

Collaborative Terminology Tooling & Data Management (CTT&DM)

Server & Tooling

System Design Document



Department of Veterans Affairs

February 2016

Version 2.1

Revision History

Date	Version	Description	Author
02/10/2016	2.1	Update TRM List – Tables 23 & 24	Engility Team
09/15/2015	2.0	Update latest version/combined Server and Tooling	Engility/Rosalind Seale/William McDonough
03/18/2015	1.0	Update version	Engility/Soni Mirchandani
02/20/2015	1.0	Final draft	Engility Team
01/05/2015	1.0	Initial draft	Engility Team

Artifact Rationale

The System Design Document (SDD) is a dual-use document that provides the conceptual design as well as the as-built design. This document will be updated as the product is built, to reflect the as-built product.

When to Complete Each Section of the SDD

Section	Completed On or Before PMAS Phase	Rationale
1 – Introduction	MS 0 Review; updated thereafter	Conceptual design should inform evaluation of investments
2 - Background	MS 0 Review; updated thereafter	Conceptual design should inform evaluation of investments
3 – Conceptual Design	MS 0 Review; updated thereafter	Conceptual design should inform evaluation of investments
4 – System Architecture	MS 0 Review; updated thereafter	Conceptual design should inform evaluation of investments
5 – Data Design	MS 1 Review; updated thereafter	Design details should be elaborated upon during PMAS Planning phase and prior to development
6 – Detailed Design	MS 1 Review; updated thereafter	Design details should be elaborated upon during PMAS Planning phase and prior to development
7 – External System Interface Design	MS 1 Review; updated thereafter	Design details should be elaborated upon during PMAS Planning phase and prior to development
8 – Human Machine Interfaces	MS 1 Review; updated thereafter	Design details should be elaborated upon during PMAS Planning phase and prior to development
Attachments	MS 1 Review; updated thereafter	Design details should be elaborated upon during PMAS Planning phase and prior to development

A product's system design should be defined conceptually prior to the allocation of personnel and resources that occur at project initiation. This gives the enterprise an opportunity to evaluate IT investments before project teams are stood up and funding is allocated. Sections 1- 4 which discuss the high level design, and should be completed prior to MS 0. All sections should be completed and updated before MS 1. Projects will need to address all SDD approval constraints prior to the MS 2 review. In addition, the SDD should reflect the as-built product going into the MS 2 review.

Activity	New Capability (1)	Feature Enhancement (2)
Field Deployment (A)	Yes	No
Cloud/Web Deployment (B)	Yes	No
Mobile Application (C)	Yes	No

Table of Contents

1. Introduction	1
1.1. Scope	2
1.2. User Profiles (Tooling)	3
2. Background	4
2.1. Overview of the System	4
2.2. Overview of the Business Process	4
2.3. Overview of the Significant Requirements	6
2.3.1. Overview of Functional Workload/Performance Requirements	8
2.3.2. Overview of Operational Requirements	8
2.3.3. Overview of the Technical Requirements	8
2.3.4. Overview of the Security or Privacy Requirements	9
2.3.5. Overview of System Criticality and High Availability Requirements	9
2.3.6. Single Sign-on Requirement	10
2.3.7. Requirement for Use of Enterprise Portals (Tooling)	10
2.3.8. Special Device Requirements	10
2.3.9. Legacy System Retirement	10
3. Conceptual Design	11
3.1. Conceptual Application Design	11
3.1.1. Application Context	14
3.1.2. High-Level Application Design	15
3.1.3. Application Locations	18
3.2. Conceptual Data Design	18
3.2.1. Project Conceptual Data Model	18
3.2.2. Database Information	19
3.2.3. User Interface Data Mapping	19
3.2.3.1. Application Screen Interface	19
3.2.3.2. Application Report Interface	20
3.2.3.2.1. Insert Name of Report	20
3.2.3.3. Unmapped Data Element	20
3.3. Conceptual Infrastructure Design (Server)	20
3.3.1. Process and Activity Monitoring Server System Criticality and High Availability	21
3.3.2. Special Technology	21
3.3.3. Technology Locations	22
3.3.4. Conceptual Infrastructure Diagram (Server)	23
3.3.4.1. Location of Environments and External Interfaces	23
3.3.4.2. Conceptual Production String Diagram	23
4. System Architecture	24

4.1. Hardware Architecture (Server)	24
4.2. Software Architecture (Tooling)	27
4.3. Network Architecture (Server)	29
4.4. Service Oriented Architecture/ESS (Tooling).....	30
4.5. Enterprise Architecture (Tooling).....	31
5. Data Design	34
5.1. Data Base Management System (DBMS) Files	42
5.2. Data View	42
6. Detailed Design	43
6.1. Hardware Detailed Design.....	44
6.2. Software Detailed Design.....	46
6.2.1. Conceptual Design	46
6.2.1.1. Product Perspective	46
6.2.1.1.1. User Interfaces	46
6.2.1.1.2. Hardware Interfaces.....	46
6.2.1.1.3. Software Interfaces	46
6.2.1.1.4. Communications Interfaces	46
6.2.1.1.5. Memory Constraints	47
6.2.1.1.6. Special Operations	47
6.2.1.2. Product Features	47
6.2.1.3. User Characteristics.....	47
6.2.1.4. Dependencies and Constraints	47
6.2.2. Specific Requirements	48
6.2.2.1. Database Repository.....	48
6.2.2.2. System Features	49
6.2.2.3. Design Element Tables	50
6.2.2.3.1. Routines (Entry Points)	50
6.2.2.3.2. Templates.....	51
6.2.2.3.3. Bulletins.....	52
6.2.2.3.4. Data Entries Affected by the Design	53
6.2.2.3.5. Unique Record(s).....	53
6.2.2.3.6. File or Global Size Changes	53
6.2.2.3.7. Mail Groups	54
6.2.2.3.8. Security Keys.....	55
6.2.2.3.9. Options.....	56
6.2.2.3.10. Protocols	58
6.2.2.3.11. Remote Procedure Call (RPC).....	59
6.2.2.3.12. Constants Defined in Interface	59
6.2.2.3.13. Variables Defined in Interface.....	60
6.2.2.3.14. Types Defined in Interface	60
6.2.2.3.15. GUI	60
6.2.2.3.16. GUI Classes	60
6.2.2.3.17. Current Form	60
6.2.2.3.18. Modified Form.....	60

6.2.2.3.19.	Components on Form	61
6.2.2.3.20.	Events	61
6.2.2.3.21.	Methods	61
6.2.2.3.22.	Special References.....	61
6.2.2.3.23.	Class Events.....	61
6.2.2.3.24.	Class Methods	61
6.2.2.3.25.	Class Properties	61
6.2.2.3.26.	Uses Clause.....	62
6.2.2.3.27.	Forms	62
6.2.2.3.28.	Functions	62
6.2.2.3.29.	Dialog	64
6.2.2.3.30.	Help Frame	65
6.2.2.3.31.	HL7 Application Parameter.....	65
6.2.2.3.32.	HL7 Logical Link	66
6.2.2.3.33.	COTS Interface.....	67
6.3.	Network Detailed Design	67
6.4.	Security and Privacy.....	68
6.4.1.	Security.....	68
6.4.2.	Privacy	68
6.5.	Service Oriented Architecture/ESS Detailed Design	69
6.5.1.	Service Description for <Consumed Service Name>.....	70
6.5.2.	Service Design for <Provided Service Name>	70
6.5.2.1.	Introduction	70
6.5.2.1.1.	Purpose and Scope of Service	70
6.5.2.1.2.	Links to Other Documents.....	70
6.5.2.2.	Service Details	70
6.5.2.2.1.	Service Identification.....	70
6.5.2.2.2.	Service Versions	71
6.5.2.2.3.	Summary of Design and Platform Details.....	71
6.5.2.2.3.1.	SOA Pattern(s) Implemented.....	71
6.5.2.2.3.2.	COTS Platform Vendor Names and Versions for Hosting Platform....	71
6.5.2.3.	Dependencies	71
6.5.2.4.	Service Design Details	71
6.5.2.4.1.	Interface Technical Specs.....	72
6.5.2.4.1.1.	Service Invocation Type	72
6.5.2.4.1.2.	Service Interface Type	72
6.5.2.4.1.3.	Service Name	72
6.5.2.4.1.4.	Interface	72
6.5.2.4.1.5.	End Points	72
6.5.2.4.1.6.	Operations or Methods.....	72
6.5.2.4.1.7.	Message Schemas	72
6.5.2.4.2.	Information Model.....	72
6.5.2.4.2.1.	Class Diagram and Description of Entities Involved.....	72
6.5.2.4.2.2.	Mappings from ELDM to Standards Based Schemas.....	72
6.5.2.4.3.	Behavior Model (AKA Use Case Realization).....	72

6.5.2.4.3.1. Use Cases (Use Case Model).....	73
6.5.2.4.3.2. Interaction Diagrams.....	78
6.5.2.5. Gap Analysis.....	80
6.5.2.5.1. Variances from Enterprise Target Architecture.....	90
6.5.2.5.2. Variances from SLDs	90
6.5.2.5.3. Variances from Standards and Policies	91
6.5.2.5.4. Justification for Exceptions and Mitigation.....	91
7. External System Interface Design	91
7.1. Interface Architecture.....	91
7.2. Interface Detailed Design	91
8. Human-Machine Interface	91
8.1. Interface Design Rules	91
8.2. Inputs	91
8.3. Outputs	91
8.4. Navigation Hierarchy	91
8.4.1. Screen [x.1]	91
8.4.2. Screen [x.2]	91
8.4.3. Screen [x.3]	91
9. Attachment A – Approval Signatures.....	92
A. Additional Information.....	93
A.1. Identification of Technology and Standards	93
A.2. Constraining Policies, Directives and Procedures	93
A.3. Requirements Traceability Matrix (RTM)	93
A.4. Packaging and Installation.....	93
A.5. Design Metrics	93

1. Introduction

Collaborative Terminology Tooling & Data Management (CTT&DM) is a consolidation of different suites of applications that will be centralized under one system. This consolidated solution will provide a robust Technical Terminology Service (TTS) to standardize terminologies across the various medical coding systems. All systems and software will be open source. The support for these terminologies and support systems will be accessed through the Collaborative Terminology Servers. These will include the following systems and enhancements:

- Standard Code System (SCS) Terminology standards produced by a Standards Development Organization (SDO)
- Veteran Health Information Systems and Technology Architecture(VistA) Lexicon standard reference for clinical terminology across the Department of Veterans Affairs (VA) containing coding systems: Clinical Procedural Terminology (CPT) & CPT Modifier
- Healthcare Common Procedure Coding System (HCPCS)
- International Classification of Diseases-9 (ICD-9)
- Systematized Nomenclature of Medicine –Clinical Terminology (SNOMED CT)
- Veteran Health Administration Terminology (VHAT), A Standard Code System created and maintained by Standard & Terminology Services (STS), specifically for use in enterprise VA systems. VHAT provides Allergies/Adverse Reactions, Vitals, Orders (partial), Demographics (partial), Pharmacy, and TIU documents titles.
- Map Sets. Associations between concepts from any two standard code systems or within the same standard code system
- General Equivalence Mappings (GEMs). A set of map sets used to translate between the ICD-9-CM and ICD-10-CM/PCS code systems. They are created by the National Center for Health Statistics (NCHS) and the Center for Medicare & Medicaid Studies (CMS).
- Logical Observation Identifier Names and Codes (LOINC). A database and universal standard for identifying medical laboratory observations.
- VA Enterprise Technology Services is a Java/Oracle based development which includes: Terminology Deployment Services (TDS) that allows terminologist to prepare, test, deploy, and troubleshoot terminology to VA systems.
- New Term Rapid Turnaround (NTRT) Web Applications allow field-users to request new terms, and track submissions through a web interface.
- Terminology Services allow other applications to access terminology content.
- VA Unique Identifiers (VUID) Services provide VUIDs through an Application Programming Interface (API) or a web interface.
- SOLOR, an integration of SNOMED, LOINC, and RxNorm
- SNOMED VA extension

1.1. Scope

The scope of this document includes the functionalities and enhancements to replace the existing VA Enterprise Terminology Service (VETS) system to include web-based access along with the integration of the International Health Terminology Standard Development Organization (IHTSDO) Workbench, and Informatics Architecture Acceleration (ISAAC) toolset. This new web-based tool aims to standardize terminology content used across the Veterans Health Administration (VHA), and will be accessible by clinicians, and terminologists responsible for updating clinical terminology in VistA, ultimately giving them the ability to update terminology in real time across disparate systems.

Table 1: Overarching CTT&DM Requirements

#	Functionality/Services	Description
1	Terminology Server (Run time)	Provide programmatic access to terminology components. Host terminology from the following systems: SNOMED CT SNOMED US Extensions SNOMED CT Spanish Edition SNOMED VA Extension LOINC RxNORM ICD-9-CM ICD-10-CM CPT/HCPCS DRG VHAT SOLOR
2	Continuous Integration Server (Content Management Service)	Provide the ability to manage the developmental workflow by providing an automated process from check-out/check-in of code to release. Prototypical examples of such continuous integration services include: Apache Continuum, Bamboo, Hudson, Jenkins, and Team City.
3	Artifact/Project Repository	Release repository for project dependencies. All project artifacts shall be managed by an Apache Maven compatible repository manager and extend Apache Maven with plugin extensions to manage terminology project processing, quality determination, release, and deployment. Artifactory Apache Archiva and Sonatype Nexus are prototypical examples of artifact repository services. Apache Ant is another software build tool that compares to Maven and may be used.

#	Functionality/Services	Description
4	Version/Source Control	Provide a distributed version control system, where developers will have the ability to work on the same code/project at the same time. Provide version control for all ETS content. Each file will be tracked, any modifications made, additions, deletions, or movement of files will receive a version number upon commit.
5	Workflow Management & Rules Engine	Support the business life cycle from authoring through execution to monitoring and management – utilizing a workflow management & rules engine. Workflow Management Service deployed on a Java EE 7/Java 8 SE server. Workflow Service will support both Representational State Transfer (REST) Application Program Interface (API) and Web Services Human Task (WS-Human Task) Management.
6	Component Request Service	Provide the ability to allow users to enter modification requests for terminology that can be tracked and managed globally.
7	Quality Management	Provide continuous inspection of code quality utilizing business rules from local validation through release validation.
8	Database Server	The Database Server will be a Oracle SQL Server
9	Issue Tracking Service	Provide the ability to enter and track defects
10	Service Desk	Provide the ability for users to request assistance from Information Technology (IT) via a ticketing system

1.2. User Profiles (Tooling)

The following are the two groups of users for the tooling application.

- Primary Users: Standards and Terminology Services (STS) and Knowledge Based Systems (KBS) Staff
- Secondary Users: Mobile Health and Others (Clinical Information System/Anesthesia Record Keeper/Nursing, etc.)

To the extent that new functionality or changes that affect the usability of the tooling application are introduced, STS, KBS, Mobile Health, and Other Staff Users will require training to ensure that each understands the steps needed to successfully execute their responsibilities.

2. Background

2.1. Overview of the System

The Collaborative Terminology Development Tooling environment will initially allow terminology mapping, browse/search terminology, workflow automation, and terminology editing.

The application server will be a platform for developing and deploying multi-tier distributed enterprise applications. The server centralizes application services, such as Web server functionality, business components, and access to backend enterprise systems. It should utilize technologies, such as caching and connection pooling, to improve resource use and application performance, as well as other components/tools for improved performance.

The Collaborative Terminology Development Tooling is being developed because the VA needs an approved resource terminology plan that will be successful and meet the goals of interoperability, standardization, and computability as mandated by Congress in the National Defense Authorization Act (NDAA).

The environment will improve workflow, data collection, and quality of operations.

2.2. Overview of the Business Process

The information shown in Table 2 provides an overview of the major categories of business process, and Figure 1 is a simplified business process flow diagram. Rather than providing a full detailed enumeration of requirements, the intention of the SDD is to show the major business process. This sets the architecture direction and drives the design depicted in the following sections. For additional details regarding the functional requirements, please refer to the Business Requirements Document ([BRD](#)).

Table 2: Business Process

Type	Description
Administrative	The ability to manage terminology source content in the terminology environment.
Terminology Search	The ability to effectively search and filter for terminology content based search criteria.
Terminology Workflow Process	The ability to support workflow and business processes for developing, reviewing, and terminology update requests.
Terminology Updates	The ability to create, view, update, and retire terminology.

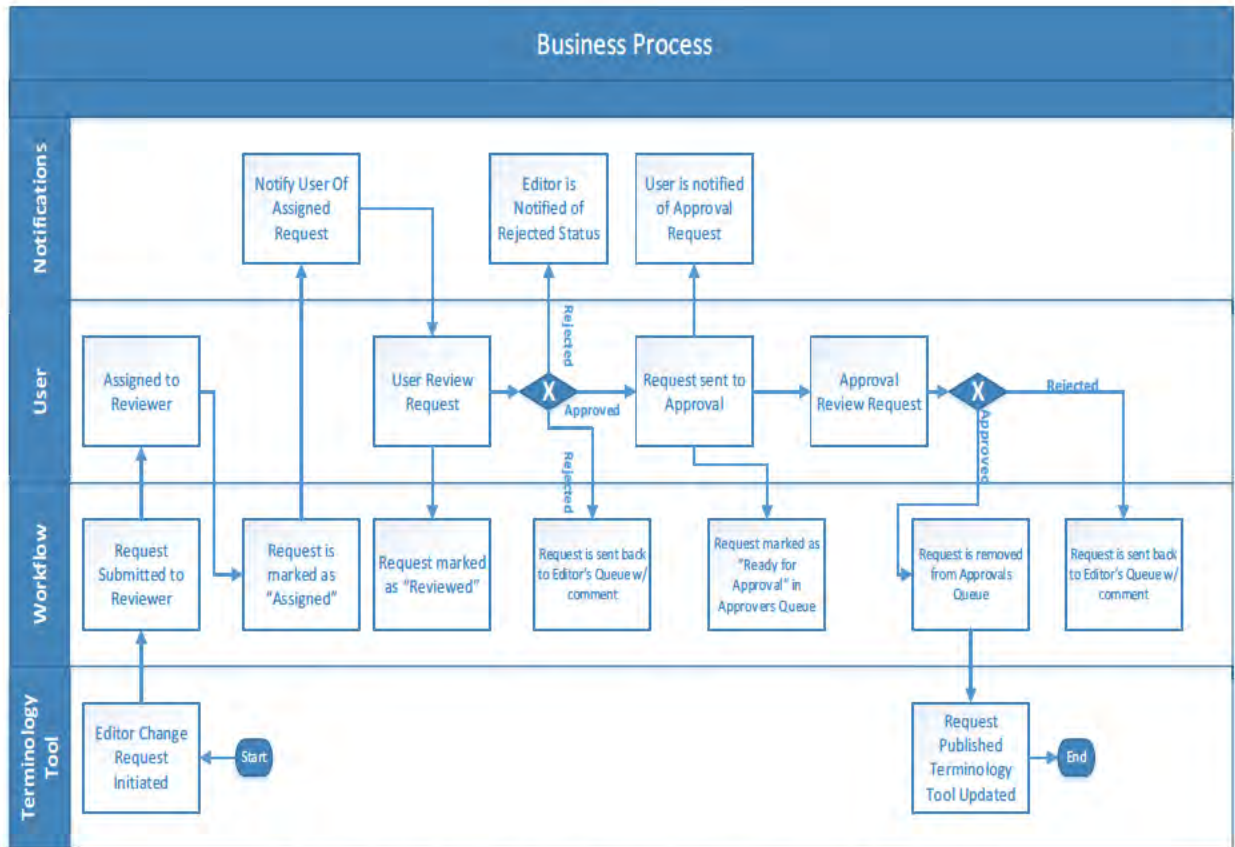


Figure 1: Tooling Business Processes Diagram

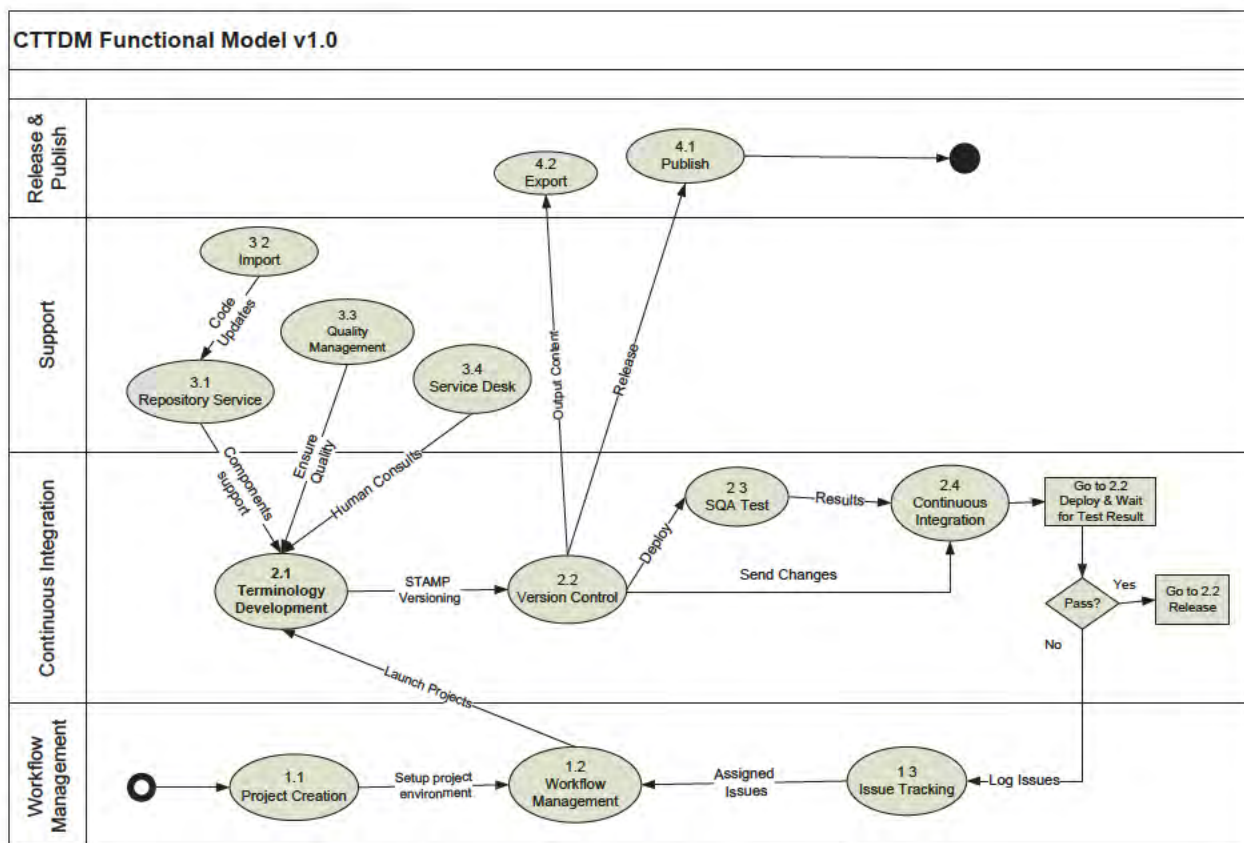


Figure 2: Server Business Processes Diagram

2.3. Overview of the Significant Requirements

The information shown in the table below provides an overview of the major categories of functional requirements. Rather than providing a fully detailed enumeration of requirements, the intention of the SDD is to show the major functionality; this sets the architecture direction and drives the design depicted in the following sections.

