DEPARTMENT OF VETERANS AFFAIRS

OFFICE OF INFORMATION AND TECHNOLOGY
SERVICE DELIVERY AND ENGINEERING (SDE)

OIT Release Architecture

V1.21

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Overview:

This document outlines the current operating environment at VA Data Centers and a summary of the specifications that should be used for any new, enhanced or replacement IT systems being planned. Development teams should use this reference to understand the target platforms to which they should code.

The document is divided into sections covering the infrastructure/system components that need to be understood by any teams planning a new or replacement system. Each section includes the following:

1. Name of the system component (e.g. client operating system, server operating system, database, etc.)
2. A brief explanation of the system component
3. Technical specifications for the component
4. Engineering (ESE) Considerations – Additional design factors that require consideration
5. "PM Checklist" - Guidelines and questions related to the specification in question that a project manager needs to consider

Within each section there may be links to supplemental material on that particular system component.

OIT's Service Delivery and Engineering (SDE) organization is responsible for the design, testing, deployment and sustainment of application platforms and supporting infrastructure including the facilities in which the systems reside (SDE is also responsible for the provisioning, interface and support of any external hosting employed). The specifications herein should not be used independently by developers to do platform/infrastructure design. Instead, project teams should include membership from SDE from the time of inception in order to properly plan the provisioning of the compute, storage, footprint, instrumentation, bandwidth and support needs for the product in question. This includes not just the production system but also development, software quality assurance (SQA) and any other testing environments used.

The contents of this document will be refreshed regularly with the latest changes and updates. For any questions on the content of the document project teams should consult with their SDE project team member(s) or, alternatively, contact SDE's Enterprise Systems Engineering group (ESE).

Background:

To make the best use of tax payer dollars and reap efficiencies and economies of scale both financially and operationally, the need for consistency and elimination of duplication is ever increasing. As the demand for IT systems and services and the complexity of the VA environment both continue to increase it is incumbent upon IT staff to ensure that the planning for new systems adheres to those principles and necessarily take a "system of systems" approach. The specifications herein help ensure lowest cost, optimization of resources and interoperability.

The systems that SDE provide and operate are evolving to environments making heavy use of commodity hardware and virtualization and are shifting towards increasingly greater use of open standards and Cloud— or "as-a-Service"— offerings. The specifications below mean to furnish a platform that is consistent with those strategic objectives as well as supporting greater interoperability between those systems still hosted internal to VA and those being deployed in the Cloud.

These same principles must be applied to development, SQA and other testing environments. Having these environments be consistent with production is essential in lowering defect rate, improving predictability in the graduation of code to production and, overall, reduces time to deliver.

There are two key aspects to systems design— the individual system components used and the integration thereof. Precisely which components are chosen and how they are assembled will depend, in great part, on the defined application requirements. SDE project team members provide those services— design, integration, testing support and deployment— to the project team.

System design reviews are performed through the process known as Systems Engineering and Design Review (SEDR). Any solution or design that will deploy infrastructure (either new, augmented or replaced) should have a design review done and SEDR should be a standard part of every project plan and timeline. Project teams can consult ProPath and with the SDE project team members.

To access the SEDR Process link click here: SEDR Process

To access the SEDR Project portal click here: SEDR Project Portal

The main deliverable from the SEDR process is the SEDR Analysis Summary. This summary includes the final design based on existing specifications (systems, data, network, and client) and any approved hardware and technology standards. The ultimate outcome is a solution that is maintainable and sustainable throughout the lifecycle of the system.

To access the most current approved standards click here: Operational Standards

In order to ensure the appropriate platform selection and configuration, project teams must have a good understanding of the business owners' requirements and expectations. Using the project team, and SDE's members, those requirements should be reviewed and matched to systems specifications early on and the following questions must be considered.

