide the care in the right place, at the right time, by the right clinicians, and in the right way (including use of technology).

3.6.2.4 Research and Development (R&D)

The R&D initiative focuses on four distinct areas:

a. Genomic Medicine, which uses information on a patient's genetic make-up to tailor prevention and treatment for that individual
b. Point of Care Research, which is a new approach to conducting clinical research studies to compare treatments without interrupting the regular flow of medical care
c. Medical Informatics and IT, which seeks to leverage data in the EHR
d. VA Central Office and Field Research Resources, which increase the ability to communicate, analyze, and report research-related data in order to address illnesses with the greatest impact on the Veteran community

3.6.2.5 Health Care Efficiency (HCE)

This initiative involves a series of projects to develop enterprise-level solutions, including the standardization of clinical and business practices when appropriate, reviewing the processes by which specially funded programs are evaluated for return on investment, and developing a more consistent approach to organizational oversight that will create a more proactive approach to compliance and oversight activities.

3.6.2.6 Health Informatics Initiative (hi^2)

The Health Informatics Initiative will shape the future of VHA clinical information systems by promoting and fostering open, transparent communication among health care providers and software development teams through shared responsibility and accountability. The purpose of the initiative is three-fold: (1) assist with VHA's transition from a medical model of care to a patient-centered model of care through development of IT software modules; (2) build a sustainable collaboration between VHA and VA OIT to deliver timely and quality software solutions; and (3) cultivate and invest in VA's workforce.

The hi^2 Health Management Platform (HMP) is built on a new extensible service oriented architecture that allows new systems to interface with legacy systems at multiple levels. HMP provides user interface modularity and flexibility, reusable services such as ordering services, data extraction, and search across all patient records. This modularity and service-based approach will allow for gradual replacement or reengineering of legacy components without affecting the entire system, and without impact to users. It is important to note that hi^2 / HMP is forming the basis for VistA Evolution at IOC.

3.7 Health Care Milestones

Health Care Delivery has multiple programs and systems that will help VHA achieve its future state. For programs funded, established, or completed in Health Care Delivery within the FY13 – 15 timeframe, Figure provides the top-level schedule and milestone information.

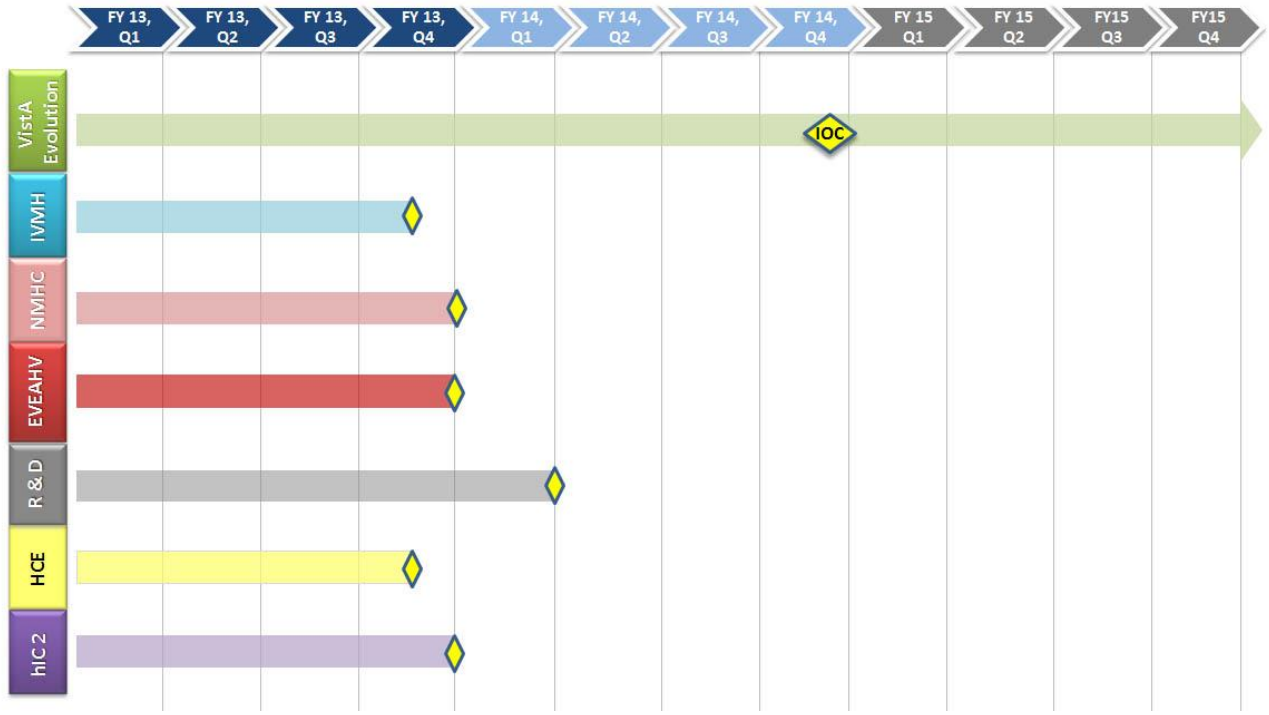

Figure – Health Care Delivery Milestones

3.8 Health Care Delivery Programs and Initiatives Alignment to VA Strategic Goals and Objectives

Figure below verifies the alignment of health care transformation programs in this Roadmap to the VA FY 2014-2020 strategic goals and objectives. A checked box in the table reflects where a program is providing or developing a capability that will advance the achievement of that specific VA strategic objective.

These initiatives and programs support the achievement of VA's FY 2014 – 2020 strategic goals and APGs that serve as a platform to transform VA. Note that in Figure , the initiatives and programs listed as EWI's support both Health Care Delivery and Benefits Delivery.

VA Strategic Plan Goals and Objectives	EWIs					Health Care Initiatives						
	VRM	EVH	CDI	IAM	ESS	VistA EVOLUTION	IVMH	NMHC	EVEAH	R&D	HCE	HI2
Goal 1 *Empower Veterans to Improve their Well-being*												
Obj. 1.1 Improve Veteran Wellness and Economic Security		✓				✓	✓					
Obj. 1.2 Increase Customer Satisfaction Through Improvements in Benefits and Services Delivery Policies, Procedures, and Interfaces	✓		✓			✓		✓	✓	✓		
Goal 2 *Enhance and Develop Trusted Partnerships*												
Obj. 2.1 Enhance VA's Partnership with DoD	✓					✓						
Obj. 2.2 Enhance VA's Partnerships with Federal, State, Private Sector, Academic Affiliates, and Non-Profit Organizations			✓			✓	✓			✓		
Obj. 2.3 Amplify Awareness of Services and Benefits Available to Veterans Through Improved Communications and Outreach							✓	✓	✓			
Goal 3 *Manage and Improve VA Operations to Deliver Seamless and Integrated Support*												
Obj. 3.1 Make VA a Place People Want to Serve												
Obj. 3.2 Evolve VA IT Capabilities to Meet Emerging Customer Service/Empowerment Expectations of Both VA Customers and Employees			✓		✓	✓				✓	✓	✓
Obj. 3.3 Build a Flexible and Scalable Infrastructure through Improved Organizational Design and Enhanced Capital Planning									✓			✓
Obj. 3.4 Enhance Productivity and Improve the Efficiency of the Provision of Veteran Benefits and Services						✓				✓	✓	✓
Obj. 3.5 Ensure Preparedness to Provide Services and Protect People and Assets Continuously in Time of Crisis												

Figure – Health Care Delivery Initiatives and Programs Alignment to VA Goals and Objectives

4 Benefits Delivery

4.1 Introduction

The VBA and the NCA deliver non-health care benefits within VA. Collectively, these Administrations provide a wide range of benefits, including: disability compensation; education and training; vocational rehabilitation and employment; home loan guaranty; dependent and survivor benefits; insurance; burial and memorial benefits through national, state and tribal Veterans cemeteries; and Veterans graves in private cemeteries. Additionally, NCA manages several types of grants, graves, and the environs of national cemeteries as national shrines. The Administrations' delivery of these benefits and services ensures that VA accomplishes its strategic goals.

VBA supports VA strategic goals, objectives, and priorities through their commitment to eliminating the backlog of disability claims and Veteran's homelessness. Both VBA and NCA seek to improve Veterans access to VA benefits and services through the alignment of their goals with the VA FY 2014-2020 strategic goals and objectives to meet Veterans service expectations.

Veterans and their families expect VA to fulfill the growing demand for their benefits and services. VA's business leaders expect the Department to provide the information needed to keep up with this demand. With this in mind, VBA and NCA are undergoing a major transformation that is people-centric, results-oriented, and forward-looking to ensure VA's total lifelong engagement with Servicemembers, Veterans, and their beneficiaries.

4.1.1 Mission and Vision

VBA's Mission is to serve as a leading advocate for Servicemembers, Veterans, their families and survivors, which includes delivering excellence in client-centered and personalized benefits and services that honor their service, assist in their readjustment, enhance their lives, and engender their full trust. It is working to be a more readily accessible organization that serves our clients whenever, wherever, and however we are needed.[55]

NCA honors Veterans and their families with final resting places in national shrines and with lasting tributes that commemorate their service and sacrifice to our Nation.[56]

[55] *VBA FY 2014-2020 Strategic Plan*, version 7.6 Pre-decisional, September 30,2013, Section 1.1, page 6
[56] *FY 2011 – FY 2015 NCA Strategic Plan*, 10/01/2013, page 1

VBA Vision

The VBA vision is "to fulfill our Nation's Promise to those who serve, by delivering the benefits and services they need to realize full, independent, and honorable lives." To attain this vision, VBA must become a client-centric service organization that engages the Veteran "from the time they enter service and throughout their life, and the final tribute when their service is memorialized."[57]

NCA Vision

NCA will be the model of excellence for burial and memorials for our Nation's Veterans and their families.

Veterans Benefits

VBA, in partnership with the VHA and NCA, provides an array of benefits and services to our clients. VBA engages with Servicemembers from the moment they take their oath through final memorialization of their service.

– *VBA FY2014 - 2020 Strategic Plan Draft,* Version 7.6 Pre-decisional 09/30/2013, Section 1.1, page 6

4.1.2 Strategic Goals

In support of VA's strategic goals, benefits delivery across the Administrations continues to demonstrate progress toward achieving success by providing the appropriate services and products. VBA and NCA continue to develop strategic forward-looking approaches that align with the Department.

Figure on the following page illustrates a summary of VBA's strategic goals aligned to VA's strategic goals, objectives, and APGs.

[57] FY 2014-2020 Strategic Plan, version 7.6 Pre-decisional, 09/30/2013, Section 1.2, page 7

Figure – VBA Strategic Plan Goals Alignment with VA Strategic Goals, Objectives, and APGs

The *FY 2011- 2015 NCA Strategic Plan* sets forth the Administration's five-year strategic vision for improving ways to honor and commemorate deceased Veterans. Figure provides a summary of NCA's five strategic goals, and their alignment with VA strategic goals and objectives.

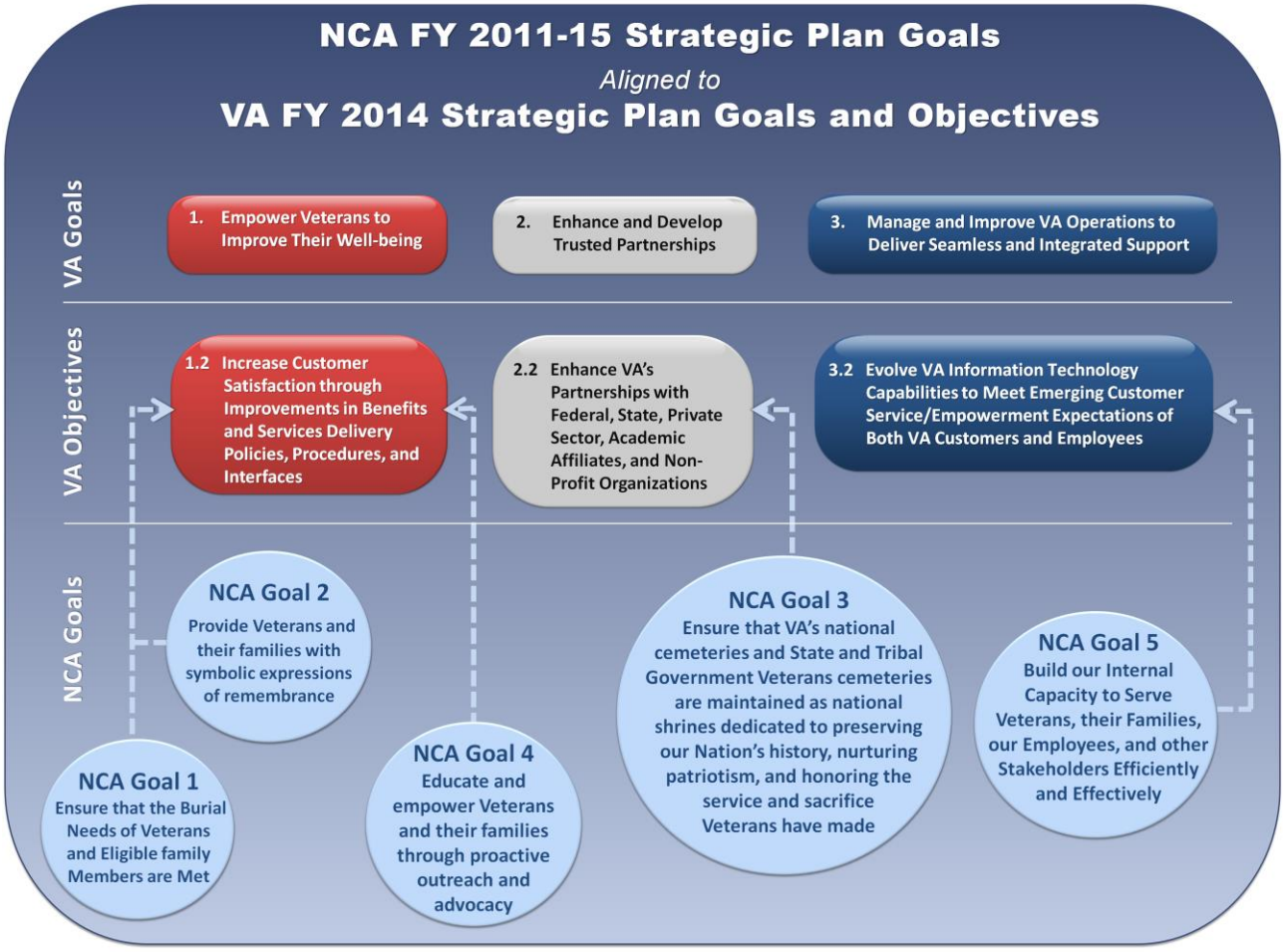

Figure – NCA Strategic Plan Goals Alignment with VA Strategic Goals, and Objectives

4.2 Current Environment

Legislation and regulations define the products and services provided by VBA and NCA. A number of chapters within Title 30 and Title 38 of the United States Code (U.S.C.) delineate the specific benefits and eligibility for those benefits.

Table is the Benefits Delivery Business Products and Support table, which classifies the types of support provided by VA.

Table – VBA and NCA Benefits Delivery Business Products and Support

Burials (NCA/VBA)	Burials
	Outer Burial Receptacles (Graveliners)
	First Notice of Death (FNOD)
	Burial Allowance
Compensation Benefits (Compensation LOB)	Disability Compensation
	Monthly Payments to Children with Spina Bifida or Other Covered Birth Defects
	Dependency and Indemnity Compensation
Education Benefits (Education and Vocational Rehabilitation and Employment LOBs)	Tuition and Fees
	Monthly Housing Allowance
	Books and Supplies Stipend
	Education and Vocational Counseling Services
Grants (NCA/VBA) (Loan LOB)	Specially - Adapted Housing (SAH) and Special Home Adaptation (SHA) Grants
	State and Tribal Cemetery Grants Program
Insurance (Insurance LOB)	Life Insurance
Loan Guaranty (Loan LOB)	VA Home Loan Guarantee
	Certificate of Eligibility (COE)
Memorials (NCA/VBA)	Headstones, Markers, and Medallions
	Presidential Memorial Certificates
	Flags
Pension Benefits (Pension LOB)	Disability Pension
	Death Pension
Vocational & Rehabilitation Services (VR&E LOB)	Vocational Counseling and Rehabilitation Planning
	Employment Services
	On the Job Training (OJT), Apprenticeship, and Non-paid Work Experiences
	Supportive Rehabilitation
	Financial assistance for purchase of an auto with Adaptive Equipment
	Independent Living Services

4.2.1 VBA Current Environment

The VBA Business Function Model has three Business Functions as depicted in Figure . Two of the functions—Relationship Management and Benefit Processing—are Veteran-facing, and the Internal Management function focuses on how VBA performs its work.

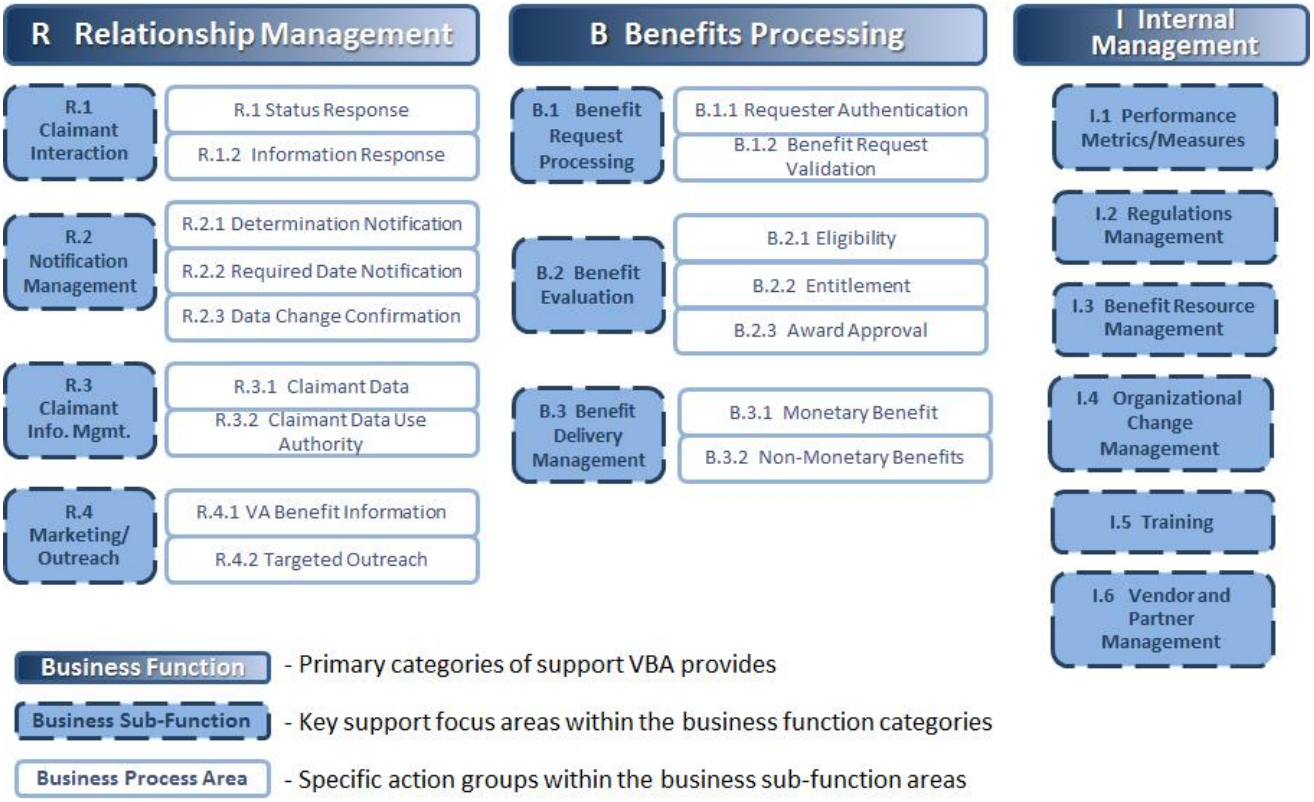

Figure – VBA Business Function Model

The VA Federal Segment Architecture Methodology (FSAM) To-Be Business Function Model provides definitions for each component. The VBA Systems Diagram shown in Figure includes both the "as-is" and the "as-planned" technical architectures. Though the technical landscape is constantly changing, this diagram is a snapshot of information as of January 2013. In addition, while not readable in its current format, Figure is presented to show the complexity of the technical architecture based on the number of systems and interfaces among them. As discussed in this section, the complexity derives from a set of legacy applications built to support individual projects. The VBA Systems Diagram does not show every system in VBA but does include the major systems that effect VBA's ability to enact its goals and strategies. In addition, it highlights internal VBA systems and interfaces, as well as those external not only to VBA, but to VA as well.