Table 3: Functional Requirements

ID	Requirement
BRD ETS-F-121	Provide capability to send user alert notifications.
BRD ETS-F-22	Provide Identity and Access Management Service.
BRD ETS-F-123	Provide capability for human consults.
BRD ETS-F-147	Provide capability to accept, process, integrate, and version electronic releases of terminologies from SDO, the National Library Medicine (NLM) and other authoritative sources.

ID	Requirement
BRD ETS-F-151	Provide capability to export terminology content and knowledge artifacts in a variety of formats for internal and external consumption. Exports must support versioning error checking, tracking, and published/subscribe paradigms.
BRD ETS-F-149	Provide capability that will support searchable, shareable Extensible Mark-up Language (XML) structures.
BRD ETS-F-178	Provide capability to support a mechanism for integrating data from the terminology tooling.
BRD ETS-F-163	Provide capability to support mapping between and among terms and knowledge artifacts.
BRD ETS-F-9	Provide capability to a workflow management service able to create, load, and execute rules. Also to coordinate workflows between Enterprise Terminology Service ETS client applications.
OWNR1993	Provide capability with a taxonomy view that must support displaying concepts parentage, when more than one parent is present and enabling navigation of the entire parentage, and lineage, of a concept.
BRD ETS-F-66	Provide a unique ID for Status, Time Author Module Path (STAMP) versioning for all enterprise terminology services, content change; map sets, rules, refsets, concepts, and definitions.
BRD ETS-199	Provide capability to support description logic in the Web Ontology Language (OWL 2 EL) profile.
1	Provide capability that shall allow administrators to set up and modify user information and permissions.
2	Provide capability to allow users the ability to add, retire, and edit new terms, relationships, and attributes to represented terminologies.
3	Provide capability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.

2.3.1. Overview of Functional Workload/Performance Requirements

The following table is an overview of the functional workload/performance requirements.

Table 4: Functional Workload/Performance Requirements

ID	Requirement
1	The web application components of the system are expected to support 5,000 registered users, and 600 concurrent users. This includes STS staff, KBS staff, contractors, field staff, etc.
2	Editing environments that support classification must be able to classify the entire terminology in 30 seconds or less, and to incrementally classify additive changes to the terminology in 500 milliseconds or less.
3	Reset environments must support Reset computation of a 150,000 member set, and computation of parent Resets in less than 10 seconds.

2.3.2. Overview of Operational Requirements

The table below lists the operational requirements for the CTT&DM project.

Table 5: Operational Requirements

ID	Requirement
1	The system shall remain responsive at all times, with no more than a 2 second lag between user action, and system response to action.
2	System response times and page load times shall be consistent with VA standards.
3	Maintenance, including maintenance of externally developed software incorporated into the application, shall be scheduled during off peak hours or in conjunction with relevant maintenance schedules.
4	Information about response time degradation resulting from unscheduled system outages and other events that degrade system functionality and/or performance shall be disseminated to the user community within 30 minutes of the occurrence. The notification shall include the information described in the current Automated Notification Reporting (ANR) template maintained by the VA Service Desk. The business impact must be noted.
5	Provide a real-time monitoring solution during the maintenance windows or when technical issues/problems occur which may require a preventative back up.
6	Notification of scheduled maintenance periods that require the service to be offline or that may degrade system performance shall be disseminated to the user community a minimum of 48 hours prior to the scheduled event.
7	The system shall be 99.9% available Monday-Friday, 6:00 AM ET to 3:00 AM ET. The system shall be 98% available on an annual basis.

2.3.3. Overview of the Technical Requirements

The table below provides a brief overview of the CTT&DM technical requirements.

Table 6: Technical Requirements

ID	Requirement
1	Section 508-compliance: All end user interfaces must be in compliant with VA handbook 6102, Section 508 and directives for website design usability.
2	Integration with other VA systems: CTT&DM ability to integrate with other internal VA systems is one of the key drivers to the overall technical architecture. The solution must have the capacity to utilize the current infrastructure and enterprise standards and services to communicate and interface with other internal systems.
3	International Electrochemical Commission (IEC) 62304 Compliance: CTT&DM will be in compliance with IEC 62304 for the development of medical device software.

2.3.4. Overview of the Security or Privacy Requirements

The table below provides a brief overview of the CTT&DM security and privacy requirements.

Table 7: Security Requirements

ID	Requirement
1	All VA security requirements will be adhered to. Based on Federal Information Processing Standard (FIPS) 199 and National Institute of Standards and Technology (NIST) SP 800-60, recommended Security Categorization is High.
2	The Security Categorization will drive the initial set of minimal security controls required for the information system. Minimum security control requirements are addressed in NIST SP 800-53 and VA Handbook 6500, Appendix D (BRD).
3	All VA Privacy requirements will be adhered to. Efforts that involve the collection and maintenance of individually identifiable information must be covered by a Privacy Act system of records notice.

2.3.5. Overview of System Criticality and High Availability Requirements

The sensitivity rating for the Collaborative Tooling system is specified in the following table.

Table 8: Sensitivity Rating

Category	Sensitivity Definition	Rating
Confidentiality	Protection from unauthorized disclosure of information.	Moderate
Integrity	Protection from unauthorized, unanticipated, or unintentional modification or destruction of information.	Moderate

Category	Sensitivity Definition	Rating
Availability	Ability of the system to ensure that system resources (data, computer programs and equipment, network connectivity) are accessible and operational, at the required level of performance, when they are needed.	High

The Collaborative Tooling system will be hosted in the following location(s):

Location: Primary – Austin Information Technology Center (AITC).

The Collaborative Tooling system is expected to be available at minimum 95% of the time with a target goal of 99%.

The Collaborative Tooling system is mission critical system and full disaster recovery setup in a secondary location is needed.

2.3.6. Single Sign-on Requirement

For the Collaborative Tooling system, The Project Information System and Management Environment (PRISME) shall provide Collaborative Tooling users with a single-sign-on capability to ensure that users only log onto PRISME once. All role-based access control is managed through the single-sign-on capability.

2.3.7. Requirement for Use of Enterprise Portals (Tooling)

The Collaborative Tooling system shall be accessible to as many as 600 concurrent users, including public use. The Collaborative Tooling system shall consist of both a stand-alone application and enterprise portal based Web applications. The standalone systems pull their data from the centralized system and resynchronize upon reconnection to that centralized system.

2.3.8. Special Device Requirements

Not applicable

2.3.9. Legacy System Retirement

The Collaborative Tooling system will lead to long-term retirement and integration of VETS and the other terminology systems currently in use. The table below lists the proposed Legacy retirements.

Table 9: Proposed Legacy Retirements

Legacy System or Legacy System Component	System Retired or Workload Reduced	Quantify the Workload Reduction
VETS & other Terminology Servers	Long term retirement and integration	Not available

3. Conceptual Design

Section 3 provides a high-level overview of the Enterprise Terminology Services (ETS) (identified within the New Service Request [NSR] #20100904 Collaborative Terminology Developing Tooling) application design. The conceptual perspective provides a logical view of the approach; this is intended to show the overall approach and architecturally significant components.

3.1. Conceptual Application Design

The CTT&DM application design has been constructed to provide the required functionality as specified in the Requirements Specification Document (RSD) while maintaining compliance with the One-VA Technical Reference Model (TRM) and industry best practices.

The current system supports 8-10 users. The goal is to support 5,000 registered users and 600 concurrent users. Annual growth may be as high as 20% initially. The current system is in the pilot phase and consists of one application server and database server, with a separate webserver that resides on the physical application server. This can be expanded in an n-Tier model or virtualized to support a larger application audience once the pilot phase is complete. The current “As-Is” system is depicted in the figure below.

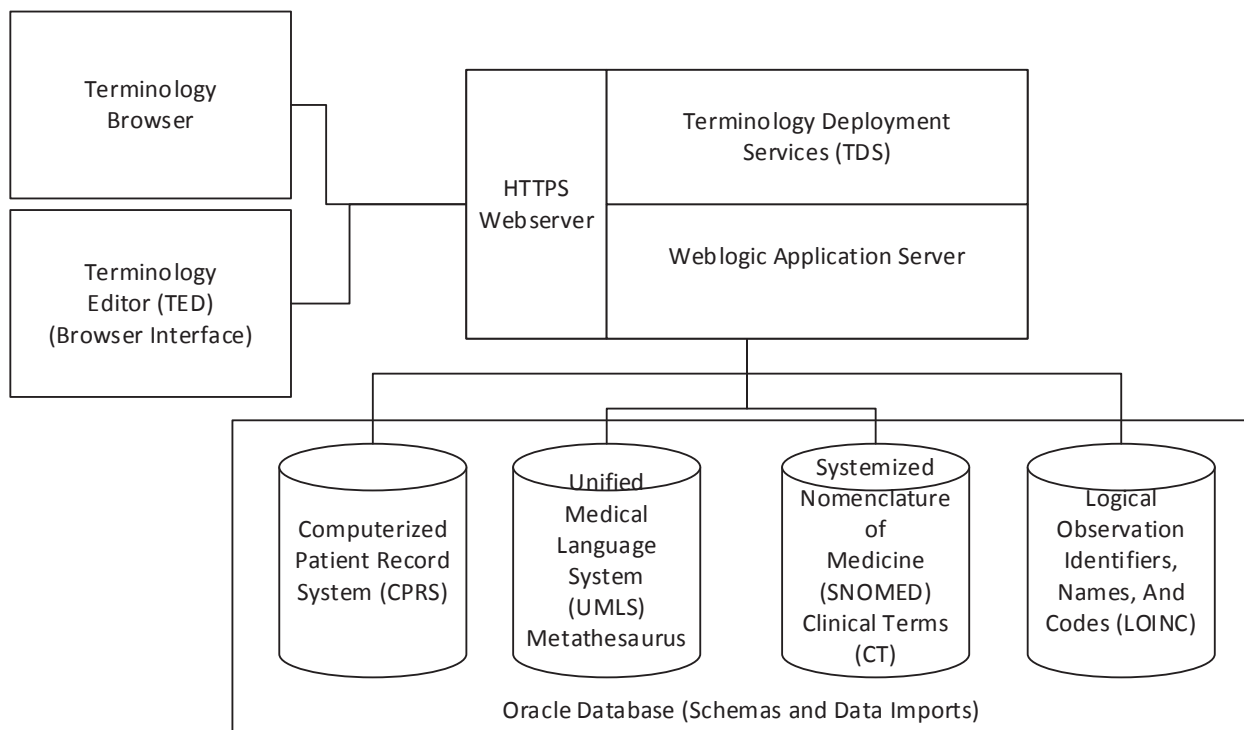


Figure 3: Current “As-Is” System

The CTT&DM conceptual design below is the “To-Be” view of the future application. Specifically, this architectural approach allows CTT&DM to meet the following requirements:

- Check for duplication daily through a QA process;
- Convert terms to any languages based on configuration;
- Allow users to be assigned multiple roles; and
- Allow the workflow status to be edited.

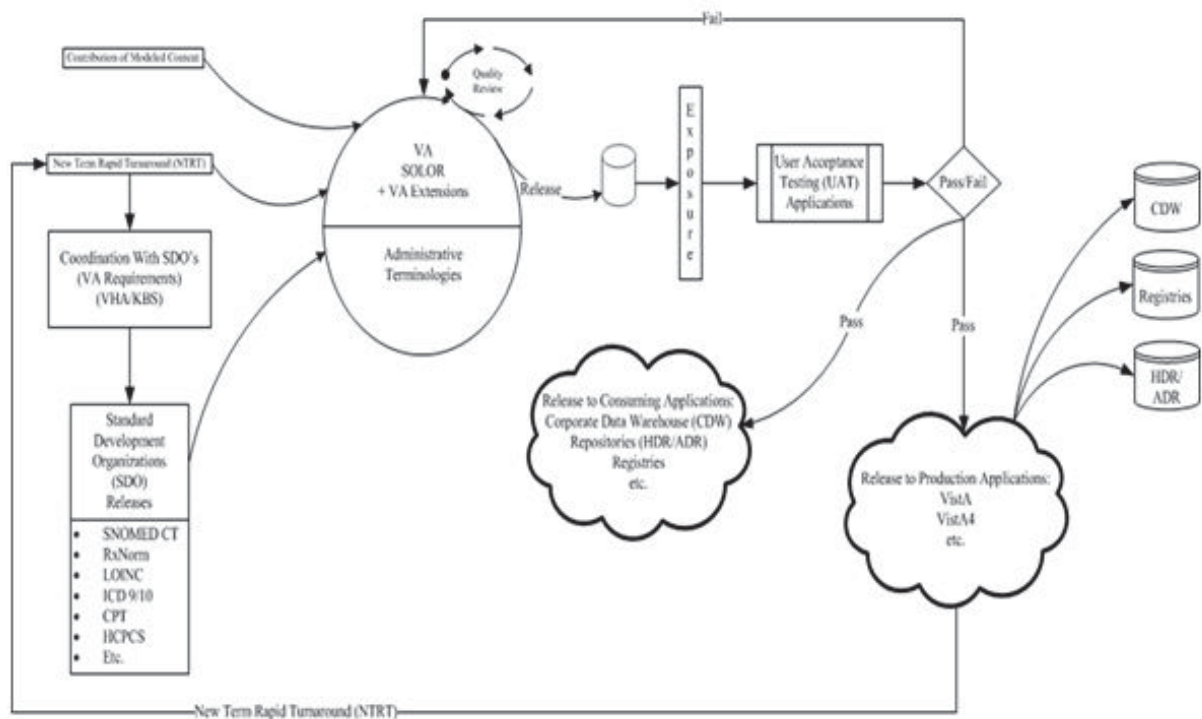


Figure 4: Conceptual “To-Be” Application Design (1 of 2)

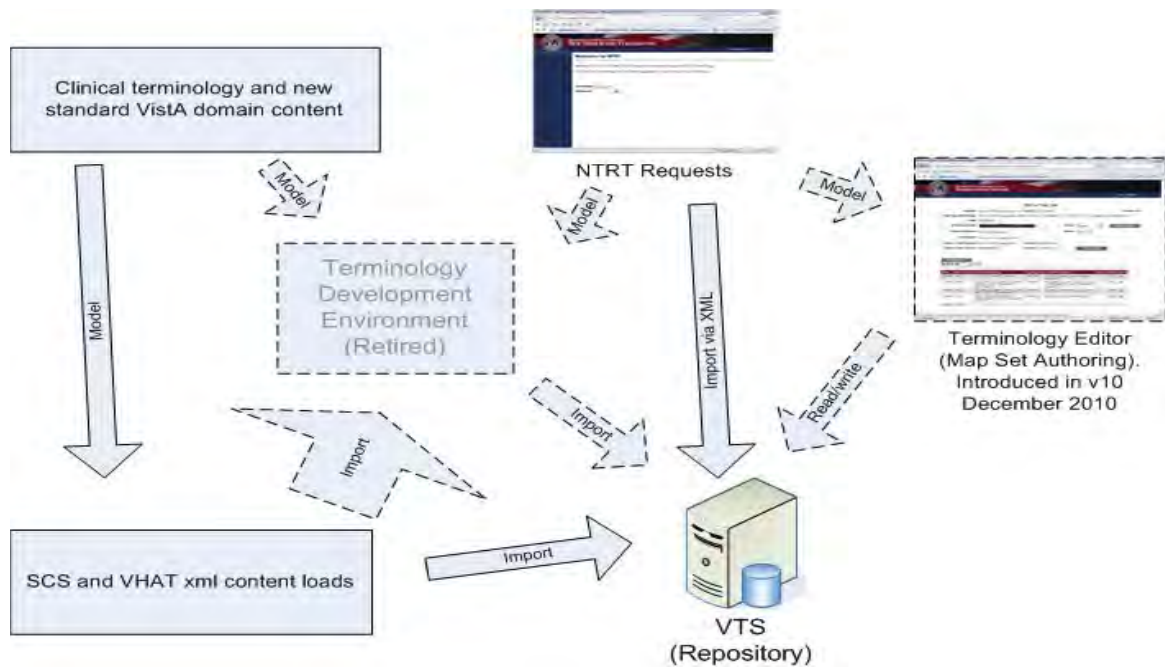


Figure 5: Conceptual “To-Be” Application Design (2 of 2)

3.1.1. Application Context

The following figure represents the VETS database. VETS is one of the systems included within the CTT&DM project.

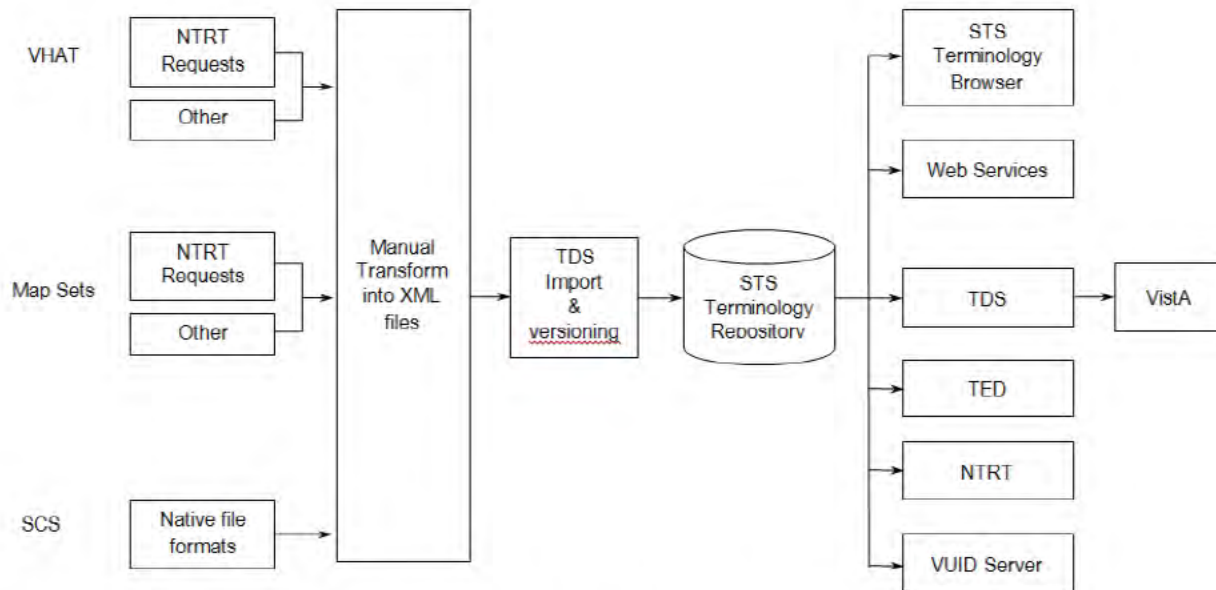


Figure 6: Application Context Diagram

The following tables outline the application context description.

Table 10: Object

ID	Name	Description	Interface Name	Interface System
N/A	N/A	N/A	N/A	N/A

Table 11: Interfaces External to OI&T

ID	Name	Related Object	Input Messages	Output Messages	External Party
N/A	N/A	N/A	N/A	N/A	N/A

Table 12: Interfaces Internal to OI&T

ID	Name	Related Object	Input Messages	Output Messages	External Party
VETS	VHA Enterprise Terminology Service	SCS, VHAT	SCS Data	Terminology Content and Knowledge Artifacts	VHA

Table 13: Externally Shared Data Stores

ID	Name	Data Stored	Owner	Access
N/A	N/A	N/A	N/A	N/A

3.1.2. High-Level Application Design

PRISME provides a single-sign-on capability that allows users to authenticate once while maintaining all role-based access controls. The identified process flow diagram below allows users to send requests modeling assistance, provides configurable workflows capable of directing model review after creation, and a workflow inbox for users to manage their work.

A J2EE Platform running on a non-Windows dependent OS will be utilized.