1) From the business owner's perspective, how long can the solution be unavailable for both scheduled and unscheduled downtimes?
2) What are the performance requirements of the application or service?
3) What dependencies does this application have on others and vice-versa? Developing a dependency map will ensure all supporting components of the new application can meet the desired levels of availability.
4) From the business owner's perspective (and from a systems' dependency perspective), how much data loss is acceptable?
5) If the solution will need to propagate data across the VA wide area network (WAN), has a WAN capacity planning analysis been performed (this should be done within the project team as early as possible in the planning phase)?
6) If the solution will have externally facing components providing access to veterans or others to VA applications, has the project team member(s) from the Office of Information Security been consulted to ensure compliance?

CURRENT OPERATING ENVIRONMENT

Operating Systems

Name	System: Operating System
Definition	An operating system (OS) is a set of programs that manage computer hardware resources and provide common services for application software. It is the most important type of system software in an IT system. Without the OS, a user cannot run an application program on the computer unless the application is self-booting.
Specifications	Windows Server 2008 R2 Red Hat Enterprise Linux 5.7
ESE Considerations	Leverage approved versions of Windows or Linux
PM Checklist	✓ The project team may choose either the Windows Server operating system or Red Hat Linux Operating system.

Future	Current	Previous	Remove
Code Name "Windows Server 8"	Windows Server 2008 R2	Windows 2003 Server	Windows 2000 Server
Red Hat Enterprise Linux v6.1 (Planned)	Red Hat Enterprise Linux 5.7	Red Hat Enterprise Linux 5.0	Any version prior to Red Hat Enterprise Linux 5.0

Platforms

Name	System: Virtualization
Definition	Virtualization allows multiple operating systems to simultaneously share processor resources in a safe and efficient manner.
Specifications	Virtualization Platforms Procurement Guidelines – This is an example of what project teams can expect to run on when hosted on a virtualized farm provided by SDE Virtualization Platform Procurement Guidance
ESE Considerations	• **Unless there are specific requirements that cannot be met with virtualization all new applications must be deployed on a virtual host.**
PM Checklist	✓ Proposed Virtualize First Policy (to be approved) Virtualize First Memo - DRAFT.doc

Future	Current	Previous	Remove
TBD	VMware vSphere 5.0 (or equivalent Type 1 hypervisor)	VMware vSphere 4.x	VMware ESX versions 3.5 and prior
Code Name Windows Server 8 Hyper-V	Microsoft Server 2008 R2 Hyper-V (or equivalent Type 2 hypervisor)	Microsoft Virtual Server 2005	Any versions prior to Microsoft Hyper-V

Name	System: Cloud
Definition	Cloud computing provides software, data access, and storage services that do not require end-user knowledge of the physical location or configuration of the system that delivers those services.
Specifications	Cloud implementations should adhere to NIST definition wherever possible and should leverage FedRAMP once it is available. NIST Cloud Definition
ESE Considerations	• Cloud first. Whenever feasible, a cloud offering should be considered (external and internal). • If cloud is not a good fit then virtualization first. • This is a requirement that projects must adhere to.
PM Checklist	✓ Draft Directive 6517 Cloud First (to be approved)  Directive 6517.doc

Name	System: Physical Server
Definition	Physical Server selection is paramount to ensuring necessary resources are available to meeting the performance and availability requirements. Redundancy of components becomes of great significance for physical servers acting as virtualization hosts.
Specifications	Server Standards: Physical Server Standards Example Class A Server = Dell R910 – Intel Xeon 7500 Processor Example Class B Server = HP DL380 G7 – Intel Xeon 5600 Processor Example Class C Server = IBM x3250 M3 – Intel Xeon 3400 Processor
ESE Considerations	Appropriate physical server platform will be determined based on performance and availability requirements and only if virtualization or cloud are not viable
PM Checklist	✓ Identify specific performance requirements to ease server hardware system selection ✓ Specify estimated growth rates of system usage

System Availability

Name	System Availability: High Availability (e.g. Clustering Solutions)
Definition	High Availability is a design methodology to ensure the expected level of service is delivered to the customer with the expected amount of uptime.
Specifications	Example methodology – Host Replication Host Replication Operational Standard Example methodology – Microsoft Cluster Server Example methodology – Red Hat Linux Cluster
ESE Considerations	Optimal HA methodology will be determined based on the availability requirements provided.
PM Checklist	✓ These decisions have significant impact on overall solution design and should be made early on in project lifecycle. ✓ Does the system require redundant hardware components and/or systems to provide high levels of uptime? How much downtime is acceptable each month for

	regular system maintenance?