For more details on the diagram, see the VBA Systems Diagram, VBA Current Systems and Databases Overview.[58]

[58] VA-VBA, Office of Business Process Integration (OBPI), *Business Segment Architecture, Business Function Model*, 05/08/2012

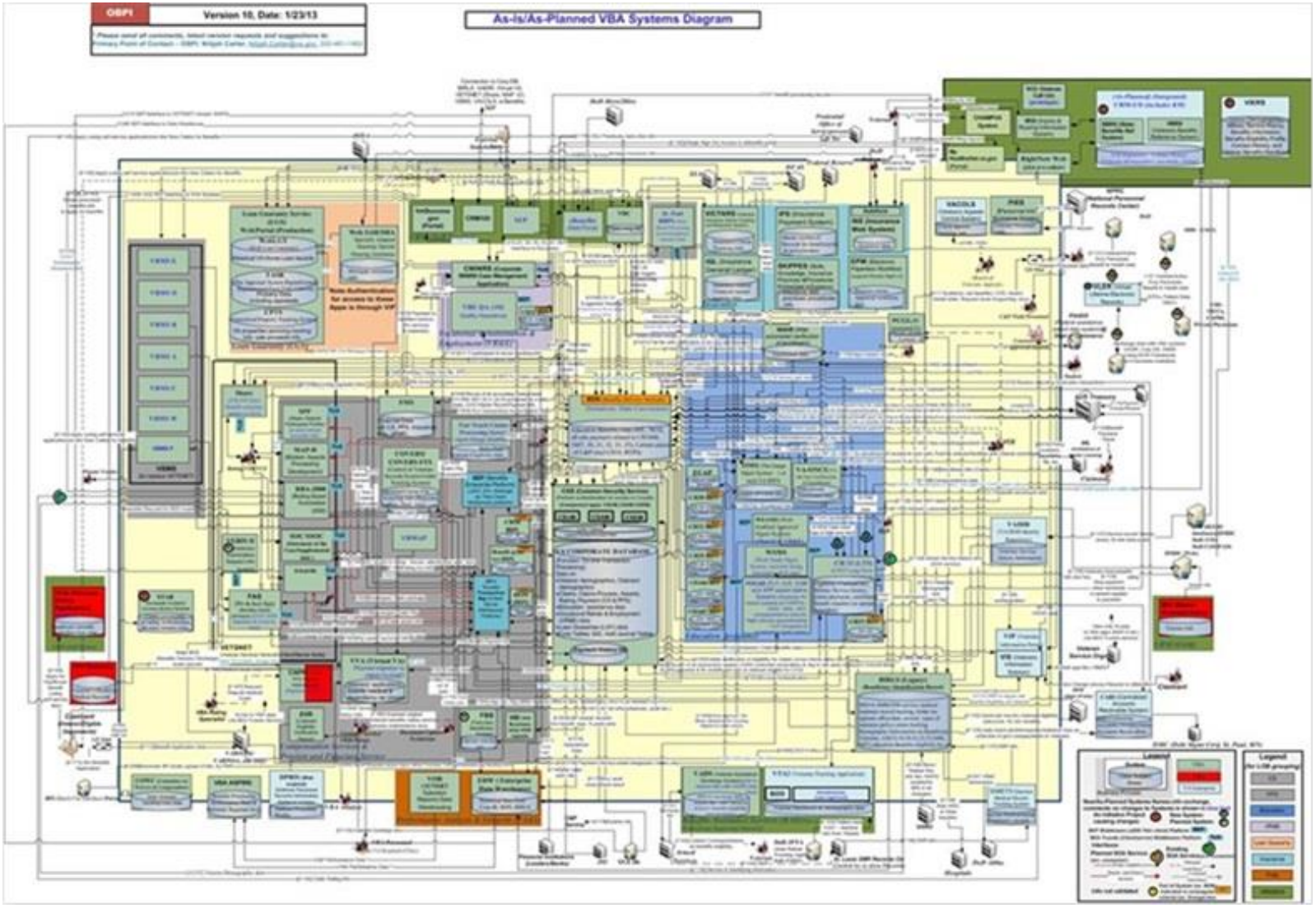

Figure – "As-Is"/"As-Planned" VBA Systems Diagram

4.2.2 NCA Current Environment

NCA has 5 Memorial Service Network Offices and 131 National Cemeteries that perform NCA's main mission in the areas of burials, memorials, and maintaining national shrines.[59] NCA's current Business Reference Model (BRM), displayed below in Figure , shows these missions (or lines of business) along with their associated programs, functions, and activities. This model is essential to the development and implementation of an architecture within NCA because it can help the Administration establish strategies for effective information technology (IT) resource management and decision support, systems development and deployment, and interoperability with business partners.

[59] *FY 2011-FY 2015 NCA Strategic Plan*, Executive Summary, page 3

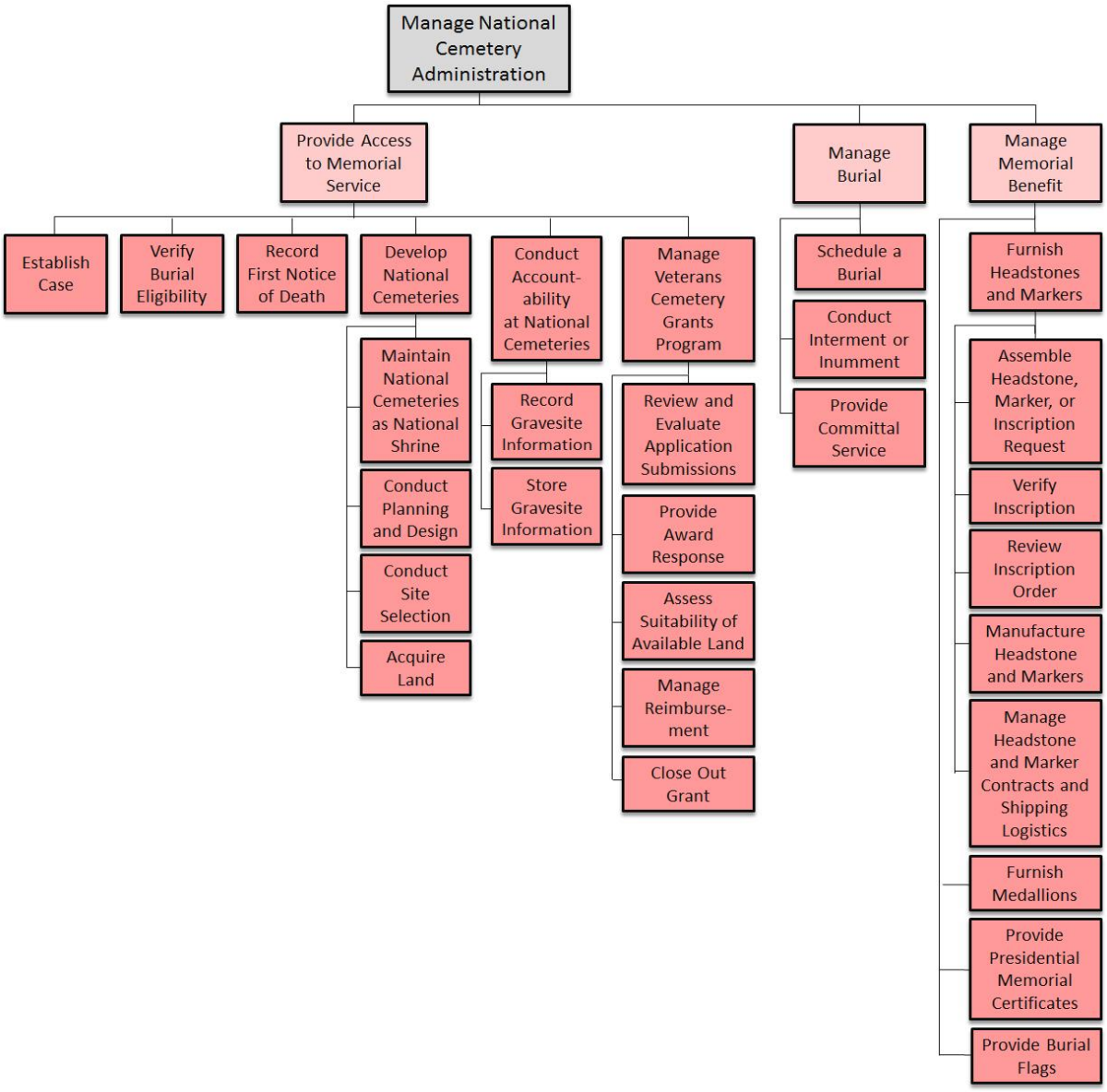

Figure – NCA Business Reference Model[60]

[60] *NCA Business Reference Model*, System Architect, September 10, 2013 , NCA portion (pink) extracted from OneVA EA BRM 2013 09 27, accessed on November 25, 2013

This BRM supports NCA's focus on business and technology strategies to modernize and expand its capabilities as provided by its legacy Burial Operations Support System (BOSS) Enterprise suite of applications.

The Burial Operations Support System (BOSS) Enterprise was designed in the 1990s and is the overarching Veterans Affairs (VA) Major Application hosting the BOSS Automated Monument Application System (AMAS) database and its many subcomponent systems including:

- Burial Operations Support System (BOSS)
- Automated Monument Application System (AMAS)
- Monument Application Scanning System (MASS)
- Management and Decision Support System (MADSS)
- Presidential Memorial Certificate (PMC)
- Cemetery Kiosk and Nationwide Gravesite Locator (NGL)

4.2.3 Performance Results

Key performance results published in the 2013 VA PAR show that VA has met its overall performance targets. According to the PAR,

- VBA exceeded performance targets on:
  - Average days to complete an Education benefits claim
  - Payment accuracy rate for Education benefits claims
  - Rate of homeownership for Veterans compared to that of the general population

VBA uses measurement results to build on areas of strong performance and address challenges such as developing and integrating programs to improve efficiencies in reducing the claims backlog and improving the accuracy of determining benefits.

- NCA has exceeded performance targets on:
  - Percentage of gravesites that have grades that are level and blend with the adjacent grade levels
  - Percentage of headstones, markers, and niche covers that are clean and free of debris or objectionable accumulations

NCA uses these measurement results to increase and improve access to burial options in national, state, or tribal Veteran cemeteries, and for Veterans who reside in sparsely populated areas where access to already established Veteran cemeteries does not exist.

These measures help VBA and NCA leadership transition the Administrations to improve the delivery of services and benefits to Veterans, their families, and their survivors.

4.3 Analysis

As VA transitions into the 21st century, VBA and NCA must accommodate a number of business drivers and challenges, while maintaining the flexibility necessary to incorporate and leverage developing technical trends.

4.3.1 Business Drivers

Business drivers establish the need for a business architecture. Business drivers are vital to the consistent growth of benefits delivery and are factors that direct the goals and objectives for VBA and NCA to achieve their desired future state and better serve the nation's Veterans in the process.

Table lists the key business drivers that affect Benefits Delivery.

Table – Business Drivers by Category

Category	Business Drivers
Increase in number of Veterans	• 940K Veterans added to rolls between FY 2009 and 2012 (more than today's combined Army and Navy Active Duty) • Post-conflict downsizing of the military
Increase in number of Benefits Claims	• Secretary's decision to add Agent Orange presumptive conditions, resulting in more claims for exposure-related disabilities • Gulf War Illness • Relaxation of PTSD Rules • Extensive and successful VA Outreach programs encouraging more Veterans to submit claims (6300 more events over 2008) • Increased use of technology and social media by Veterans, to self-inform about available benefits and resources • Annual claims receipts up 50% since 2008 • Aging population • Declining Veteran population • US Veteran population distribution • Veteran access to a burial option • The availability of land for new cemeteries/National Veterans Burial Grounds/Urban Initiative sites • Awareness of VA burial benefits

4.3.2 Challenges

The dynamic business drivers present VA with major challenges in meeting benefits delivery goals. These challenges include:

- **Existing Claims Backlog**: An existing backlog[61] of 418K claims out of a total inventory of 722K claims as of October 2013
- **Increase in new Claims**: Ten years at war, increased survival rates has resulted in more claims with more complexity
- **Fully Developed Claims:** Today, VBA receives only three percent of claims in fully developed form;[62] non-fully developed claims require gathering additional evidence before adjudication

4.3.3 Technology Trends

Technology trends guide VBA and NCA to create solutions to overcome challenges that may prevent the accomplishment of their set goals. Below is a summary of major IT trends that have potential implications for Benefits Delivery:

- **Enterprise Shared Services (ESS)** – Within VBA, the Benefits Gateway Services organization facilitates the development and use of shared services. Benefits delivery will realize systems development needs faster due to the combination of VBA efforts and other enterprise efforts in development, using an ESS strategy (see the Enterprise Shared Services sub-section within Chapter 2, Enterprise-wide Initiatives, for more information). The shorter systems development cycles will allow faster realization of technologies to support claims processing and easier access to information for the Veteran.
- **Improved Information Management** – From a benefits delivery perspective, modernizing business processes will support claims processing and management through the availability of all incoming information in electronic format. Having improved data resources will allow faster processing of claims through the reduction of time to validate incoming information. For more information, see Chapter 2, Enterprise-wide Initiatives, and the CDI subsection.

[61] Claims older than 125 days in processing are identified as “backlogged”
[62] *VA Strategic Plan to Eliminate the Compensation Claims Backlog*, VBA, January 25, 2013

4.4 Future Environment

4.4.1 Veteran-Centric

The future environment of VA for benefits delivery will be a Veteran-centric operating model that allows seamless access to information and faster claims processing. Updated systems will help eliminate paper tracking of the day-to-day operations, will enhance the clarity of communications within VA, and will allow the electronic capture of data.

Veterans, families, VA partners, and the public will have a much higher level of support and quicker, easier access to information. The information will provide clarity for staff members who require it to perform their duties and usability for those individuals who view it. The future environment with respect to access to benefits includes improved access and communications between Veterans and VA through multiple channels—phone, Web, mail, social media, and mobile applications. VBA and NCA will provide tools, processes, and enterprise services that will increase the speed, accuracy, and efficiency of information exchange.

4.4.2 Paperless Claims

From a claims processing perspective, VA's environment will support:

- A Web-based system that provides real-time, on-demand access to information
- An electronic documents and records environment that speeds up benefits delivery by removing current paper-based inefficiencies
- Automated processes, workflow, and workload management capabilities resulting in improved quality, accuracy, and timeliness of claims decisions

This will mean the following to Veterans:[63]

- VA will process all claims within 125 days with 98 percent accuracy
- Servicemembers and Veterans will file claims electronically through eBenefits
- Status of claims will be available on the eBenefits website; and claimants will receive notifications electronically by email, if they desire, about the progress of their claims or benefits
- VA will receive and process award letters and benefit payments electronically
- Veterans Service Organizations (VSOs), physicians, and private attorneys will be able to represent their clients electronically through the Stakeholder Enterprise Portal (SEP)

[63] VBA End State Transformation Site accessed: October 9, 2013

4.5 Transition Strategy and Activities

The strategy by which benefits delivery will move to its future environment and address the *VA FY 2014–2020 Strategic Plan* goals, objectives, and APGs are described in the *FY 2014-2020 VBA Strategic Plan*, the *VBA Transformation Plan*, the *VBA Strategic Plan to Eliminate the Compensation Claims Backlog*, and the *FY 2011 – 2015 NCA Strategic Plan*.

The strategy to eliminate the disability claims backlog includes a new operating model, developing process improvements and implementing modernized systems to automate the processing of claims. VBA is rapidly developing and testing streamlined business processes, focusing on eliminating repetition and rework. VBA established a "Design Team" concept to support business-process transformation. Using design teams, VBA conducts rapid development and testing of process changes and automated processing tools in the workplace. This Design Team process demonstrates through pilot initiatives that changes are actionable and effective prior to nationwide implementation.[64]

The strategy to improve Veteran access to benefits and services includes moving toward a Veteran-centric model of integrated service delivery. From a benefits delivery perspective, VA will update its processes and its systems to provide a holistic view of the Veteran and not just manage individual benefits claims separately. VA is also implementing modernized systems and taking advantage of recent technological and social trends to provide better access to VA benefits and services.

The strategy to establish service goals that exceed the expectations of Veterans and their families includes the enhancement of memorialization product quality, the increase of outreach to the Veteran population, the automation of pre-need burial processing through eBenefits, and the sharing of First Notice of Death (FNOD) information across VA. NCA is redesigning its mission critical systems to meet these objectives. NCA develops the strategic objectives that align to VA's strategic goals, which strengthen NCAs objectives to meet Veterans and their families' expectations for quality, timeliness and responsiveness to benefit requests and proactive outreach. This will build NCA's internal capacity to serve Veterans, their families, and stakeholders.

[64] *VA Strategic Plan to Eliminate the Compensation Claims Backlog*, VBA, January 25, 2013

4.5.1 VBA Transformation

The *VBA Transformation Plan* guides the Administration's transformation activities. The *Transformation Plan* includes 40+ high-impact initiatives across people, processes, and technology through a systematic and repeatable gap analysis process. The following is a selected list of transformational activities from the Plan along with a brief description:[65]

People

- Intake Processing Centers
- Segmented Lanes
- Cross-functional Teams
- Challenge Training
- Skills Certification
- Quality Review Teams

In particular, VBA accelerated the implementation of the new organizational model of segmented lanes with cross-functional teams. VBA Central Office provided significant support and training. The new organizational model is now operational at all Regional Offices (ROs).

Processes

- Simplified Notification Letter to Veteran
- New decision support tools to improve efficiency and consistency
  - Evaluation Builder
  - Rules-Based Calculators
- Fully Developed Claims
- Electronic Disability Benefits Questionnaires
- Paperless Compensation and Pension Records Interchange (CAPRI) Records
- Acceptable Clinical Evidence
- Appeals Design Teams
- Private Medical Records

[65] *VA Strategic Plan to Eliminate the Compensation Claims Backlog*, VBA, January 25, 2013; VBA Reveals Transformation Plan to Address Backlog (Veterans Benefits Administration)

Through these process-improvement initiatives, VBA is rapidly developing and testing streamlined business processes, and focusing on eliminating repetition and rework. For example, VBA implemented the Simplified Notification Letter initiative. This initiative has reduced key strokes and automated production language in preparation of Veterans' decision letters, thus improving rating decision productivity and accuracy. VBA implemented this initiative on March 1, 2012; it has decreased claims "waiting" for a rating decision by 35 percent.