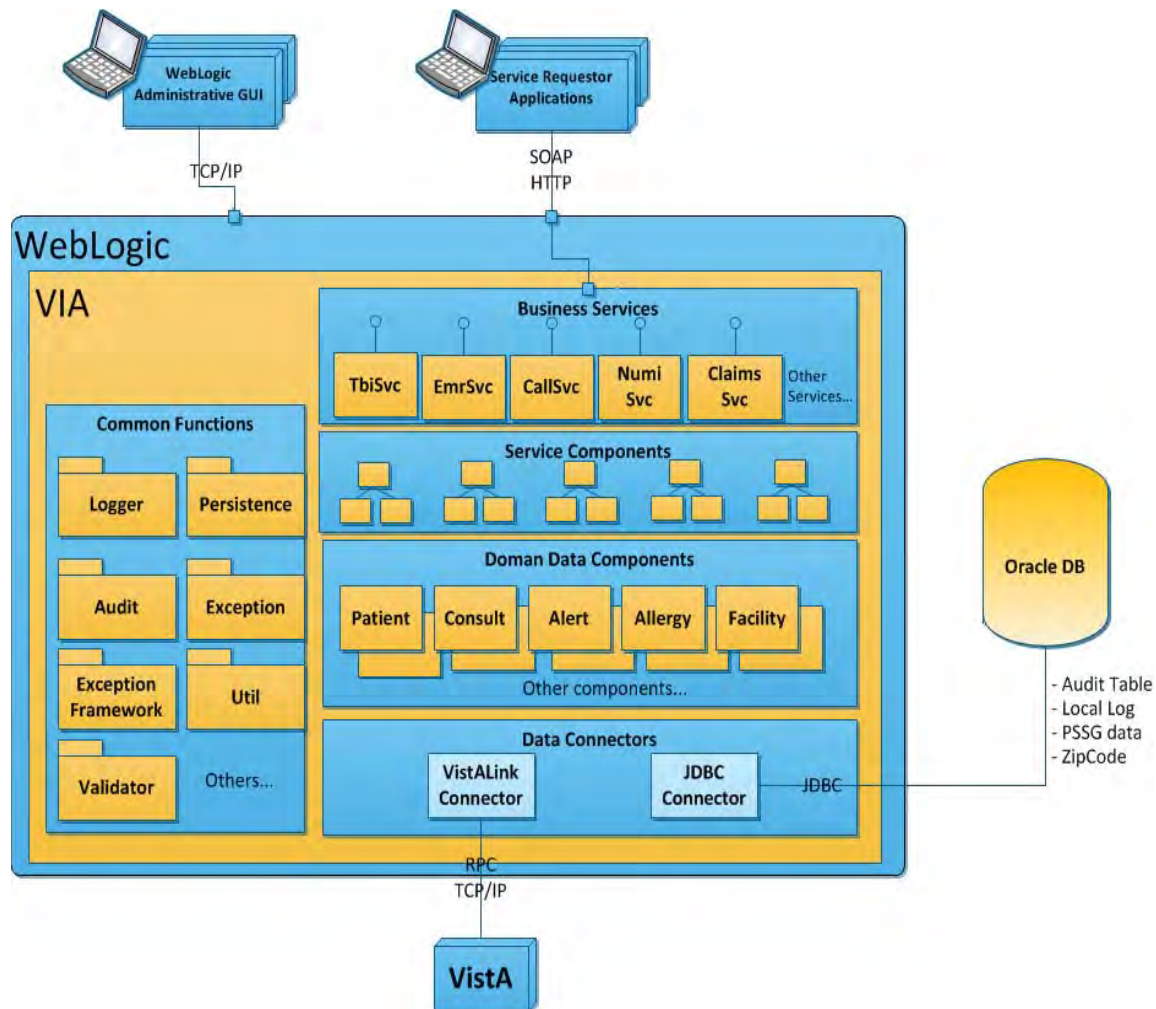


Figure 7: High-Level Application Design

The following tables list the object/components in the high-level application design to be built or modified

Table 14: Objects / Components to be Built or Modified

ID	Name	Description	Service or Legacy Code	External Interface Name	External Interface ID	Internal Interface Name	Internal Interface ID	SDP Sections 1&2
VETS	Veterans Enterprise Terminology System	Suites of products that deliver standardized Terminology Content for use across the VA enterprise; including VistA and CHDR	Rapid and accurate issuance of terms, updates of existing terms, and deployment of solutions over a browser to multiple applications.	Veterans Enterprise Terminology System	VETS	Veterans Enterprise Terminology System	VETS	Being Developed
VETS	Connected Health/Mobile Applications	Provides mobile access to VA healthcare information	Limited; applications are being developed	Connected Health/Mobile Applications	Connected Health/Mobile Applications	Connected Health/Mobile Applications	Connected Health/Mobile Applications	Being Developed
CDW	Corporate Data Warehouse	National data repository that pulls from several VHA clinical and administrative systems, primary VistA.	Existing functionality	CDW	CDW	CDW	CDW	Being Developed

ID	Name	Description	Service or Legacy Code	External Interface Name	External Interface ID	Internal Interface Name	Internal Interface ID	SDP Sections 1&2
	Registries	Supports the maintenance of local and national registries for clinical and resource tracking of care for patients with certain clinical conditions.	Existing functionality	Registries	Registries	Registries	Registries	Being Developed

Table 15: Internal Data Stores

ID	Name	Data Stored	Steward	Access
N/A	N/A	N/A	N/A	N/A

3.1.3. Application Locations

The following tables describe the application locations and users for the CTT&DM applications.

Table 16: Application Locations

Application Component	Description	Location at Which Component is Run	Type
VETS	Suite of products that deliver standardized terminology content for use across the VA enterprise	Austin Information Technology Center (AITC)	Client-facing servers that expose VA services

Table 17: Application Users

Application Component	Location	User
VETS, TDS, STS	STS and KBS Staff	Primary User
VETS, TDS, STS	Mobile Health (Connected Health) Others (Clinical Information System/Anesthesia Record Keeper, Nursing, etc.)	Secondary User

3.2. Conceptual Data Design

This section provides a high-level representation of the CTT&DM project's design approach for data.

3.2.1. Project Conceptual Data Model

Clinical and technical tooling to support a comprehensive Enterprise Terminology Service (ETS) will build on existing open-source terminology tooling projects currently either under development at, or in use at, the IHTSDO, the NLM, Kaiser Permanente, Sweden's National Release Center, Denmark's National Release Center, and the VHA.

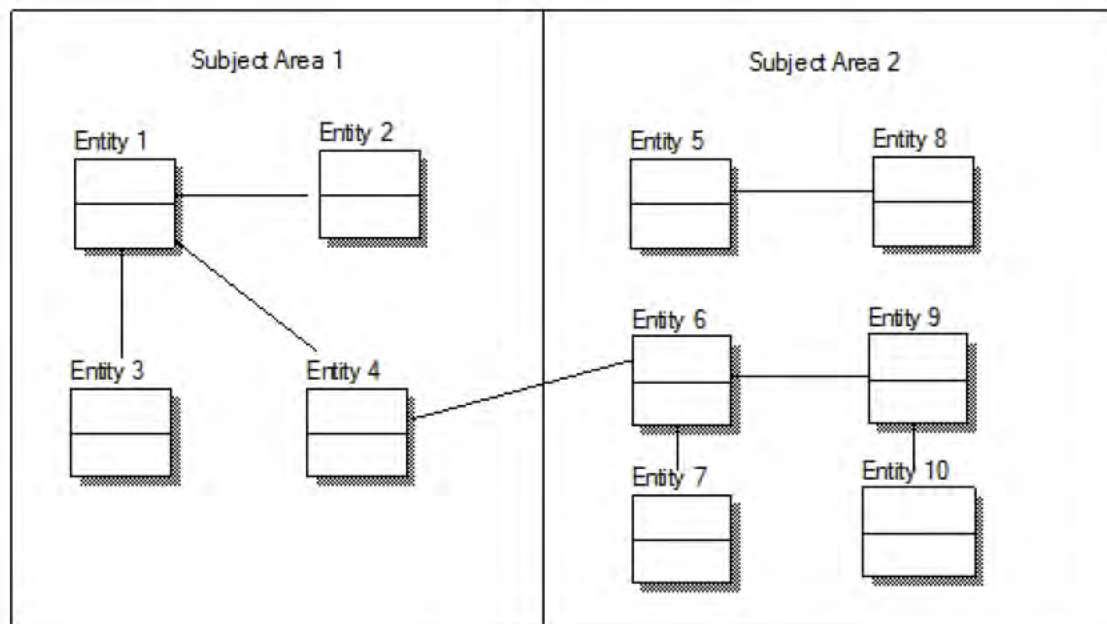


Figure 8: Project Conceptual Data Model

3.2.2. Database Information

Table 18: Database Inventory

Database Name	Description	Type	Steward
STS Terminology Repository	Oracle database housed at the Austin Information Technology Center	Interface	Terminology Deployment Services

3.2.3. User Interface Data Mapping

N/A

3.2.3.1. Application Screen Interface

N/A

Table 19: Screen Description

Graphical User Interface (GUI) Field	Table (Database Table that field connects to)	Field (Field in Table that the GUI field connects to)	Comments
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

3.2.3.2. Application Report Interface

N/A

3.2.3.2.1. Insert Name of Report

N/A

Table 20: Description

Report Column	Data Source
Patient	N/A
SSN	N/A
DoB	N/A

3.2.3.3. Unmapped Data Element

N/A

3.3. Conceptual Infrastructure Design (Server)

The CTT&DM system will be composed of a variety of technology systems and those systems are widely available in the marketplace. The preference is to integrate existing systems rather than developing everything from scratch. The technology systems that are available in the marketplace and that will be integrated as parts of the CTT&DM system include but are not limited to the following:

1. Terminology server (open source)
2. Continuous integration
3. Issue tracker
4. Version control
5. Business process management.

There are many options in the marketplace for the selection of the above technologies. The technologies may be open source or proprietary – with open source selections preferred. Criteria for choosing the technologies are many. One key factor is the compatibility required of the many technologies that must be able to work together.

There will be three main environments in the CTT&DM system infrastructure; they are the development, preproduction, and production environments. Preproduction and production

environments are Vista environments. Many servers are identified within the target technical architecture including those listed below:

- Terminology server
- Terminology deployment server
- VUID server
- Application server
- Continuous integration server
- Version control server
- Issue tracker server
- SQA test server
- Master File server
- Process execution and business rule server

3.3.1. Process and Activity Monitoring Server System Criticality and High Availability

System Criticality and High Availability designations are determined by AITC. Requirements associated with system hosting availability and uptimes are within scope of AITC. Application specific Service-Level Agreements (SLAs) be defined by Veteran Affairs protocols.

Since CTT&DM is hosted in AITC, it is covered under their Disaster Recovery Plan (DRP). CTT&DM handles administrative accounting data and does not require any separate Recovery Time Objectives (RTOs) and Recovery Point Objectives (RPOs).

Additionally, the application does not need to be paused, or altered, during the run process in order to guarantee a consistent and usable backup.

CTT&DM will be in an operational environment hosted within AITC and administered by VA Enterprise Operations (EO). AITC/EO have operational responsibility for the production systems it hosts, and so, is responsible for developing and providing Disaster Recover (DR)/ Continuity of Operations Plan (COOP) policies and procedures. Additionally, there are some requirements within the SysAdmin Module related to data retention and auditing. The requirements partially address the data recovery requirements; however AITC/EO will retain responsibility for development and providing system backup procedures and services per the existing requirements of the CTT&DM system.

3.3.2. Special Technology

The following table lists the special technology requirements.

Table 21: Special Technology Requirements

Special Technology	Description	Notional Location	TRM Status
N/A	N/A	N/A	N/A

3.3.3. Technology Locations

The following table shows all of the locations of the current VETS backbone architecture and core usage.

Table 22 (Grouping): Technology Location Details

Technology Component Production	Location	Usage
Workstations	VA – Austin (AITC)	12 x 5
Special Hardware	VA – Austin (AITC)	12 x 5
Interface Processors	VA – Austin (AITC)	12 x 5
Legacy Mainframe	VA – Austin (AITC)	12 x 5
Legacy Application Server	VA – Austin (AITC)	12 x 5
Legacy Databases	VA – Austin (AITC)	12 x 5
Other	VA – Austin (AITC)	12 x 5

Technology Component Production 2	Location	Usage
TBD	TBD	TBD

Technology Component Certification	Location	Usage
TBD	TBD	TBD

Technology Component Education	Location	Usage
TBD	TBD	TBD

Technology Component Test	Location	Usage
TBD	TBD	TBD

Technology Component Development	Location	Usage
TBD	TBD	TBD

3.3.4. Conceptual Infrastructure Diagram (Server)

3.3.4.1. Location of Environments and External Interfaces

The figure below shows the configuration of the CTT&DM system and depicts the location of the environments and the external interfaces. There are two environments, development and preproduction, along with the VistA, Software Quality Assurance (SQA) test environments. Both are clustered and distributed environments. The terminology repository is also made accessible to the public, through a web-based application server for editors and programmable access.

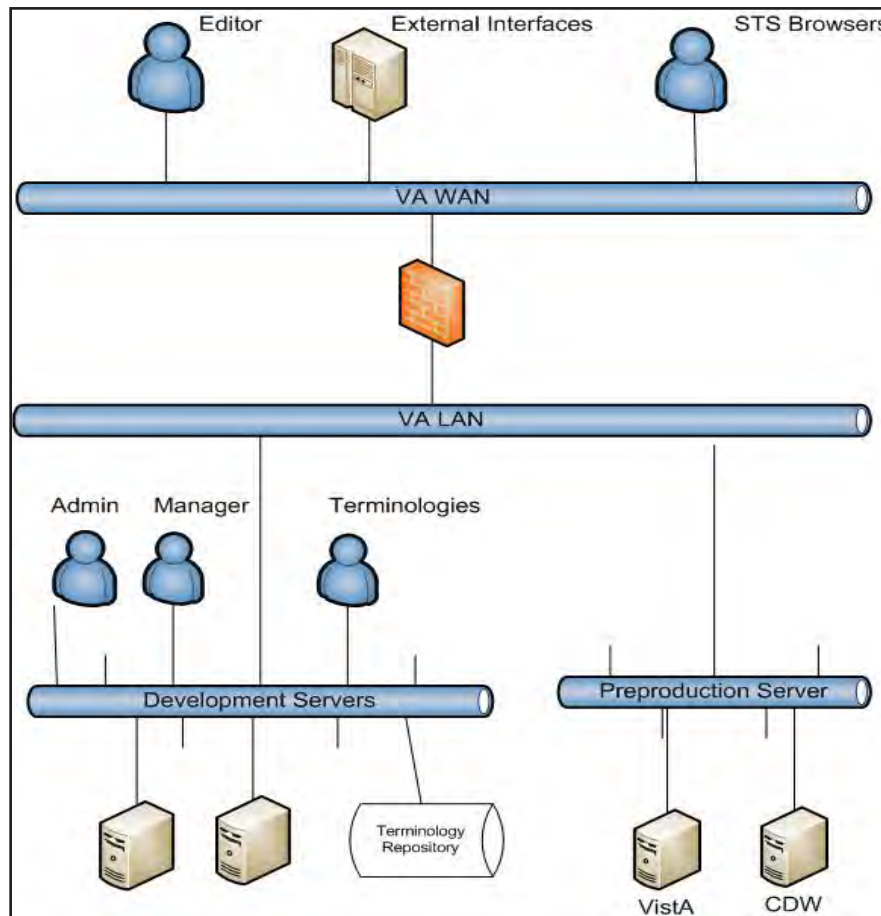


Figure 9: CTT&DM Conceptual Networks and Environments

3.3.4.2. Conceptual Production String Diagram

The figure below depicts the server architecture that hosts the CTT&DM system. It is a “To-Be” server architecture that integrates three subsystems: VETS, Continuous Integration (CI), and Business Process Management (BPM). Each subsystem has its own architecture. The integration of the three architectures should be seamless and interactive as a whole system.

VETS receives data inputs from three sources which are then converted to XML. Some of the data inputs are internally tested and some are imported to the repository of the terminology server. CI then coordinates the 8-step publication process including, Version Control and Issue Tracker. BMP tracks/monitors the projects status and assigns tasks to users.

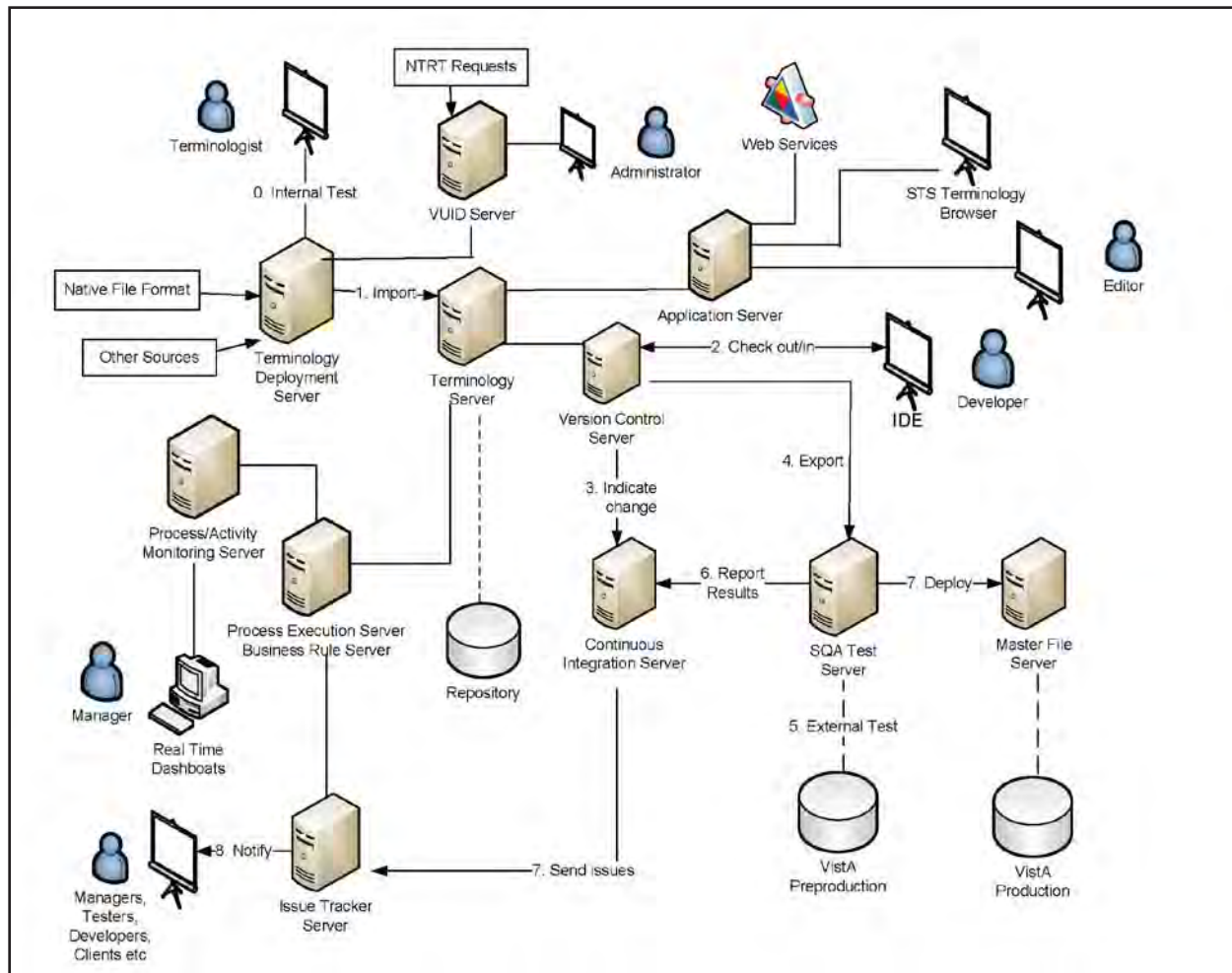


Figure 10: Conceptual Production String Diagram

4. System Architecture

The following sections outline the conceptual model that defines the structure, behavior, and many views of the CTT&DM system. The conceptual model makes use of elements of both software and hardware, and it is used to enable design of such a composite system. It is a logical ‘partitioning scheme’ which naturally divides all of the present and foreseeable requirements of the system into a workable set of cleanly bounded subsystems with nothing left over. Also, it describes all of the necessary, or core, subsystems. The system architecture is platform-independent and captures all business, technology, and contextual interaction aspects at a conceptual level.

4.1. Hardware Architecture (Server)

The suggested hardware architecture for the CTT&DM system is both distributed and centralized computing. It is distributed in development and preproduction or user acceptance testing. It is centralized in repository storage and centralized backup. As the number of users of the CTT&DM system increases, the system can scale out to add more servers as needed. The benefits include, but are not limited to, the following:

1. Lower capital and operational costs upfront (minimal hardware investment upfront).
2. Security (all data is stored within a secured datacenter).
3. Less administrative costs/overhead (fewer resources are needed since all equipment is in one location).
4. Less backup complexity.
5. Greater control over potential risk areas, such as, Internet access.
6. Each scaled out server survives on its own, so there is no Single Point of Failure in this regard.

The basic architecture of the distributed and centralized computing is N-tier architecture. N-Tier typically refers to web applications that further forward their requests to other enterprise services. This type of application is the one most responsible for the success of application servers. Another basic aspect of distributed computing architecture is the method of communicating and coordinating work among concurrent processes. Through various message passing protocols, processes may communicate directly with one another, typically in a master/slave relationship. Alternatively, a "database-centric" architecture can enable distributed computing to be done without any form of direct inter-process communication by utilizing a shared database.

The hardware architecture for the CTT&DM system is depicted in the figure below. There are two development servers and four preproduction test servers. The number of both development and test servers is not fixed; instead, the number of these servers may be increased, as needed, to meet expanding business requirements.