Name	System Availability: Disaster Recovery (e.g. Replication Solutions)
Definition	Disaster Recovery (DR) is the process, policies and procedures related to recovery or continuation of technology infrastructure critical to an organization after a natural or human-induced disaster. It is a subset of business continuity. While business continuity (COOP-Continuity of Operations) involves planning for keeping all aspects of a business functioning in the midst of disruptive events, Disaster Recovery focuses on the IT or technology systems that support business functions.
Specifications	Proper Disaster Recovery requires several components to create an overall functional solution. Some technologies that may be leveraged for DR include storage replication, backups, point in time copies and virtualization. A sample solution for an application with low RTO and RPO might include 2 geographically dispersed data centers, replication of the storage array, large low latency WAN circuits between the data centers, duplicate hosts at both locations and clustering software.
ESE Considerations	Decisions on RTO/RPO will drive overall solution architecture and can significantly increase costs.
PM Checklist	✓ Recovery Point Objective (RPO): How much data can be lost in the event of a disaster? ✓ Recovery Time Objective (RTO): How soon after a disaster is declared must the system be returned to service?

Name	System Availability/Performance: Scalability
Definition	Scalability (Scale Out Design) is the ability of a system, network, or process, to handle growing amounts of work in a graceful manner or its ability to be enlarged to increase capacity incrementally as needed.
Specifications	Application design should be in a modular fashion to enable appropriate growth with minimal system redesign as well as providing higher availability
ESE Considerations	New solutions should be designed to support a scale out design to accommodate future growth and availability
PM Checklist	✓ Project teams should code for a scale out architecture rather than a scale up architecture

Storage Technologies

Name	System: Storage Design
Definition	Storage Design refers to the configuration of the physical storage devices and media used to store and transfer data between systems and applications. Protection, also called RAID (*Redundant Array of Independent Disks*) is storage technology that provides increased reliability through redundancy that divides and replicates data among multiple physical drives. Each RAID scheme (or architecture) is followed by a number (e.g., RAID 0, RAID 1) that provides a different balance between the increase of data reliability and the increase of input/output performance. Storage Performance/IOPS (Input Output Operations Per Second) is used to benchmark computer storage devices like hard disk drives (HDD), solid state drives (SDD), and storage area networks (SAN). The specific number of IOPS possible in any system configuration will vary greatly depending upon variables such as read/write operations, access patterns, queue depth, and data block size. Other factors that affect the IOPS include system setup, storage drivers, OS background operations, etc.
Specifications	Storage Standards
ESE Considerations	The appropriate storage platform will be determined based on performance and availability requirements
PM Checklist	✓ Capacity – How many usable GBs are required? o What is the estimated annual growth rate of the storage requirement? ✓ Protection (RAID) – Ties in to availability and performance – How critical is the data and what performance impact is acceptable when a drive fails? ✓ Performance (IOPS) – What are the application's requirements from the storage subsystem? (For example how many transactions per second, inputs/outputs per second, etc.)