Technology

- VRM
- eBenefits Online Self-Service Portal (eOSSP)
- Stakeholder Enterprise Portal for VSOs
- Veteran Online Application Direct Connect
- Unified Desktop, Virtual Hold, Scheduled Callback
- Veterans Benefits Management System (VBMS)
- Post-9/11 GI Bill Paperless Claims Processing System (long-term solution)

The third and final phase will add technology tools after employees are comfortable with the new organizational model. The VBMS is the cornerstone of VBA's technology transformation efforts and provides the new electronic environment for claims processing at VBA. VBMS was operational at all 56 ROs June 2013.

Impact of Transformation

The impact of VBA's transformation will lead to the elimination of the claims backlog and the processing of all claims within 125 days at 98% accuracy by 2015. Additional information is in the *VBA Transformation Plan* and at the VBA Transformation website.[66]

The following programs and initiatives facilitate VBA's future environment transformation.

4.5.1.1 Veterans Benefits Management System (VBMS)

VBMS is an initiative intended to eliminate the disability claims backlog. It is a Web-based, paperless claims processing solution complemented by improved business processes. Specifically, as stated in the *VA FY 2014-2020 Strategic Plan*, "Information 'on demand' is now a core expectation; so is the ability to transact both work and personal business 'anytime, anywhere.' These trends have resulted in tremendous changes to what individuals expect in terms of customer service as well as how they expect to manage their own work life and career. For VA this presents huge challenges and opportunities in terms of how it delivers services to

[66] VBA Claims Processing Transformation site, accessed November 25, 2013

Veterans and eligible beneficiaries and how it empowers its employees to perform their duties. New and emerging IT capabilities delivered must:

- Enable each Veteran to manage his/her relationship with VA in a unified manner, with both the Veteran and VA employees serving them able to access and maintain a holistic view of the Veteran's complete profile along with services entitled, available, and provided
- Enable Veterans and eligible beneficiaries, VA employees and trusted partners with the ability to access authorized VA-maintained information 'anytime, anywhere'
- Enable VA employees with the flexibility to take advantage of emerging technologies to increase alternative work arrangements such as telework"

VBMS will serve as the enabling technology for quicker, more accurate, and integrated claims processing in the future. Implementation of VBMS will help VA meet increasing demand while providing more timely and responsive customer service to Veterans and their families.

4.5.1.2 Veterans Claims Intake Program (VCIP)

Because VBMS must process all claims information in an electronic environment, all data must be received in or converted to electronic form. Consequently, and out of necessity, VCIP develops strategies for receiving scanned images from a scanning vendor as the primary intake method for claims and claims information. It is VBA's goal and expectation that the intake of new claims information can quickly be converted to direct receipt of electronic data; for example, from claims information entered directly by a Veteran on a Web-based form. However, the sheer volume of existing paper-based claims and the fact that 60 percent of all claims are "supplemental" to an existing adjudication ensure that the VBMS system will need to accommodate a large volume of scanned images in the near future (approximately 60 million images per month).[67]

4.5.1.3 Veterans Service Network (VETSNET)[68]

The VETSNET Compensation and Pension (C&P) is a suite of applications that facilitates the entire C&P claims process. Within the suite, the end user can establish and develop Veterans' claims, the rating decision, award and notification letter documentation, and transmission of payment information to Treasury. Throughout these activities, data is shared and passed between the applications to support end-to-end claims processing, customer service, and notification. VETSNET satisfies emerging business needs through functional enhancements supporting the Disability Evaluation System. Enhancements to the software suite assist in streamlining documenting the rating and evaluation of claims under this program. VETSNET is a

[67] *VA Strategic Plan to Eliminate the Compensation Claims Backlog*, VBA, January 25, 2013
[68] VETSNET OMB Exhibit 300, 2012

fundamental component of VA's EA in providing critical C&P informational support to its customers through an integrated and technologically sound environment.

In addition, other business needs implemented support of the Combat Related Special Compensation and changes to the Veterans Claims Assistance Act notification requirements. Additionally, VETSNET C&P replaces the C&P functions of the Benefits Delivery Network (BDN). The VETSNET Executive Team, an interdisciplinary team responsible for the day-to-day execution of the project and led by a Senior Executive well versed in C&P processes, provides oversight for the VETSNET investment. The VETSNET Executive Board (VEB) provides strategic direction. The VEB meets on a regular basis to monitor and control investment progress.

4.5.1.4 Benefits Assistance Service (BAS)[69]

The BAS ensures the timely and accurate provision of benefit information and services to Servicemembers, Veterans, dependents, and survivors. BAS facilitates activities to achieve VBA's strategic outreach needs and provides consistent client-service products, which support all of VBA services, staffs, and regional offices. BAS works to properly conduct and communicate VBA's strategic client-centered outreach needs and direct service activities. The staff establishes policy and procedures for client-centered outreach, direct services, social media, marketing, and web-content tools.

The BAS:

- Coordinates with the VA Office of Public and Intergovernmental Affairs (OPIA) on public affairs and outreach projects
- Ensures that VBA's public affairs mission and activities align with the vision and priorities of the Under Secretary for Benefits
- Oversees the development of the annual VBA Communications Plan, which encompasses the marketing tools and initiatives of the various VBA business lines
- Coordinates the Departmental-level development of Congressional Outreach Report
- Assesses client satisfaction with VBA products and services
- Obtains appropriate input from stakeholders and Veterans Service Organizations
- Develops and facilitates on-going DoD liaison activities on behalf of the Benefits Executive Council (BEC), BEC Information Sharing/Information Technology, and other transitional programs

[69] M27-1: Benefits Assistance Service Procedures

4.5.1.5 Vocational Rehabilitation & Education (VR&E)[70]

The VR&E Program, authorized by Congress under Title 38, U.S.C., Chapter 31 and Code of Federal Regulations, Part 21, is sometimes referred to as the Chapter 31 program. This program assists Veterans with service-connected disabilities to prepare for, find, and keep suitable jobs. For Veterans with service-connected disabilities so severe that they cannot immediately consider work, this program offers services to improve their ability to live independently.

Services provided by the VR&E Program include:

- Comprehensive rehabilitation evaluation to determine abilities, skills, and interests for employment
- Vocational counseling and rehabilitation planning for employment services
- Employment services such as job-training, job-seeking skills, resume development, and other work readiness assistance
- Assistance finding and keeping a job, including the use of special employer incentives and job accommodations
- On the Job Training (OJT), apprenticeships, and non-paid work experiences
- Post-secondary training at a college, vocational, technical or business school
- Supportive rehabilitation services including case management, counseling, and medical referrals
- Independent living services for Veterans unable to work due to severe disabilities

4.5.1.6 Education (EDU)[71]

The Education Service of the VBA currently administers nine education benefit programs summarized below.

1) All Volunteer Force Educational Assistance Program (also referred to as the Montgomery G.I. Bill-Active Duty Educational Assistance Program (MGIB))
2) Post-Vietnam Era Veterans' Educational Assistance Program (VEAP)
3) Survivors' and Dependents Educational Assistance (also referred to as Dependents' Educational Assistance (DEA))
4) Educational Assistance for Members of the Selected Reserve (also referred to as the Montgomery G. I. Bill - Selected Reserve (MGIB-SR))

[70] VBA's Vocational Rehabilitation & Employment site, accessed: December 3, 2013
[71] Web Automated Reference Material System site

5) Educational Assistance for Reserve Component Members Supporting Contingency Operations and Certain Other Operations (also referred to as the Reserve Educational Assistance Program)
6) Educational Assistance Test Program
7) Educational Assistance Pilot Program (also referred to as Non-contributory VEA)
8) The Antiterrorism Act of 1986, Educational Assistance for Members Held as Captives and their Dependents
9) Summary of National Call to Service, Section 510, Title 10, U.S.C.

4.5.1.7 Compensation Service (CS)

The compensation program provides monthly benefits to Veterans in recognition of the effects of disabilities, diseases, or injuries incurred or aggravated during active military service. The program also provides monthly payments to surviving spouses, dependent children, and dependent parents in recognition of the economic loss caused by a Veteran's death during military service or, subsequent to discharge from military service as the result of a service-connected disability.[72]

4.5.1.8 Pension and Fiduciary Services (PFS)

Pension programs provide needs-based benefits designed to provide certain wartime Veterans and their survivors a minimum level of income that raises their standard of living.

VA's fiduciary program provides protection to Veterans and other beneficiaries who are unable to manage their financial affairs due to injury, disease, or the infirmities of age. Under this program, VA appoints fiduciaries to manage VA benefits and ensure the welfare and needs of beneficiaries by using the least restrictive, yet most effective payment method. The program closely monitors fiduciaries for compliance with program responsibilities to ensure that VA benefits used are for the sole purpose of meeting the needs, security, and comfort of beneficiaries and their dependents.[73]

4.5.2 NCA Transformation

NCA's transformation will incorporate the transition to a SOA and Enterprise Service Bus (ESB) platform. NCA is developing a modernized, redesigned BOSS to participate in the event driven architecture for the exchange of information pertaining to the burial of Veterans and their dependents. This approach will support the VA Project Management Accountability System (PMAS) requirement to deliver capabilities to the end user in increments of six months or less.[74]

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[72] VBA's Annual Benefit Report for 2012 , page 8
[73] VBA's Annual Benefit Report for 2012, pages 30 and 41
[74] *Project Management Accountability System (PMAS) Guide 4.0*, Section 4.4

The system will also leverage other systems, applications, and services already available in VA as well as those in development for other initiatives.

In FY 2014, NCA will deliver automated FNOD processing and Resolution letters. VLER Memorials will also deliver the redesign pilot in FY 2014 and improved IOC in FY 2015 for automated delivery of VA burial and memorial benefits to eligible Veterans and their families. These development efforts fall under (1) the redesign of BOSS Enterprise and its subsystems and (2) the improvements to the legacy BOSS Enterprise to develop better data-sharing across VA for reduced burial and memorial benefits delivery cycle times. This will include improvements in Pre-Need Planning, Capacity Planning, and Remains tracking by developing a single database for all NCA enterprise systems that will continue to improve burial scheduling services by automating performance and inventory reporting requirements through the elimination of manual tracking and scheduling.

4.5.2.1 VLER Memorials Redesign Project

To address improvements in claims processing for burial benefits, NCA is building the VLER Memorials Redesign project. NCA must enable an increased level of automation and reduction of manual, paper-based, and data rekeying tasks. The modernized system will sustain or increase the high level of quality currently provided, mitigate risks from exposure to human error, enable NCA to provide faster and easily accessible services to Veterans and their families, and minimize costs related to system operation and maintenance. Further, the system will improve communications between the business support functions and advance technologies that enable a Virtual Lifetime Electronic Record (VLER).[75]

Modernizing this NCA mission-critical suite of systems will afford VA the flexibility to adapt to current needs and exchange information within VA as well as with organizations outside of VA. The ability of NCA to take advantage of the information flow from VA as well as other agencies, such as DoD, will improve the efficiency and timeliness of providing burial benefits. Figure , as depicted below, is a notional future version of the NCA Corporate System, its various components, and their interconnections. Additional details concerning the various components can be found in the current draft version of the VLER Memorial Redesign, System Design Document.[76]

[75] VLER Memorials Program, *Program Management Plan Version 1.2*, April 2012, Section 1.2.3
[76] Department of Veterans Affairs VLER Memorials Phase 1, *System Design Document, draft version 4.1.13*, dated September 30, 2013

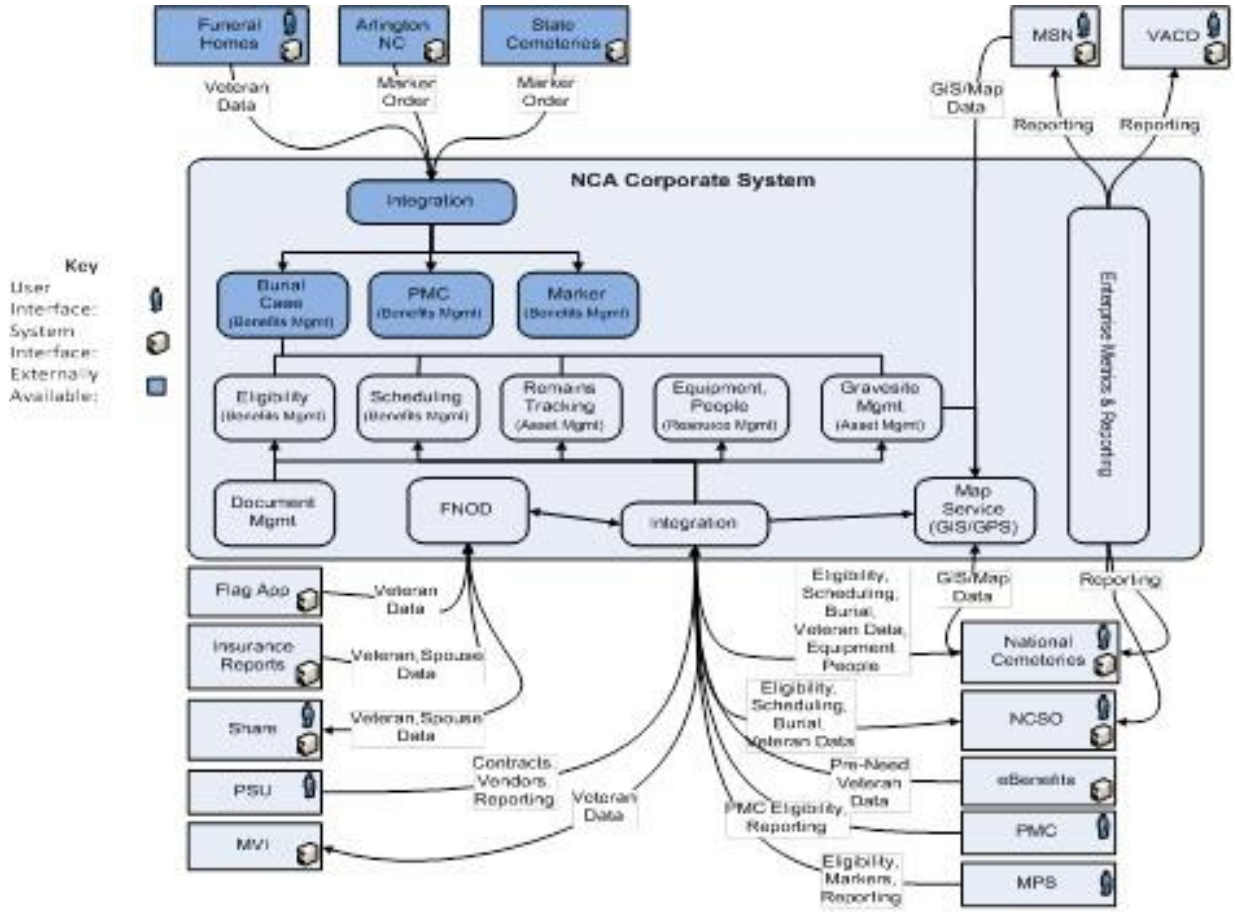

Figure – Future System Memorial Affairs Architecture DRAFT[77]

4.6 Enterprise-Wide Initiatives

Chapter 2 presents a discussion of VA's enterprise-wide initiatives. Some of these enterprise-level initiatives provided by benefits delivery improve the Administrations' overall effectiveness. These initiatives include:

- VRM – Veterans Relationship Management is delivered through VBA to improve Veterans access to benefits and services
- EVH – Eliminate Veteran Homelessness has six pillars of integrated services; VBA delivers three: outreach and education; housing and support services; and income, employment, and benefits

[77] Ibid

4.7 Benefits Delivery Milestones

Benefits Delivery has multiple programs and systems that will help lead both VBA and NCA to their future state. Figure lists target completion milestones for programs funded, established, or completed by benefits delivery within the FY 2013 – 2015 timeframe.

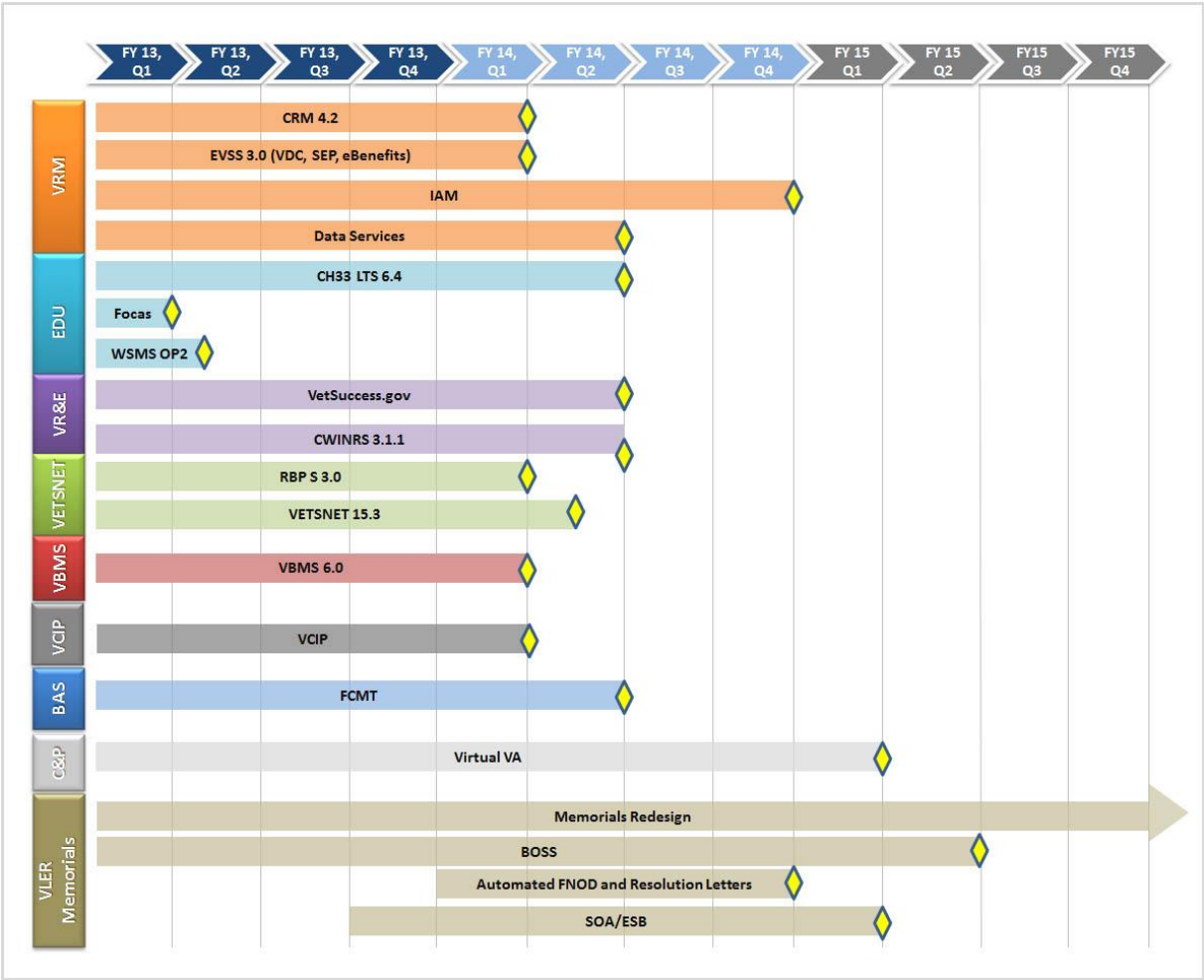

Figure – Benefits Delivery Programs Milestone Chart

The milestones listed in Figure belong to VBA except VLER Memorials, which belongs to NCA. The VBA milestones reflect a sample of key areas where VBA has organized its strategic planning and investment efforts to satisfy VA's strategic goals. Some milestones are continuations of efforts that have already produced significant improvements in performance and functionality and assist VBA in substantially reducing its pending disability claims backlog and inventory, as well as improving its quality rating. The NCA VLER Memorials program is a consolidation of three prior programs (Memorial Affairs Letter Enhancement, Memorial Affairs Redesign, and Memorial Affairs Performance Usability Enhancements) that ended in FY13. The VLER Memorials program will become the major Enterprise suite for all NCA efforts.