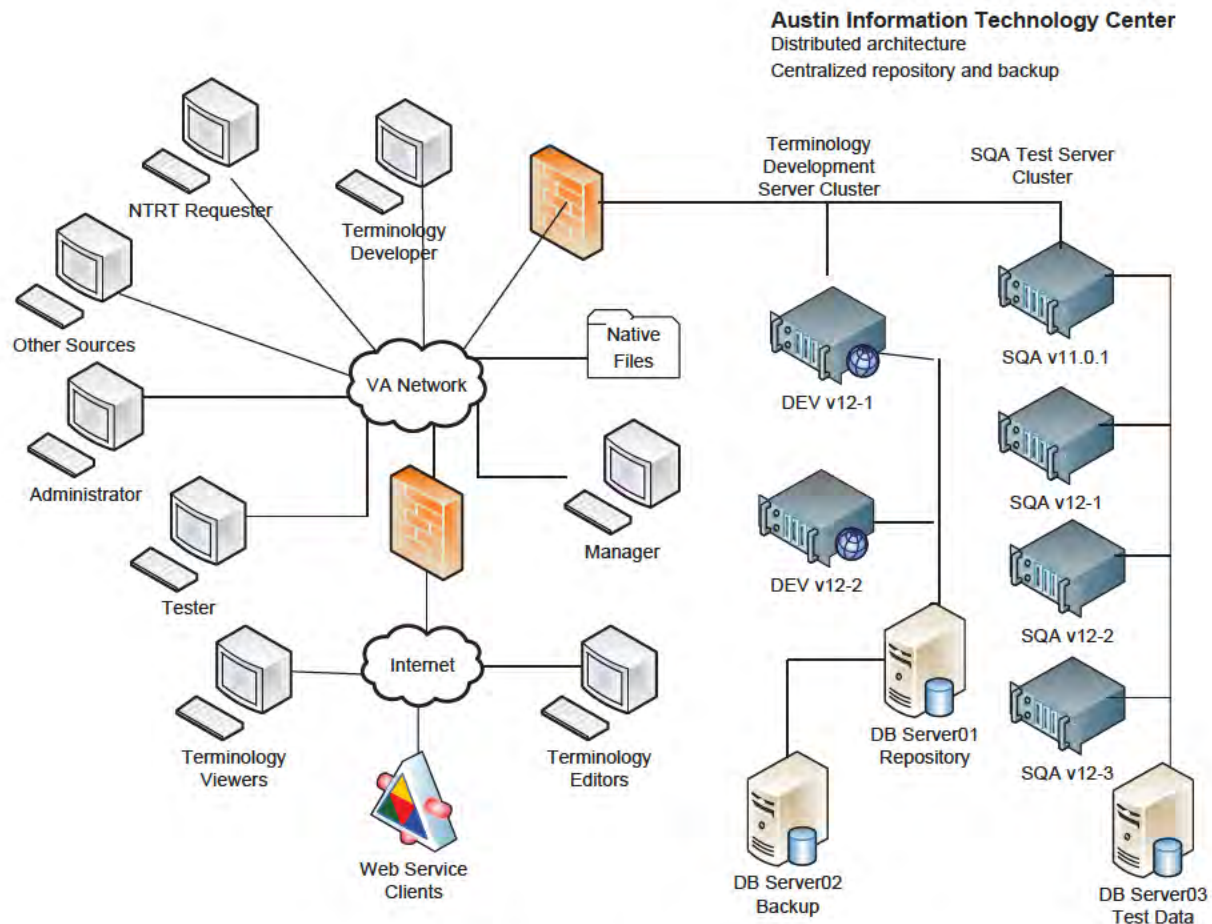


Figure 11: Hardware Architecture Diagram

Potential technologies to facilitate the distributed computing and centralized storage model are listed below:

- **VMware** – Virtual Desktop Technology.
- **Citrix XenApp** – Formerly Presentation Server, a long-time leader in the Application Delivery market.
- **Microsoft Terminal Server** – Often referred to as ‘Citrix-light’; it has made great improvements in Windows 2008.
- **Riverbed** – This market leader in wide area network (WAN) optimization has several different models for small and midsize offices. For an added ‘cool’ factor, some of their devices come embedded with the free version of VMware, allowing the purchaser to deploy up to 5 Virtual Machines, running inside the Riverbed appliance.
- **Hosted Backups** – There are many vendors in this space; utilizing them for back-up data at remote sites may eliminate this hurdle for distributed computing.

4.2. Software Architecture (Tooling)

The default platform for all software development beneath the presentation layer development will be Oracle 64 bit Java 8 SE. The default framework for all web application presentation layer development will be done in HTML5 markup, with JavaScript as the Document Object Model (DOM) scripting language, and with support for high-resolution display devices. Scaled Vector Graphic (SVG) images are the preferred means for scalable image representations to support high-resolution display devices. Alternatively, when SVG imagery is not appropriate, developers may use the image-set () CSS capability for raster images. The default framework for all Java Rich Internet Application (RIA) development will be JavaFX 8. Representational State Transfer (REST) is the default architectural style for providing web services. Apache Jersey 2.6 is the default framework for implementing web services. All project artifacts shall be managed by an Apache Maven compatible repository manager, and will have an associated Project Object Model (POM) file that contains all the elements required for deployment of artifacts to the Maven central repository. For this specification, an artifact is a resource used by—or produced from—the development process, whether it is documentation, data, or an executable file. Additional existing software development tools should be directly applied where possible - make use of unit test frameworks (JUnit), defect reporting systems (Jira), version-control systems (Git), configuration management systems (Maven), and continuous integration environments (Hudson).

The figure below portrays the software architecture.

Software Architecture v.1.0

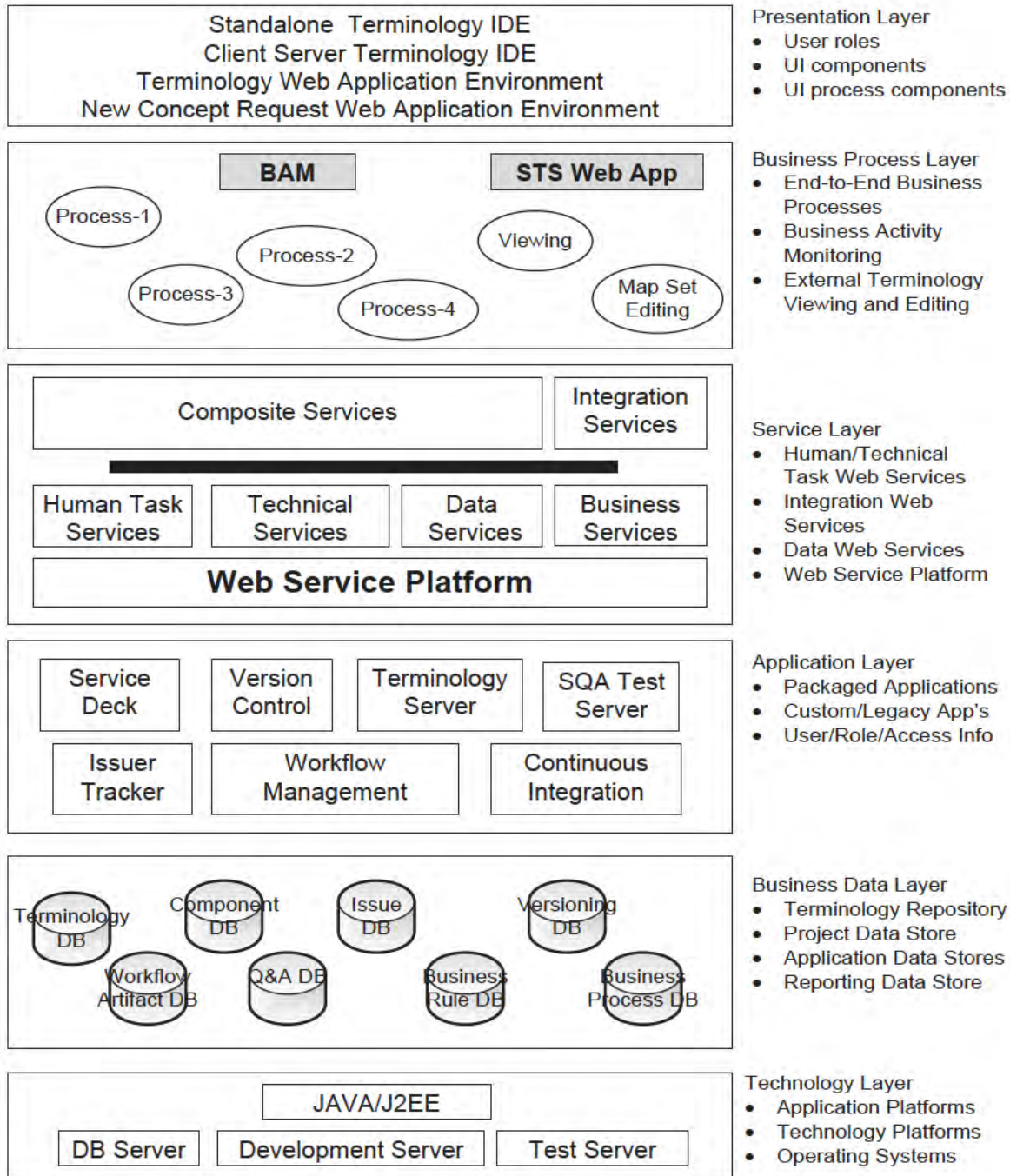


Figure 12: Software Architecture

4.3. Network Architecture (Server)

The following figure, Network Architecture Diagram specifies the physical components of the network and depicts their functional organization and configuration. Both development servers and SQA testing or preproduction servers are configured to be distributed within the VA network. They are N-Tier web applications to serve both VA organizational users and external organizational users.

The network architecture characterizes distributed computing where the participating nodes hold applications of many kinds that can be deployed in different locations of the VA network. The number of development and preproduction servers and their detailed specifications, are not predetermined, but can be scaled out to maintain required capacity and performance, to satisfy the operational principles and procedures.

Routine operations include: content transfer between the development repository server and the backup database server and between the repository server and preproduction servers.

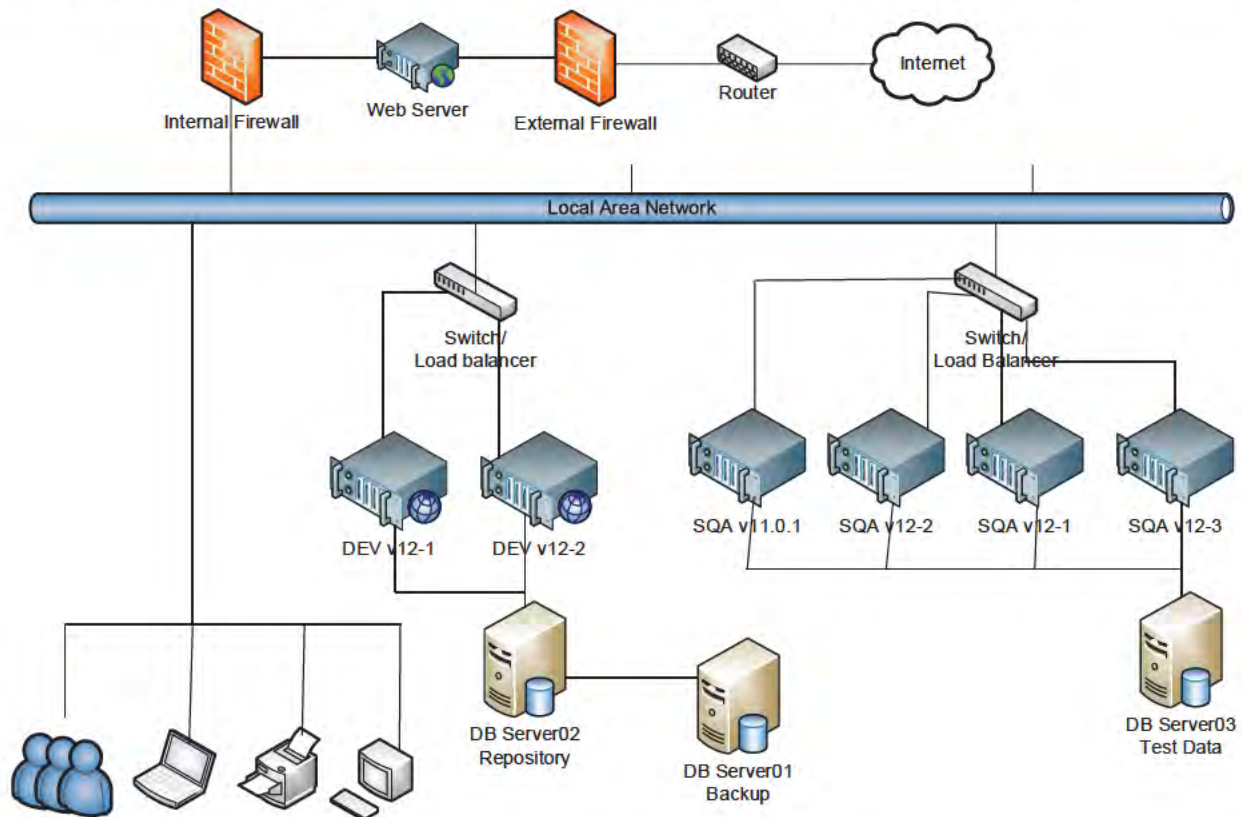


Figure 13: Network Architecture Diagram

4.4. Service Oriented Architecture/ESS (Tooling)

The following figure shows the Service Oriented Architecture.

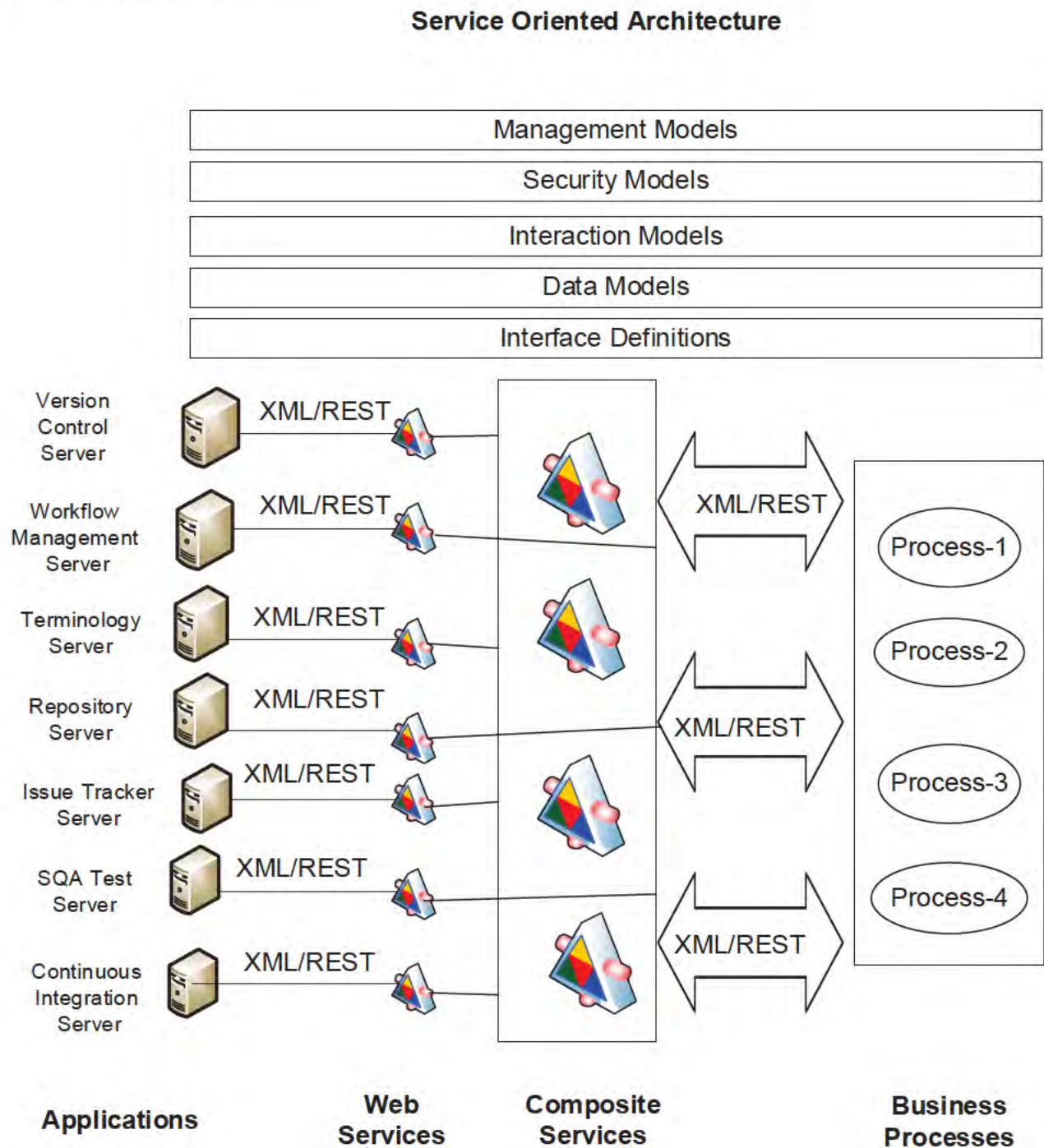


Figure 14: Service Oriented Architecture

There will be two enterprise shared services which will be providing:

- Workflow Management
- WS-Human Task

PRISME will provide a workflow management service that is based on the BPMN 2.0 specifications and supports the entire life cycle of the business process (from authoring through execution, to monitoring, and management). Java Business Process Model (jBPM) is an open-source (Apache 2) prototypical example of such a workflow management service.

The Workflow Management Service shall provide Web Services-Human Task (WS-Human Task) management capabilities that include the ability to define the type of task, the priority of the task, the data associated with the task, and the ability to assign a task to an individual or a group.

There may be web services needed in order to integrate BPM, Issue Tracker, and Continuous Integration. When the services are decided, these will be the consumed web services.

4.5. Enterprise Architecture (Tooling)

CTT&DM shall be in full compliance with the Product Development (PD) software engineering One-VA Technical Reference Model (TRM). In the table below are the list of One-VA TRM approved, and/or approved w/ constraints, decisions for technology and standards.

Table 23: CTT&DM TRM – Technology

Technology	Decision	Constraints (if Applicable)	Approved Date	Release #
J2EE Server	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	11/30/2014	4.1.X
Oracle	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	3/12/2015	Current VA Version
Jenkins	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	1/20/2015	1.597
Sonatype Nexus	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and	6.02.2015	2.11

Technology	Decision	Constraints (if Applicable)	Approved Date	Release #
		future security vulnerabilities.		
jBPM	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	1/23/2015	6.1
Sonarqube	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	4/2/2015	5.1
jQuery	Approved	Technology must remain patched and operated in accordance with Fedral and Department security policies and guidelines in order to mitigate known and future security vulnerabilities.	5/12/2015	2.1.X
GIT	Unapproved	(Requesting a TRM update or waiver.)		
JIRA	Unapproved	(Requesting an TRM update or waiver.)		

Table 24: CTT&DM TRM – Standards

Standard	Decision	Constraints (if Applicable)	Approved Date	Release
HTML 5	Approved w/Constraints Planning/Evaluation Constraint	<p>1. Use of HTML 5 is limited to internal VA websites for evaluation use only and must continue to be 508 accessible and produce error-free functionality when using VA common desktop configuration. The HTML 4.01 version will remain the official version of HTML supported in VA at this time.</p> <p>2. This entry is currently being evaluated, reviewed, and tested in controlled environments. Use of this technology is strictly controlled and</p>	12/31/2013	5.0 CR

Standard	Decision	Constraints (if Applicable)	Approved Date	Release
		not available for use within the general population.		
Ruby	Approved w/Constraints	Projects using this technology should employ a Test-Driven development model, and allow sufficient time to the functional testing phase to ensure adequate testing of dynamic typing.	4/4/2014	2.1.0
Java SE	Approved		11/30/2014	8
Scalable Vector Graphics (SVG)	Approved		3/30/2015	1.1 2nd Edition
Xquery	Approved		4/29/2015	3.0
JavaScript	Approved		10/31/2014	Edition 5.1
Java EE	Approved		10/31/2014	7
OWL 2	Approved		5/23/2014	2
HL7	Approved w/Constraints	<p>Please contact Veterans Health Administration (VHA), Chief Health Informatics Officer (CHIO) Standards & Interoperability prior to implementation to obtain guidance and the VHA-endorsed version of this standard.</p> <p>This entry is currently being evaluated, reviewed, and tested in controlled environments. Use of this technology is strictly controlled and not available for use within the general population.</p>		
BPMN	Approved		8/27/2014	2.0
Logical	Approved	Please contact VHA, CHIO	6/17/2014	2.4

Standard	Decision	Constraints (if Applicable)	Approved Date	Release
Observation Identifier Names and Codes (LOINC)	w/Constraints	Standards & Interoperability prior to implementation to obtain guidance and the VHA-endorsed version of this standard.		
Systematized Nomenclature of Medicine – Clinical Terminology (SNOMED – CT)	Approved w/Constraints	Please contact the VHA Office of Standards & Interoperability (S&I) (Mail group: VHA S&I Response Team) prior to implementation to obtain guidance and the VHA-endorsed version of this standard.	4/7/2015	January 2014
Unix	Approved		3/31/2014	3
CSS	Approved		10/31/2014	2.1

5. Data Design

This section defines the overall data and data management systems. CTT&DM is a system of systems, many of which have their own data management systems. This section identifies the data between systems and databases that the systems will operate on. To identify the data and database management systems, we apply dataflow diagram (DFD) techniques to define major data and their flows as well as functions processing the data.

The DFD Level 0, shown in Figure 14, and the DFD Level 1, shown in the following figures, display a graphical representation of the "flow" of data through the CTT&DM system from its process aspects. These figures show what kind of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It visualizes the data processing from which we identify data stores. Eight data stores are identified as eight databases.

The DFD is derived from the data CTT&DM will need to process, where they are coming from, and where the processed data will flow into. The DFD proposes what functions are needed in order to process the data as required. The data aspect of the DFD is derived from the Tooling BRD while the functional aspect is derived from Section 2.2, Overview of the Business Process, and shows the functional business model. We use four functional groups as elements of the Level 0 DFD and use the thirteen identified functions as the elements of the Level 1 DFD. The Level 2 DFD is necessary, but we limited our scope of this project at the Level 1 DFD.

The DFDs are condensed representations of functions and data and their interaction with CTT&DM. The CTT&DM DFD merely represents information contained in the Tooling BRD

into a new form understandable by development staff. The information in the Tooling BRD is not assumed to be complete, but it does contain sufficient information to diagram data flows. Therefore, the understanding of the DFD Level 0 and Level 1 requires a necessary understanding of the Tooling BRD and the statements of the problem. The DFD merely represents the problem in a new form. The prerequisites of the DFD audience are to have a clear understanding of the problem, which requires reading the Tooling BRD. Without a clear understanding of the BRD, it will be difficult to understand the DFD.

The purpose of the DFD is to represent the problem into technical drawings so that development can proceed. The drawings condense large amounts of the problem information into pictures. To accomplish this, it applies significant abstraction skill to filter out the detailed information to capture the whole picture. The purpose of the DFD is not to educate readers as to what the problem is. Readers of the DFD are assumed to already have ample understanding of the problem, that is, the readers are assumed to have already read and understood the Tooling BRD and RSD.

The DFD of CTT&DM represents the problem rather than a solution in three dimensions: 1) data source, sink, and flows; 2) system and subsystems' boundaries to differentiate what are parts of the system from those that are not; 3) functions at different levels necessary to process the data. We will provide a brief overview below of five Level-0 and Level-1 diagrams by giving detailed explanation on the functions and data in each DFD diagram.

CTT&DM DFD Level 0

The CTT&DM is split into four functional groups: project management, terminology development, support, and publication according to Section 2.2, Overview of the Business Process. The four groups are the four functions at Level 0 which defines the boundary of the CTT&DM system. Functions outside of the four functional groups are outside of the CTT&DM boundary. The four functional groups entail all business functional requirements documented in the Tooling BRD. The table below describes the allocation of business functional requirements to the four groups.