Name	Data: Backup/Restore Data
Definition	Backup/Restore Data refers to the ability to make copies of data which may then be used to restore the original after a data loss event.
Specifications	• ***Backup Software***: Backup Software Standards o Netbackup v7.x, Commvault Simpana 9 • ***Long Term Backup*** (ex archive): Long Term Backup Standards • ***Virtual Tape Library Backup***: Virtual Tape Library Standards • ***De-Duplication***: De-Duplication Standards
ESE Considerations	• Backup Solutions will be designed based on data recovery requirements • Depending on data type an appropriate backup/restore and storage solution will be selected
PM Checklist	✓ Does the application need to be quiesced (paused or altered during the run process in order to guarantee a consistent and usable backup)? ✓ How long is the backup window? ✓ How fast must data be restored (RTO)? ✓ What type of data is included in the solution? (Database, images, documents, etc.) ✓ Does data need to be extracted from the system and moved to long term archival at any point in the data lifecycle?

VistA Platforms

	Future	Current	Previous	Remove
Operating System	In development	Linux front end/ Linux back end	OpenVMS back end/ OpenVMS or Linux front end	
Database	Intersystems Caché v2011	Intersystems Caché v2008.2 adhoc 9526	Intersystems Caché v5.x	Any version prior to Caché v2008
Server Platform	Commodity x86 hardware based on physical server standards above	Commodity x86 hardware based on physical server standards above	HP RISC Architecture **RISC (ALPHA AND ITANIUM) NO LONGER BEING DEPLOYED**	
Storage Platform	Enterprise Class Tier 1 array (exact platform TBD)	HP EVA 8400	HP EVA 5000	

NETWORK

Name	Network: Local Area Network (LAN)
Definition	Local Area Network (*LAN*) is the computer network that interconnects computers in a limited area such as home, computer laboratories or a single office or medical center building. The data transfer rate is higher due to a smaller geographic area to communicate with.
Specifications	LAN equipment standards (Sample of the equipment that new systems will be connected to in data centers: LAN Specifications Current standard networking equipment = Cisco or equivalent
ESE Considerations	• Remote management of the solution must be incorporated into the overall system design. • Determine if bandwidth requirements can be met with existing capacity or if augmentation is required.
PM Checklist	✓ Are there specific latency requirements between client and server? ✓ How much data will be transmitted between client and server or server and other applications on an average day (bandwidth requirements)?

Name	Network: Wide Area Network (WAN)
Definition	Wide Area Network (*WAN*) is a telecommunication network that covers a broad area that links across regional or national boundaries. Business and government entities utilize WANs to relay data among employees, clients, buyers, and suppliers from various geographical locations to carry out daily functions regardless of location.
Specifications	WAN equipment and circuit standards (Sample of the circuitry that will be available to connect client and servers hosted in remote data centers WAN Specifications Current standard networking equipment = Cisco or equivalent
ESE Considerations	• Remote management of the solution must be incorporated into the overall system design. • Depending on system location, latency requirements between the client and server may not be able to be met and must be mitigated in other ways. • Determine if bandwidth requirements can be met with existing capacity or if augmentation is required.
PM Checklist	✓ Are there specific latency requirements between client and server? ✓ How much data will be transmitted between client and server or server and other applications on an average day (bandwidth requirements)?

CLIENT

Name	Client: Desktop/Laptop Standard Configuration
Definition	Desktop/Laptop Standard Configuration - End user computing method used to access the application.
Specifications	Windows 7 – Standard Desktop OS The document embedded below includes the current supported client hardware, operating system and standard desktop application suite.  ESE Windows 7 Build Specification 1 3 1 4.p NOTE: All desktop PCs are purchased from the single, standard PC lease contract let by VA. Current hardware configuration consists of Dell OptiPlex 990 PCs with Intel core i5-2400 3.1Ghz processor, 4 GB RAM and 250GB hard drive.  Dell OptiPlex 990.docx
ESE Considerations	• Attempt to minimize the client footprint • Target web based client interfaces whenever possible • Web client – Ensure proper browser support • "Fat" client – Ensure full Windows 7 support • Is Mobile Device support required?
PM Checklist	✓ Remote Access: Does the application need to be reachable from outside the VA network?