4.8 Benefits Delivery Programs and Initiatives Alignment to VA Strategic Goals and Objectives

Figure below identifies the alignment of benefits transformation programs in this Roadmap to the VA FY 2014-2020 strategic goals and objectives. A checked box in the matrix indicates the program is providing or developing a capability that will advance the achievement of that specific VA strategic objective. Note that initiatives and programs listed as EWI's in Figure support both Health Care Delivery and Benefits Delivery. These initiatives and programs promote achievement of VA's FY 2014 – 2020 strategic goals through enabling technology for quicker, more accurate and integrated claims processing.

VA Strategic Plan Goals and Objectives	EWIs		Benefits Initiatives								
	VRM	EVH	VBMS	VCIP	VETSNET	BAS	VR&E	EDU	CS	PFS	VLER MEMORIALS
Goal 1 *Empower Veterans to Improve their Well-being*											
Obj. 1.1 Improve Veteran Wellness and Economic Security		✓					✓	✓			
Obj. 1.2 Increase Customer Satisfaction Through Improvements in Benefits and Services Delivery Policies, Procedures, and Interfaces	✓		✓	✓	✓		✓	✓	✓	✓	✓
Goal 2 *Enhance and Develop Trusted Partnerships*											
Obj. 2.1 Enhance VA's Partnership with DoD	✓										
Obj. 2.2 Enhance VA's Partnerships with Federal, State, Private Sector, Academic Affiliates, and Non-Profit Organizations	✓	✓				✓					✓
Obj. 2.3 Amplify Awareness of Services and Benefits Available to Veterans Through Improved Communications and Outreach	✓					✓	✓				
Goal 3 *Manage and Improve VA Operations to Deliver Seamless and Integrated Support*											
Obj. 3.1 Make VA a Place People Want to Serve											
Obj. 3.2 Evolve VA IT Capabilities to Meet Emerging Customer Service/Empowerment Expectations of Both VA Customers and Employees	✓										
Obj. 3.3 Build a Flexible and Scalable Infrastructure through Improved Organizational Design and Enhanced Capital Planning											
Obj. 3.4 Enhance Productivity and Improve the Efficiency of the Provision of Veteran Benefits and Services	✓										
Obj. 3.5 Ensure Preparedness to Provide Services and Protect People and Assets Continuously in Time of Crisis											

Figure – Benefits Delivery Initiatives and Programs Alignment to VA Goals and Objectives

5 IT Infrastructure

5.1 Introduction

VA OIT provides the technology infrastructure, applications, and information assurance to support the Department's business functions and enable VA to meet its mission needs effectively. OIT is undergoing the same major transformation as the rest of VA—to enable the infrastructure and services to become more people-centric, results-oriented, and forward-looking. To do so, OIT is undertaking multiple enterprise level initiatives, such as enterprise-shared services, improved information assurance and security, improved support for mobile users, and cloud services. These IT infrastructure transformational activities play a critical role in enabling Veteran-facing initiatives.

5.1.1 Alignment to OIT Goals and Objectives

Within the overall mission and vision of OIT, as described in the *VA IRM Strategic Plan*, the VA CIO has established three goals and related objectives. Two of the three OIT strategic goals and related objectives that directly support the IT infrastructure are identified below in Table .

Table – OIT IT Infrastructure Related Strategic Goals and Objectives

Goal 1: Be a trusted strategic partner to VA Administrations and staff offices in driving VA mission objectives
Objective 1.1 Advocate a unified vision of information resource management aligned to VA mission objectives
Objective 1.2 Manage IT portfolio, aligning investments to VA mission needs and objectives
Objective 1.3 Deliver an integrated, interoperable VA mission systems environment, optimized to maximize information-sharing capabilities
Objective 1.4 Drive duplication and redundancy out of VA mission systems environment (RRTF)
Goal 2: Be a recognized leader in Information Resource Management operational excellence, security, and innovations
Objective 2.1 Develop and deliver integrated, innovative, and accessible solutions utilizing disciplined processes and technologies
Objective 2.2 Provide reliable delivery of adaptable, high quality IT infrastructure and services
Objective 2.3 Provide robust and comprehensive information security and privacy services

5.2 Current Environment

Since the transformation of VA OIT functions from decentralized organizations to a centralized IT Management organization under the authority of the CIO in November 2006, VA has consolidated disparate IT functions into one organization, transforming it into one of the world's largest consolidated IT organizations.[78] VA OIT currently serves a complex IT infrastructure that supports over 327,000 VA employees nationwide,[79] overseeing and facilitating all VA IT product and service delivery activities to provide mission critical tools necessary to serve over 21.9 million Veterans. IT is integrated in all of VA's 151 Medical Centers, 820 CBOCs, 300 Vet Centers, 56 Regional Offices, and 131 National and 89 State or Tribal Cemeteries.[80]

VA owns and manages most of its infrastructure and supports a vast technology profile of more than 390,000 desktop computers, 37,000 laptops, 21,000 mobile devices, and 512,000 email accounts. The current VA technology environment consists of applications with dedicated infrastructure and a project-centric IT service delivery model based on delivering incremental functionality at least every six months. The IT environment is characterized by infrastructure diversity with an infusion of modern and legacy technologies, which would benefit from integrated design, ability to reuse existing IT investments, and industry standards.

5.2.1 IT Services and Capabilities

The IT services and capabilities that comprise VA's current IT environment consist of seven technology categories listed below, which make up the Enterprise Technical Architecture (ETA). The ETA, combined with OIT's modernization initiatives, which are depicted in Figure , drive VA's IT Modernization efforts.

The seven technology categories of the Enterprise Technical Architecture as displayed in Figure are:

1. **Enterprise Shared Services** consists of the enterprise systems integration and information exchanges
2. **Information Management** consists of the organized storage, retrieval, management, and analysis of collected data
3. **Application Standards** consists of the specification, design, construction, implementation, and lifecycle management of software applications, including application layer communication, presentation, and business logic services

[78] *VA Information and Technology Strategic Plan FY 2006 – 2011*, December 2007
[79] *VA FY 2014-2020 Strategic Plan*, March 6, 2014
[80] Ibid

4. **Platforms and Storage** consists of the hardware and software platform delivery, which support computing applications and data storage
5. **Networks and Telecommunications** consist of the standards, software, and hardware for computer networking and telecommunications
6. **Information Security** consists of the Information security (protecting data), computer security (protecting systems), and information assurance (people, products, and procedures to ensure data confidentiality, integrity, availability, assured delivery, and non-repudiation)
7. **Systems Management** consists of the management and administration of VA's IT enterprise and its associated facilities, assets, programs, and projects

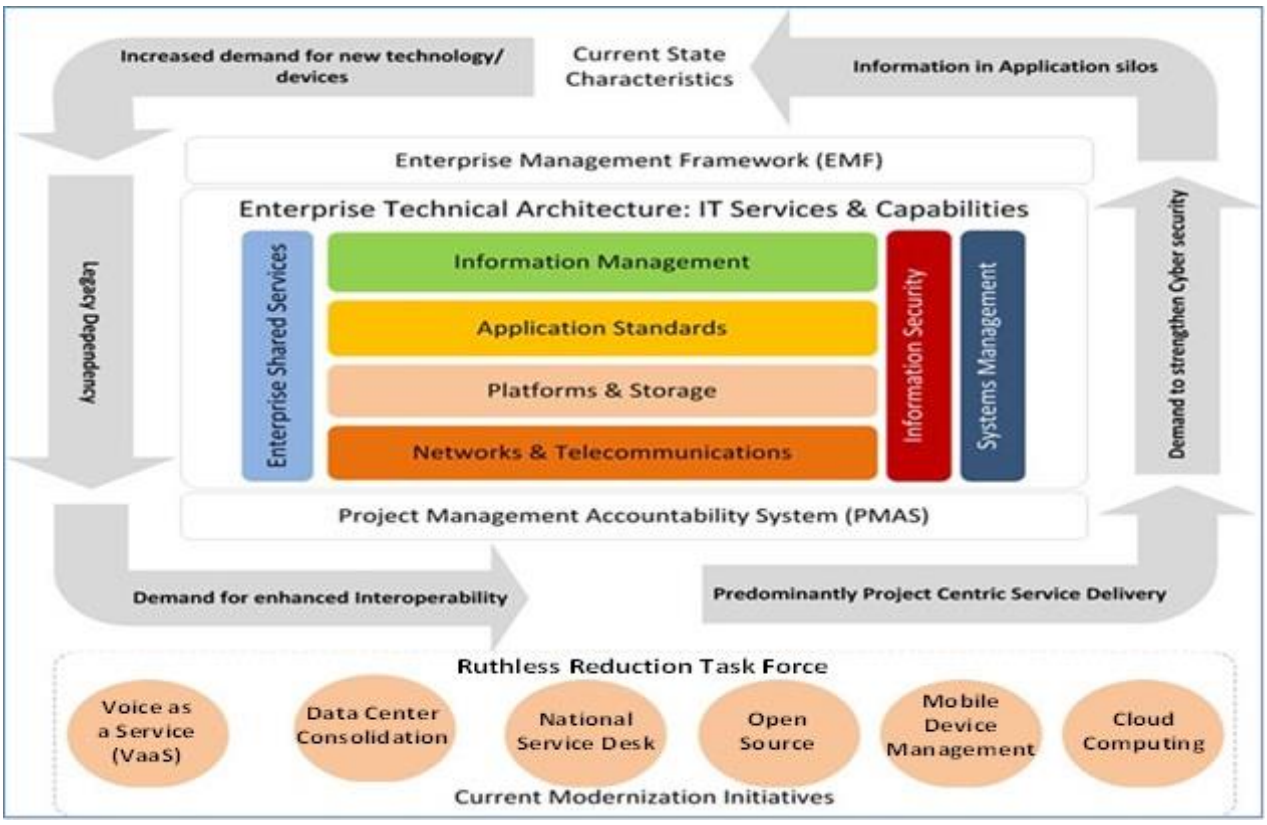

Figure – VA Current IT Environment

5.3 Analysis

While the current IT services and capabilities provide adequate support for VA mission needs, significant opportunities exist for improving the efficacy of the current IT infrastructure. These opportunities expose themselves in the form of poorly integrated systems, duplicative platforms, inefficient processes, capacity-demand mismatches, or an ever-increasing cost associated with the operations and maintenance (O&M) of existing platforms. Further, the estimated 185,000[81] active Servicemembers separating from service annually are anticipated to increase with the current military downsizing. As this large number of returning Veterans seek benefits and services from VA, the increased demand will affect the level of information technology services required. Infrastructure capacity in place today may be inadequate as technology access is pushed to individual Veterans. Furthermore, VA continues to roll out new automated capabilities that will increase electronic transaction volume.

Aging infrastructure and applications are nearing the end of their ability to support the increasing demand placed on them by evolving business and mission requirements. Aging systems may soon be unable to keep pace with and adapt to increased demands for new functionally, security, and ubiquitous access. Without technology refreshment, VA will not be able to keep up with the demand for services.

In support of realizing VA OIT's vision and addressing the challenges described above, OIT has surveyed customer needs, performed environmental situational scans, and identified the following drivers and trends that shape the future state of IT infrastructure.

5.3.1 Statutes, Regulations, and Guidance

Table below identifies some of the significant statutes, regulations and miscellaneous guidance influencing VA's IT infrastructure modernization efforts.

Table – Statutes, Regulations, and Guidance

Statutes
Government Performance Results Act (GPRA) Modernization Act of 2010, PL 111-352 (Jan. 2011)
Affordable Care Act (Dec. 2009)
E-Government Act of 2002 (E-Gov Act), Public Law 107-37 (Apr. 2003)
Capital Planning and Investment Control, Public Law 107-217 (Aug. 2002)
Clinger Cohen Act of 1996 (Clinger-Cohen), Public Law 104-106 (Feb. 1996)
Government Management Reform Act (GMRA) (Sept. 1994)
Federal Information Security Management Act of 2002 (44 U.S.C. 3541 et seq)

[81] 2012 Demographics Profile of the Military Community

Regulations
OMB Circular A-11, Part 7, Planning, Budgeting, Acquisition, and Management of Capital Assets (June 2008)
OMB Memorandum M-06-02, Improving Public Access to and Dissemination of Government Information and Using the Federal Enterprise Architecture Data Reference Model (Dec. 2005)
OMB Circular A-130, Management of Federal Information Resources
Additional Guidance
OMB Digital Government Strategy (May 2012)
OMB IT Shared Services Strategy (Dec. 2011)
OMB Federal CIO 25-Point IT Reform Action Plan (Dec. 2010)
OMB Cloud First Policy (Dec. 2010)
OMB IPv6 Transition Guidance (Sept. 2010)
OMB Federal Data Center Consolidation Initiative (Feb. 2010)
OMB/DHS HSPD-12 Directive (Aug. 2004)
Reduced travel funds, requiring greater reliance on telepresence
Reduced finds for office space, requiring greater dependence on telework
OMB M-08-05 Implementation of Trusted Internet Connections (TIC)
International Statistical Classification of Diseases and Related Health Problems (ICD), ICD-10 (1992)

5.3.2 Business Drivers

The business drivers[82] that influence VA's IT are the factors that create a compelling case to improve VA's IT performance. These drivers include:

- Responding to demand for computing resources and automation to support an increased number of Veterans filing for claims
- Establishing information interoperability and enabling real time sharing of Veteran data through standards-based and secure information exchange among trading partners
- Supporting continuous improvement and investment in enhanced cyber security policies, standards and technologies
- Establishing unified IT delivery capability for VA health care, benefits, memorial services, staff offices, and DoD
- Delivering products and services that empower the Veteran, enable self-service, and facilitate Administration employee effectiveness
- Supporting emergency preparedness and disaster management activities

[82] *OIT Fiscal Year (FY) 15-19 Planning Guidance*, 02/07/2013

- Responding to increased demand for VA services amid reduced budgetary resources
- Reusing or integrating with similar systems available within other Federal government agencies/departments for internal staff and organizational business support

5.3.3 Technical Drivers

As VA leadership looks to the future, they anticipate increasing demands on its IT systems' capabilities to transform the agency into an innovative, responsive 21st century organization committed to meeting VA strategic goals. In support of achieving these goals, VA OIT has surveyed customer needs and identified the following areas that will facilitate IT transformation:

- Implementing an IT infrastructure that is agile, planned, and secure
- Implementing the *OneVA Enterprise Technology Strategic Plan*[83]
- Maximizing the use of supported open source products and COTS products and services
- Adopting modern development frameworks to facilitate responsive and rapid application deployment
- Promoting IT innovation
- Supporting the delivery of products/platforms and the full lifecycle management of the same from conception to decommissioning, encompassing all components from data center to desktop
- Instituting and enforcing a Technical Reference Manual (TRM) that supports operations efficiently and effectively

5.3.4 Technology Trends

Technological advancement will play a major role in shaping the IT infrastructure of VA and the delivery of innovative services to Veterans. The influence of technology is likely to become even stronger and more pervasive in the immediate future, to deliver anywhere/any time services. VA would benefit[84] from strengthening the capability for rapid-fire assessment of alternative solutions and approaches based on risk assessment and economic justification, as a foundation for continually driving innovation and adopting emerging trends such as the Nexus of Forces,[85] which create a user-driven ecosystem of modern computing.

[83] *OneVA Enterprise Technology Strategic Plan*, December 28, 2012
[84] *OIT Fiscal Year (FY) 15-19 Planning Guidance*, 02/07/2013
[85] Gartner Special Report: *The Nexus of Forces: Social, Mobile, Cloud and Information*

Table presents the attributes of the Nexus of Forces, which is the convergence and mutual reinforcement of social, mobility, cloud, and information patterns (predictive, near real-time analytics) that drive new business scenarios. These four independent forces have converged because of human behavior, which creates a technology-immersed environment. The forces interact, reinforce one another, and are associated through complex dependencies.

Table – Technology Trends in the Gartner Special Report: The Nexus of Forces: Social, Mobile, Cloud and Information[86]

Trend	Attributes
Social Networking	• Social networking links people to their work and each other in new and unexpected ways • Access to social networks implies a personally relevant transactional experience that is integrated into, and initiated from, a social platform
Mobility	• Mobile devices are a platform for effective social networking and new ways of work • People are mobile and require devices and applications in their hands as opposed to (only) machines tethered to a desk
Cloud Computing	• Cloud enables delivery of information and functionality to users and systems • Access to relevant, tasteful information requires access to ubiquitous cloud services where that information is made available
Information	• Information is the context for delivering enhanced social and mobile experiences • Location data (for example, from a device) shapes the enormous amount of potential data into information that is most relevant

VA can take advantage of the above trends to create innovative products and services and provide them in a secure environment to Veterans, Servicemembers, internal customers, citizens, or any other participant in an ecosystem of humans and machines. However to take advantage of these trends and respond effectively, VA must modernize its systems, skills, and mind-sets. In addition to the trends cited in Table , VA will investigate some additional IT trends to support OIT in the delivery of capabilities, products, and services more effectively and efficiently:

- **Responsive Design** provides developers with a systematic way to code fully functional applications once on any type of device (phone, tablet, or computer). It is expected that all future VA software will be developed utilizing responsive design principles.
- **Web Application Frameworks** (e.g., *jQuery, Angular.js, Backbone*, etc.) provide robust tools for developers to rapidly create complex applications by leveraging existing code and architectures. This technique results in reduced development times. However, without adequate configuration control, web application frameworks can limit code reusability across an enterprise. VA will select a suite of best of breed web frameworks to deploy across all VA web software development activities.

[86] Ibid

- **Open Source Software** is a subcategory of COTS that provides much less restrictive licensing than traditional COTS software. For certain types of commercial software (particularly health care) as well as general productivity and component software, *Open Source Licensing* provides benefits traditional licensing is unable to offer. Accordingly, the VA intends to leverage open source software components (e.g. *jQuery*, *bootstrap*, etc.) and other open source software applications whenever such use will provide "best value" to the Government**.** Increased expansion and use of Open Source licensing is expected to increase vendor competition and lower lifecycle costs of software ownership for VA.
- **Infrastructure as a Service (IaaS)** has emerged a primary implementation of cloud computing at VA. IaaS enables multiple solutions/systems to leverage existing hardware and core software components (e.g., networking, operating systems, and databases) as available services. Additionally, as VA continues the transition to the cloud, IaaS will dramatically increase security and significantly decrease software development, operations, and maintenance costs. The VA is planning to implement enterprise level IaaS, and restrict the purchase of additional hardware and core software at both the program and project levels. This topic is addressed further in section 5.5.8.

5.4 Future Environment

The target state[87] view of VA's IT infrastructure environment, depicted in Figure , envisions creation of a robust and secure environment that provides VA staff with the flexibility they need to become more effective and efficient at what they do. The availability of information on any device, anywhere, and anytime will help make day-to-day activities easier and less time-consuming. Internal users and mission partners will experience a robust, agile, interoperable infrastructure that provides connectivity, improved computing capability. This environment will facilitate new approaches for delivery of integrated services to Veterans, while supporting VA's execution of strategies. Ultimately, this vision will lead to more cost effective investments in technology, and will open new doors to service and benefits delivery opportunities that currently do not exist.