Table 25: Functional Groupings

Function	Definition
Project Management	5.1.1 Workflow Management Service 5.1.2 Identity and Access Management Service 5.1.4 Tracker Service 5.1.9 Project Creation Application 5.2.22 Workflow
Terminology Development	5.1.6 Version Control Service 5.1.8 Continuous Integration Service 5.2.1 Status Time Author Module Path (STAMP) Versioning Component Database 5.2.2 Taxonomy Viewing 5.2.4-8 Query Capabilities; Reference set Capabilities; Document Generation Capabilities; Scripting Capabilities; Description Logic 5.2.11 Template-Based Modeling

Function	Definition
	5.2.14-19 Interview Driven Modeling; Steal Pieces and Re-use in a New Model; Rules Driven Modeling 5.2.21 Context-sensitive help 5.2.24-25 Additional Considerations; Server Requirements 5.5.4 XML Transforms
Support	5.1.3 Artifact Repository Service 5.1.5 Service Desk 5.1.7 Quality Management 5.2.3 Component Request Service 5.2.9. Mapping Capabilities 5.2.10 Browse a Set of Approved, Suggested, or Similar Models 5.2.12-13 Modify Existing; Specialize From Existing; 5.2.20 Human consults 5.2.23 Quality Assurance 5.3.4 New Concept Request Application
Release and Publication	5.5.1 Terminology Releases from Standards Development Organizations (SDO) 5.5.2 Terminology Releases from Knowledge Sharing Partners 5.5.3 Clinical Decision Support (CDS) and Knowledge Related Artifacts 5.6 Outputs from System 5.6.1 Publishing Output Content (VETS)

There are three kinds of data entering and leaving the CTT&DM system. They are listed below:

1. Terminology data that is further broken down into three kinds:
 - VA's internal terminology standard (VHAT);
 - Map Sets, which map between concepts in different terminologies; and
 - Standard Code Systems (SCS) which are terminologies, developed by Standards Development Organizations, such as SNOMED CT, ICD-10, and LOINC.
2. Project artifacts that are published and made accessible to other organizations and project artifacts made by other organizations are made accessible to CTT&DM.
3. Components, new terms added to one of the SCS Systems, new CDS or Knowledge Artifacts, new automation rules for scripting the behavior of an application, new rules for confirming the quality or correctness of an editing action, or batch quality assurance and related components managed as part of the ETS. The components may be from external standard organizations such as SNOMED.

There are three kinds of external entities that are data sources and data sinks.

1. External consumers including SDO, the NLM US realm/NLM, Healthcare and Health IT partners and other authoritative sources.
2. Knowledge sharing partners that create and publish terminologies.

3. VistA organizations that create NTRR requests and receive terminology releases

In the Level 0 DFD diagram, the starting point is VistA organizations entering VA terminology requests and Map Set requests into project management function, that create projects for terminology development. The developed new terminologies are then released, or published, into all three kinds of external entities.

Project artifacts are produced and acquired by external organizations, such as knowledge sharing partners. Project artifacts created by knowledge sharing partners, flow into the system as needed. Components enter into the system upon request and Virtual User Input Devices (VUIDs) are assigned through the function of Import, Export, and Publish.

DFD diagrams at Level 1 are self-explanatory once the Level 0 diagram is understood. We briefly describe DFD diagrams at Level 1.

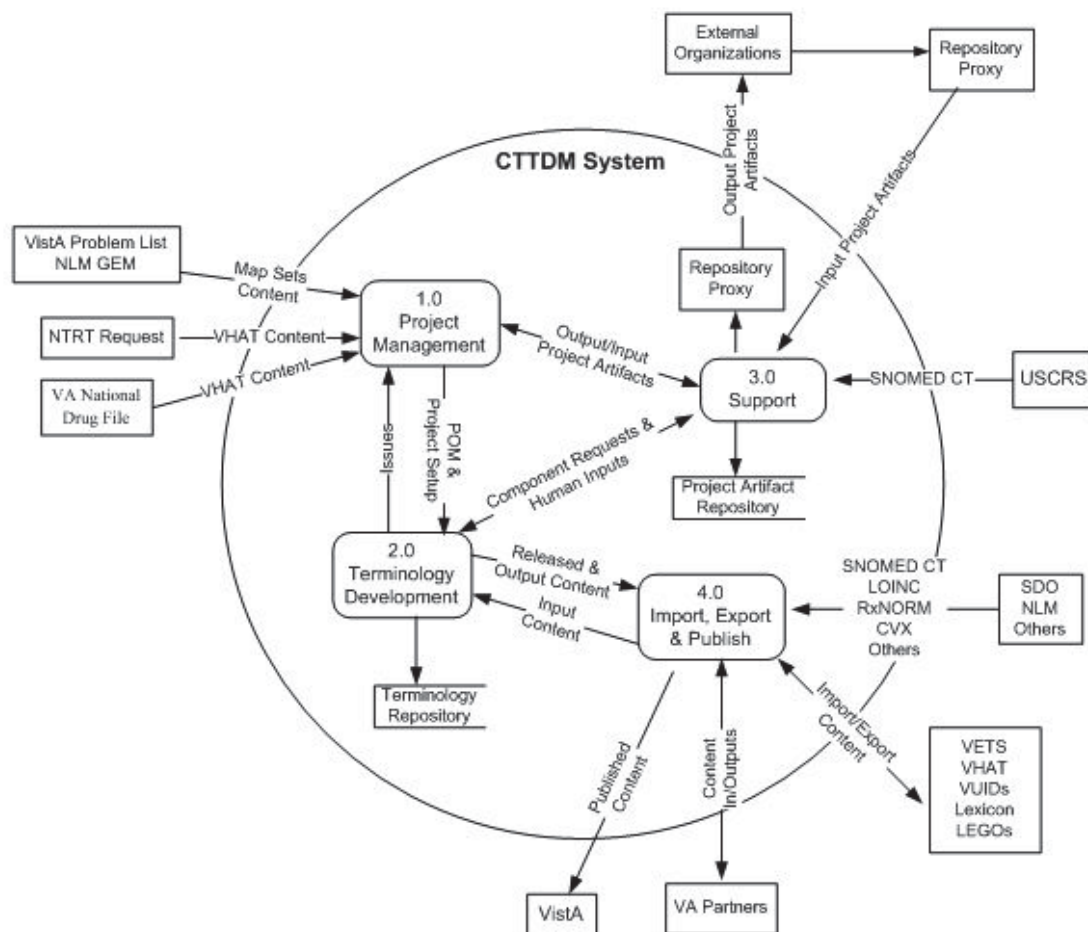


Figure 15: CTT&DM DFD Level 0

Project Management 1.0

This function contains three functions at the next level: project creation, workflow management, and issue tracking. There are five data inputs and two data outputs consistent with the Level 0 DFD. There are three data stores in this function: issue DB, business rule DB, and business process DB.

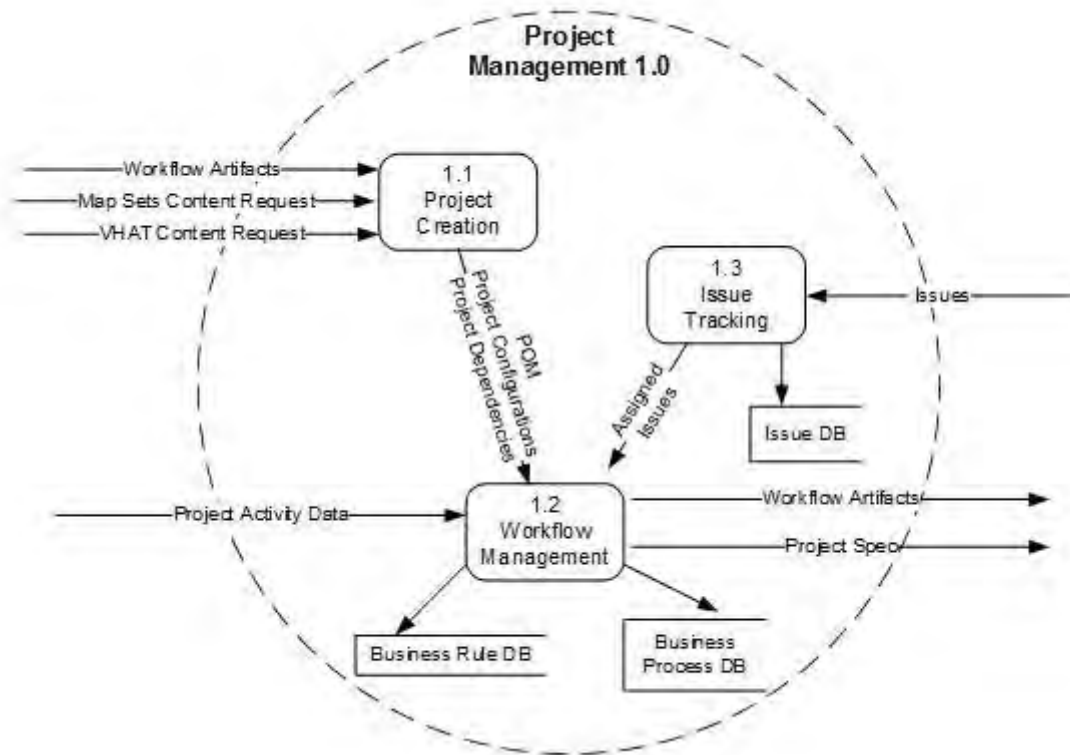


Figure 16: CTT&DM Project Management Level 1 DFD

Terminology Development 2.0

This function contains four functions at the next level and two data stores. The four functions are new concept creation, version control, continuous integration, and SQA test. The two data stores are terminology database (DB) and versioning DB. Data inputs and exports are consistent with the Level 0 DFD.

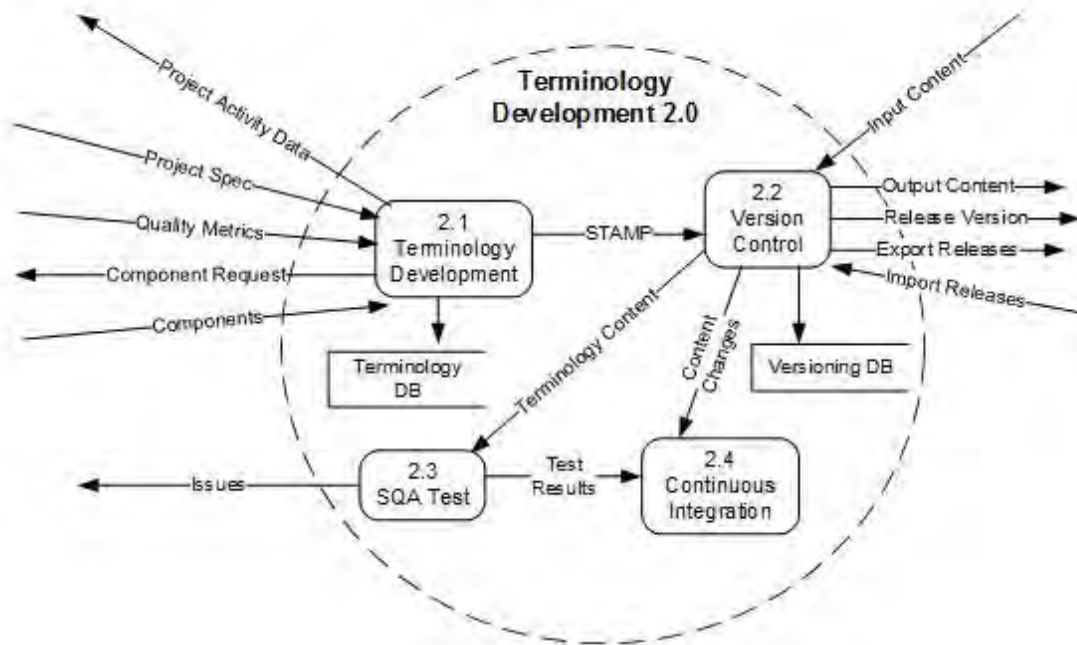


Figure 17: CTT&DM Terminology Development Level 1 DFD

Support 3.0

This function contains four functions at the next level and three data stores. The four functions are the component request service, artifacts repository service, quality management, and service desk. The three data stores are component, project artifacts, and Q&A databases. Data coming and leaving the function are consistent with the Level 0 DFD.

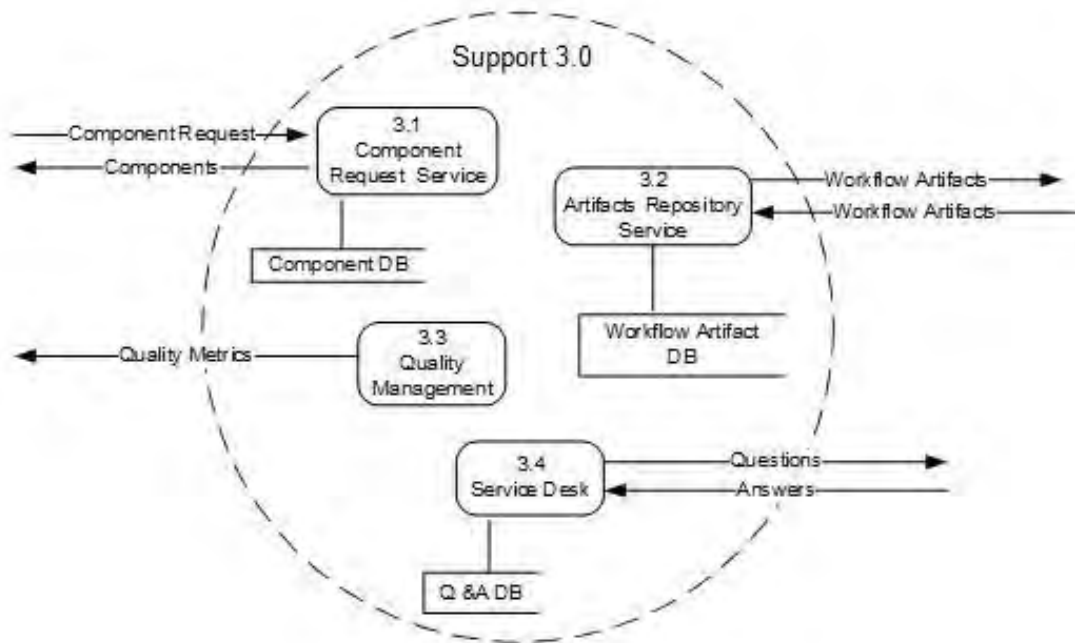


Figure 18: CTT&DM Support Level 1 DFD

Release and Publish 4.0

This function contains two functions at the next level: import & export and release & publish. Data coming in and leaving the function are consistent with the DFD Level 0.

In summary, data flow diagrams are process models partially describing the system that exists and the system that is required. The model shows what is currently being done with the information that is entering the system. The process model does not show how the information is organized but, act as a focus for discussion between the developer and the user, to determine what the new system should be able to do. The models will also provide a measure during testing to see if the system produced does do what was promised. Typically, the processes shown on a DFD will in some way translate into screen designs in the final system. For example, a process on a DFD may evolve as a menu item that when clicked, opens in a window to allow data input, output, or simply review.

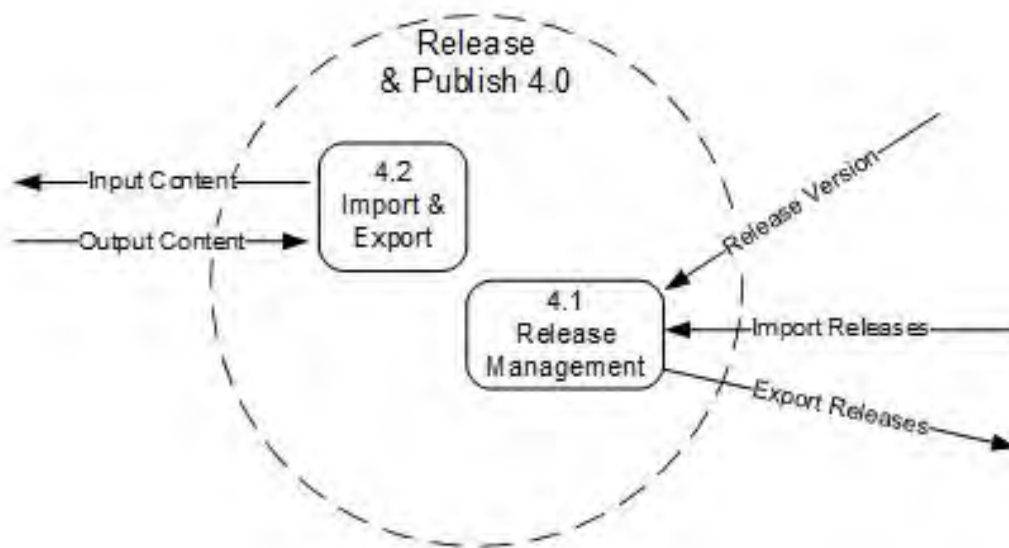


Figure 19: Release and Publish Level 1 DFD

5.1. Data Base Management System (DBMS) Files

Some databases are embedded in commercial-off-the-shelf (COTS) systems, and others are used for different things. The following database servers have their own database management capabilities: Issue tracking system, continuous integration server, and JIRA. Hudson, Jenkins, and Bamboo all have their own data repository. Bamboo is interfaced with a JDBC driver, and can hook up with SQL. Artifact repositories use a hybrid approach, have multiple ways to manage a system, and interface through Java database connectivity (JDBC). The Mongo database is used for mobile applications. The Version Control Service shall have the necessary storage, configuration, and bandwidth to support version control of large textual data sources, such as a complete history of all Systematized Nomenclature of Medicine (SNOMED) release files (Systematized Nomenclature of Medicine Clinical Terms [SNOMED CT] is released biannually, and the data files of the release are ~1.3 GB, compressible to ~200 MB).

The capability to update versions will come in due time. Every object has STAMP versioning, but there are not normalized tables for the logical design. DBMS schemas, subschemas, records, sets, tables, and storage page sizes come from the relationship records. The access methods are indexed, sequentially, and random access. The estimated database file size including overhead resulting from access methods and free space is 2-5 GB. The estimation on the number of transactions that the database may have to process is as follows

- In the editing environment, there are five commits per author, per hour, which comes to a commit every four minutes.
- The run time environment will need to be discussed more and is to be determined (TBD).

5.2. Data View

CTT&DM is a distributed system integrating several systems. These systems are either embedded or SaaS systems integrated through SOA architecture. Many of these systems have their own databases. Below are eight databases and their relationships identified for the CTT&DM system.

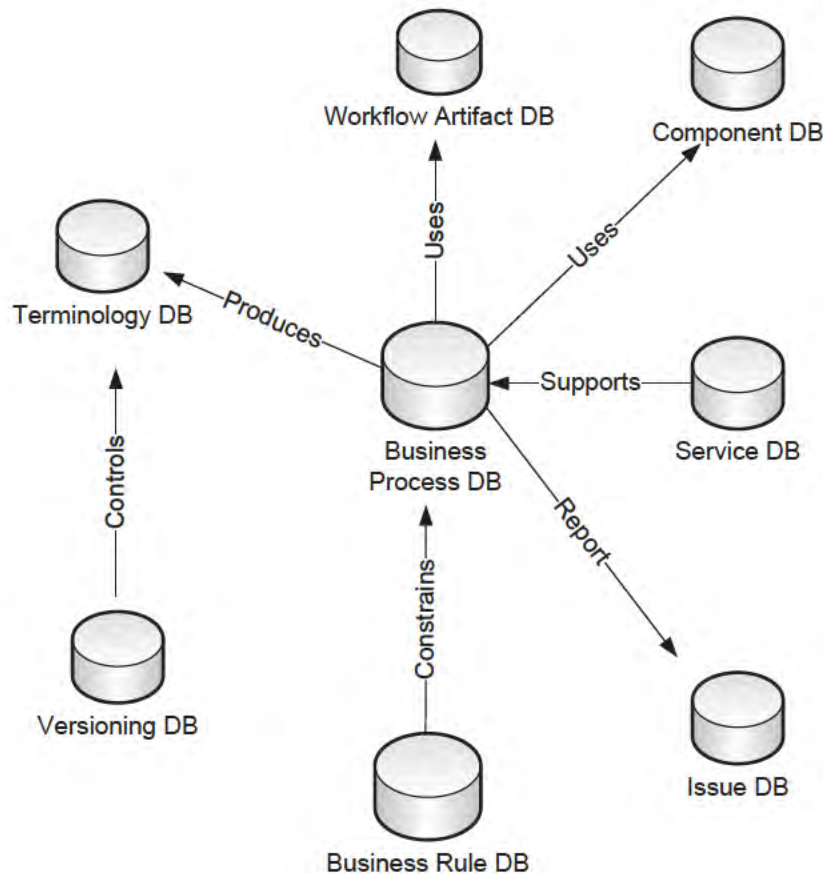


Figure 20: Data View

6. Detailed Design

The system shall be developed using an open source, non-Windows-dependent architecture. The system servers shall employ servers that include, but are not limited to: an Application Server, Continuous Terminology Server, Database Server, and a Versioning Control Database Server.

The application server is a platform for developing and deploying multitier distributed Enterprise Collaborative Terminology Tooling that will be centralized on an integrated server which will utilize technologies, such as caching and connection pooling, to improve resource use and application performance, as well as other components/tools for improved performance. The application server shall provide the following features/functionality:

- Shall be developed on a J2EE Platform.
- Shall be developed on a Non-Windows Dependent OS.
- Shall be developed using XML technologies. XML describes the content and structure of data in a document and is an industry standard for delivering content on the Internet. Typically, XML is used as the data exchange format between J2EE applications and client applications, or between components of a J2EE application.
- Server shall support Web browsers and other clients that use HTTP/HTTPS.

- Server shall support most commonly used Web browsers; such as Windows, Chrome, and Mozilla Firefox, as well as mobile devices such as IOS and Android.
- Server provides a platform for deploying Web services as components of a heterogeneous distributed application. Web services use a cross-platform, cross-language data model (XML), to provide interoperability among application components on diverse hardware and software platforms.
- The web application components of the system shall support 5,000 registered users, and 600 concurrent users.
- Server shall provide Enterprise scalability.
- Servers shall have a minimum capacity of 1.2 TB, 10-15K rpm or Solid State Disk (SSD), 24 GB RAM (48 GB recommended). The servers shall have a minimum of six CPU cores available for concurrent processing with 12 CPU cores preferred; Intel Xeon E5, 3.0 GHZ, six core processors is a prototypical example, equivalent or better performance to prototypical example, would be acceptable.