Name	Client: Application Virtualization
Definition	Application Virtualization – Leveraging remote desktop protocols to access applications running on remote servers.
Specifications	Citrix XenApp 5.x or equivalent
ESE Considerations	• Attempt to minimize the client footprint • Target web based client interfaces whenever possible • Potential mitigation strategy to deal with latency between client and server • Leveraged to provide remote access to applications via CAG
PM Checklist	✓ Remote Access: Does the application need to be reachable from outside the VA network?

Future (target 4Q FY12)	Current	Previous	Remove
Citrix XenApp 6.5 & XenDesktop 5.5	Citrix XenApp 5.x	Citrix Presentation Server 4.0	Version 4.0 and prior

LINKAGE

Name	Linkage: Dependency Mapping
Definition	Dependency Mapping - Systems that the application interacts with that provide natural points for integration (internal and external interfaces)
Specifications	Sample Dependency Map:  Application Dependency Map.BMI
ESE Considerations	Dependency Map to ensure that all other systems that the application is dependent upon have the same levels of service
PM Checklist	✓ What other systems does the application interact with? ✓ Are the systems internal or external? ✓ Provide Dependency Map NOTE: Project teams must work with SDE to identify all application/system dependencies. Dependencies on existing systems and common services must be reviewed in the design phase to ensure interoperability and to ensure that all dependencies have same or better performance and availability than that of the system/service in question.

Database Products

Database Product	Future	Current	Previous	Remove
Caché	Intersystems Caché v2011	Intersystems Caché v2008.2 adhoc 9526	Intersystems Caché v5.x	Any version prior to Caché v2008
Oracle	TBD (Oracle 12g)	Oracle 11gR2	Oracle 10g	Oracle 9i
Microsoft SQL	TBD (MS SQL 2012)	MS SQL 2008	MS SQL 2005	MS SQL 2000
MySQL	TBD	N/A	N/A	N/A

Middleware/Messaging Products

Middleware	Future	Current	Previous	Remove
Vitria Businessware	(TBD) Businessware 4.5	Businessware 4.3	Businessware 3.1.7	Any version prior v 4.3

BusinessWare is Vitria's platform for integrating complex transaction and process-based applications and is the messaging standard within the Department. Vitria combines broad capabilities for application integration with Business Process Management (BPM) and Business-to-Business (B2B) integration, providing a unified solution for modeling, implementing, monitoring, and managing end-to-end processes that span multiple systems and organizations.

A number of instrumentation/monitoring products exist and may be used (based on business/technical requirements) for the monitoring, proactive detection, triage and diagnosis of performance problems in complex, composite and Web production application environments within VA's Data Centers.

Instrumentation/Monitoring Products

Instrumentation Monitoring Products	Future	Current Product (being deployed to DISA DECCs)	Previous Product Version	Remove
CA Spectrum Infrastructure Monitoring	9.2.1+	9.2.1	9.2	
CA NetQoS	SuperAgent – 9.1+	SuperAgent – 9.1	SuperAgent – 9.1	
	Reporter Analyzer – 9.0+	Reporter Analyzer – 9.0	Reporter Analyzer – 9.0	
	Performance Center – 6.1+	Performance Center – 6.1	Performance Center – 6.1	
CA eHealth	6.3+	6.2.2	6.2.2	6.2 and earlier
CA Application Performance Monitoring (Introscope and Customer Experience Manager)	9.1+	9.0.7.1	9.0	8.1 and earlier
CA Service Operations Insight	3.0+	3	2.5	
CA Database Performance Monitoring	11.4.0.26+	11.4.0.26	11.4	
Virtual Assurance Infrastructure Manager (VAIM)	12.0.2+	12.0.2	12	
System Edge Agent	5.7.7+ with VAIM, 4.3+ without VAIM	5.7.7 with VAIM, 4.3 without VAIM	5.7.7 with VAIM, 4.3 without VAIM	
XPOLog Log Monitoring	4.3+	4.3	4.2	
CA Enterprise Log Manager	12.5+	12.5	12.5	
BMC Performance Assurance	7.5.10	7.5.00	N/A	N/A