[87] *VA IT Roadmap Target State Vision of the VA Enterprise Technical Architecture (ETA)*, December 28, 2012

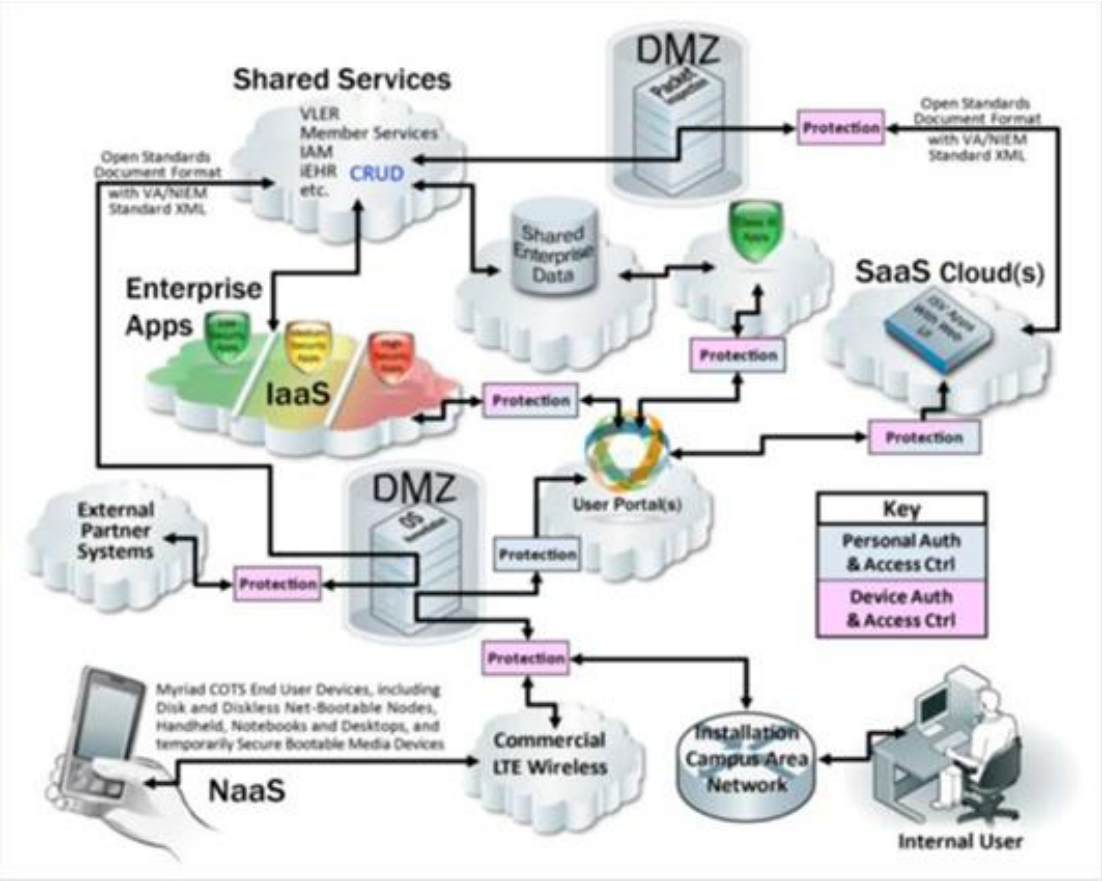

Figure – VA IT Target State[88]

This vision for VA's IT target state describes an environment that takes advantage of a variety of new and emerging technologies which, when combined, constitutes a dramatic shift in:

- The way capabilities and services are acquired and provisioned
- Applications are designed and implemented
- Information is accessed, exchanged, processed, and retained
- Data, systems, people, products, and the IT infrastructure are protected through standards and software that ensure data confidentiality, integrity, availability, and assured delivery
- Data and the IT infrastructure are protected

To realize this vision will require a paradigm shift in the way VA approaches the initiation, planning, execution, monitoring, and close out of portfolio management. The list of attributes in Table captures the essence of VA's technology vision.

[88] Ibid

Table – Attributes of Future Environment

Attributes	Technology Vision
Device Freedom	VA staff and Veterans are allowed the flexibility to utilize any approved device that may or may not be hardwired into VA's network that can be used as a portal for information for the end user or used by staff to perform their duties.
Location Freedom	VA staff and Veterans are unencumbered by physical location in accessing information.
Temporal Freedom	VA staff and Veterans are able to access information at any time.
User Interface (UI) Freedom	VA staff and Veterans are able to access information unencumbered by device dependent or proprietary user interfaces and standards.
Secure Authentication	Devices and people are authenticated at appropriate points using separate services that are not mutually dependent.
Data Security	Information is protected as it traverses through the network and kept in a data store that serves as the "single source of truth."
Browser Independent Applications	Enterprise applications are built as dynamic Web sites that adapt to how browsers need to translate and display information.
Reusable Shared Services	Enterprise applications and external partner systems utilize common services to exchange, process, and present information.
Best of Breed Applications	VA adopts best of breed COTS and Government Off-the-Shelf (GOTS) solutions vetted through a rigorous "buy or build" governance process.
Persistent Data	Shared Enterprise Data approaches combined with Enterprise CRUD (Create, Read, Update, and Delete) services provide effective, efficient, and secure exchange and retention of information.
Utility Computing	VA leverages technologies that allow the acquisition and provisioning of capabilities and services enabling adoption of a utility/commodity cost model.
On Demand Capacity	VA leverages technologies that provide elasticity, scalability, and speed in the acquisition and provisioning of capabilities and services.

The technology vision described in Table is ambitious, but achievable through conscientious effort to ensure that all technology investments from this point forward are aligned with this vision and underlying architecture. Achieving this vision will require incremental change and alignment with policies and architectures such as the *VA IRM Strategic Plan*, Enterprise Target Application Architecture, Release Architecture, TRM and Information Security Architecture.

The *OneVA Enterprise Technology Strategic Plan FY 2013-2020* is the first step in defining technologies and timelines that will guide OIT along the way. To reap immediate benefits, OIT must strive to realize this vision as quickly and economically as feasible, to help VA drive toward a vision whereby Veterans and their dependents—as well as VA customers and partners—will have the technology and support necessary to receive seamless services and information on

"any device, anywhere, anytime."[89] This technology vision is about enabling VA to deliver "world class" medical care, benefits, social support, and lasting memorials promoting the health, welfare, and dignity of all Veterans in recognition of their service to this Nation.

5.5 Transition Strategy and Activities

The transition to the target state environment includes delivering improved IT infrastructure capabilities to support the Administrations' and staff offices. VA is moving toward a unified approach to design, engineer, and deliver IT solutions in compliance with the OneVA EA. Improved governance is eliminating the development of duplicative and fractured capabilities and functionality. The transition strategy illustrated in Figure relies on the implementation of VA IT Infrastructure Roadmap and recent technological and social trends to better support VA business and mission needs.

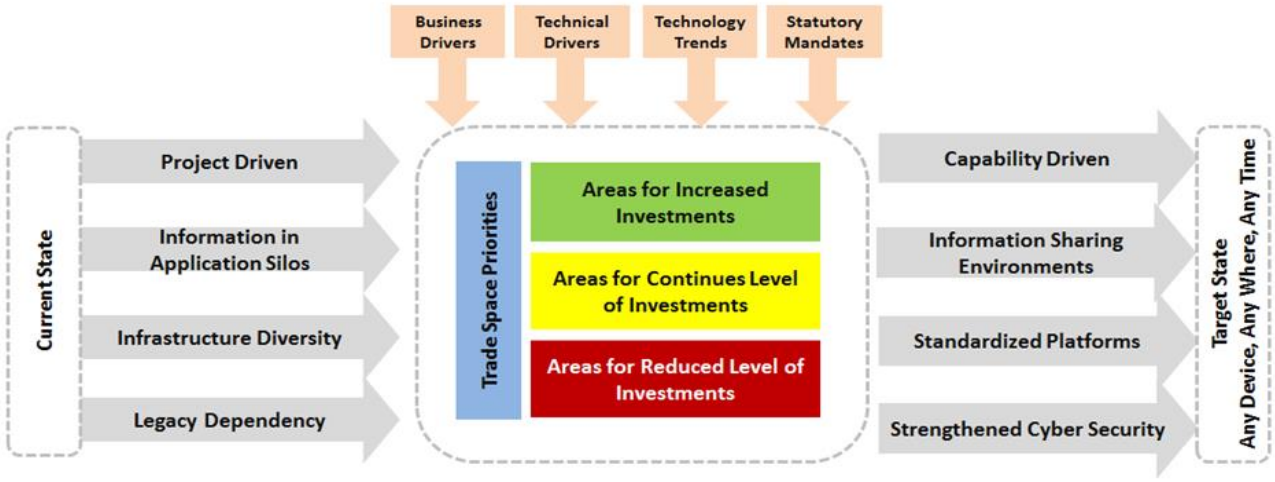

Figure – Transition Strategy

The strategy shown in Figure illustrates the transitional influences within the Department. The IT transformation activities depicted are guided by the *OIT FY15-19 Planning Guidance* and predicated on the trade space priorities derived from the *OneVA Enterprise Technology Strategic Plan (December 2012)*. These trade space priorities fall into three categories: areas for increased investment, areas for continued steady state investment, and areas for reduced investment. The OIT Planning Guidance includes 28 high-impact areas across the three trade space priority areas. The subsections below identify some of the key initiatives being executed appropriate to VA's transition strategy.

[89] Ibid

5.5.1 Enterprise Shared Services (ESS)

VA OIT is leading an ESS Initiative[90] that will facilitate an effective and cohesive implementation of an enterprise service-oriented paradigm across VA and achieve a common operation and uniformity of ESS. By increasing consistency and commonality across VA, new capabilities can be created more rapidly and economically. ESS will help achieve enterprise goals of interoperability, agility, reuse, and governance of services across internal and external organizations and programs. Key transitional objectives related to ESS include:

- Making information and functional capabilities available through shared services
- Transitioning vertically integrated systems to reusable services and capabilities
- Deploying capabilities and services consistently throughout the enterprise
- Using services as a common practice
- Establishing an enterprise approach for service governance
- Establishing enterprise policies and procedures to govern services
- Establish the tools environment to support planning, development, and operation of ESS

5.5.2 Information Security Evolution

VA's secure target state is predicated upon implementing integrated, comprehensive threat-based security architecture. This directly relates to securing VA's sensitive information, systems, software, and networks from breach and intrusion, and providing for data privacy and information security—a more secure way for data to be stored, revised, updated, deleted, or transmitted. Key transitional activities related to information security include:

- Executing a data loss prevention tool across VA environments
- Ensure National Institute of Standards & Technology (NIST) guidelines are followed for emerging technologies and applications, which make systems reliable, usable, interoperable, and secure—for example, NIST 800-53
- Ensure Federal Information Processing Standards (FIPS) are validated to protect sensitive information, specifically FIPS 140-2
- Make VA security a personal priority with all VA system users (government, contractors, and volunteers) by getting them directly involved in and responsible for VA security
- Create a central office for Information Security/Assurance, to include patching, scanning, remediation/mitigations efforts, including a lab for testing Microsoft patches
    - Ensure the separation of duties is enforced between operation and security. Place systems such as ePO, SCCM and others under an operational division and create a dedicated feed to security for review, execution, etc.

[90] *VA Enterprise Shared Services (ESS) Strategy*, Draft Version 0.7, January 7, 2013

- Expand visibility and capabilities to the enterprise-computing environment to enforce regulatory requirements, improve asset and configuration management functions, and support a scalable continuous monitoring security Assessment & Authorization model
- Deploy a secure enterprise mobility framework capable of supporting a robust consumer driven mobility health care ecosystem that embraces mHealth innovations to improve care delivery, research, and education
- Advance VA security posture to promote collaborative and interoperability efforts with DoD and other strategic business partners to maximize Veterans benefits and health care delivery efficiencies through VLER and other initiatives
- Integrate OIT access and security controls management more closely with business processes and allow flexibility to accommodate operational realities of complex health care, research, and educational environments
- Improve on incident response capabilities to better detect, identify, communicate, and resolve threats and vulnerabilities that may lead to privacy violations, cyber-attacks, cybercrime, data integrity issues, and data loss

5.5.3 Information Management Evolution

In response to increasing demand, VA plans to support exponential growth in volume and speed of storage, retrieval, and analysis of data through robust Information Management. VA's focus in this area is to manage data as an enterprise asset in order to enable increased information sharing, rapid deployment of new capabilities, and seamless access to secure authoritative information for smooth navigation for Veterans across the VA network of services. Key transition activities related to information management include:

- Support information interoperability and semantic harmonization through a real time mediation service
- Implement robust information interoperability standards
- Realize Information transformation through:
  - Institution of VA-wide policies and procedures for governing and managing enterprise data
  - Development of a CDI driven operational environment
- Establish the OneVA EA Enterprise Data Model to provide a common vocabulary and understanding of data concepts shared across VA
- Leverage unstructured data design elements and NO-SQL constructs
- NoSQL constructs support unstructured data and are cloud friendly

5.5.4 Open Source Implementation

VA has and will continue to embrace applications and programs that take advantage of an open source model, which invites innovation from the public and private sectors. A major example of VA's commitment to open source is the Product Development (PD) program called *Code in Flight*, created to share VA project artifacts with the open source community during

enhancement of our health products. This changed our historical policy on FOIA releases to share only nationally deployed products. In FY13, 41 PD development projects were identified as enhancing or extending VISTA Health products during FY13 and were targeted for Code in Flight releases during their development period. By the end of FY13, 21 development projects were successfully shared as Code in Flight.

In FY14, OIT will increase the number of health products to be shared with the open source community during their development phase, and will be addressing additional necessary changes—to design standards, documentation standards, FOIA procedures, and engagement of open source resources—all through collaborative development. These initiatives will allow OIT to increase the throughput of releasing to the open source community, and will widen the channel and number of pilot projects to intake open source developed or modified health products into the VA environment.

5.5.5 National Service Desk Rollout

Since the inception of the National Service Desk (NSD), all field help desks originally identified as requiring transition have been realigned to the NSD. Two new desks have been identified and are in the process of transition: Financial Service Center (FSC) and a VHA Support Desk recently identified in Region 1, Denver. In addition, rollout of the Single Service Desk Phone System is expected to complete on time. The rollout of the IT Service Management (ITSM) system was provided funding to obtain dedicated staff for the rollout. The ITSM rollout will establish a single ticketing system for all Tier 1 Service Desks and their business partners.

5.5.6 IT Platforms Standardization

One of the key steps for VA in consolidating IT infrastructure is the standardization of IT platforms and streamlining the deployment of systems across multiple business units onto those platforms. The key objectives of platform standardization are to minimize program-unique infrastructure and to design platforms that ensure a secure cyber environment and yield reduced costs, increased agility, and greater flexibility and interoperability. Key transition activities related to standardizing the platforms include:

- Identify, develop, and mandate the use of enterprise-wide shared IT platforms.
- Establish a single face to the Veteran with a single portal platform and mobile application delivery platform(s).
- Sustain a National Service Desk (NSD) to meet higher user and service-level expectations and implement usage of NSD by all programs.
- Include open source tools and applications in the TRM.
- Continue standardizing end user device operating systems.
- Select and support commoditized hardware products through the Commodity Enterprise Contract, which includes commodity hardware products such as laptops, mobile tablets, thin clients, servers, switches, routers, firewalls, and storage, based upon infrastructure standards published in the OneVA EA and TRM.

5.5.7 IT Infrastructure Modernization

VA IT Infrastructure Modernization is driven by a change in mindset that applies to all VA initiatives using IT infrastructure: VA does not need to own all of its networks and devices; however, it must protect information as it traverses them. The infrastructure transformation is guided by moving toward utility computing and on-demand capacity, which provide for virtual environments, elasticity, and scalability. Key transitional activities related to optimizing the infrastructure include:

- In response to OMB guidance on the Federal Data Center Consolidation Initiative (FDCCI), VA has developed a data center consolidation approach to optimize and consolidate decentralized health record systems. As part of that approach, VA has migrated 12 production health record systems to Defense Information Systems Agency (DISA) Defense Enterprise Computing Centers (DECCs) and is in the planning stages for virtualization and optimization of additional health records systems.
- Develop and execute a Unified Communication and Collaboration strategy that enables a converged platform serving all communications media (voice, data, video, chat, presence, and unified messaging)
- Consolidate the Enterprise Network and fully implement the Medical Community of Interest (MEDCOI) Network. MED-COI is a network designed to allow greater data interoperability between VA and the Department of Defense. The network connection required to support initial operating capability was implemented in Q1 of FY14. Full operating capability is currently planned for Q1 of FY15.
- Consolidate over the long-term 300 VA data centers under the FDCCI.
- Implement a Digital Operating Environment that supports paperless administration of Veteran benefits:
  - Continue implementation of the Enterprise Management Framework (EMF), which will support a unified enterprise service management model that includes release management, configuration management, change management, and incident management.
- Develop a road map from the current de-centralized network control-plane to the more versatile and flexible centralized network control-plane utilizing software defined networking.

5.5.8 VA Cloud Computing Delivery

The adoption of a utility cloud-computing model for server environments will provide the agile, scalable, and reliable infrastructure needed to keep pace with the explosive growth of information and increased variety and uses of VA's strategic information assets.[91]

An example of this began during FY 2012 when OIT started offering Infrastructure as a Service (IaaS)[92] at the Austin Information Technology Center (AITC) in accordance with the NIST definitions of cloud computing. This includes support for on-demand, self-service provisioning, broad network access, resource pooling, rapid elasticity, and measured service.

VA OIT is continuing to pursue the Cloud Computing initiative[93] that paves the way to increase capacity and add capabilities without investing in new infrastructure, training new personnel, or licensing new software. With the cloud providing rapid elasticity, customers can commission or decommission virtual environments with minimal service provider interaction. This accelerates the process and provides the advantage of "fast IT" necessary to support agile development efforts and the rapid delivery of Veteran-facing IT functionality. Key transition activities related to delivering cloud capabilities include:

- Expansion of internal IaaS and Platform as a Service (PaaS) offerings
- Continue investigation of the viability of using external SaaS providers to deliver Email as a Service as compared to internal cloud options
- Implementation of the Adaptive Cloud Environment (ACE) to provide IaaS capabilities and support services in a standardized orderable environment
- Plan for continuing the capabilities provided for in ACE after the conclusion of the current contract with a seamless transfer of services between cloud providers
- Implement a cloud broker to aggregate, integrate and customize internal and external cloud services

[91] *OneVA Enterprise Technology Strategic Plan*, December 28, 2012
[92] *OIT SD&E DCIO FY12 Annual Report*
[93] *VA OIT SD&E Playbook FY 2013*

5.5.9 Mobile Capabilities Standardization and Rollout

In FY13, VA OIT completed the implementation of the Mobile Device Manager (MDM). Mobile devices are now managed by the MDM to provide visibility, manageability, and security around the mobile devices. VA has a standard security baseline for all mobile devices and new mobile device requests are measured against the new baselines to ensure security. VA IT staff was provided training for use of the MDM as well as management, provisioning, usability, and security features of mobile devices to provide service to IT customers.