6.1. Hardware Detailed Design

This section provides the hardware design specifications for the development and the user acceptance testing (UAT) environments. There are two development servers and two database servers for the development environment. There are four SQA test servers and one database server for the user acceptance testing environment. In the table below, the specifications for each of these nine machines are shown.

Table 26: Hardware Configuration Parameters for the Development and the UAT Environments

Environment	Function/ Application/ Operating System (OS)	Data Center	vCPUs	vCOREs	RAM (GB)	Disk OS/ Data (GB)
SQA Test Server (UAT)	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
SQA Test Server (UAT)	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
SQA Test Server (UAT)	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
SQA Test Server (UAT)	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
Database Server (UAT)	VMWare Platform Oracle 11g RHEL 6.2	AITC	1	2	16	100/ 400
Subtotal					80	2,500
Development Server	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
Development Server	VMWare Platform Weblogic 10.2.5 RHEL 6.2	AITC	1	2	16	100/ 400
Database Server (Dev)	VMWare Platform Oracle 11g RHEL 6.2	AITC	1	2	16	100/ 400
Database Server (Dev)	VMWare Platform Oracle 11g RHEL 6.2	AITC	1	2	16	100/ 400
Subtotal					64	2,000
Grand Total					192	4,500

Note that the disk storage specifies separate logical drives designated for use by the operating system and for system application data. The hardware configurations assume the use of virtual machines (VMs).

Table 27: Production System Components

System Component Query	Description
Racks	Racks NOT YET SPECIFIED. Note: The Linux servers mentioned in the table above are Virtual machines and running on an ESX VMware Farm.

6.2. Software Detailed Design

Details will be defined during the development cycle and are not applicable at this time.

6.2.1. Conceptual Design

The Conceptual Design for CTT&DM is defined above in Section 3.1, Conceptual Application Design.

Details will be defined for the Server during the development cycle and are not applicable at this time.

6.2.1.1. Product Perspective

The sections below will be explained in Section 6, Software Detailed Design.

Details will be defined for the Server during the development cycle and are not applicable at this time.

6.2.1.1.1. User Interfaces

Details will be defined for the Server during the development cycle and are not applicable at this time.

6.2.1.1.2. Hardware Interfaces

No special hardware devices are used within the application. The application can be accessed via standard web browsers.

6.2.1.1.3. Software Interfaces

All software interfaces are detailed in the CTT&DM RSD.

6.2.1.1.4. Communications Interfaces

System will be accessed both internally, within the VA, and via the public Internet. The system will support use of laptops and desktops. The users will be able to interact with the system via a web browser.

6.2.1.1.5. Memory Constraints

The system will be accessed both internally, within the VA, and via the public Internet. The system will support use of laptops and desktops. The users will be able to interact with the system via a web browser.

6.2.1.1.6. Special Operations

The only special operations required by the user are operations such as backup, recovery, and archiving. There won't be any use of external storage devices with the system. There won't be any additional hardening of the applications installed locally on the system.

6.2.1.2. Product Features

The product features are better described in the user manual.

6.2.1.3. User Characteristics

Users of the CTT&DM system server-side, are current users of the VETS application and will need any additional training, as necessary, when the system is implemented into the environment.

The CTT&DM system consists of users who perform the following tasks:

- The system integrates with VA business applications (as determined to be feasible) across heterogeneous environment and platforms.
- Author content
- Review and update functions performed by Domain Reviewers
- Deployment functions performed by Testing Coordinators and other authorized Deployers

6.2.1.4. Dependencies and Constraints

The following is a list of dependencies and constraints for the CTT&DM system.

- Regulatory policies
- Must run on UNIX OS and be able to run in concert with existing system components.
- The default platform for all software development beneath the presentation layer will be Oracle 64 bit Java 8 SE.
- Application is to be built on open-source architecture.
- Must be accessible over the public Internet.
- PRISME will provide a workflow management service that is based on the **Business Process Model and Notation (BPMN) 2.0**.
- The workflow management service engine must be able to run embedded within the default Java 8 Standard Edition (Java 8 SE) application platform.
- The default framework for all web application presentation layer development will be done in HTML5 markup, with JavaScript as the Document Object Model (DOM)

scripting language, and with support for high-resolution display devices. SVG images are the preferred means for scalable image representations to support high-resolution display devices. Alternatively, when SVG imagery is not appropriate, developers may use the image-set ([\(\) CSS capability](#)) for raster images.

- The default framework for all Java Rich Internet Application (RIA) development will be JavaFX 8.
- REST is the default architectural style for providing web services.
- [Apache Jersey 2.6](#) is the default framework for implementing web services.
- The Workflow Management Service shall publish workflow processes as Maven or Maven plug-in artifacts.
- The Version Control Service shall have storage, configuration, and bandwidth to support version control of large textual data sources, such as a complete history of all SNOMED release files (SNOMED CT is released biannually, and the data files of the release are ~1.3 GB, compressible to ~200 MB).
- The rich client tools will support scripting using the Oracle Nashorn JavaScript libraries.
- High-performance stand-alone terminology editing environment, deployed as a [Java Web Start](#) rich internet application able to efficiently run on a laptop computer.
- The Stand-alone Terminology Integrated Development Environment must support all the capabilities currently supported by the IHTSDO and ISAAC workbench.
- The system will be able to accept, process, integrate, and version electronic releases from terminology knowledge sharing partners.

6.2.2. Specific Requirements

Specific requirements are defined in the “To-Be” Requirements. The traceability requirements are detailed above in Section 2.3, Overview of the Significant Requirements.

6.2.2.1. Database Repository

The database used to house the current terminology content is VETS. There is no determination as to the proposed logical database design of the CTT&DM. The following figure is a diagram of the database repository.

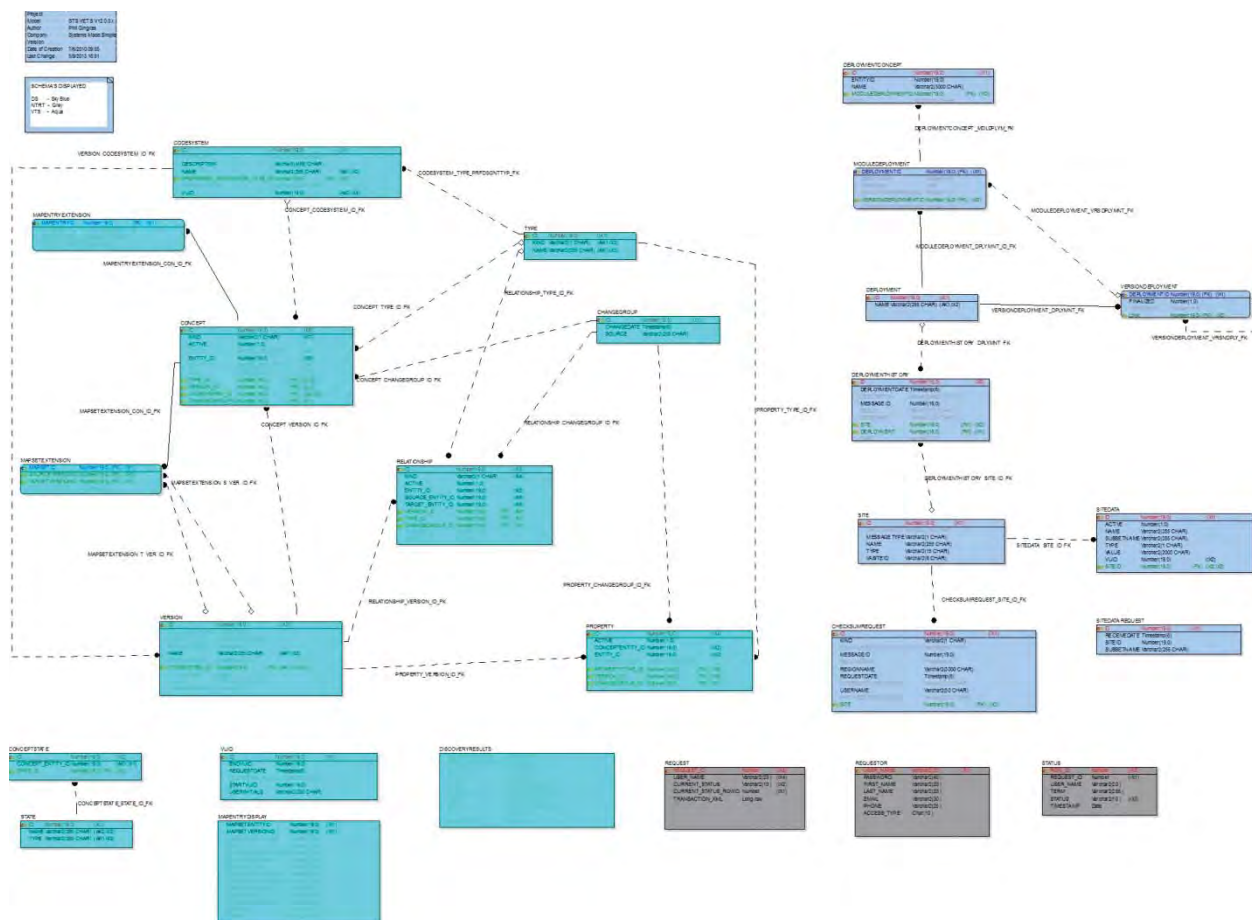


Figure 21: Database Repository Diagram

6.2.2.2. System Features

The proposed system features of the CTT&DM server are described in the list below:

- Terminology Server (Runtime Service) – Provides programmatic access to terminology content.
- Continuous Integration Server - Provides the ability to manage the developmental workflow by providing an automated process.
- Artifact/Project Repository – Provides the ability to apply version control and share common libraries.
- Version/ Source Control - Provides a distributed version control system, where clinical terminologists will have the ability to work on the same terminology/project at the same time. Version control will be provided for all CTT&DM content. Each file will be tracked, any modifications made, additions, deletions, or movement of files will receive a version number upon commit.
- Workflow Management and Rules Engine - Supports the business life cycle from authoring, through publication, of terminology content, to monitoring and management – utilizing a workflow management and rules engine.

- Component Request Service - Provides the ability to allow users to enter modification requests for terminology that can be tracked and managed globally.
- Quality Management - Provides continuous inspection of content quality utilizing business rules from local validation, through release validation.
- Database Server - The server will provide storage, the ability to manipulate data, archiving, and versioning. All changes made to the database will be tracked.

6.2.2.3. Design Element Tables

Not Applicable – CTT&DM is not a VistA package.

6.2.2.3.1. Routines (Entry Points)

Not Applicable – CTT&DM is not a VistA package.

Table 28: Routines (Instructions)

Routines	Instructions
Routine Name	N/A
Enhancement Category	N/A
RTM	N/A
Related Options	N/A
Related Routines	N/A
Data Dictionary (DD) References	N/A
Related Protocols	N/A
Related Integration Control Registrations (ICRs)	N/A
Data Passing	N/A
Input Attribute Name and Definition	N/A
Output Attribute Name and Definition	N/A
Current Logic	N/A
Modified Logic (Changes are in bold)	N/A

Table 29 (Grouping): Routines

Routines	Activities
----------	------------

Routine Name	N/A
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
RTM	N/A
Related Options	N/A

Related Routines	Routines “Called By”	Routines “Called”
	N/A	N/A

Routines	Activities
Data Dictionary (DD) References	N/A
Related Protocols	N/A
Related Integration Control Registrations (ICRs)	N/A
Data Passing	<input type="checkbox"/> Input <input type="checkbox"/> Output Reference <input type="checkbox"/> Both <input type="checkbox"/> Global Reference <input type="checkbox"/> Local
Input Attribute Name and Definition	Name: Definition:
Output Attribute Name and Definition	Name: Definition:

Current Logic
N/A

Modified Logic (Changes are in bold)
N/A

6.2.2.3.2. Templates

Not Applicable – CTT&DM is not a VistA package

Table 30: Templates (Instructions)

Templates	Instructions
Template Name	N/A
Enhancement Category	N/A
RSD Traceability	N/A

Templates	Instructions
Template Type	N/A
Related Options	N/A
Related Routines	N/A
Data Dictionary (DD) References	N/A
Global References	N/A

Table 31 (Grouping): Templates

Templates	Description
Template Name	N/A
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
RSD	N/A
Template Type	<input type="checkbox"/> Sort <input type="checkbox"/> Input <input type="checkbox"/> Print <input type="checkbox"/> Other
Related Options	N/A

Related Routines	Routines “Called By”	Routines “Called”
N/A	N/A	N/A

Routines	Description
Data Dictionary (DD) References	N/A
Global References	N/A

6.2.2.3.3. Bulletins

Not Applicable – CTT&DM is not a VistA package

Table 32: Bulletins (Instructions)

Bulletins	Instructions
Bulletin Name	N/A
Enhancement Category	N/A
RTM	N/A
Related Options	N/A
Related Routines	N/A
Mail Subject	N/A

Mail Group	N/A
Parameters	N/A
Data Dictionary (DD) References	N/A

Table 29 (Grouping): Bulletins

Bulletins	Description
Bulletin Name	N/A
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
RTM	N/A

Related Routines	Routines “Called By”	Routines “Called”
N/A	N/A	N/A

Routines	Description
Mail Subject	N/A
Mail Group	N/A
Parameters	N/A
Data Dictionary (DD) References	N/A

6.2.2.3.4. Data Entries Affected by the Design

Not Applicable – CTT&DM is not a VistA package

Table 33: Data Entries Affected by the Design

Field Name	Current Value	New Value
N/A	N/A	N/A

6.2.2.3.5. Unique Record(s)

No unique records have been identified at this time.

Table 34: Unique Record ID

Field Name(s)	Current Value	New Value
N/A	N/A	N/A

6.2.2.3.6. File or Global Size Changes

Not Applicable – CTT&DM is not a VistA package

Table 35: File or Global Size Changes

File/Global Name(s)	Estimated Increase	Estimated Decrease
N/A	N/A	N/A

6.2.2.3.7. Mail Groups

Not Applicable – CTT&DM is not a VistA package

Table 36: Mail Groups (Instructions)

Mail Groups	Instructions
Mail Group Name	N/A
Enhancement Category	N/A
Related Options	N/A
Related Routines	N/A
Data Dictionary (DDs) References	N/A
Related Protocols	N/A
Mail Group Description	N/A
Self-Enrollment Allowed	N/A
Type	N/A

Table 37 (Grouping): Mail Groups

Mail Groups	Activities
Mail Group Name	N/A
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Related Options	N/A

Related Routines	Routines “Called By”	Routines “Called”
N/A	N/A	N/A

Mail Groups	Instructions
Data Dictionary (DD) References	N/A
Related Protocols	N/A
Mail Group Description	N/A
Self-Enrollment Allowed	<input type="checkbox"/> Yes <input type="checkbox"/> No
Type	<input type="checkbox"/> Public <input type="checkbox"/> Private

6.2.2.3.8. Security Keys

Security Keys will be developed as development proceeds.

Table 38: Security Keys (Instructions)

Security Keys	Instructions
Security Key Name	TBD
Enhancement Category	TBD
Related Options	TBD
Related Routines	TBD
Data Passing	TBD
Security Key Description	TBD
Subordinate Keys	TBD
Mutually Exclusive Keys	TBD
Granting Condition Logic	TBD
Current Logic	TBD
Modified Logic (Changes are in bold)	TBD
Hierarchical Precedence	TBD

Table 39 (Grouping): Security Keys

Security Keys	Activities
Security Key Name	TB
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Related Options	TB

Related Routines	Routines "Called By"	Routines "Called"
TBD	TBD	TBD

Security Keys	Activities
Data Passing	<input type="checkbox"/> Input <input type="checkbox"/> Output <input type="checkbox"/> Both <input type="checkbox"/> Global Reference <input type="checkbox"/> Local Reference

Security Keys	Activities
Security Key Description	TBD
Subordinate Keys	TBD
Mutually Exclusive Keys	TBD
Granting Condition Logic	TBD

Current Logic
TBD

Modified Logic (Changes are in bold)
TBD

Security Keys	Activities
Hierarchical Precedence	TBD

6.2.2.3.9. Options

All Options will be captured directly from VA FileMan DDs after the fact.

Table 40: Options (Instructions)

Options	Instructions
Option Name (MENU TEXT field)	TBD
Enhancement Category	TBD
Associated Menu Options that will invoke this reference	TBD
Data Passing	TBD
Menu Text Description	TBD
Option Type	TBD
Option Definition	TBD
Current Entry Action Logic	TBD

Options	Instructions
Modified Entry Action Logic (Changes are in bold)	TBD
Current Exit Action Logic	TBD
Modified Exit Action Logic (Changes are in bold)	TBD

Table 41 (Grouping): Options

Options	Activities
Option Name	TBD
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Associated Menu Options that will invoke this reference	TBD
Data Passing	<input type="checkbox"/> Input <input type="checkbox"/> Output <input type="checkbox"/> Both <input type="checkbox"/> Global Reference <input type="checkbox"/> Local Reference
Menu Text Description	
Option Type	<input type="checkbox"/> Edit <input type="checkbox"/> Print <input type="checkbox"/> Menu <input type="checkbox"/> Inquire <input type="checkbox"/> Action <input type="checkbox"/> Run Routine <input type="checkbox"/> Other
Associated Routine	TBD
Option Definition	TBD

Current Entry Action Logic
TBD

Modified Entry Action Logic (Changes are in bold)
TBD

Current Exit Action Logic
TBD

Modified Exit Action Logic (Changes are in bold)
TBD

6.2.2.3.10. Protocols

All protocols will be captured directly from the VA FileMan DDs after the fact.

Table 42: Protocols (Instructions)

Protocols	Instructions
Protocol Name	TBD
Enhancement Category	TBD
Associated Protocols	TBD
Data Passing	TBD
Item Text Description	TBD
Protocol Type	TBD
Associated Routine	TBD
Current Entry Action Logic	TBD
Modified Entry Action Logic (Changes are in bold)	TBD
Current Exit Action Logic	TBD
Modified Exit Action Logic (Changes are in bold)	TBD

Table 43 (Grouping): Protocols

Protocols	Activities
Protocol Name	TBD
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Associated Protocols	TBD
Data Passing	<input type="checkbox"/> Input <input type="checkbox"/> Output <input type="checkbox"/> Both <input type="checkbox"/> Global Reference <input type="checkbox"/> Local Reference
Item Text Description	TBD
Protocol Type	<input type="checkbox"/> Action <input type="checkbox"/> Menu <input type="checkbox"/> Protocol <input type="checkbox"/> Protocol Menu <input type="checkbox"/> Limited Protocol <input type="checkbox"/> Extended Action <input type="checkbox"/> Dialog <input type="checkbox"/> Other
Associated Routine	TBD

Current Entry Action Logic
TBD

Modified Entry Action Logic (Changes are in bold)
TBD

Current Exit Action Logic
TBD

Modified Exit Action Logic (Changes are in bold)
TBD

6.2.2.3.11. Remote Procedure Call (RPC)

Any remote procedure calls will be captured directly from the VA FileMan Data Definitions (DDs) after the fact.

Table 44: RPCs (Instructions)

RPCs	Instructions
Name	TBD
TAG^RTN	TBD
Input Parameters	TBD
Results Array	TBD
Description	TBD

Table 45 (Grouping): RPCs

RPCs	Activities
Name	TBD
TAG^RTN	TBD
Input Parameters	TBD
Results Array	<input type="checkbox"/> Single Value <input type="checkbox"/> Array <input type="checkbox"/> Word Processing <input type="checkbox"/> Global Array <input type="checkbox"/> Global Instance
Description	TBD

6.2.2.3.12. Constants Defined in Interface

Table 46: Constants Defined in Interface

Name	Description
TBD	TBD

6.2.2.3.13. Variables Defined in Interface

No variables have been identified at this time.

Table 47: Variables Defined in Interface

Name	Type	Description
TBD	TBD	TBD

6.2.2.3.14. Types Defined in Interface

No types have been identified at this time.

Table 48: Types Defined in Interface

Name	Type	Description
TBD	TBD	TBD

6.2.2.3.15. GUI

Graphical User Interface (GUI) designs will be provided in Section 8.4, Navigation Hierarchy.

Table 49: GUI

Unit Name	Description
TBD	TBD

6.2.2.3.16. GUI Classes

No classes have been identified at this time.

Table 50: GUI Classes (Instructions)

GUI Classes	Instructions
Class Name	N/A
Derived From Class	N/A
Purpose	N/A

Table 51: GUI Classes

GUI Classes	Instructions
Class Name	N/A
Derived From Class	N/A
Purpose	N/A

6.2.2.3.17. Current Form

Form layouts will be developed as development proceeds.

6.2.2.3.18. Modified Form

Form layouts will be developed as development proceeds.

6.2.2.3.19. Components on Form

Table 52: Components on Form

Name	Type	Description
TBD	TBD	TBD

6.2.2.3.20. Events

Table 53: Events

Name	Type	Description
TBD	TBD	TBD

6.2.2.3.21. Methods

Table 54: Methods

Method Name	Procedure/Function	Description
TBD	TBD	TBD

6.2.2.3.22. Special References

Special Reference will be developed as development proceeds.

Table 55: Special References

Special Reference Name	Type	Description
TBD	TBD	TBD

6.2.2.3.23. Class Events

Class Event will be developed as development proceeds.

Table 56: Class Events

Name	Type	Description
TBD	TBD	TBD

6.2.2.3.24. Class Methods

TBD as development proceeds

Table 57: Class Methods

Name	Procedure/Function	Description
TBD	TBD	TBD

6.2.2.3.25. Class Properties

TBD as development proceeds

Table 58: Class Properties

Class Properties Name	Type	Visibility	Description
TBD	TBD	TBD	TBD

6.2.2.3.26. Uses Clause

Details will be defined during the development cycle and are not applicable at this time.

6.2.2.3.27. Forms

Details will be defined during the development cycle and are not applicable at this time.

Table 59: Forms (Instructions)

Forms	Instructions
Form Name	TBD
Enhancement Category	TBD
Form Functionality	TBD
Current Form Layout	TBD
Modified Form Layout (Changes are in bold)	TBD

Table 60 (Grouping): Forms

Forms	Description
Form Name	TBD
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Form Functionality	TBD

Current Form Layout
TBD

Modified Form Layout (Changes are in bold)
TBD

6.2.2.3.28. Functions

Details will be defined during the development cycle and are not applicable at this time.