VA introduced a virtual environment that provides the ability for users to take advantage of their own devices while keeping sensitive data inside VA's network. OIT is collaborating with VHA to develop a strategy to deploy thousands of devices to VHA staff, including working through a pilot to determine the appropriate resource model. Finally, a standard security review of apps was started to determine which public and COTS apps are safe to run on VA devices.

VA is laying out the long-term strategy to support the changing dynamic of the endpoint: shifting from the traditional desktop to a mobile device that can support everyday needs of staff and provide a dynamic environment to support the Veteran. VA is piloting new mobile products, including mobile document sharing, automatic application review, and network access controls tied to a mobile device manager, and proximity capabilities for mobile devices.

5.5.10 Voice as a Service (VaaS) Implementation

Voice service is a foundational component in business communications. The VA voice infrastructure that is comprised of traditional PBX voice systems, many of which are more than 15 years old, has become an ever growing and unsustainable portion of the budget.

To address this issue, OIT has been developing the Enterprise Voice System (EVS), also known as the Voice as a Service (VaaS) project, which was approved in January 2012. The intent of VaaS is to modernize the voice infrastructure within VA, while providing cost savings using a hybrid of Government Owned and Contractor Operated (GO/CO) systems. There is currently a GO/CO proof of concept at three locations within VA (Fort Harrison, Montana; Tennessee Valley Health Care System, Tennessee; and Charleston, South Carolina). The intent of the proof of concept is to validate the technical feasibility and anticipated cost savings of GO/CO across the enterprise.

5.6 IT Infrastructure Milestones

IT Infrastructure has multiple programs and systems that will help VHA, VBA, NCA, and staff offices achieve their desired future states.

Figure provides the top-level schedule and milestone information for the set of IT Infrastructure programs.

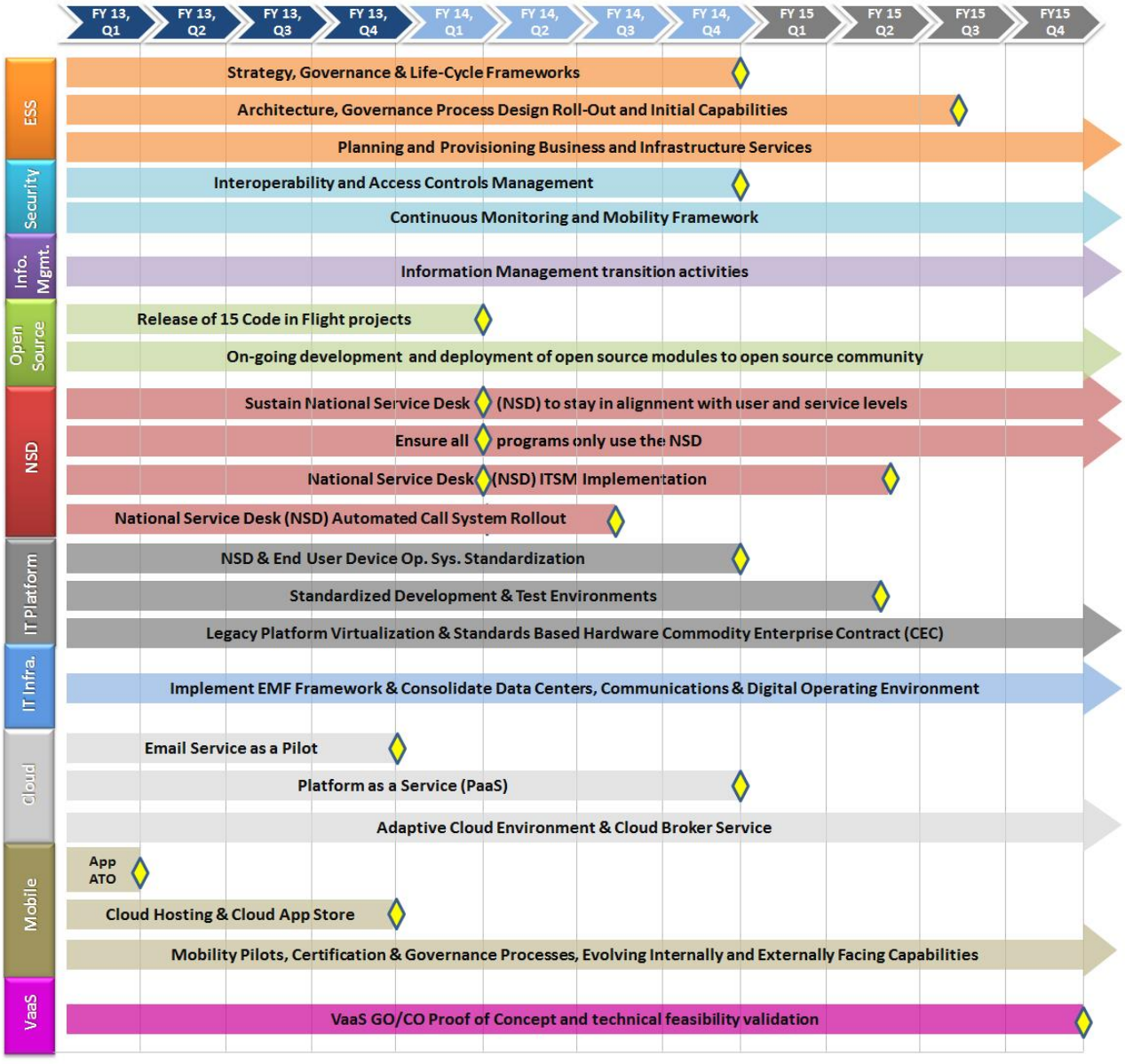

Figure – IT Infrastructure Programs Milestones

5.7 IT Infrastructure Programs and Initiatives Alignment to VA Strategic Goals and Objectives

Figure below verifies the alignment of IT Infrastructure initiatives to the VA FY 2014-2020 strategic goals and objectives. A checked box in the table reflects where an initiative is providing or developing a capability that will advance the achievement of that specific VA strategic objective. These initiatives, which are described in greater detail in this section, represent both enhancements to existing capabilities of the IT infrastructure as well as transition strategy activities meant to transform VA's IT infrastructure to support VA's strategic goals and objectives.

VA Strategic Plan Goals and Objectives	ESS	INFO SECURITY	INFO MGMT	OPEN SOURCE	NSD	IT PLATFORM	INFRAST.	CLOUD COMP	MOBILE	VaaS
	IT Infrastructure Initiatives									
Goal 3 *Manage and Improve VA Operations to Deliver Seamless and Integrated Support*										
Obj. 3.1 Make VA a Place People Want to Serve										
Obj. 3.2 Evolve VA IT Capabilities to Meet Emerging Customer Service/Empowerment Expectations of Both VA Customers and Employees	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Obj. 3.3 Build a Flexible and Scalable Infrastructure through Improved Organizational Design and Enhanced Capital Planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Obj. 3.4 Enhance Productivity and Improve the Efficiency of the Provision of Veteran Benefits and Services		✓		✓				✓	✓	✓
Obj. 3.5 Ensure Preparedness to Provide Services and Protect People and Assets Continuously in Time of Crisis		✓	✓			✓	✓	✓	✓	

Figure – IT Infrastructure Initiative Alignment to VA Goals & Objectives

5.8 IT Infrastructure Governance

The *VA IRM Strategic Plan* describes VA's IT Governance process and decision bodies. The IT Infrastructure programs are subject to those same processes. However, there are additional considerations that constrain and support IT infrastructure modernization efforts. To address these considerations, OIT leverages these additional enablers to synergistically build and deliver new IT infrastructure capabilities. The following sections describe these additional IT infrastructure governance enablers.

5.8.1 Enterprise Technical Architecture

The technical layer of the OneVA EA, also known as the ETA, defines the IT infrastructure environment required to support VA's business application environment and achieve VA's mission objectives. VA's IT infrastructure, the ETA, contains the technology profile, principles, rules, and standards necessary for consistent development, deployment, and maintenance of networks, systems, and applications. The ETA provides for technology that is capable of secure, seamless, interactive, and efficient delivery of benefits, services, and information enterprise-wide, as well as providing internal users and mission partners with a robust and agile interoperable infrastructure.

VA has published a variety of policies and architecture products documenting the rules and standards for the ETA and enabling a compliance process for IT infrastructure modernization, as illustrated by Figure . A sampling of compliance-enabling documents includes the Release Architecture, the Enterprise Application Architecture (EAA), the SOA Technical Framework, and the Office of Information Security (OIS) Information Security Handbook. Collectively, the rules and standards in these documents seek to ensure interoperability within VA's IT environment and support integration of new applications to result in seamless service of Veterans' needs.

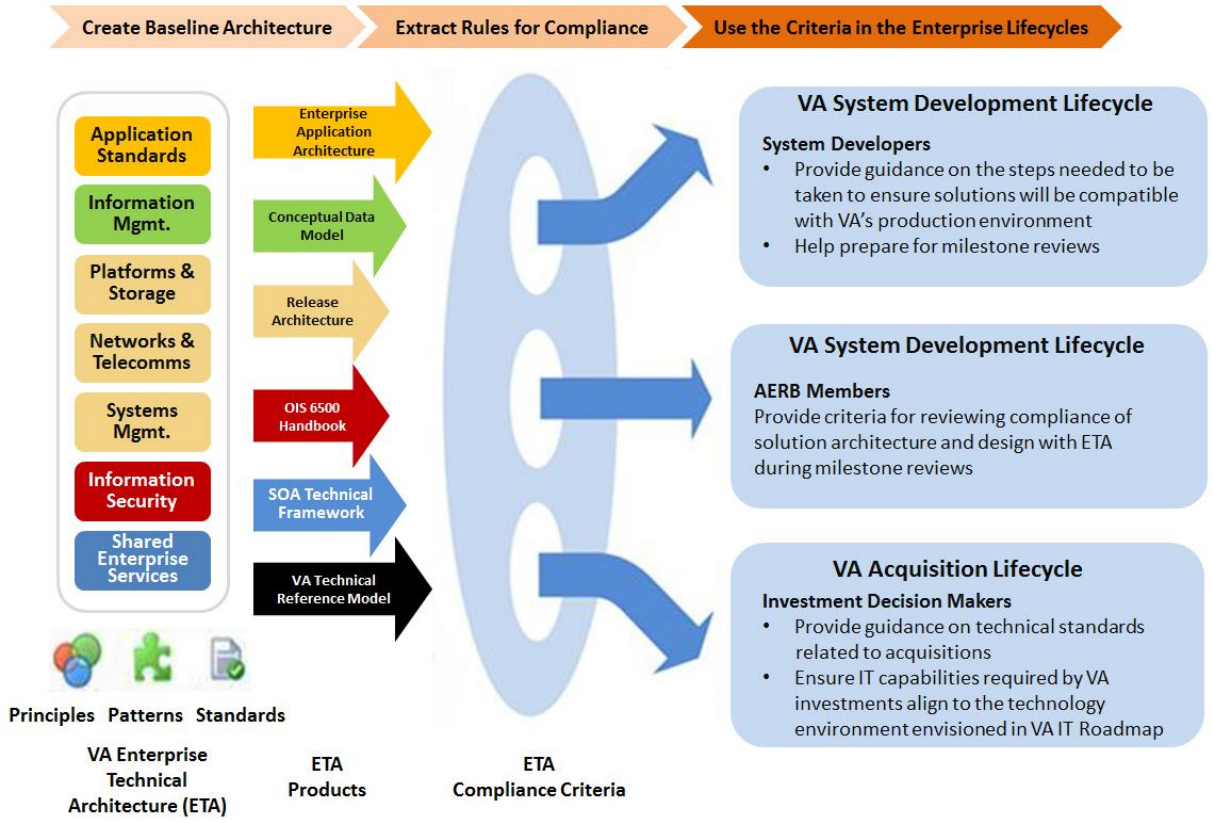

Figure – VA Enterprise Technical Architecture (ETA) Compliance

5.8.1.1 ETA Compliance Criteria

The ETA Compliance Criteria are published and maintained to assist both program developers and VA investment decision-makers in their efforts to ensure alignment of IT infrastructure modernization efforts with the technical layer of the OneVA EA. This layer, named the VA ETA, details rules and standards for use and configuration of VA networks as well as standards for information security and application design. These rules and standards apply to all VA IT solutions and investments.

5.8.1.2 VA Technical Reference Model

VA ETA provides visibility into the technology products and standards profile through the VA TRM.[94] The VA TRM tracks the status of the technology products being considered or in use within VA's infrastructure. This status provides stakeholders with information from a past, present, and future perspective, allowing them to make informed decisions for new and ongoing IT efforts.

5.8.2 Project Management Accountability System (PMAS)

VA established PMAS to improve IT development and capability delivery, which includes IT infrastructure modernization efforts. The two key features of PMAS are: (1) incremental delivery and (2) Integrated Product Teams (IPTs). PMAS uses an incremental product build process for IT projects with delivery of new functionality, tested and accepted by the customer, in cycles of six months or less. Projects managed in accordance with PMAS are closely monitored and are subject to review by senior leaders when significant deviations from plan occur. IPTs bring multi-disciplinary subject matter experts from across VA to assess and evaluate program plans, status, issues, and issue resolution throughout the PMAS project lifecycle. Collectively IPT members are held mutually accountable for the success of the effort.

FY 2013 marked the fourth full fiscal year in which IT infrastructure development projects were managed by PMAS. Going forward into FY 2014 the PMAS business office intends to leverage lessons learned to improve PMAS SharePoint dashboard capabilities, and continue to drive shortened increment lengths for continuous delivery, accounting for additional releases within each increment and increased use of Agile.

5.8.3 Enterprise Management Framework

VA embarked on a multi-year build out of a unified EMF[95] to provide visibility into the VA IT Infrastructure through national metrics, reports, and trending as well as intelligent analysis to enable proactive management of critical infrastructure. The EMF, based on IT Infrastructure Library (ITIL) service management best practices, now supports release management, configuration management, change management, and incident management aspects of the VA IT Infrastructure, while providing real-time monitoring of the operating status of the production-computing environment.

EMF is now under VA Enterprise Operations (EO) operational control with the primary EMF site in Austin, TX and the failover site located at Philadelphia, PA. The system is currently federating data from over 80 VA managed data repositories and contains over 21 million configuration items in its Configuration Management Data Base. EO has efforts underway to expand this Configuration Item inventory further using automated discovery tools. In addition, EO will be organizing a cross OIT steering committee to ensure optimal use of the EMF capabilities.

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[94] Office of Architecture, Strategy & Design (ASD), *VA Technical Reference Model (TRM)*, February 6, 2013
[95] OIT Service Delivery and Engineering *DCIO Annual FY12 Report*

III OneVA EA

6 The OneVA EA Program

6.1 Mission and Vision of the OneVA EA[96]

The OneVA EA mission is to serve as a strategic planning and management tool that helps VA's leadership chart the course for the Department's transformation into a 21st century organization. The OneVA EA products[97] inform and support the Department's business and operational visions, strategies, and missions. The EA will provide information to VA's capital planning and investment control processes to help guide the investment lifecycle to ensure alignment of technology with strategic priorities. Using the OneVA EA in this manner also enables VA to identify areas of redundancy and duplication within business processes and systems, thus providing invaluable support to portfolio management. VA's EA program, while still relatively early in its reestablishment, is beginning to gain traction in numerous processes and forums. VA recognizes the importance of this effort and is committed to fully leveraging EA to support VA transformation.

The OneVA EA vision is to be the authoritative reference for the requisite strategic, business, and technology information used to make informed decisions for VA (see Figure , Vision for OneVA EA). This vision will be achieved through an ongoing, collaborative effort between VA's Administrations and staff offices supporting the delivery of benefits and management of the Department. Together, these entities document the current and desired relationships among business processes and IT, and plan the transition to the desired state. They also develop business rules, development standards, and decision criteria that support transition. As evidenced herein, the OneVA EA is being developed and evolved to provide ever-improving descriptions of the current and future VA environment.

[96] *OneVA EA Vision and Strategy*, September 2013

[97] Products, in this context, are models, dashboards, reports, and other formats in which VA enterprise information may be stored, exported, and presented to users of the OneVA EA.

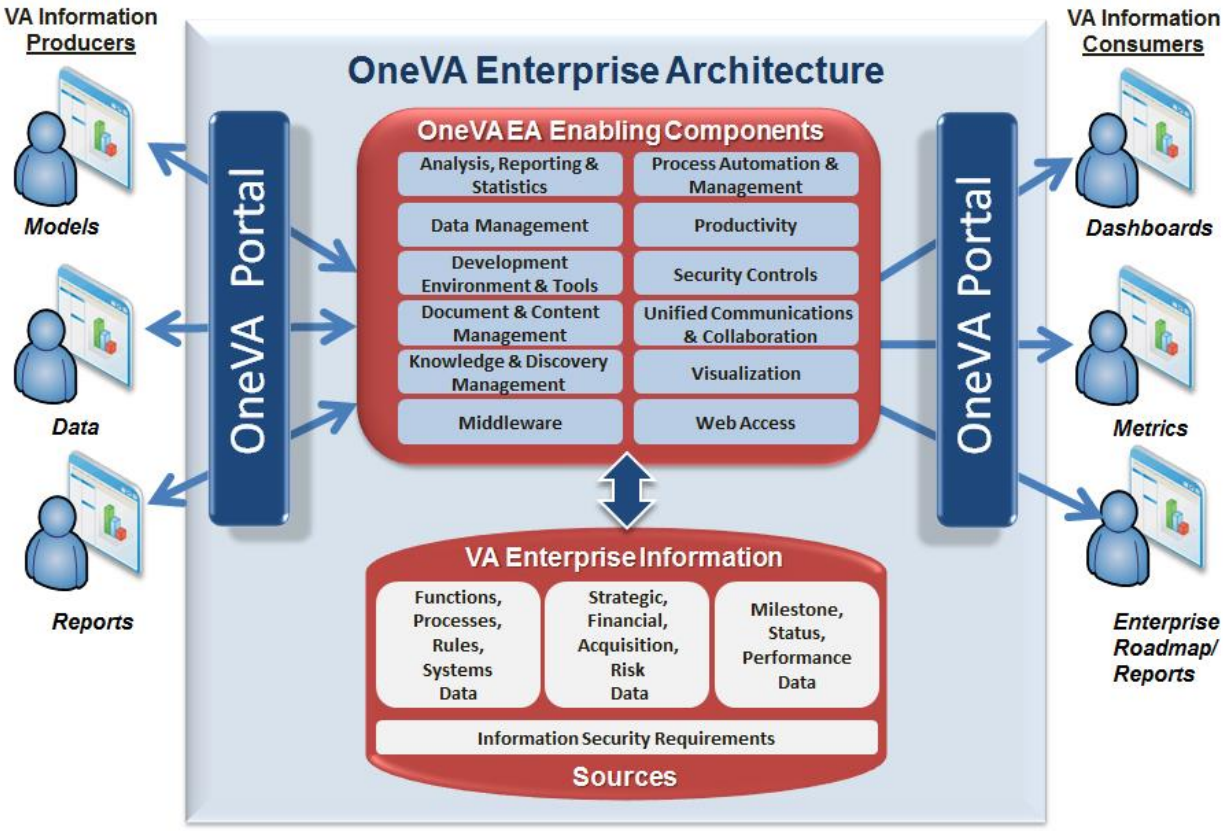

Figure – Vision for OneVA EA

6.2 OneVA EA Guiding Principles

The OneVA EA Program is steered by a set of six guiding principles[98] designed to enable enterprise mindsets and decisions that have been approved by VA's Enterprise Architecture Council (EAC). These principles support VA's drive to adopt enterprise approaches in developing and delivering services and capabilities to Veterans and VA employees, and guide the development and use of EA. These principles are enumerated in Table below.

[98] *OneVA EA Vision and Strategy*, September 2013

Table – OneVA EA Guiding Principles

Principle	Description
1. Mission Alignment	VA information, systems, and processes shall be conceived, designed, operated, and managed to address the Veteran-centric mission needs of VA.
2. Data Visibility and Accessibility	VA Application, Service, and Data Assets shall be visible, accessible, available, and understandable and trusted to all authorized users (including unanticipated users).
3. Data Interoperability	VA Information shall be made interoperable through data standardization, including the identification, designation, and utilization of authoritative sources.
4. Infrastructure Interoperability	VA IT Infrastructure shall be made interoperable through definition and enforcement of standards, interface profiles, and Implementation guidance.
5. Information Security	VA shall provide a Secure Network and IT environment for collaborative sharing of information assets (information, services, etc.) with Veterans and other partners, including (among others) federal agencies, third party service providers, academia, researchers, and businesses.
6. Enterprise Services	VA solutions shall utilize enterprise-wide standards, services, and approaches to deliver seamless capabilities to Veterans, facilitate IT consolidations through reuse, and simplify the use of Veteran functions.

In addition, the OneVA EA Program leverages the Common Approach to Federal Enterprise Architecture (CAF), which promotes increased levels of mission effectiveness by standardizing the development and use of architectures within and between Federal Agencies[99], as foundational guidance. Alignment with the CAF is based on several items including (but not limited to) the following: primary outcomes, levels of scope, basic elements, sub-architecture domains, reference models, and a roadmap. The following items describe the OneVA EA's efforts founded on the CAF:

- VA has adopted the CAF primary outcomes that are supported through use of the OneVA EA, which include Service Delivery, Functional Integration, Resource Optimization, and Authoritative Reference
- The OneVA EA's federated approach recognizes and accounts for the varying levels of architecture scope (e.g., VA-wide, Segment, Solution) within VA
- The OneVA EA Program leverages the *eight basic elements*[100] as a structure to evolve the OneVA EA and continuously increase its value in support of VA priorities and decision processes
- The sub-architecture domains are recognized as both viewpoints of and categorization for OneVA EA data to be used within core decision processes

[99] *Common Approach to Federal Enterprise Architecture*, May 2, 2012, *Document Link*
[100] The 8 Basic Elements of OneVA EA are further detailed in the *OneVA EA Vision and Strategy*, September 2013

- Reference models are both created (e.g., OneVA EA BRM) and re-used (e.g., FEA BRM and Application Reference Model (ARM)) to enable effective and efficient development and use of the OneVA EA

VA also understands that for the OneVA EA to achieve its vision, it must be built upon a flexible yet robust metamodel. It is this metamodel that enables the capture and rendering of data and information consistent with the different sub-architecture domains.

Figure depicts the alignment of the OneVA EA Metamodel to the VA rendition of the CAF sub-architecture domains. The different types of information in the metamodel are denoted in different colors. Integrating this information enables viewing the current and the future VA environments through different perspectives, thus supporting the VA governance processes.

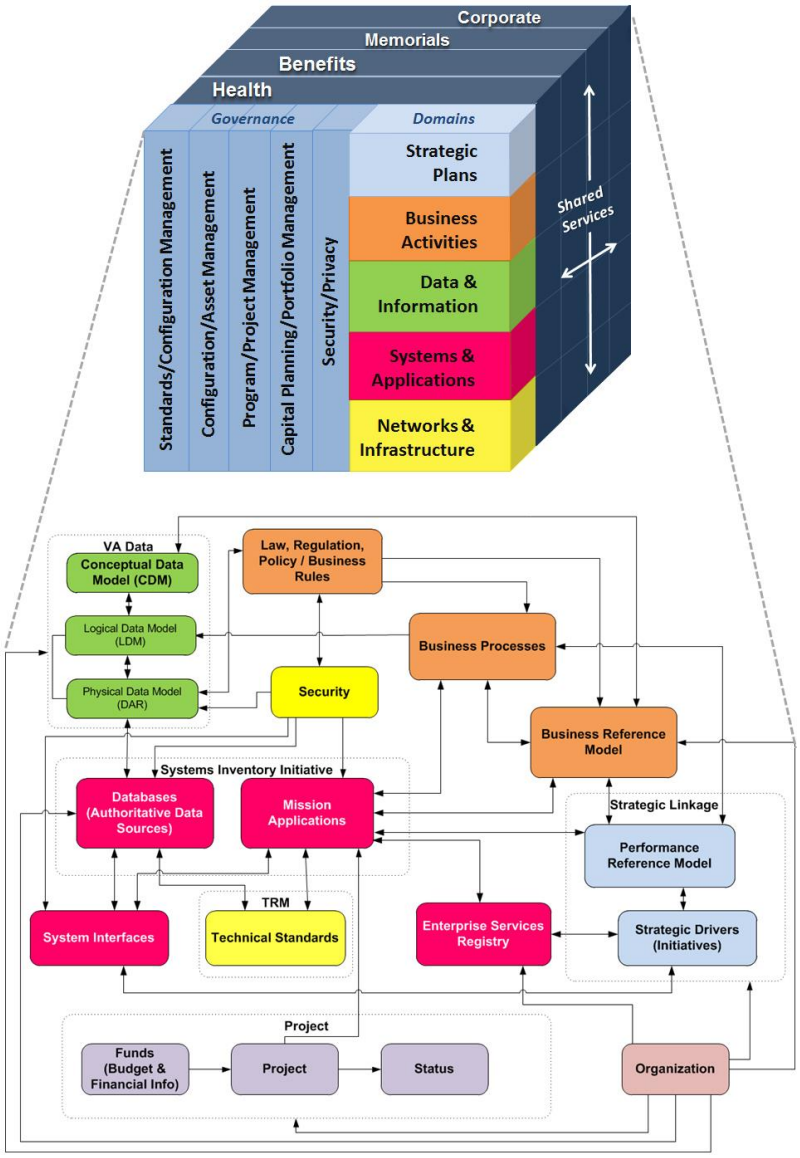

Figure – Alignment of the OneVA EA Metamodel to CAF sub-Architecture Domains

6.3 OneVA EA Program Structure

The OneVA EA effort was established and formalized in policy by VA Directive 6051, *Department of Veterans Affairs (VA) Enterprise Architecture (EA)*. This directive establishes mandatory policy for the establishment of an integrated Department-wide OneVA Enterprise Architecture as the "explicit description and documentation of the current and desired relationships among program/business and management processes and information technology." It directs that "all VA IT systems must comply with the Department's Enterprise Architecture" and establishes the role of the VA Chief Enterprise Architect to steward VA's EA Program. The Directive establishes roles and responsibilities as follows:

- **Deputy Secretary** – Chairs the Strategic Management Council, decisions of which are informed and guided by the Department's EA
- **The Assistant Secretary for Information and Technology (VA CIO)** – (1) Chairs the VA ITLB, decisions of which are informed and guided by VA's EA, (2) ensures all IT projects are evaluated for compliance with the Department's EA throughout the investment lifecycle, and (3) prepares and manages the IT portfolio for the Department, ensuring compliance with the Department's EA
- **Under Secretaries, Assistant Secretaries, and Other Key Officials** – (1) Ensure VA EA alignment and integration between IT and program/business goals and processes within their scope of responsibility, and (2) ensure adequate funding and commitment to VA EA efforts, (3) serve on VA's Information Technology Board
- **VA Chief Enterprise Architect** – Stewardship of the OneVA EA program and chair of the (EAC), ensuring "the integrity of architectural development processes and the content of Enterprise Architecture products," so 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."[101]

In practice, VA combines the functions of enterprise architecture and IT strategic planning into a single office under the Office of the VA Chief Enterprise Architect. Supporting the Chief Enterprise Architect is a team of architects and strategic planners organized into two directorates:

- **Director Enterprise Architecture** – Responsible for establishing the authoritative reference for the requisite strategic, business, and technology information used to make informed decisions for VA. This includes end-to-end development and management of the OneVA EA, which describes the current and desired relationships among business/program management processes and information technology; and the required standards and tools to Support OneVA EA development and use.

[101] Department of Veterans Affairs, VA Directive 6051, *Enterprise Architecture*, July 21, 2002

- **Director Strategy, Planning and Accountability** – Responsible for providing strategic planning and programming efforts to transform and modernize VA's IT business capabilities and ensure proper alignment to VA goals and objectives. This role also supports the VA IT environment to help formulate and measure the evolution of strategies and alignment of VA's overarching strategic plans, business goals and objectives.

Collectively, the Office of the VA Chief Enterprise Architect is charged with four basic responsibilities:

- Performing a leadership role in Enterprise strategy and transformation
- Developing the EA to meet stakeholder needs
- Ensuring appropriate use of the EA across the Department
- Chief Enterprise Architect management functions

6.3.1 OneVA EA Collaborative Environment

VA will develop and manage the OneVA EA using a federation approach organized to align and integrate architectures across the Department. This approach enables architectures to be aggregated to inform enterprise decision making while respecting the diverse requirements of Administrations and staff offices. Conceptually, the OneVA EA Federated Environment (Figure) has three levels of architecture: (1) VA-wide, (2) Segment, and (3) Solution. Each architecture level has a distinct purpose and focus within the federation as described below.

1. **VA-wide Architecture:** This federation level, as depicted in Figure below, contains strategic architecture content, having a scope that spans the full Department. Integrated architecture content is the primary focus of this federation level. However, non-integrated content may also be accommodated. The integrated content (gold shaded oval) reflects complementary views of a single architecture, unified by a common meta-structure, developed using a single architecture development approach, and enabled by a common tool suite. The federation non-integrated content (outside the gold shaded oval) interfaces with the integrated content (inside gold shaded oval).

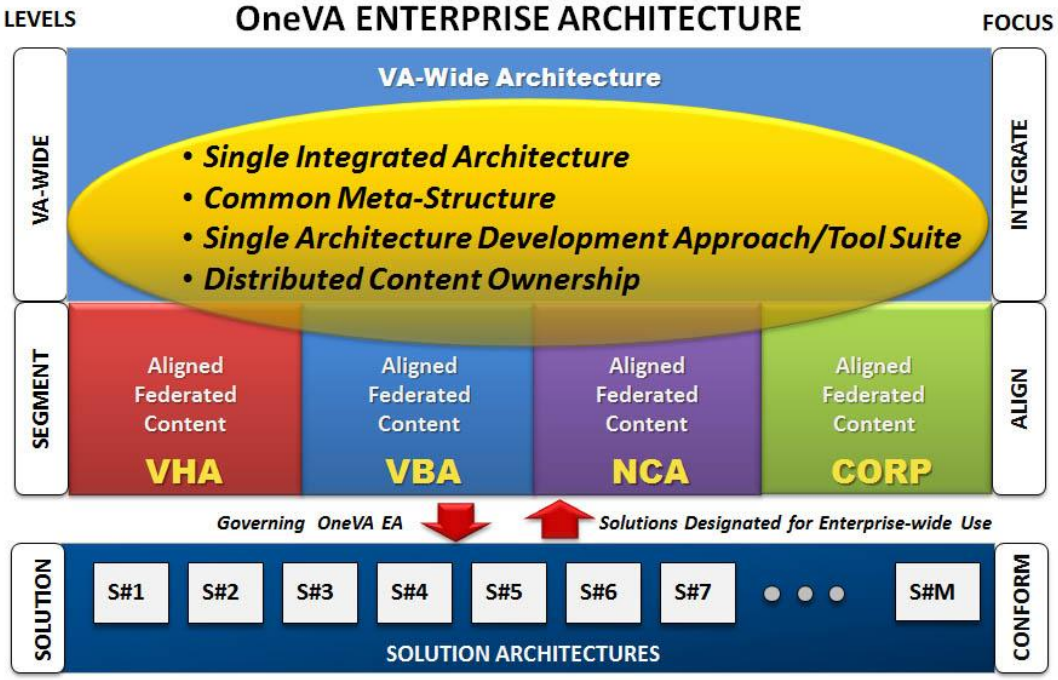

Figure – OneVA EA Federated Environment

2. **VA Segment Architecture:** This federation level contains strategic and business-specific architecture content for the associated business area (i.e., Administration, Corporate). The alignment of Segment and VA-wide architectures is the primary focus of this federation level. At the discretion of the decision authority for each Segment, alignment can be achieved by: (1) Integrating segment content into the single VA-wide architecture (gold shaded oval) using the common methodology and tool suite provided by the VA Chief Enterprise Architect; or (2) Implementing a federation process to align external segment content (outside the gold shaded oval) with VA-wide content.
3. **VA Solution Architecture:** This federation level contains operationally specific architecture content required to support solution implementation and complies with applicable architecture content from the federation levels above. Typically, this is the detailed architecture for a focused activity (e.g., project, initiative) intended to achieve a specific outcome. The conformance of solution architecture content with applicable architecture content in the Federation levels above is the primary focus of this federation level. The OneVA EA is composed of many solution architectures, each being developed and managed by the organization responsible for solution implementation.

The EA team is working with architects from OIT, the Administrations and staff offices to formulate rules and principles for content that resides in each of these areas.

6.3.2 OneVA EA Governance

Governance comprises the planning, decision-making, and oversight processes and groups that determine how the One VA EA is developed, verified, versioned, used, and maintained. VA has identified several groups that must interact to enable the OneVA to achieve its mission in support of VA transformation. To govern the evolution of and establish priorities for the OneVA EA, the VA Chief Enterprise Architect leverages a two-tiered governance structure as depicted in Figure . The first tier is responsible for setting strategic priorities and direction, while the second tier is tactical in nature ensuring the OneVA EA evolves in the pre-defined strategic direction. The sections following the figure below describe each governance body represented in Figure .

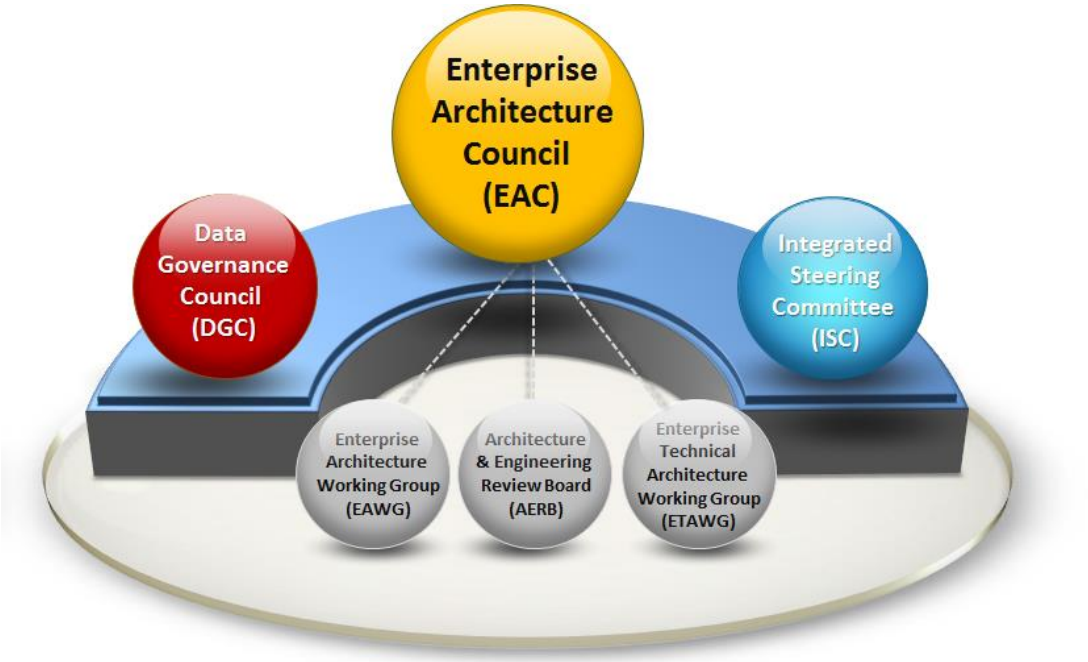

Figure – OneVA EA Governance Structure

6.3.2.1 Executive Governance

VA's IT governance bodies assist in setting the conditions for success, and facilitate effective IT governance and executive decision-making.

Enterprise Architecture Council (EAC) – The EAC, an SES-level body, provides oversight of VA's EA (OneVA EA), its implementation, governance, and federation. This governance body also sets the priorities for the development of architectural content at the VA-wide level. The EAC ensures that the OneVA EA framework is current, relevant, and sufficient by reviewing and validating the planned, recurring releases of the EA. Its membership includes senior level participation from across VA Administrations and staff offices as well as each functional area within the Office of the VA CIO.

Data Governance Council (DGC) – The DGC, an SES-level organization, guides the enforcement of VA data standards and data governance policy for every information technology project and business process initiative. The DGC enforces data standards, provides common data processes, and manages authoritative sources of master data for VA.

Integration Steering Committee (ISC) – The ISC supports integration of new initiatives across the VA enterprise with participation from the three Administrations. The ISC is an SES-level committee.

6.3.2.2 Working Groups

VA's IT Working Groups look at the OneVA EA, including compliance, implementation, and cross-agency architecture integration. These enterprise-level working groups are described below.

Enterprise Architecture Working Group (EAWG) – The EAWG, led by the Director, Enterprise Architecture, comprises functional architects and process managers from across VA. It directly supports the VA Chief Enterprise Architect and the EAC activity in evaluating potential EA standards, rules and policies, and additionally serves as a forum to raise and discuss implementation issues related to OneVA EA development and maintenance.

Architecture and Engineering Review Board (AERB) – The AERB's primary duties are to review System Design Documents (SDD) to assess their compliance with the ETA, and to review and evaluate proposed waivers, which can ultimately be escalated up to the EAC. AERB members consist of representatives from the organizations that maintain the infrastructure segments. The AERB is co-chaired by the Director, Enterprise Architecture, and the Deputy Director for Enterprise Systems Engineering.

Enterprise Technical Architecture Working Group (ETAWG) - The Enterprise Technical Architecture Work Group (ETAWG) provides a forum for communicating and governing technical requirements and policy including hardware, software, and infrastructure that support VA enterprise needs. The ETAWG is chaired by the VA Technical Architect (OIT) and all OIT leaders representing program, infrastructure, and security requirements for the VA enterprise are included.

6.4 OneVA EA Usage

Although the re-established OneVA EA program commenced only in FY12, EA products are beginning to be used extensively within VA strategic and operational decision-making processes. EA is fully embedded in the Department's application development processes and is sufficiently robust such that the EA is being used in a number of key enterprise-wide initiatives. As the Department's EA matures, many methods exist within the context of the single IT authority to expand use of EA tools and methods across multiple core processes including strategic planning, investment/portfolio management, and the PMAS. Below are examples of using the OneVA EA to support VA core processes as well as other VA enterprise initiatives.

6.4.1 VA Strategic Planning

The OneVA EA is a valuable tool used within the VA Strategic Planning processes. The Department's capabilities model, now an integral part of the OneVA EA, is used to identify opportunities for agency-wide integration of service delivery, and all identified strategic options are aligned to this model to ensure a full range of options are considered. Information gathered in the VA environmental scan—that included other Federal agencies, as well as technical and economic drivers—is captured to serve as a basis and imperative for further analysis. Finally, all initiatives that have arisen from VA strategic planning are integrated within the OneVA EA (e.g., linked/mapped to related systems, processes, data flows) to enable decision-makers and developers to perform more thorough analysis of dependencies within and across programs. As the OneVA EA continues to mature, OneVA EA information, architectural products, and associated analytical capabilities will be developed and refined to continuously improve its value as a decision support tool within the planning and programming cycles.