Table 61: Functions (Instructions)

Functions	Instructions
Function Name	TBD
Short Description	TBD
Enhancement Category	TBD
Related Options	TBD
Related Routines	TBD
Data Dictionary (DD) References	TBD

Functions	Instructions
Related Protocols	TBD
Related Integration Control Registrations (ICRs)	TBD
Data Passing	TBD
Input Attribute Name and Definition	TBD
Output Attribute Name and Definition	TBD
Current Logic	TBD
Modified Logic (Changes are in bold)	TBD

Table 62 (Grouping): Functions

Function Name	Activities
Short Description	TBD
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Related Options	TBD

Related Routines	Routines "Called By"	Routines "Called"
TBD	TBD	TBD

Function Name	Activities
Data Dictionary (DD) References	TBD
Related Protocols	TBD
Related Integration Control Registrations (ICRs)	TBD
Data Passing	<input type="checkbox"/> Input <input type="checkbox"/> Output <input type="checkbox"/> Both <input type="checkbox"/> Global Reference <input type="checkbox"/> Local Reference
Input Attribute	Name:

Function Name	Activities
Name and Definition	Definition:
Output Attribute Name and Definition	Name: Definition:

Current Logic
TBD

Modified Logic (Changes are in bold)
TBD

6.2.2.3.29. Dialog

Dialogs are described in the “To-Be” requirements and will be developed as development proceeds.

Table 63: Dialog (Instructions)

Dialog	Instructions
Dialog Message (Description)	TBD
Enhancement Category	TBD
Dialog Message (Description) Condition	TBD
Current Dialog Message (Description)	TBD
Modified Dialog Message (Description) (Changes are in bold)	TBD

Table 64 (Grouping): Dialog

Dialog	Instructions
Dialog Message (Description)	TBD
Enhancement Category	<input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Dialog Message (Description) Condition	TBD
Current Dialog Message (Description)	TBD

Dialog	Instructions
Modified Dialog Message (Description) (Changes are in bold)	TBD

6.2.2.3.30. Help Frame

Details will be defined during the development cycle and are not applicable at this time.

Table 65: Help Frame (Instructions)

Help Frame	Instructions
Help Frame Text	TBD
Enhancement Category	TBD
Help Frame Text Calling Mechanism	TBD
Current Help Frame Text	TBD
Modified Help Frame Text (Changes are in bold)	TBD

Table 66 (Grouping): Help Frame

Help Frame	Description
Help Frame Text	TBD
Enhancement Category	<input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change
Help Frame Text Calling Mechanism	TBD

Current Help Frame Text
TBD

Modified Help Frame Text (Changes are in bold)
TBD

6.2.2.3.31. HL7 Application Parameter

Details will be defined during the development cycle and are not applicable at this time.

Table 67: HL7 Application Parameter (Instructions)

HL7 Application Parameter	Instructions
HL7 Application Parameter Name	TBD
Enhancement Category	TBD

HL7 Application Parameter	Instructions
Application Status	TBD
Facility Name	TBD
Country Code	TBD
HL7 Field Separator	TBD
HL7 Encoding Characters	TBD
Mail Group	TBD

Table 68: HL7 Application Parameter

HL7 Application Parameter Name	Description			
Enhancement Category	<input type="checkbox"/> New	<input type="checkbox"/> Modify	<input type="checkbox"/> Delete	<input type="checkbox"/> No Change
Application Status	<input type="checkbox"/> Active	<input type="checkbox"/> Inactive	<input type="checkbox"/> Active	<input type="checkbox"/> Inactive
Enhancement Category	Current		Modified	
Facility Name	TBD		TBD	
Country Code	TBD		TBD	
HL7 Field Separator	TBD		TBD	
HL7 Encoding Characters	TBD		TBD	
Mail Group	TBD		TBD	

6.2.2.3.32. HL7 Logical Link

Table 69: HL7 Logical Link (Instructions)

HL7 Logical Link	Instructions
HL7 Logical Link Parameter (LLP) Name	TBD
Enhancement Category	TBD
Node	TBD
Institution	TBD
Domain	TBD
Autostart	TBD
Queue Size	TBD
LLP Type	TBD

Table 70: HL7 Logical Link

HL7 Logical Link	Description	
HL7 Logical Link Parameter Name	TBD	
Enhancement Category	<input type="checkbox"/> New <input type="checkbox"/> Modify <input type="checkbox"/> Delete <input type="checkbox"/> No Change	
Enhancement Category	Current	Modified
Node	TBD	TBD
Institution	TBD	TBD
Domain	TBD	TBD
Autostart	TBD	TBD
Queue Size	TBD	TBD
LLP Type	TBD	TBD

6.2.2.3.33. COTS Interface**Table 71: COTS Interface (Instructions)**

COTS Interface	Instructions
Communication Method	TBD
Application Interface	TBD

Table 72: COTS Interface

COTS Interface	Description
Communication Method	TBD
Application Interface	TBD

6.3. Network Detailed Design

The CTT&DM uses standard network devices such as routers, switches, firewalls, and load balancers implanted at AITC. Detailed specification on these network devices are not provided here. The discussion herein focuses on two types of content transfer: data backup and deployment from development environment to user acceptance testing environment.

There are two major types of content transfers between servers: backup enterprise data from terminology development server to backup database server and data from development environment to pre-production or test environment. Policies of both data backup policy and content transfer are needed to minimize the disruption of operations.

6.4. Security and Privacy

6.4.1. Security

The CTT&DM will adhere to all VA security requirements in accordance to VA Directive and Handbook 6500, Federal Information Processing Standard (FIPS) 199 and National Institute of Standards and Technology (NIST) SP 800-60, recommended Security Categorization. CTT&DM will be housed at the Austin Information Technology Center (AITC), and information security controls are covered under the AITC General Support System (GSS). A continuous monitoring plan has been implemented which reviews key security controls for regular and continuous monitoring.

The CTT&DM Security Categorization will drive the initial set of moderate security controls required for the information system. Minimum security control requirements are addressed in NIST SP 800-53 Revision 4 and VA Handbook 6500, March 2015, Appendix C: (References), Appendix E: (VA System Privacy Controls), Appendix F: (VA System Security Controls).

6.4.2. Privacy

Protecting the privacy of data that CTT&DM will be managing whether it is transactional, unstructured, or meta-data is of utmost importance to the system design and functionality, and there are both privacy and data security constraints that should be addressed in accordance with VA directives and Health Insurance Portability and Accountability Act (HIPAA).

The CTT&DM will adhere to all proposed VA Privacy requirements and controls, Identity Management and Security requirements including VA Handbook 6500, March 2015, Appendix C: (References), Appendix E: (VA System Privacy Controls), and NIST SP 800-53 Revision 4 Privacy Controls. Efforts that involve the collection and maintenance of Personal Identifiable Information (PII) and/or Protected Health Information (PHI) must be covered by a Privacy Act system of records notice.

6.5. Service Oriented Architecture/ESS Detailed Design

CTT&DM uses standard network devices such as routers, switches, firewalls, and load balancers implanted at AITC. Detailed specifications for these network devices are not provided here. The discussion herein focuses on two types of content transfer:

1. Data backup.
2. Deployment from development environment to user acceptance testing environment.

There are two major types of content transfer between servers:

1. Backup enterprise data from terminology development server to backup database server.
2. Data from development environment to preproduction or test environment.

Policies governing both data backup and content transfer are needed to minimize the disruption of operations.

The Data Backup Flow Diagram is depicted in the figure below and shows the basic data flow during typical data backup operations.

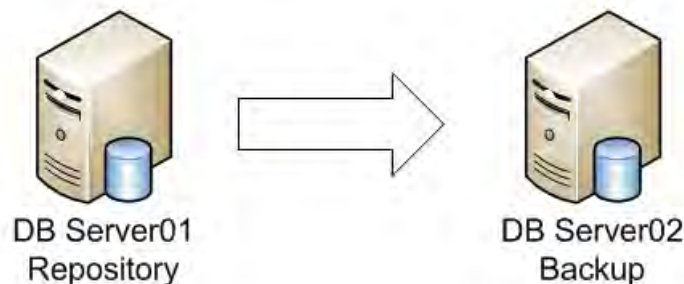


Figure 22: Data Backup Flow Diagram

The growth of data volumes necessitates an efficient approach to data backup and recovery. For any organization that is highly dependent on Information Technology (IT), backup and maintenance of data for servers, are critical factors for its viability and operations. It is essential that certain basic standard practices be followed to ensure that data files are backed up on a regular basis.

The Systems Support team ensures that all backups are completed successfully and reviews the backup process on all servers daily. Logs are maintained to verify the amount of data backed up and the unsuccessful backup occurrences. Once the new developed system is in place, backup procedures will be relatively the same.

Backup Content

The content of data backed up varies from server to server. The primary data that will be backed up are XML files designated to be backed up in the background as a task to be done on a regular basis. Data to be backed up will be listed by location and specified data sources. This will be stipulated in a separate document called the "Data Sources Manifest". Because it is impractical for the Systems Support to backup every bit of data stored on the servers, the only data that

Systems Support accepts responsibility for is the data which is explicitly listed in the “Data Source Manifest”.

Backup Types

Backup of servers may occur every day after regular business hours or backups may occur per other regularly scheduled backup plan. Three types of backup are listed below:

- **Full backup.** Includes all the source files. This method ignores the file's archive bit until after the file is backed up. At the end of the job, all files that have been backed up have their archive bits turned off. Only one full backup will be done per week, followed by differential and/or incremental.
- **Differential backup.** Includes files that have been changed since the last Full (Clear Archive Bit) or Incremental backup. If the archive bit is on, the file is backed up and the archive bit is not turned off. The next time an incremental backup is done, this file is skipped (unless it has been modified again).
- **Incremental backup.** Includes only files that have changed since the last Full (Clear Archive Bit) or Incremental backup. The next time an incremental backup is done, this file is skipped (unless it has been modified again).

Daily backups take place on a five-day rotation. Weekly backups take place on a five-week rotation. Monthly backups of high availability servers occur the last calendar day of the month and are on a twelve-month rotation. Special backups may be made for longer retention periods during special situations, such as system upgrades and major projects.

6.5.1. Service Description for <Consumed Service Name>

Details will be defined during the development cycle and are not applicable at this time.

6.5.2. Service Design for <Provided Service Name>

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.1. Introduction

6.5.2.1.1. Purpose and Scope of Service

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.1.2. Links to Other Documents

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.2. Service Details

6.5.2.2.1. Service Identification

Details will be defined during the development cycle and are not applicable at this time.

Table 73: Service Attributes

Service Attribute	Value
Name and Alias (if any)	TBD
Overview	TBD
Version	TBD
Latest Status	TBD
Service Type	TBD
Architecture Layer	TBD
Business Domain	TBD
Service Domain	TBD
Business Organization and Owner	TBD
Technical Organization and Owner	TBD
Development Organization and Owner	TBD
Support Organization and Owner	TBD
Target Consumer Organization(s) and Owner(s)	TBD

6.5.2.2.2. Service Versions

Table 74: Service Versions

Version Numbers	Current Status of Version	A Brief Description of the change implemented in that version
TBD	TBD	TBD
TBD	TBD	TBD
TBD	TBD	TBD

6.5.2.2.3. Summary of Design and Platform Details

6.5.2.2.3.1. SOA Pattern(s) Implemented

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.2.3.2. COTS Platform Vendor Names and Versions for Hosting Platform

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.3. Dependencies

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4. Service Design Details

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1. Interface Technical Specs

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.1. Service Invocation Type

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.2. Service Interface Type

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.3. Service Name

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.4. Interface

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.5. End Points

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.1.6. Operations or Methods

Details will be defined during the development cycle and are not applicable at this time.

Table 75: Operation or Methods

Operation Name	Inputs	Outputs	Transactional Qualities if relevant (Updating?, Atomic?, Can participate in transaction?)	Pre and Post Conditions	Exception (s)
TBD	TBD	TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD	TBD	TBD

6.5.2.4.1.7. Message Schemas

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.2. Information Model

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.2.1. Class Diagram and Description of Entities Involved

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.2.2. Mappings from ELDM to Standards Based Schemas

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.3. Behavior Model (AKA Use Case Realization)

Details will be defined during the development cycle and are not applicable at this time.

6.5.2.4.3.1. Use Cases (Use Case Model)

Concept Workflow

A. Create a Request for a Change to Concept(s)

User Type: Editor

1. The need to create a new concept or a change an existing concept
2. An editor creates a request for the new concept to be created or for the existing concept to be modified.
3. The request is submitted for review.
4. The request is routed to the appropriate reviewer Queue.
5. The request is marked as “Assigned”.
6. The request resides in the assigned reviewer Queue.

B. Review and Reject/Approve the Concept(s)

User Type: Reviewer

1. The workflow state associated with this request is marked as “Ready for Review” in the reviewer workflow inbox.
2. The request resides in the appropriate Reviewer’s Queue.
3. The Reviewer reviews the request that is marked “Ready for Review”.
4. The reviewer rejects the modification to one or more concepts made by the editor
 - a. The reviewer marks the rejected concepts as “Rejected” with comment.
 - b. The reviewer sends back the request to the original editor.
5. The Concept Reviewer approves the modification
 - a. The reviewer marks the approved concepts as “Approved”.
 - b. The reviewer sends the request to the approval.
 - c. The approved request is marked “Ready for Approve” in the assigned approval workflow inbox queue.

C. Approve the Request

User Type: Approval

1. The workflow state associated with this request is marked as “Ready to Approve”
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the concept(s) marked “Ready to Approve”.
4. The approver approves the modification to all concepts made by the original editor.
5. The approver marks all concepts as “Approved”.
6. Requests are marked as “Completed”.
7. All concepts are marked as “Approved”.
8. The requests are removed from the approver’s Queue.

9. The approved changes are published and system updated accordingly.

D. Reject the Request

User Type: Approver

1. The workflow state associated with this request is marked as “Ready to Approve”.
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the concept(s) marked “Ready to Approve”.
4. The approver rejects the modification to one or more concepts.
5. The approver marks the rejected concepts as “Rejected”.
6. The approver adds comments on why the request was rejected.
7. The approver sends back the request to the editor.
8. The request is removed from the approver’s Queue.

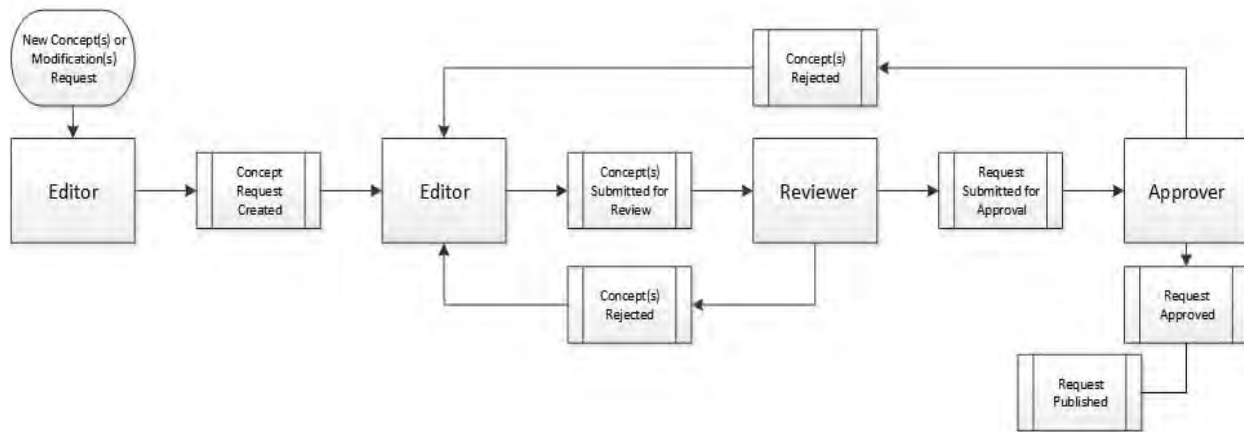


Figure 23: New/Modified Concept Process Flow

Terminology Workflow

E. Create a Request for a Change to Terminology(s)

User Type: Editor

1. The need to create a new terminology or to change an existing terminology
2. An editor creates a request for the new terminology to be created or for the existing terminology to be modified.
3. The request is submitted for review.
4. The request is routed to the appropriate reviewer Queue.
5. The request is marked as “Assigned”.
6. The request resides in the assigned reviewer Queue.

F. Review and Reject/Approve the Terminology(s)

User Type: Reviewer

1. The workflow state associated with this request is marked as “Ready for Review” in the reviewer workflow inbox.
2. The request resides in the appropriate Reviewer’s Queue.
3. The Reviewer reviews the request that is marked “Ready for Review”.
4. The reviewer rejects the modification to one or more terminologies made by the editor
5. The reviewer marks the rejected terminology as “Rejected” with comment.
6. The reviewer sends back the request to the original editor.
7. The Terminology Reviewer approves the modification
8. The reviewer marks the approved terminology as “Approved”.
9. The reviewer sends the request to the approval.
10. The approved request is marked “Ready for Approve” in the assigned approval workflow inbox queue.

G. Approve the Request

User Type: Approval

1. The workflow state associated with this request is marked as “Ready to Approve”
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the terminology(s) marked “Ready to Approve”.
4. The approver approves the modification to all terminology made by the original editor.
5. The approver marks all terminology as “Approved”.
6. Requests are marked as “Completed”.
7. All terminology is marked as “Approved”.
8. The requests are removed from the approver’s Queue.
9. The approved changes are published and system updated accordingly.

H. Reject the Request

User Type: Approval

1. The workflow state associated with this request is marked as “Ready to Approve”.
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the terminology(s) marked “Ready to Approve”.
4. The approver rejects the modification to one or more terminology.
5. The approver marks the rejected terminology as “Rejected”.
6. The approver adds comments on why the request was rejected.

7. The approver sends back the request to the editor.
8. The request is removed from the approver's Queue.

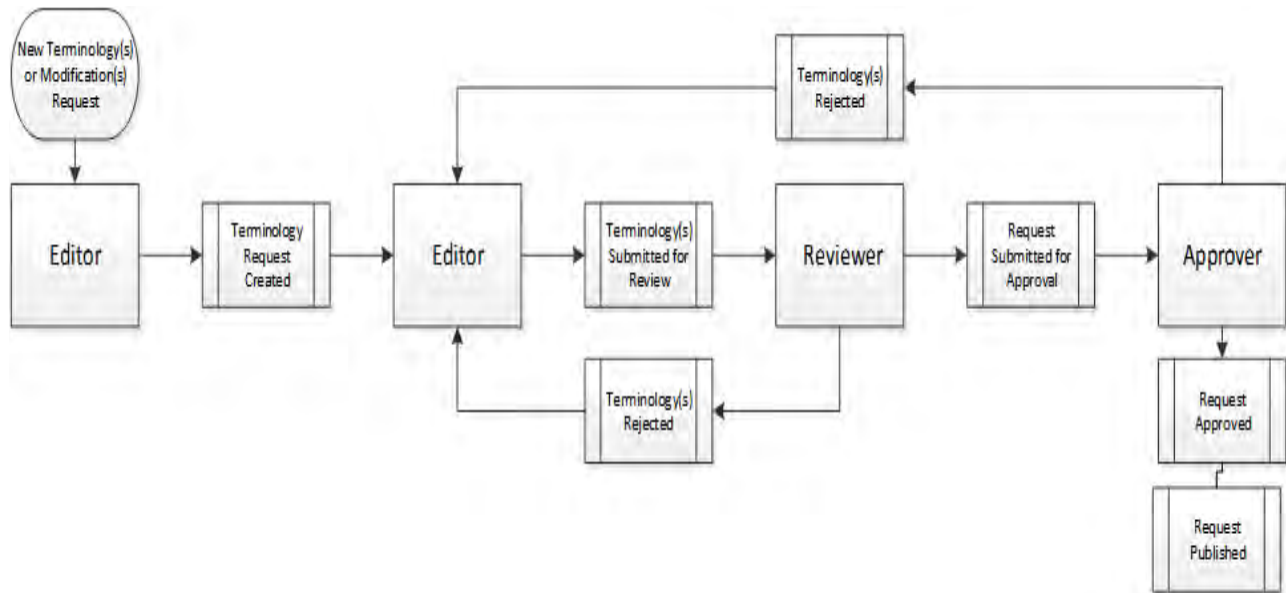


Figure 24: Terminology Workflow

Read-Only Workflow “To-Be”

I. Create a Request for a Change to Terminology(s)

User Type: Read-Only User

1. The need to create a new terminology or a change to an existing terminology
2. A read-only user creates a request for the new terminology to be created or for the existing terminology to be modified (this is done in a tracking system i.e., Jira)
3. The request is submitted for review.
4. The request is routed to the appropriate reviewer Queue.
5. The request is marked as “Assigned”.
6. The request resides in the assigned reviewer Queue.

J. Review and Reject/Approve the Terminology(s)

User Type: Reviewer

1. The workflow state associated with this request is marked as “Ready for Review” in the reviewer workflow inbox.
2. The request resides in the appropriate Reviewer's Queue.
3. The Reviewer reviews the request that is marked “Ready for Review”.
4. The reviewer rejects the modification to one or more terminologies made by the read only user.
5. The reviewer marks the rejected terminology as “Rejected” with comment.
6. The rejected request is sent back to the read only user (via tracking system)

7. The read only user receives an email notification of the status update (via tracking system)
8. The Terminology Reviewer approves the modification
9. The reviewer marks the approved terminology as “Approved”.
10. The reviewer sends the request to the approval.
11. The approved request is marked “Ready for Approve” in the assigned approval workflow inbox queue.

K. Approve the Request

User Type: Approval

1. The workflow state associated with this request is marked as “Ready to Approve”
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the terminology(s) marked “Ready to Approve”.
4. The approver approves the modification to all terminology made by the original editor.
5. The approver marks all terminology as “Approved”.
6. Requests are marked as “Completed”.
7. Terminology is marked as “Approved”.
8. The requests are removed from the approver’s Queue.
9. The approved changes are published and system updated accordingly.
10. The status is updated in the tracking system to notify user of the approved request.