6.4.2 Investment Management and FY15-19 IT Planning Guidance

The *VA OneVA Enterprise Technology Strategic Plan*[102] describes VA's vision for the evolution of its IT infrastructure, application development, and services delivery environments. This document looks at specific emerging innovations, and projects their role and impact on future VA operations. This target state view of VA's IT infrastructure environment, described in the ETA, is being used to guide enterprise-wide IT planning and investment decision-making. The *OneVA Enterprise Technology Strategic Plan will* play a key role in influencing VA's IT budget, technology investments, and strategic decisions necessary to transform and modernize VA's IT capabilities that support the Administration's business needs in providing better service to the Veteran. In January 2013, OIT conducted a multi-year IT planning activity to develop the FY15-19 OIT Planning Guidance that was used to inform IT program development. In this process, the *OneVA Enterprise Technology Strategic Plan* was used extensively to define and establish investment selection criteria, and specific content related to emerging technologies.

6.4.3 PMAS/ETA Compliance Criteria

PMAS is the disciplined approach VA employs to ensure on-time delivery of information technology (IT) capabilities and to improve the Department's project delivery success rate. PMAS establishes the framework and methodology that ensures the customer, IT project team, vendors, and all stakeholders engaged in a project focus on a single compelling mission—"achieving a project's stated incremental deliverable on-time."[103]

[102] *OneVA Enterprise Technology Strategic Plan*, December 28, 2012
[103] *Project Management Accountability System (PMAS) Guide 4.0*

VA Directive 6071 (PMAS) mandates the use of PMAS for all VA IT product delivery projects, whether the project will create new functionality, or enhance existing capabilities within VA's current systems or infrastructure. The directive also mandates the use of PMAS for all IT development projects whether funded by the IT Appropriation, or any other VA appropriation, and that are resourced at a value greater than $250,000 total life cycle cost. By agreement with DoD and the IEHR Interagency Program Office (IPO), all IPO projects are included in PMAS.

The ETA was established and defines VA's target state reference architecture for IT infrastructure and service layers of the OneVA EA. ETA Compliance Criteria and Guidance were developed and are used within the PMAS process to provide a checklist and navigation tool to the aggregate set of underlying ETA, rules, technical standards, and guidance which guide all IT development activities.

The ETA Compliance Criteria are also incorporated into the PMAS project reviews called *Milestone Review* decisions, which all IT projects go through as they progress from planning to active development, implementation, and project closure. As a result, through PMAS, project management decisions are informed by the degree to which IT products align to and comply with the enterprise technical architecture and VA operational infrastructure. This is a key first step in achieving the full value of enterprise architecture that will ultimately improve interoperability and result in reduced IT operations, maintenance, and sustainment costs.

6.4.4 Customer Data Integration Initiative (CDI)

CDI is a newly stood-up initiative to harmonize and sequence the exchange and use of digital information within the VA computing environment and between VA and its mission partners in the delivery of benefits to Veterans and beneficiaries. Today, the ability of VA to integrate capabilities fully and provide services to Veterans is hindered by a legacy environment in which the same or similar information about Veterans is gathered and stored in multiple places—thus, discovery or recognition of authoritative sources of information is often challenging. While this complex issue is often manifest as multiple overlapping databases, the root cause is typically business process-centric. Within the CDI initiative, leadership from across the Department's Administrations and staff offices have come together to first gain a clear picture of existing VA processes and data flows, and then address them in a systematic manner. The EA team is playing a lead role in this effort, using this commitment as the mechanism to leverage leadership across VA to build out the Department's existing process and data architecture. This represents a huge opportunity to engage every organization within VA in both the development and use of EA while simultaneously addressing a critical need of the Department.

6.4.5 Enterprise Requirements Evaluation and Management Process

The Department has initiated development of an integrated enterprise-wide requirements methodology in support of its evolving Planning, Programming, Budgeting, and Execution function. Existing formalized processes are Administration-based and are focused on IT-specific needs versus evaluating the full range of leadership actions available to address challenges. The OneVA EA team is a lead participant in the development of this process along with the leadership from across the Department. EA methods are expected to play a critical role in

enabling VA to aggregate, organize, and analyze requirements requests and to manage seams and cross-boundary integration opportunities around initiatives stood up to address them.

6.5 EA Program Performance Measurement

VA recognizes the necessity of capturing measures and metrics, focused on mission-relevant outcomes that can truly measure the service efficiency and effectiveness of the VA in delivering services to Veterans. The EA team is working with Department stakeholders to create the appropriate links between the EA program and Department goals in developing these measures and metrics. Table presents the three level measurement framework developed by the EA program organized around outputs and outcomes.

Table – Three Level Measurement Framework

Measurement Framework Level	Output/Outcome
1. **Completeness of the Architecture Itself**	**Output**
2. **Use of the Architecture in the Decision Process of the Department**	**Outcome**
3. **Results in Terms of Agency Outcome**	**Outcome**

At the first level, the EA Program is using the maturation of the VA Systems Inventory (VASI) as a key indicator of the completeness of the EA as a whole. The VASI is being assessed both in terms of the systems it has catalogued and in terms of the linkages established between those systems and the business functions, processes, and capabilities that they support. This approach measures completeness through attributes owned by the organizations that are the responsible for providing data. For example, OIS must provide accreditation information for systems, SDE must provide the relevant software platform, and ITRM must provide the related budget line.

Performance measures at the second level are related to the use of the OneVA EA to support the decision processes of the Department. Performance measures at this level include measuring the use of the OneVA EA as a key resource to inform analyses and decisions within VA enterprise core processes (such as PPBE) and how often architecture compliance criteria are used to assess programs going through PMAS milestones. The OneVA EA program will be responsible for measuring maturity and will propose metrics for use at this level, although the OneVA EA program may not be responsible for collecting all measures.

Architecture completeness and OneVA use in informing core decision processes are inputs to assessing results for the Department (third level). Results are described in the performance goals and measures that are developed to align with the Department's strategic goals and objectives. VA performance measures are used to describe the Department's current state and assess progress toward its desired future state (Strategic Objectives, Agency Performance Goals, etc.).

VA reports its performance externally in multiple ways:

- Summarized in the yearly PAR
- In accordance with the GPRA Modernization Act of 2010
- Through PortfolioStat reporting required by OMB:
  - *VA IRM Strategic Plan* (annually)
  - *VA Enterprise Roadmap* (annually)
  - Integrated Data Collection data from program execution (quarterly)

The EA Program assesses its progress in all three levels of performance management as part of the enterprise architecture maturity assessment included in the Appendix (Section 7.2) of this *VA Enterprise Roadmap.*

The primary internal reporting vehicles for performance measurement are VA and OIT Monthly Performance Reviews (MPRs). The VA MPR is a briefing chaired by the VA Deputy Secretary. Performance presentations are based on the operating plans of each VA Administration and staff office to describe the progress made in meeting established monthly and/or Fiscal Year "To Date" performance goals. Projects are reviewed noting milestones achieved and timeliness of milestone accomplishment. The VA MPR is aligned with VA strategic goals and a Balanced Scorecard is used to assess performance. The measures reviewed by the VA MPR are related to agency outcomes; these measures are reported in the yearly PAR and in accordance with the GPRA Modernization Act of 2010.

The purpose of the OIT MPR is to inform the CIO of performance areas that are currently a concern or that could potentially become a problem or issue for OIT. As with the VA MPR, projects are reviewed for milestones achieved as well as timeliness of milestone accomplishment. Performance measures in the OIT MPR are aligned not only with VA strategic goals but also with OIT strategic goals and objectives.

6.6 EA Accomplishments and Planned Activities

Although the VA EA program is still at an early stage of maturity, as identified in our Enterprise Architecture Management Maturity Framework (EAMMF) self-assessment (Appendix 2), much has been accomplished since the program's reestablishment early in 2012. VA is on track to continuously evolve and improve a OneVA EA that is actionable and supports decisions by VA staff, industry, and the open source community. VA continues to increase the enterprise effectiveness of EA, including the use of OneVA EA artifacts to inform IT multi-year planning guidance and IT budget development. As evidenced within the previous section, the OneVA EA is increasingly embedded in strategic planning and transformation leadership processes across the Department.

Tremendous challenges continue to exist in maturing the OneVA EA program so that it provides ever-greater value and support to the Department's decision processes to better focus investment of VA resources on the right solutions.

For the OneVA EA to continue to increase its value, VA investment and management processes, extending from high level, visionary Quadrennial Strategic Planning down to design decisions for each project, must be integrated and at a level of maturity and detail sufficient to benefit from OneVA EA information. For VA, integration of many segmented management processes to enterprise-wide processes is just beginning, and the OneVA EA program is preparing to engage in and support these efforts. The maturity and evolution of the OneVA EA program is dependent on, and informs, VA enterprise process integration. Most importantly, VA must:

- Continue to extend the integrated model of VA business functions, capabilities, systems and information flows. To date, we have gathered, aggregated, and published independent work completed across the Department in these areas.[104]
- Continue to work with business process owners as well as other business stakeholders to formalize business rules, establish compliance/alignment criteria and embed them within core processes
- Establish enterprise strategies foundational to VA transformation such as enterprise requirements and management, enterprise business processes, enterprise shared services, and enterprise data management
- Engage with Strategic Planners to evolve from a disjointed approach to an enterprise perspective, to include planning, programming and budgeting processes

6.6.1 CY2012/CY2013 Accomplishments

Since the hiring of a new executive-level VA Chief Enterprise Architect in late 2011, VA has succeeded in strengthening the OneVA EA program. Efforts in 2012 centered on reestablishing the OneVA EA program and building relationships with key stakeholders and process owners within the Department needed for success.

During FY13 VA's OneVA EA program had the following key accomplishments:

EA Program/ Enterprise Leadership Accomplishments

- Re-established the EAC, a cross-functional group of business and IT stakeholders. EAC meetings were used as information sessions, where the EA vision and strategy and EA principles were presented and discussed.
- Engaged with and supported other cross-agency transformation leaders in forming an "Integrated Governance" construct, using the EAC as well as other bodies (e.g., the ISC and the DGC) to foster discussions about VA enterprise solutions and approaches

[104] Thus far, the OneVA EA BRM has integrated VBA business functions, and the System Interface Models contain a subset of VA-wide systems. The goal is to have OneVA EA be more representative of the entire VA enterprise.

- Established the EAWG, a collaborative group of architects from across the Department to address enterprise architecture concerns and conduct evaluations on behalf of the EAC
- Developed and published the ETA Compliance Criteria, which pulled the technical standards into a guidance document to help users (both program developers and investment decision-makers) in aligning their work to these enterprise technical rules and standards
- Re-launched the OneVA EA intranet, which aggregates EA information from across all VA Administrations and staff offices into a resource accessible by all internal VA stakeholders
- Updated the OneVA EA internet site to be more inclusive of EA artifacts
- Embedded usage of ETA Compliance Criteria into VA development process at critical development milestones, ensuring alignment of development activity with VA enterprise rules and standards

FY13 OneVA EA Deliverables Provided

- Established the initial tooling environment and delivered the first integrated architecture built within the tooling environment (4Q13)
- Integrated Enterprise Shared Services content with OneVA EA through the OneVA EA website (4Q13)
- Delivered the BRM (1Q13) and the Veteran-facing portion of the Conceptual Data Model (1Q13)
- Incorporated a series of enterprise architecture products including updates to the BRM, Business Processes (including information to support the CDI work, System Interface Models, and updates to the Infrastructure Segment Architecture (1Q13, 2Q13, 4Q13)
- Delivered an expanded version of the BRM that provides a more comprehensive view of the Benefits related capabilities (e.g., Ensure Income Security, Provide Education Benefits) (4Q13)
- Incorporated VA Strategic Plan and mappings from it to the BRM, as well as the VA Functional Organization Manual and mappings to applicable laws, regulations and policies (2Q13, 4Q13)
- Delivered and updated ETA Compliance Criteria, used to evaluate alignment to technical rules and standards (1Q13, 4Q13)
- Completed the foundational analysis and issued the data call for Systems Inventory information, which will provide an authoritative source of application and database information for VA (4Q13)
- Developed the first iteration of the OneVA EA Usage Guide (4Q13)
- Delivered the OneVA EA Vision and Strategy (2Q13)

- Established ETA Working Group to guide the development of the ETA and serve as a forum to share information and communicate across the OIT pillars (3Q13)

6.6.2 FY14 Planned Priorities

In FY14, the focus of the OneVA EA Program will be on developing the disciplines to strengthen the overall program and Program Office. The Chief Enterprise Architect is framing program development efforts using the eight basic elements of Federal Enterprise Architecture.[105] Priorities in each area are listed below.

Content

- Use Systems Inventory initiative to build out EA content regarding relationships to stakeholders, security boundaries, infrastructure, financial execution, and information exchanges in VA's systems and applications environment
- Drive development and publication of initial version of a VA Enterprise Logical Data Model (ELDM); use ELDM to define and document system data exchanges
- Further develop and evolve EA "strategic" content (e.g. objectives, strategies, priorities, performance goals, organization, capabilities, execution, evaluation and reporting) in concert with VA strategic & PPBE leadership
- Enterprise Technical Architecture – Begin to transition content from standalone documents to a web-based automated EA repository
- Technical Reference Model (TRM), Data Architecture Repository (DAR), Enterprise Shared Services (ESS), ProPath: Develop strategy and approach for integrating these artifacts into the OneVA EA Repository

Use

- Actively use EA compliance / alignment to guide and constrain IT system development activities
- Foster use of EA products and analyses to support FY16 budget formulation and FY 17-21 Multi-Year Plan
- Support VA enterprise PPBE processes; integrate EA content, taxonomies and alignment mechanisms as processes evolve
- Increase stakeholder use of the Information Resource Management Strategic Plan and the Enterprise Roadmap through fully integrating content within the EA web environment
- Develop EA views to support defined business needs

[105] *Common Approach to Federal Enterprise Architecture*, OMB, May 2, 2012, *Document Link*

Governance

- Evolve the EAC's role to provide more strategic direction for the development and delivery of OneVA EA products that align to and support achievement of enterprise priorities
- Collaborate with EA stakeholders to establish the OneVA EA framework and provide guidance for the development and use of architecture across VA
- Develop Enterprise Information Management Policy (in support of CDI)

Method

- Develop, distribute, and implement the OneVA EA Development Methodology and Architecture Style Guide to inform development activities and enforce modeling standards for Administration and Corporate Staff architects
- Develop, distribute, and implement the EA Configuration Management Plan to manage changes to key EA configuration items

Tools

- Evolve EA tooling environment to provide extended business intelligence, modeling, and reporting capabilities
- Evaluate Portfolio Management capabilities for inclusion in enterprise tool suite
- Evolve EA Repository to include richer and more interactive content. Increase public access to content
- Provide training on EA tool capabilities to OneVA EA stakeholders

Reporting

- Develop reports that respond to enterprise requirements defined by VA executive leadership as well as OMB / GAO mandated requirements
- Develop, publish, and present EA and OneVA EA overviews to familiarize the VA with EA concepts, principles, and activities

Audit

- Perform self-assessments of the OneVA EA program against the Enterprise Architecture Management Maturity Framework (EAMMF) 2.0. Use gap analysis to identify requirements for future OneVA EA program planning
- Develop a Performance Management Plan and a Quality Management Plan

VA EA Program Office Maturation

- Develop an EA Program Management Plan to document the approach to govern, develop, and use architecture information and the means by which the EA program itself will be managed
- Evolve relationship of EA program with other functional elements of VA OIT, Architecture Strategy and Design (ASD) organization so that ASD provides more unified and holistic services to OIT and VA

7 Appendices

Appendices are provided under separate cover and include the following:

- Appendix 1: Enterprise Architecture Maturity Measurement Template (EAMMF)
- Appendix 2: Enterprise Architecture Outcomes and Measurements Template

Acronyms

Acronym	Definition
AERB	Architecture and Engineering Review Board
APG	Agency Priority Goal
API	Application Programming Interface
ASD	Architecture, Strategy, and Design
BA	Business Architecture
BAS	Benefits Assistance Service
BFF	Business Functional Framework
BOSS	Burial Operations Support System
BPA	Business Process Architecture
BRM	Business Reference Model
C&P	Compensation and Pension
CAF	Common Approach to Federal Enterprise Architecture
CBOC	Community-based Outpatient Clinics
CCD	Common Customer Data
CDI	Customer Data Integration
CEC	Commodity Enterprise Contract
CEHRT	Certified EHR Technology
CIO	Chief Information Officer
CMS	Centers for Medicare & Medicaid Services
CPRS	Computerized Patient Record System
DAP	Digital Analytics Program

Acronym	Definition
DAR	Data Asset Repository
DHMSM	DoD Healthcare Management System Modernization
DoD	United States Department of Defense
EA	Enterprise Architecture
EAC	Enterprise Architecture Council
EAMMF	Enterprise Architecture Management Maturity Framework
EAWG	Enterprise Architecture Working Group
EHR	Electronic Health Record
EMF	Enterprise Management Framework
EO	Enterprise Operations
ESS	Enterprise Shared Services
ETA	Enterprise Technical Architecture
ETAWG	Enterprise Technical Architecture Working Group
EVH	Eliminate Veteran Homelessness
FDCCI	Federal Data Center Consolidation Initiative
FDGS	Federal Digital Government Strategy
FEA	Federal Enterprise Architecture
FNOD	First Notice of Death
FOC	Full Operational Capability
GAO	Government Accountability Office
GO/CO	Government Owned and Contractor Operated
GSA	General Services Administration

Acronym	Definition
GUI	Graphical User Interface
HISP	Health Information Strategic Plan
HIT	Health Information Technology
HL7	Health Level 7
HMP	Health Management Platform
IAM	Identity and Access Management / Integrated Acquisition Model
iEHR	Integrated Electronic Health Record
IOC	Initial Operational Capability
IPO	Interagency Program Office
IPT	Integrated Product Team
IRM	Information Resources Management
ISC	Integration Steering Committee
IT	Information Technology
ITSM	IT Service Management
IVMH	Improving Veterans Mental Health
LOB	Line of Business
MBAN	Medical Body Area Network
MDM	Mobile Device Management
MPR	Monthly Performance Review
NCA	National Cemetery Administration
NIST	National Institute of Standards and Technology
NMHC	New Models of Health Care

Acronym	Definition
NSD	National Service Desk
OIA	Office of Informatics and Analytics
OIS	Office of Information Security
OIT	Office of Information and Technology
OJT	On the Job Training
OMB	Office of Management and Budget
OSEHRA	Open Source Electronic Health Record Agent
PACT	Patient Aligned Care Team
PAR	Performance and Accountability Report
PD	Product Development
PI	Prevention Index
PMAS	Project Management Accountability System
PPBE	Planning, Programming, Budgeting and Execution
PTSD	Post-Traumatic Stress Disorder
R&D	Research and Development
RFID	Radio Frequency Identification
RO	Regional Office
RPMS	Resource and Patient Management System
RRTF	Ruthless Reduction Task Force
RTLS	Real-Time Locator Systems
SEP	Stakeholder Enterprise Portal
SOA	Service Oriented Architecture

Acronym	Definition
SSA	Social Security Administration
TRM	Technical Reference Model
VA	United States Department of Veterans Affairs
VaaS	Voice as a Service
VBA	Veterans Benefits Administration
VBMS	Veterans Benefits Management System
VCIP	Veterans Claims Intake Process
VETSNET	Veterans Service Network
VHA	Veterans Health Administration
VistA	Veterans Health Information Systems and Technology Architecture
VRM	Veterans Relationship Management
VSO	Veterans Service Organization

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