L. Reject the Request

User Type: Approval

1. The workflow state associated with this request is marked as “Ready to Approve”.
2. The request resides in the approver’s Queue.
3. The approver reviews the request and the terminology(s) marked “Ready to Approve”.
4. The approver rejects the modification to one or more terminology.
5. The approver marks the rejected terminology as “Rejected”.
6. The approver adds comments on why the request was rejected.
7. The rejected request is sent back to the read only user (via tracking system)
8. The read only user receives an email notification of the status update (via tracking system)
9. The request is removed from the approver’s Queue.

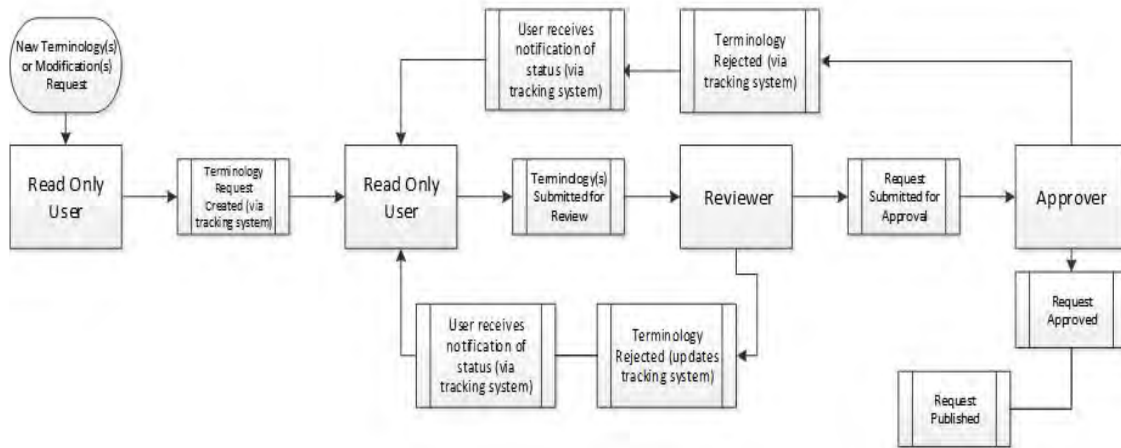


Figure 25: “To-Be” Read-Only User Workflow

6.5.2.4.3.2. Interaction Diagrams

- Step 1 of TDS. Content is received and stored in local database. Terminologists load content and manually convert them to XML files to populate them automatically for inclusion to the Repository.
- Step 2. Terminologies do internal test directly from repository. If pass the test then go to next step
- Step 3. SQA test. This test happens in VistA preproduction environment by deploying the tested content to different VistA test production systems.



Figure 26: Continuous Integration Cycle

A Continuous Integration (CI) server that allows you to implement the Continuous Integration Cycle approach (see Figure 26).

Using a web-based continuous integration server allows the organization to automate the terminology build chain, e.g., monitoring changes in version control systems, triggering new builds, testing artifacts, sending notifications, deploying to production servers, etc. CI is a software development practice which allows members of the team to integrate their work frequently. Each terminology contributor may integrate daily, which means that multiple integrations may be made per day. Each integration may be verified by an automated build - including test - to detect integration errors as quickly as possible. Many teams find that this approach leads to significantly reduced integration problems and allows a team to develop cohesive terminology content more rapidly.

The Continuous Integration Cycle entails these basic process steps (Figure 26):

1. Developers check in new code into the version control system.
2. The CI server may poll this system regularly for changes, e.g., every minute.
3. If changes are indicated, the new code is checked out to build servers, and a new build of your project is executed.
4. The results are reported back to the CI server.
5. The CI server sets the new status of the project as stable, instable, or failed.
6. Notifications are sent to users and other stakeholders, who will either fix any problems encountered or proceed implementing new features.

Note: This complete cycle may be very fast-paced. It may not exceed much more than 15 minutes, in a typical CI server environment.

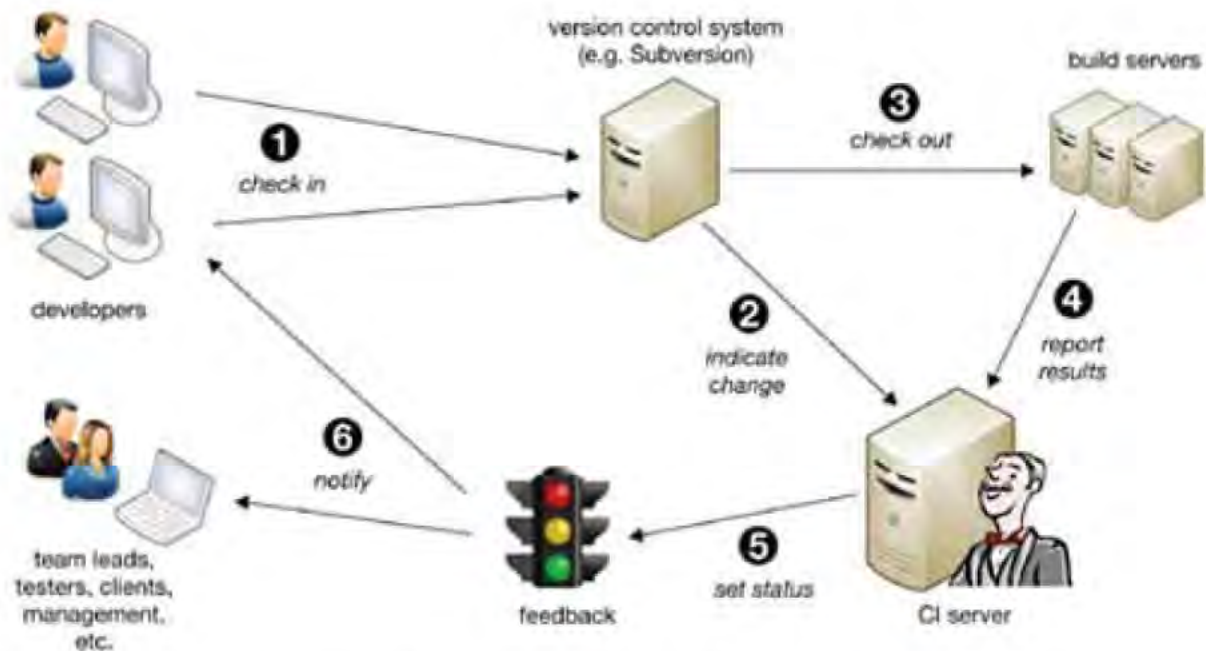


Figure 27: Continuous Integration Cycle Steps

6.5.2.5. Gap Analysis

Table 76: Gap Analysis

Category	Baseline	Gap Description	Artifact
Accessibility Specifications	No Changes	No Changes	N/A
Design Constraints Specifications	No Changes	No Changes	N/A
Disaster Recovery Specification	No Disaster Documentation	Disaster specifications have been added.	RSD/ Section 2.4
Documentation Specifications	N/A	Document specifications have been added.	RSD/ Section 2.5
System Functions	N/A	The system should be able to check for duplication upon conception.	RSD/Section 2.6.3.1
System Functions	N/A	The system should run a daily QA process checking for duplicates.	RSD/Section 2.6.3.1
System Functions	N/A	The system should support the functionality require to convert terms to common required languages.	RSD/Section 2.6.3.1

Category	Baseline	Gap Description	Artifact
System Functions	N/A	The system should allow a user to be assigned multiple roles	RSD/Section 2.6.3.1
System Functions	N/A	The system shall allow users to be assigned concepts	RSD/Section 2.6.3.1
System Functions	N/A	The system shall allow the workflow status to be edited	RSD/Section 2.6.3.1
System Functions	N/A	The system shall allow additional workflow status to be added (in addition to the prototype list)	RSD/Section 2.6.3.1
System Functions	N/A	The system should support the functionality require to convert terms to common required language.	RSD/Section 2.6.3.1
Alerts	No Changes	No Changes	N/A
Identity and Access Management Service	No Changes	No Changes	N/A
Human Consults	No Changes	No Changes	N/A
Context-sensitive help	No Changes	No Changes	N/A
Workflow	No Changes	No Changes	N/A
Terminology Releases from Standards Development Organizations (SDO)	No Changes	No Changes	N/A
Terminology Releases from Knowledge Sharing Partners	No Changes	No Changes	N/A
Terminology Releases from Knowledge Sharing Partners	No Changes	No Changes	N/A
XML Transforms	No Changes	No Changes	N/A
Outputs From System	No Changes	No Changes	N/A
Publishing Output Content (VETS)	No Changes	No Changes	N/A
Business-Specified Non-Functional Requirements	No Changes	No Changes	N/A

Category	Baseline	Gap Description	Artifact
Document Generation Capabilities	No Changes	No Changes	N/A
Mapping Capabilities	N/A	The tooling shall allow authors to store guidelines or rules (heuristics) that govern the map and its creation and use.	RSD/ Section 1.2 Increment 1 Requirement
Mapping Capabilities	N/A	The tooling shall allow the capability to update the map set when the source and target are updated from standards development organizations.	RSD/ Section 1.2 Increment 1 Requirement
Mapping Capabilities	N/A	The tooling shall allow authors to define the metadata for a map set/value set.	RSD/ Section 1.2 Increment 1 Requirement
Browse a Set of Approved, Suggested or Similar Models	No Changes	No Changes	N/A
Template Based Modeling	No Changes	No Changes	N/A
Modify Existing	No Changes	No Changes	N/A
Specialize From Existing	No Changes	No Changes	N/A
Duplicate Pieces and Re-use in a New Model	No Changes	No Changes	N/A
Rules Driven Modeling	No Changes	No Changes	N/A
Interview Driven Modeling	No Changes	No Changes	N/A
Rules Driven QA	No Changes	No Changes	N/A
Semi-Automated Modeling	No Changes	No Changes	N/A
Stratified by Domain	No Changes	No Changes	N/A
Stratified by Architectural Level	No Changes	No Changes	N/A
Workflow Management Service	No Changes	No Changes	N/A
Taxonomy View	No Changes	No Changes	N/A
Description Logic	No Changes	No Changes	N/A

Category	Baseline	Gap Description	Artifact
Quality Assurance	No Changes	No Changes	N/A
Additional Considerations	No Changes	No Changes	N/A
User Type	No User Role Documentation	Read-Only User	RSD/ Section 2.6.3.26 User Type
User Type	No User Role Documentation	Editor User	RSD/ Section 2.6.3.26 User Type
User Type	No User Role Documentation	Reviewer User	RSD/ Section 2.6.3.26 User Type
User Type	No User Role Documentation	Approver	RSD/ Section 2.6.3.26 User Type
User Type	No User Role Documentation	Final Approval User	RSD/ Section 2.6.3.26 User Type
User Type	No User Role Documentation	Administrative User	RSD/ Section 2.6.3.26 User Type
User Functionality	N/A	User shall be assigned to a concept and a role	RSD/ Section 2.6.3.7 User Functionality
Task Request	N/A	User shall be able to reject or approve task/request	RSD/ Section 2.6.3.28 Task Request
Task Request	N/A	User shall receive email notifications notifying the user a task/request is available	RSD/ Section 2.6.3.28 Task Request
Task Request	N/A	User shall be able to retrieve task/request	RSD/ Section 2.6.3.28 Task Request
Task Request	N/A	User shall be able to reject or approve task/request	RSD/ Section 2.6.3.28 Task Request
Task Request	N/A	User shall be able to filter task/request by open, closed, due date, etc.	RSD/ Section 2.6.3.28 Task Request
Task Request	N/A	User shall be able to reject or approve task/request	RSD/ Section 2.6.33 Task Request
Task Request	N/A	User shall receive email notifications notifying the user a task/request is available	RSD/ Section 2.6.33 Task Request

Category	Baseline	Gap Description	Artifact
Terminology	N/A	User shall have the ability to add new terms, relationships and attributes to represented terminologies	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User shall have the ability to retire terms, relationships and attributes from represented terminologies	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User shall have the ability to modify terms, relationships and attributes in represented terminologies	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User should have the ability to browse previous versions of terminologies	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User shall be able to reject or approve task	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User shall have the ability to compare the differences between different versions of terminologies	RSD/ Section 2.6.3.29 Terminology
Terminology	N/A	User shall be able to clone terminology from another terminology	RSD/ Section 2.6.3.29 Terminology
Concept	N/A	User shall have the ability to clone concept – The ability to create a new concept as a clone of another concept	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to create child concept. The ability to create a new concept as a child of another	RSD/ Section 2.6.3.30 Concept
Concept	N/A	User shall have the ability to move a set of concepts to a new parent concept	RSD/ Section 2.6.3.30 Concept
Concept	N/A	User shall have the ability to retire a concept	RSD/ Section 2.6.3.30 Concept
Concept	N/A	User shall have the ability to add concepts	RSD/ Section 2.6.3.30 Concept
Concept	N/A	User shall have the ability to modify concepts	RSD/ Section 2.6.3.30 Concept
Concept	N/A	User shall have the ability to add concepts	RSD/ Section 2.6.35 Concept

Category	Baseline	Gap Description	Artifact
Concept	N/A	User shall have the ability to modify concepts	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to clone concept – The ability to create a new concept as a clone of another concept	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to create child concept. The ability to create a new concept as a child of another	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to move a set of concepts to a new parent concept	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to retire a concept	RSD/ Section 2.6.35 Concept
Concept	N/A	User shall have the ability to add concepts	RSD/ Section 2.6.35 Concept
Search	N/A	User shall be able to perform a basic or advance search	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall be able to search on complete or partial name	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall be able to search within a specified portion of the hierarchy, within reference sets, or relationship type, and destination	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall be able to save search criteria for individual and public use	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall be able to search for inactive and active terminology	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall have a preference option on how the user wants to search within the taxonomy view	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall have the ability to compare versions of text	RSD/ Section 2.6.3.31 Search
Search	N/A	User shall be able to perform a basic or advance search	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to search on complete or partial name	RSD/ Section 2.6.36 Search

Category	Baseline	Gap Description	Artifact
Search	N/A	User shall be able to search within a specified portion of the hierarchy, within reference sets, or relationship type, and destination	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to save search criteria for individual and public use	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to search for inactive and active terminology	RSD/ Section 2.6.36 Search
Search	N/A	User shall have a preference option on how the user wants to search within the taxonomy view	RSD/ Section 2.6.36 Search
Search	N/A	User shall have the ability to compare versions of text	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to perform a basic or advance search	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to search on complete or partial name	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to save search criteria for individual and public use	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to search for inactive and active terminology	RSD/ Section 2.6.36 Search
Search	N/A	User shall have a preference option on how the user wants to search within the taxonomy view	RSD/ Section 2.6.36 Search
Search	N/A	User shall have the ability to compare versions of text	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to perform a basic or advance search	RSD/ Section 2.6.36 Search
Search	N/A	User shall be able to search on complete or partial name	RSD/ Section 2.6.36 Search
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.3.32 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.3.32 Workflow Inbox

Category	Baseline	Gap Description	Artifact
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.3.32 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox

Category	Baseline	Gap Description	Artifact
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall have access to their personal inbox to work on task/request	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	User shall be able to search and filter personal inbox	RSD/ Section 2.6.37 Workflow Inbox
Workflow Inbox	N/A	Providing the ability to define a workflow and business process module that can be modified easily to adapt to changes in VA business requirements.	RSD/ Section 2.6.37 Workflow Inbox
Query	No Changes	No Changes	N/A
Refset Capabilities	N/A	User shall have the ability to create refsets composed of associations	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability to create of refsets through definitional constructs	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability to update existing refsets	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability retire terms, relationships, and attributes from refsets	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability to view different versions of refsets	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability to request and submit a request for a new refset	RSD/ Section 2.6.3.34 Refset Capabilities
Refset Capabilities	N/A	User shall have the ability to request a change or modification to an existing Refset	RSD/ Section 2.6.3.34 Refset Capabilities

Category	Baseline	Gap Description	Artifact
The Project Information System and Management Environment (PRISME)	No Changes	No Changes	N/A
Artifact Repository Service	No Changes	No Changes	N/A
Tracker Service	No Changes	No Changes	N/A
Service Desk	No Changes	No Changes	N/A
Version Control Service	No Changes	No Changes	N/A
Quality Management Platform	No Changes	No Changes	N/A
Project Creation Application	No Changes	No Changes	N/A
Component Request Service	No Changes	No Changes	N/A
Terminology Web Application Environment	No Changes	No Changes	N/A
New Concept Request Application	No Changes	No Changes	N/A
Scripting Capabilities	No Changes	No Changes	N/A
General GUI Compliance	No Changes	No Changes	N/A
GUI Compliance Specific to Terminology Tooling	No Changes	No Changes	N/A
Multi-divisional Specifications	No Changes	No Changes	N/A
Performance Specifications	No Changes	No Changes	N/A
Quality Attributes Specification	No Changes	No Changes	N/A
Reliability Specifications	No Changes	No Changes	N/A
Known Interfaces	No Changes	No Changes	N/A
Related Projects or Work Efforts	No Changes	No Changes	N/A

Category	Baseline	Gap Description	Artifact
Security Specifications	No Changes	No Changes	N/A
System Features	N/A	The system should be able to check for duplication upon conception.	RSD/ Section 2.1. System Features
System Features	N/A	The system should run a daily QA process checking for duplicates.	RSD/ Section 2.14 System Features
System Features	N/A	The system should support the functionality require to convert terms to common required language.	RSD/ Section 2.14 System Features
System Features	N/A	The system should allow a user to be assigned multiple roles	RSD/ Section 2.14 System Features
System Features	N/A	The system should be able to check for duplication upon conception.	RSD/ Section 2.14.1 System Features
System Features	N/A	The system should run a daily QA process checking for duplicates.	RSD/ Section 2.14.1 System Features
System Features	N/A	The system shall allow users to be assigned concepts	RSD/ Section 2.14 System Features
System Features	N/A	The system shall allow the workflow status to be edited	RSD/ Section 2.14 System Features
System Features	N/A	The system shall allow the additional workflow status to be added (in addition to the prototype list)	RSD/ Section 2.14 System Features
Usability Specifications	No Changes	No Changes	N/A
Applicable Standards	No Changes	No Changes	N/A
User Class Characteristics	No Changes	No Changes	N/A

6.5.2.5.1. Variances from Enterprise Target Architecture

Details will be defined during the development cycle and are applicable at this time.

6.5.2.5.2. Variances from SLDs

Details will be defined during the development cycle and are applicable at this time.

6.5.2.5.3. Variances from Standards and Policies

Details will be defined during the development cycle and are applicable at this time.

6.5.2.5.4. Justification for Exceptions and Mitigation

Details will be defined during the development cycle and are applicable at this time.

7. External System Interface Design

There are several key external systems that will need to be integrated into the CTT&DM design as the design progresses those interfaces will be defined in further detail here.

7.1. Interface Architecture

The designed system will need to initially integrate into the VA network, more importantly the existing VETS infrastructure. Details will be defined during the development cycle but the long term “To-Be” solution is to have the new system completely replace VETS.

7.2. Interface Detailed Design

A detailed interface design will be developed as development proceeds.

8. Human-Machine Interface

A detailed interface design will be developed as development proceeds.

8.1. Interface Design Rules

A detailed interface design will be developed as development proceeds.

8.2. Inputs

Standard input devices (keyboard, mouse) are needed to input data into all screens. CTT&DM is a web-based application that is not designed to be mobile.

8.3. Outputs

The information will be shown on the desktop or laptop monitor. Within the report screen, all reports are printable as well as can be saved in PDF, Excel, or word format.

8.4. Navigation Hierarchy

Details will be defined during the development cycle and are applicable at this time.

8.4.1. Screen [x.1]

Details will be defined during the development cycle and are applicable at this time.

8.4.2. Screen [x.2]

Details will be defined during the development cycle and are applicable at this time.

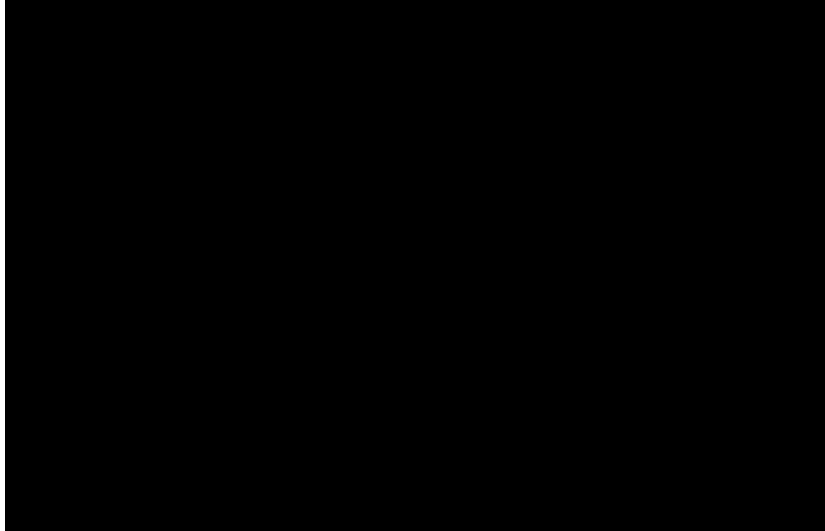
8.4.3. Screen [x.3]

Details will be defined during the development cycle and are applicable at this time.

9. Attachment A – Approval Signatures

This section is used to document the approval of the SDD. The review should be conducted face-to-face where signatures can be obtained 'live' during the review. If unable to conduct a face-to-face meeting, then it should be held via LiveMeeting and concurrence captured during the meeting. The Scribe should add /es/name by each position cited. Example provided below:

The Business Sponsor and Project Manager are required to sign. Please sign above your name.



Date:

Date:

A. Additional Information

None has been identified at this time

A.1. Identification of Technology and Standards

See Section 4.5, Enterprise Architecture

A.2. Constraining Policies, Directives and Procedures

CTT&DM is a standalone system but will be sharing environments with Veterans Health Information System and Technology Architecture (VistA), Consolidated Health Data Repository (CHDR), VETS, LOINC, SNOMED CT, Digital Imaging and Communication in Medicine (DICOM), DTS, Sysmedical Snow Owl, Language Engine (LE), Snapper, and Regenstreif LOINC Mapping Assistant 112 (RELMA112).

A.3. Requirements Traceability Matrix (RTM)

For more information please see the [CTT&DM RTM](#).

A.4. Packaging and Installation

Not applicable at this time

A.5. Design Metrics

Not applicable at this time.